JOINT EWMA & JOURNÉES CICATRISATIONS CONFERENCE 2022

Abstracts

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Electronic posters (e-Posters)

Case Studies

EP205 TREATING A PILONIDAL SINUS DISPLAYING MALIGNANT TRANSFORMATION, WITH NEGATIVE PRESSURE WOUND THERAPY WILL BE CLINICALLY APPROPRIATE

Rachel Eyre[1], Pauline Whitehouse[1], Katie Jones[2], Ross Kenny[2], Joanne Handsaker[3]

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Aim: We report an unusual case of a large squamous cell carcinoma arising from a chronic pilonidal sinus (CPS), its successful surgical excision and subsequent wound healing with the assistance of a negative pressure wound therapy (NPWT) dressing.

Method: 68 yrs male, non-tender 30x40mm fungating lesion in the natal cleft arising from previous sinus. Surgery involved a wide local excision. Resulting defect measured 100 x 170mm, to the depth of the saccrococcygeal fascia. A NPWT dressing was initially applied in theatre using black sponge and liner as the interface. The dressing was subsequently changed in the community once a week by tissue viability nurses.

Results: Histology from surgery revealed a pT3 moderately differentiated keratinising squamous cell carcinoma with no evidence of vascular or perineural infiltration. There was greater than 5mm clearance on all margins.

After 2 weeks with the NPWT the wound had substantially reduced in size to a third of the original defect, at 10 weeks the wound cavity further reduced to 15mm and had otherwise epithelialized

Conclusion: In assessing for malignancy in CPS disease, early diagnosis and excision is essential to a good prognosis. Use of NPWT on a large complicated wound in a notoriously difficult area to heal enables early ambulation and rapid definitive wound healing with minimal complications and a good cosmetic outcome, whilst in the community and without the later need for reconstructive surgery. Secondary intention healing via NPWT should be considered as an initial option for any large wound in the saccrococcygeal area.

EP206 ACELLULAR EXTRACELLULAR MATRIX ON AN INFECTED AMPUTATION WOUND IN A DIABETIC PATIENT - FIRST EXPERIENCE IN A VASCULAR SURGERY DEPARTMENT

Tiago Ribeiro[1], Rita Soares Ferreira[2], Joana Costa[2], Raquel Alves[2], Maria Emília Ferreira[2]

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Aim: Acellular extracellular matrix*(ECM) derived is associated to superior healing in ulcers of several etiologies. The mechanism is providing an adequate environment to growth factors, collagen and glycoproteins to improve this process. The authors aim to describe the first experience of a vascular depart-

ment with ECM on a neuroischemic diabetic foot lesion after ray amputation, with extensive soft tissue debridement due to infection.

Method: Case report.

Results / Discussion: A 76-year old female diabetic patient with CLTI underwent popliteal and anterior tibial angioplasty, through antegrade and retrograde pecutaneous access, and 5th ray amputation. Additionally, two weeks of targeted antibiotic therapy was administered. After infection control and adequate revascularization were achieved, she was left with a deep 10x5x4cm, with 80% reddish and 20% devitalized tissue wound on the lateral aspect of the foot. Initially negative-pressure wound therapy (NPWT) was started, but with a slow effect. Afterwards, the weekly application of Acellular Extracellular Matrix derived from porcine intestinal submucosa was initiated. After just one week wound bed depth was significantly decreased. Wound size was reduced on a weekly basis, and full wound closure was achieved after 13 weeks, with a good functional and cosmetic outcome.

Conclusion: In this case, the application of ECM aid healing extensive foot lesions after successful revascularization. It should be considered as an adjunct therapy for challenging lesions to promote wound healing.

**Oasis Extracellular Matrix*

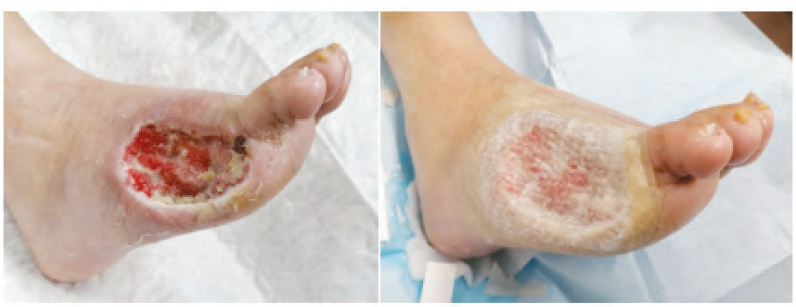

Figure 1 - Week 0. Initial Treatment

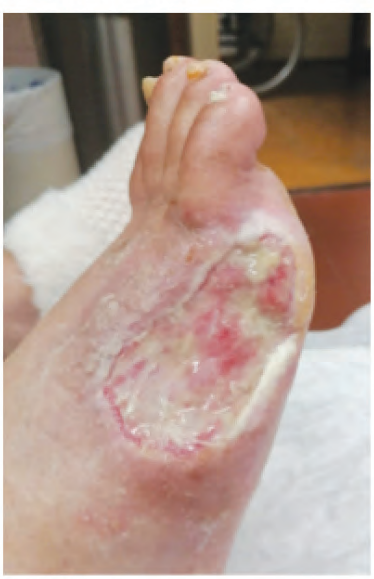

Figure 2 - Week 1

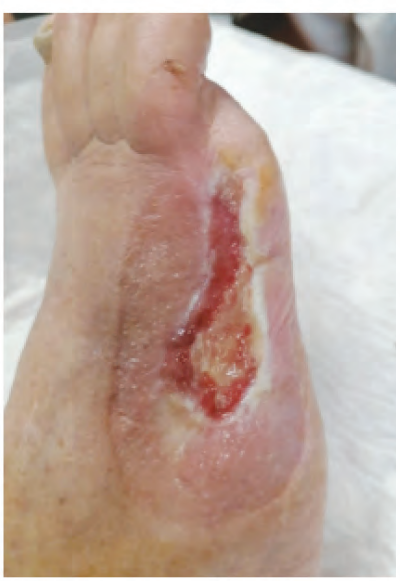

Figure 3- Week 6

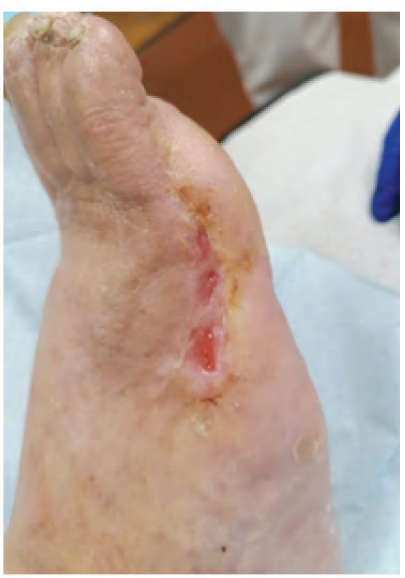

Figure 4 - Week 12

EP207 EVALUATION OF THE USE OF HYDROPHILIC FOAM WITH ANTIMICROBIALS FOR THE TREATMENT OF BURNS WITH HYPERGRANULATION

Maria Ines Diaz[1], Claudia Ramirez[2], Alberto Felipe Torres Gueren[3], Karen Perez[4]

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Aim: Hypergranulation negatively influences the healing time of burns and contributes to the recurrence of contractures in these wounds. The treatment of hypergranulation tissue remains controversial and lacking in protocols in many cases. Thus, the aim of this study was to examine the feasibility and document the use of hydrophilic absorbent foam with polyhexamethylene biguanide (PHMB) in the treatment of hypergranulatory tissue formation resulting from burn wounds.

Method: Two patients with burns of different origin and with subtle signs of infection and hypergranulation, with stuck healing process, were recruited. As part of the care protocol, physiological saline solution and cleanser were applied and then hydrophilic absorbent foam with polyhexamethylene biguanide (PHMB) was applied and their evolution observed. Patients were monitored once a week.

Results / Discussion: The patients recruited had indications for grafting but given the occupation of beds due to the COVID-19 pandemic, alternative treatments had to be sought, so the strategy proposed in the methods was chosen. After 4 weeks of application of the protocol, both patients showed a notorious improvement in the healing process, with a reduction of the wound area close to 70%.

Conclusion: The treatment of burn wounds with hypergranulation does not have a clear protocol to follow in many countries. Thus, this work shows how the use of an absorbent foam with antimicrobial can be established as a low cost and efficient alternative to be included in a protocol for the treatment of burn wounds, even helping to avoid grafting.

EP208 FEASIBILITY STUDY WITH A NEW MICROTRANSPLANT DEVICE AND CONTROLLED COMPRESSION TREATMENT

Andreas Nilsson[1], Charlotta Arrhenius[2], Torbjörn (Toby) Lundh[3]

[1]PressCise, R&D, Sweden; [2]S2Medical, Linköping, Sweden; [3]University of Gothenburg and Chalmers University of Technology, Gothenburg, Sweden

Aim: The aim was to make a feasibility study on the combination of a new autologous micrografting technique and a novel compression technology that always delivers a well-defined pressure

Method: Three patients suffering from venous leg ulcers were included in this limited study. A new autologous microtransplantation technique was used before applying a wound dressing and controlled compression. The novel compression technology was selected due to its documented ability to provide a specific pressure, regardless of applier skills or patient leg size.

Patient#1: Female 86yo, pitting oedema, DVT. Wound: 2.5 months duration, size 13mm.

Patient#2: Male, 82yo, pitting oedema, DVT. Wound: Duration 4 months. Size 11mm.

Patient#3: Female, 66yo, type1 diabetes, hypertension. Wound: 25 years duration, size 24x35mm.

Results / Discussion: The treated wounds healed in 11 weeks in patients #2&3, with one wound dressing used on each patient. Patient#3 had over 50% wound healing in four months. Two of the patients also had additional wounds that were not transplanted; for one of the wounds the healing time was significantly prolonged, and for the other, no healing was achieved, despite advanced wound care. The patients reported no pain in the treated wound post-first check-up after initial treatment. The results were encouraging, a larger study is therefore suggested.

Conclusion: Despite the limited size of the study, combination treatment using the new microtransplant device and controlled compression showed such promising results that researchers believe it has the potential to shorten wound-healing time while also improving cost-effectiveness.

EP209 AN INNOVATIVE APPROACH TO MANAGE PAIN AND STIMULATE HEALING IN ARTERIAL ULCERS USING ELECTRICAL STIMULATION THERAPY*

Patricia Terrill[1], Elizabeth Ovens[2]

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Aim: Arterial leg ulcers have a significant impact on a patient's quality of life1, with many experiencing pain, non-healing, risk of amputation and death2. Electrical stimulation therapy has been demonstrated to promote healing in chronic wounds and reduce pain3-10, when used as an intervention alongside standard wound care. A case study was undertaken to demonstrate the effectiveness of applying a small, single use, automated electrical stimulation therapy* on wound healing and pain for a patient with a painful arterial leg ulcer, of three years duration.

Method: EST* was applied continuously to the wound edges for the 12-day treatment period, alongside moist wound healing dressings and wound bed preparation strategies. Data was collected prior to, during the 12-day EST* and for 20 weeks following therapy. Wound size, pain score, exudate levels and photographic imagery were undertaken.

Results / Discussion: Prior to therapy, the wound had shown no improvement, despite advanced wound care, and dressing changes were painful and stressful for the patient. Following EST*, a reduction in wound size was evident, despite poor vascular supply, and significant pain reduction was noted during the 12-day EST*. Following EST*, revascularisation and infection management was undertaken and the wound healed within 20 weeks.

Conclusion: Arterial ulcers are notoriously difficult to heal, despite vascular interventions, with pain being a major factor affecting quality of life. Application of an easily operated, wearable and pre-set programmed EST*, can stimulate wound healing and reduce pain for this patient group, particularly if conservative approaches are the mainstay of treatment.

EP210 EVALUATION OF THE EFFECTIVENESS OF THE USE OF PRODUCTS WITH POLYHEXANIDE (PHMB 0,2%) IN THE TREATMENT OF GENITAL INJURY CAUSED BY AUTOINFLAMMATORY DISEASE (CAPS)

VERA LUCIA ANDREOLI[1], TANIA MELO[2]

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Aim: Evaluate the effectiveness of Polyhexanide 0.2% in dermatological formulations, in a genital lesion, not sexually transmitted, caused by autoinflammatory disease (CAPS), under investigation, waiting until now for genetic mapping.

Method: C.E.F., adolescent, female, 14 years old, presents an autoinflammatory disease with acute and painful genital lesion. Products with 0.2% Polyhexanide were used in different pharmaceutical forms. She was instructed to wash the genitals with liquid soap with 0.2% PHMB in the baths twice a day or as needed. After the site was dried, a gel with 0.2% PHMB was placed in the lesion region and a polymeric membrane covering was placed in order to protect the area. After physiological needs, cleaning was recommended with a non-rinsing foam solution with 0.2% PHMB.

Results / Discussion: After 23 days, total closure of the lesion was observed, with no recurrences so far. The procedure optimized the cleaning process, reduced pain, accelerated the granulation process with consequent healing of the lesion, generating great comfort and improving quality of life.

Conclusion: The great challenge in the treatment of genital injuries is to maintain local hygiene and care for the injury, in addition to controlling pain, odor and the appearance of other opportunistic infections. The result presented, demonstrated the safety and effectiveness of formulations with 0.2% Polyhexanide due to the rapid installed aseptization, with control of the inflammatory process, promoting healing in a short period of time, with an improvement in the adolescent's physical and mental quality of life.

EP211 ANOREXIA NERVOSA AND CHRONIC WOUNDS

Javorka Markovic Delic[1]

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Aim: Anorexia nervosa (AN) is a psychiatric obsessive-compulsive eating disease of teenagers and adolescents (12-24 years) with psychological and somatic consequences. The prevalence is 0.5-1%, it is fifteen times more common in females. BMI is <17.5 kg / m2, bulimia has 3% and depression 6% of patients.

The aim of the study is to present a female patient, 24 years old, with a long term of AN. The immediate cause was a family conflict, abuse.

Method: Clinical state. Low BMI, loss of fat and muscle tissues, chronic digestive problems, osteoporosis, amenorrhea, anemia, xerosis, difficulty moving, aggressive posture, malabsorption, swelling of the left lower leg with five wounds, acrocyanosis. Laboratory. Lower values of proteins, cholesterol,

minerals estrogen, anaemia, leukopenia. On the left foot below the ankles were four wounds ,2-6 cm in diametars, partially covered with crustes, bloody secretions, one of the inner side of the lower leg, lasting 9 months, very painful. The first of the wound appeared after microtrauma.The skin of the leg and foot is cyanotic, dry, with local cellulitis around the wounds. Bacteriogical finding. Proteus mirabilis. Color Duplex scan : Insuffitienty of VV Perforantes directa inferior sin, of lower leg ,arterial and venous periferal system were without pathological changes.

Results / Discussion: After one month of treatment (debridement, antiseptic, laser) four wounds were healed.

Wounds in AN they are often acute, as a consequence of self- injury. The key role in the formation and duration of these wounds is played by venous insufficiency of the perforating vein and venous stasis. The co-factors were injury, infection, malnutrition, immunodeficiency. It is mixtum and atypical chronic wound. Conclusion: The team that participates in the treatment of AN, includes, among other specialists, a psychiatrist. Mortality in AN is 20%, caused by suicide or somatic disorders.

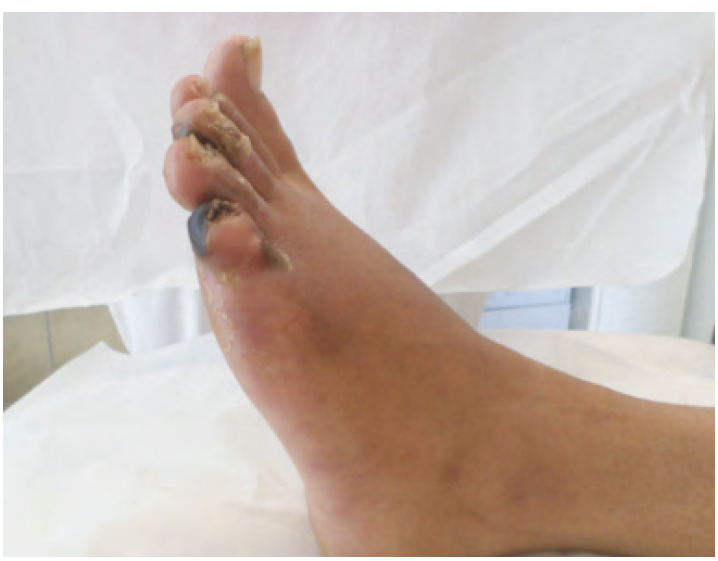
EP212 TREATMENT OF A PAINFUL ARTERIAL ULCER WITH HYPERBARIC OXYGEN TREATMENTS AND ELECTRICAL STIMULATION

Irem Tezer Ates[1]

[1]Nurokor Bioelectronics, London, United Kingdom

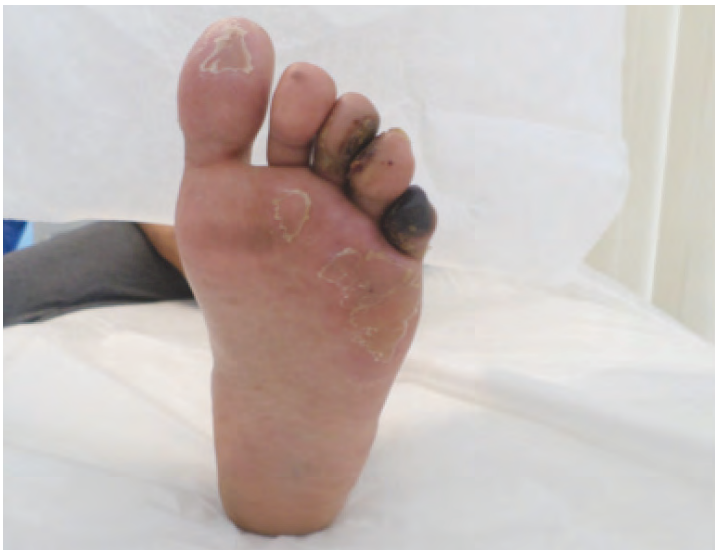
Aim: To show the management of arterial peripheric ulcers.

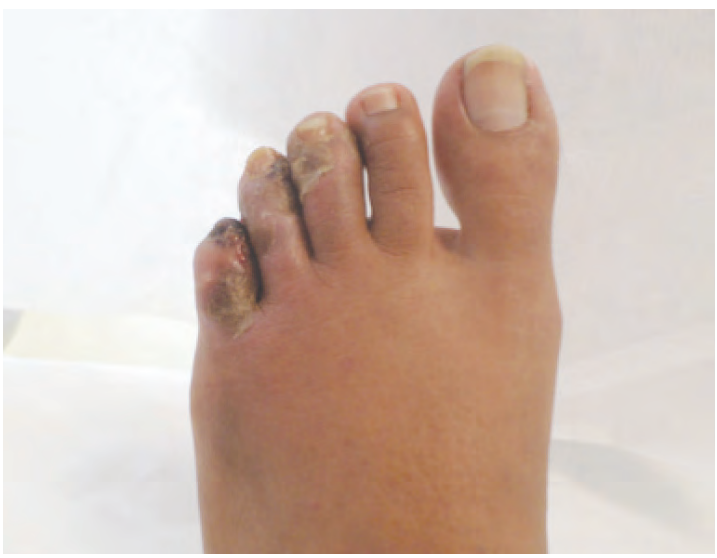
Method: 40-year-old woman suffering from peripheral arterial disease admitted to wound care center (Antalya, Hiperox) with a complain of painful non-healing wounds for 3 months. The wounds have not shown any progress with medical treatments and dressings. On examination there was a dark red discoloration and severe pain on the left forefoot of the patient. There were 1x1, 2x2, 2x2 and 5x3 cm necrotic wounds on the fingers 2nd,3rd,4th, 5th respectively. The university hospital had decided for the amputation of the fingers. On admission VASpain score was 7-8 during the day and 8-9 during wound dressing changes and at nights. She was using high dosage of analgesics and wide spectrum antibiotics. 60 sessions of HBOT as 100% oxygen inhalation at 2,5 ATA with 2x5 min air brake, for totally 2 hours. First 10 sessions of HBOT applied twice a day. Non-invasive electrical stimulation treatments were utilised for 40 sessions, 20 min each. Low-molecular-weight heparin (prophylactic dosage) and acetylsalicylic acid 100mg were started immediately.



Discussion / Results: Analgesic dosage lowered immediately after the 3rd week of the treatment. After the sessions, the patient's pain was relieved, no pain killer needed anymore, and wounds were closed totally. Thermal pictures documented.

Conclusion: Amputation rates could be lowered with the usage of high-tech medical devices. Wound care centers could benefit from HBOT and ES systems as they are found to be very effective in the pain management and in wound treatments.





EP213 USAGE OF ELECTRICAL STIMULATION FOR THE TREATMENT OF DIABETIC NEUROARTHROPATHY

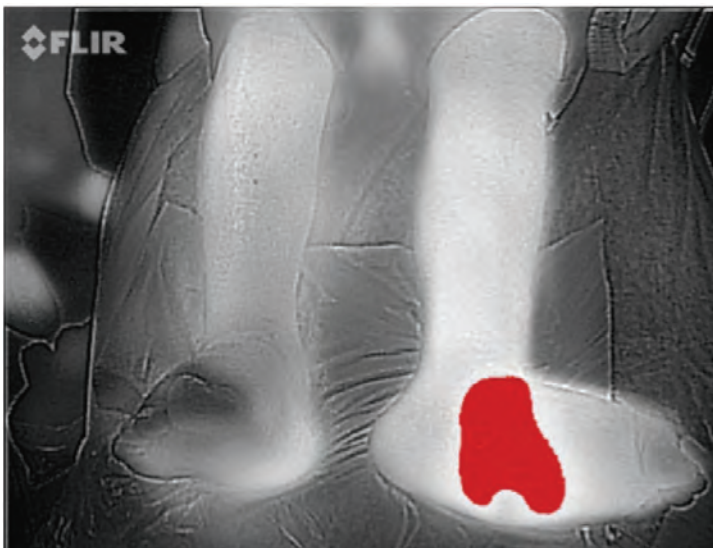
Irem Tezer Ates[1]

[1]*Nurokor Bioelectronics, London, United Kingdom*

Aim: To present new technological approaches in the management of Charcot Neuropathic Osteoarthropathy (CN).

Method: 83-year-old obese man who is experiencing diabetes mellitus type 2 and hypertension for 15 years and neuropathy for 5 years admitted to our wound care center (Antalya, Hiperox). He has been suffering from rocker bottom deformity with a 2cmx1.5cm wound on his left foot for 2 years. Non-invasive frequency rhythmic electrical modulation system applied to both extremities and photographed with

a thermal camera. Eight electrodes were applied to the surface of the lower limbs. The patient was non-compliant for brace protection.



Discussion/Results: Diabetic neuropathy may result limb amputations. CT and MRI are necessary for the early diagnosis of CN but waiting lists can delay the treatments. Thermal camera usage showed significantly high activity which helped diagnosis.

The wound got smaller after 20 ES. No side effects seen during and after the treatments. ES is being used for wound care for decades but there are only few studies published with CN. Promising results supported the previous studies. One of the necessities in CN is non-weight bearing. Each visit to hospitals can cause stress on the foot and ankle.

Conclusion: ES can be very beneficial in diabetic neuropathies and play a major role in the prevention and the treatment of CN. Handy and functional ES protocols and devices are needed to be prescribed for Charcot's foot patients for home-based care. Thermal camera can be an adjuvant tool to diagnose CN.

EP214 SUSTAINABLE WOUND CARE MANAGEMENT

Irem Tezer Ates[1]

[1]Nurokor Bioelectronics, London, United Kingdom

Aim: The wound care market is growing every day. Different kinds of disposable wound dressings are being designed which are generally very costly. However, there is no attempt for sustainable wound care management plans. The aim is to introduce a way to reduce waste and costs in wound care clinics. The Royal College of Nursing publishes that a total of 60,700 tonnes of nonrecyclable clinical waste were reported in England by participating organizations for the period of 2015/16. Bins of clinical waste are generated in wound care centers on a daily basis. In order to reduce this, electrical stimulation (ES) could be used as an environmentally sustainable method in wound care management.

Method: A combination of hyperbaric oxygen treatments and ES systems was utilised for problematic wounds between 2013 to 2019 in our clinic. In cases, where the patient had a contraindication for hyperbaric, ES was utilised. After cleaning the wound, sterile gauze was chosen for the closure of the wound. No special wound dressing materials or vacuumed negative pressure were used. All patients' pictures were documented.

Results / Discussion: The arterial insufficiency patients and diabetic patients got significant benefits from ES as their walking distance increased, pain levels decreased, and their wounds closed or got

smaller. The most significant healing rates were seen in the combination treatment. Usage of electrical systems lowered the waste and cost of dressings explicitly.

Conclusion: Involving ES in wound management would require fewer nurse visits and fewer dressing changes with less waste generation. ES may provide the closure of the wound in a shorter time, and this would totally reduce waste production. With this clinical knowledge, we could incorporate ES as a cost-effective/environmentally sustainable method in wound management protocols.

EP215 CLINICAL EXPERIENCE OF MOIST TO JUMPSTART HEALING OF STALLED SURGICAL WOUNDS

Tan Kok Kuan[1], Matthew Tan[1], Diane Eng[2]

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Aim: Penile circumcision is a common elective procedure undertaken for men of all ages. The resulting wound is usually held together by a device or sutured together. In general, most circumcision wounds heal by such primary intention measures. However, there is a significant proportion of wounds that require healing by secondary intention. Studies have revealed that the wound's location and the dynamic changes in wound size during penile tumescence are key challenges in circumcision wound care. Currently, there is no established protocol for managing complicated circumcision wounds. This case report highlights the use of a new wound treatment protocol based on the M.O.I.S.T concept to overcome the challenges of complex circumcision wound management.

Method: We present a case of a 35-year-old patient with a background of well-controlled diabetes who underwent elective device circumcision complicated by delayed wound healing after removal of the circumcision device. A wound treatment protocol involving hypochlorous acid irrigation, followed by the application of topical haemoglobin Spray and a silicone adhesive foam dressing, was administered every three days for a total of 12 days.

Results / Discussion: Secondary wound healing was achieved after 12 days of treatment with this treatment regime. We observed that our wound care protocol was able to enhance the aeration of the wound, which is difficult to achieve with many groin wounds. The silicone adhesive foam dressing also compensated for dynamic changes in wound size due to its ability to expand and contract with the wound. Conclusion: Circumcision wound care is challenging, particularly when healing by secondary intention is required, due to the location of the wound and the changes in wound size during tumescence. There is a paucity of established protocols for such complicated wounds. We hope that our case highlights the potential of topical haemoglobin spray in conjunction with silicone adhesive foam dressing to overcome the challenges of healing complex circumcision wounds.

EP216 A CASE SERIES USING MANUKA HONEY TO TREAT WOUND INFECTION IN POST OPERATIVE HEAD AND NECK CANCER WOUNDS

Inger Jensen[1]

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Aim: To assess the effectiveness of Manuka Honey in the treatment and healing of infected wounds.

Method: Small case series study (n=3) was conducted to assess whether Manuka Honey dressing was a viable alternative to oral antibiotics in treating wound infections.

- 72-year old female who underwent free flap fibula graft reconstruction for floor of mouth cancer in spring 2017. Radiation 66 Gy/33 F. 5 days post operatively graft became necrotic and the patient underwent several more surgeries.

Presented to author in August 2017 (fig 1) for treatment of necrotic wound.

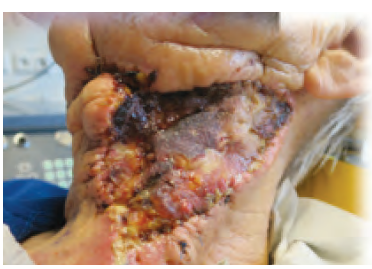
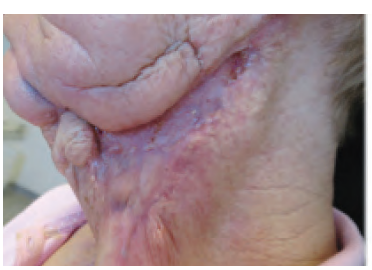
- 49-year old, healthy male. Lentigo maligna melanoma, split thickness skin graft 15 Feb-2018. Presented to author 22 Feb 2018 (fig. 2) The defect measured 7 x 7 cm
  Wound odour and a large part of the skin graft was loose at the edges and sticky.

- 74-year old male. Hypertonia. Type 2 diabetes treated with both oral medication and insulin. Pollen allergy. Squamous cell carcinoma at the top of the skull. Surgery June 5 -2019. Secondary healing. Hints of infection at first dressing. (fig 3)

Manuka honey was used directly at first dressing.

Results / Discussion: Quick healing, despite initial large defects. 17 – 23 dressings under a period of 1 – 5 months. No oral antibiotics or further surgery was needed.

Conclusion: This small case series indicates that Manuka Honey is a viable option in wound care, providing an effective alternative for oral antibiotics in treating wound infection and in promoting healing.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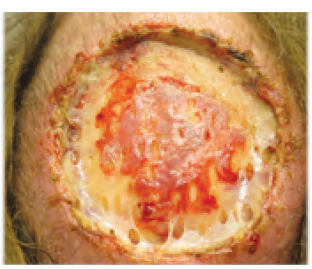
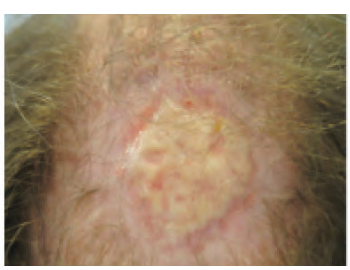
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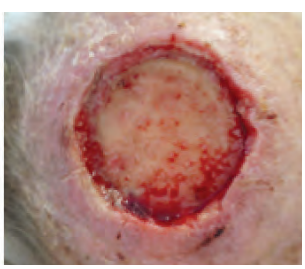
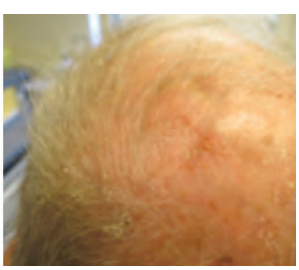
(fig 3)

EP217 EFFECTIVE TREATMENT INDEPENDENT OF ETIOLOGY FOR DEEP VEIN THROMBOSIS WHICH DEVELOPED DURING THE COURSE OF COVID-19 PANDEMIC

Hasan Murat Arslan[1], Serife Kelle Dikbas[2]

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Aim: Thromboembolic events are increasing in COVID-19 patients, whereas uninfected people are affected indirectly due to the pandemic. Immobility during the pandemic course, obesity and smoking may increase the risk of deep vein thrombosis (DVT) (1,2). Low molecular weight heparin (LMWH) is widely used for the treatment of DVT during the course (3).

This case report aims to tell the treatment span of a patient during the course of pandemic, who was followed for early stage DVT and underwent surgery due to hematoma, which was later found out to be Bartonella infection (cat scratch disease).

Results / Discussion: Male patient had no chronic disease or predisposing factor for DVT other than long term immobility and sedentary life style associated with COVID-19 pandemic. He referred to internal medicine clinic with the complaints of pain, tenderness and erythema on the left groin for the last 1 week. Venous Doppler ultrasound imaging yielded acute thrombosis of the left popliteal vein extending to the great saphenous vein and the perforating veins. He was hospitalized for DVT. Since COVID-19 patients have a tendency to develop DVT (3). He was administered LMWH at a dose of 0.4 U/ml (4000 U) twice per day.

Conclusion: The success of LMWH on treatment of early diagnosed DVT with appropriate dose and duration seems to be promising.

EP218 PERFORMANCE OF AN ANTIMICROBIAL GELLING FIBER DRESSING IN COMBINATION WITH A SOFT SILICONE FOAM DRESSING IN THE MANAGEMENT OF MEDIUM TO HIGHLY EXUDING WOUNDS – A CASE SERIES

Else Sværke Henriksen[1]

[1]Nykøbing F sygehus, Nykøbing F, Denmark

Aims: This case study series was undertaken to evaluate the performance of an antimicrobial gelling fiber dressing* in combination with a soft silicone foam dressing** in the management of infected, medium to highly exuding wounds.

Methods: For each case, wound area and healing progress were assessed at each clinic visit. The performance of the dressings was evaluated at each clinic visit. In addition, the patient experience was captured throughout the treatment.

Results: These clinical cases demonstrate that the dressings help optimize the wound healing progress through effective exudate management and generally good adherence to difficult-to-dress areas. The dressings performed very well in terms of handling ability, ease of application, stay-on-ability after ap-

plication, exudate handling capability, and ease of removal without pain or skin damage. The patients reported a positive impact on their daily life, with e.g. the fewer dressing changes and stay-on-ability leading to less frequent visits to the clinic.

Conclusion: The findings indicate that the evaluated dressings performs well in combination, facilitate wound management, help decrease the number of dressing changes and improve the patients day to day experience.

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EP219 EFFECTIVENESS OF HYPERBARIC OXYGEN IN A DRUG INDUCED WOUND: A CASE REPORT

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Aim: To report the effectiveness of hyperbaric oxygen (HBOT) in a drug induced wound.

Material and methods: A73 old man sustained a wound at his right leg nearby the lateral malleolus. In the record: diabetic nephropathy and retinopathy and a normal arterial leg doppler.

The wound is very little, well delineated, partially necrotic and extremely painful (10 on a vas scale). The only plausible etiology we found was a ploglitazone induced wound as it appeared one month after the drug introduction. Only moderate improvement of the wound was achieved with advanced dressings and antibiotics and the pain remained excoriating and poorly controlled with all kind of pain killers.

It reminded us one case of hydroxyurea induced wound that we successfully treated with HBOT (unpublished). So the patient was referred to a HBOT test that proved effective: low tcpo2 at the wound significantly improving after HBOT.

After a few treatments, the pain decreased by 80% and after 20 treatments the wound closed.

Discussion and conclusion: Drug induced wounds are a rather poorly understood matter and so is the efficiency of HBOT, except a few cases of hydroxyurea induced wound.

So we found of interest reporting and sharing this specific case that should draw the attention of wound practitioners to the potential HBOT efficiency in drug induced wounds.

EP220 HYPEROXYGENATED FATTY ACIDS IN SURGICAL WOUNDS WITH SIGNS OF HYPOXIA

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Aim: Calcaneal fractures usually occur in young adults and generally are very painful and disabling. After the surgical approach, these wounds are very likely to have a serious complication, due to the complex anatomical shape of the calcaneus and its spongy structure. Hyperoxygenated fatty acids with 60% of linoleic acid and vitamin E are composed of essential fatty acids subjected to a hyperoxygenation process, with clinical efficacy to increase blood microcirculation, decreasing the risk of ischemia, facilitating the renewal of epidermal cells, enhancing keratinocyte cohesion, preventing water loss and skin peeling. Linoleic acid improves autolytic debridement by contributing to the production of metalloproteins, induces granulation and being able to accelerate the healing process.

These cases report compare the depth of the ischemic process in identical surgical wounds with and without application of hyperoxygenated fatty acids.

Method: Cases report that compare the depth of the ischemic process in identical surgical wounds with and without application of hyperoxygenated fatty acids, identifying the advantages of applying it to surgical wounds with clinical signs of hypoxia.

Results / Discussion: Both surgical wounds showed clinical signs of hypoxia, resulting in dehiscence. In the wound where was not application of hyperoxygenated fatty acids, the necrotic tissue affected deeply with exposure of osteosynthesis material, with 12 weeks of treatment until healing. In the other, with application of hyperoxygenated fatty acids since the 1st treatment, the necrotic tissue was superficial and healed in 4 weeks.

Conclusion: The problem of surgical wounds with warning signs is increasingly important, as their complication can be very harmful. It is necessary to develop strategies, increasing blood microcirculation, decreasing the risk of ischemia but also improve skin conditions.

EP221 PACIENT WITH MALIGNANT WOUND (SKIN CARCINOSIS) - CASE REPORT

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62 years old female patient is treated for breast cancer from 2017. Her treatment started with chemotherapy.

In spring 2020 the disease spread on to the other breast and into soft tissue. She has malignant wound on both breast and 2/3 of her back. She started with chemotherapy III. order and anti-Her2 therapy. The wound and surrounding skin was treated with modern materials by community nurses and with the help of the patient's family.

Wound was getting better until the end of October, when it became more vivid red and little bigger, more 'alive'. Then we started with new chemotherapy. We treated the wound with high absorbent therapeutic wound dressing.

Wound is now healing fast. Currently the part of the wound on the back is healed, on the breasts it looks better (less fragile and smaller, pale red).

EP222 LARVAL THERAPY IN COMPLEX WOUND DEBRIDEMENT

Sara Correia[1], Aida Paulino[1], Isabel Alves Costa[2], Otília Maria Sequeira Barata Courela[1,3], Maria Teresa Ferreira da Costa de Azevedo Silva[4]

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Introduction: Larval Therapy is a non-invasive and safe treatment. Its purpose is to obtain a more effective debridement, decrease the microbial load, enable the evolution of the wound healing, decreasing the overall costs.

Objectives: The objective is to evaluate the efficacy of the application of larval therapy in two clinical cases of complex wounds.

Methodology: Evaluated two clinical cases, patients with different etiology of complex wounds with larval therapy. Data was collected from clinical registries, evaluation, observation and photography's. Applicated PUSH scale in the evaluation of the wound. Informed consent was given.

Results: Male patients with 82 and 86 years old, with different comorbilities, polymedicated, needed hospitalization in a surgical ward.

The younger patient was diagnosed diabetic foot, with amputation of the first and second toe, microbiologic analysis was inconclusive. PUSH=16. After biobag with 300 larvae the wound is debride in four days PUSH =13.

The elder patient presented with a leg ulcer of mixed etiology. PUSH = 17. Microbiologic analysis positive to Pseudomonas aeruginosa. After two treatments, each with 400 larvae, six days, it allowed debridement the wound PUSH=14.

Both patients didn't mention any complaints regarding larval therapy.

Conclusion: The effectiveness and results obtained in these two cases allowed us to consider Larval therapy as a safe and effective method for selective debridement of complex wounds.

The rapid debridement shortened time the patients remained in the ward, avoid the need to go to operating room and more invasive treatments, and so it diminished the costs.

Larval Therapy, became as an alternative for debridement and treatment, especially valuable in a time when resistance to topical treatments and antibiotics are a national concern and reality.

EP223 SECOND DEGREE BURN ON FACE TREATED WITH SPECIAL COVERINGS AND ADJUVANT HYPERBARIC OXYGEN THERAPY: CASE REPORT

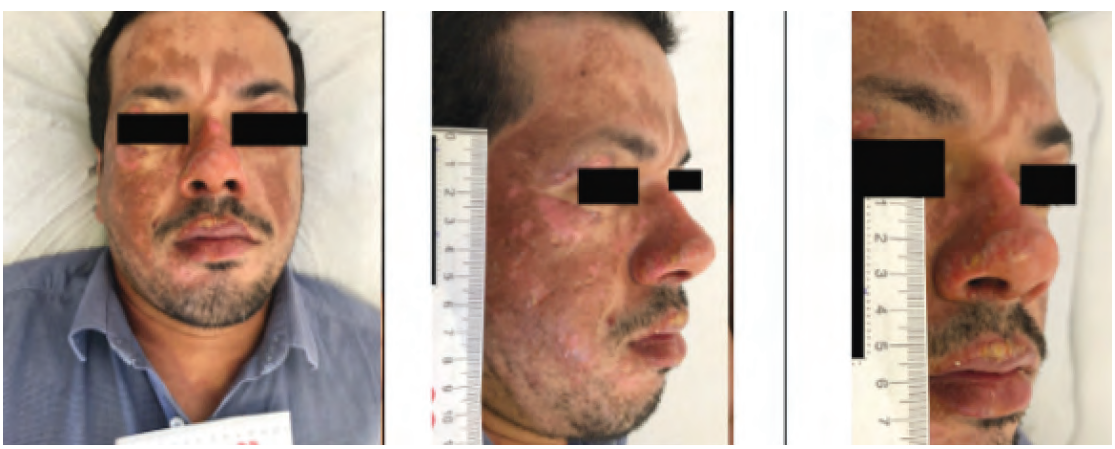
Tammila de Lima Almeida[1], Ana Flávia Novaes[2], Arthur César Pacheco Lopes[2], Luiz Humberto Souza Junior[3], Bianca Bastos[4], Clezio Figueiredo Martins[5]

[1]Faculdade Santo Agostinho - Afya Educacional, Medicina, Brazil; [2]Universidade Federal da Bahia (UFBA) - Campus Anísio Teixeira, Brazil; [3]UniBH - Campus Buritis, Medicina, Brazil; [4]Cicatrimed Tratamento Integral de Feridas, Brazil; [5]Cicatrimed, Brazil

Aim: The objective of this study was to describe the outcome of a patient with multiple second degree injuries burns on the face, who underwent integral wound and adjunctive treatment with HBOT.
Method: Upon physical examination at admission, she was independently mobile and had no pain, with a lesion on the tip of her nose with croissant tissue showing epithelialization and a spot lesion at the apex of her small ear with vitalized bed, draining bloody secretion in little amount of time. The primary clusion was performed with Silver Alginate, Primary Occlusion with sterile Gazes, Secondary Occlusion with microporous tape, Hyperbaric Oxygen Therapy in a single-seat chamber at 2.3 ATA, with a 57-minute session. Compression Speed 13 minutes (5 sessions), Nutritional Support Therapy, Mesh with DACC technology, Antibiotic Therapy: Amoxicillin with Clavulanate 875mg 12/12 hours for 7 days, Prednisone 20mg, 40 mg day, for 20 days. There was daily assessment by the nursing team and periodic medical assessment. The dressing change and cleaning of the wound was performed every 3 days or less, when the need was identified by the multidisciplinary team.

Results / Discussion: The patient presented a good evolution, which can be seen in illustration 1.
Conclusion: Based on the literary analysis and the positive evolution of this case, these results reinforce that the integral approach to wounds associated with adjuvant hyperbaric oxygen therapy has a leading role in the treatment of complex burns.

Illustration 1 - Patient outcome



EP224 THE USE OF INTACT FISH SKIN GRAFTS IN HIDRADENITIS SUPPURATIVA PATIENTS TO AID WOUND HEALING, A CASE SERIES

Baldur T Baldursson[1]

[1]Landspitali University Hospital, Department of Dermatology, Reykjavík, Iceland

Aim: Hidradenitis suppurativa (HS) is a chronic inflammatory disease that significantly affects the skin areas where apocrine glands are found. Severe forms of disease may require extensive surgical resection and reconstruction. A hallmark of intact fish skin grafts (FSG) is their ability to fill up tissue defects after surgical procedures or trauma. FSG can potentially be used to fill lesions of HS patients.

Methods: In this clinical case series, we present 5 patients with (HS) ranging from moderate to severe with a total of 7 operated wounds. Two of the patients are on adalimumab. The operation chosen was deroofing the lesions and debridement of scar tissue to ensure a healthy wound bed. The FSG was prepared based on the manufacturer's instructions. It was pressed into the wound cavity and sutured into place. Wounds were bolstered, and an absorbent polyurethane dressing with a silicone wound contact surface was applied.

Results / Discussion: Satisfactory results for wound healing were achieved with the FSG. In uncomplicated cases, the healing took 20-30 days. No seromas or premature closures of the skin over the tissue defect was observed. One patient had a pseudomonas infection that was successfully treated with antibiotics.

Conclusion: HS in its severe form is a debilitating disease. Notwithstanding the use of powerful drugs such as biologics, operations on large lesions must be performed in a timely fashion to avoid hopeless chronicity. However, these operations always leave a cavity. The use of FSGs has shown promise in treating lesions related to these operations.

EP225 TOBACCO PLANT DERIVED RECOMBINANT HUMAN COLLAGEN IN MANAGEMENT OF ATYPICAL AND HARD-TO-HEAL LOWER LIMB ULCERS - A CASE STUDY SERIES

Giorgio Guarnera[1], Raoul Borioni[1], Laura Fratticci[1], Maria Chiara Tesori[1], Carolina Paciotti[1]

[1]Aurelia Hospital, Vascular Surgery Department, Rome, Italy

Aim: Collagen plays a fundamental role in tissue repair and regeneration and is widely used as a scaffold in dermal substitutes. The aim of this case study series was to evaluate the safety and performance of recombinant human type I collagen (rhCollagen) derived from genetically engineered plants* in management of atypical and hard-to-heal ulcers.

Method: rhCollagen was used in patients affected by lower limb ulcers which, due to their etiopathogenetic and clinical characteristics, showed no improvement with advanced dressings and were not suitable for autologous or heterologous grafts. All patients underwent surgical debridement, followed by a single application of rhCollagen in a gel form. Moist gauze or polyurethane film was the secondary dressing. Follow up was performed weekly for one month.

Results / Discussion: Eight patients were treated: male/female 6/2, age 45-89 years, ulcer type: traumatic (2), heroin injection (1), necrotic angiodermitis (1), hypertensive (2) and venous (2). Within one month of a single rhCollagen treatment, complete wound closure was achieved in three (38%) of the patients; five (62%) of the patients suffering from larger lesions showed more than 50% wound size reduction. In four patients, rhCollagen was shown to be effective in treating dermatitis surrounding the ulcers. Pain relief occurred in all patients. No adverse events or recurrences were reported.

Conclusion: A single treatment with rhCollagen demonstrated high efficacy and safety in treatment of atypical and hard-to-heal wounds, including dermatitis surrounding wounds. This positive experience authorizes further studies on a larger patient population.

** VergenixFG (Collplant Ldt, Rehovot, Israel)*

EP226 THE HEALING EFFECT OF MATRIX RHYTHM THERAPY ON CHRONIC LEG ULCERS (CLU): CASE SERIES FROM A SINGLE INSTITUTION

Harish Kumar[1], Ozlem Hammond[2], Ulrich Randoll[3]

[1]Sai Healthcare Foundation, Chennai, India; [2]Matrix Rhythm Therapy UK , Research and Development, United Kingdom; [3]Dr Randoll Institute, Munich, Germany

Aim: Chronic leg ulcer (CLU) is usually associated with significant morbidity and reduced quality of life. The results of 4 CLU cases treated in one institute utilizing theraphy* a non-invasive mechano-magnetical (8-12Hz) approach-leading to increased circulation, oxygenation and wound healing presented.

Method: Theraphy* was applied with the handheld resonator by trained therapist. All cases received appropriate therapies, however failed to heal before the referral. The therapy* was applied around the wound edges and the whole of the effected limb. All cases received 60 minutes therapy once weekly except one case it was twice weekly. Standard wound care was continued as prior referral; no other treatment was given.

Results / Discussion: The cases were aged 79, 48, 75 and 48, two men and two women. The non-healing median period was 30 (6-48) months. The underlying cause of the ulcers was peripheric vascular disease. The sizes and total sessions being given were Case 1: 5x7,5 cm, 5 sessions; Case 2: 4x4 cm, 4 sessions; Case 3: 12x7,5 cm, 12 sessions and Case 4: 2x3 cm, 3 sessions. Except case 3, which healed almost 90%, all other wounds were completely healed at the time of this abstract submission.

Conclusion: Theraphy* is a non-invasive, safe therapy and has demonstrated complete wound closure in 3 cases, one case is still on treatment with very good healing process. Further studies to integrate theraphy* into the standard of care of wound management is warranted, including the impact on quality of life and healthcare costs.

** MaRhyThe©*

EP227 MOIST EXPOSED BURN OINTMENT AS THE SIMPLE TOOL FOR REGENERATIVE WOUND HEALING

Kee Ai Wong[1]

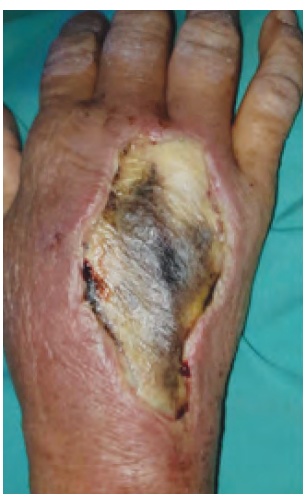
[1]Sarawak General Hospital, General Surgery, Kuching, Malaysia

Aim: To study the effectiveness of Moist Exposed Burn Ointment as a simple tool to achieve regenerative wound healing.

Method: Cases presentation.

Results / Discussion: Moist Exposed Burn Ointment* liquefies necrosis tissue and prevents healthy tissue loss during aggressive wound debridement. The non-infected necrotic tissue can act as a potential wound bed protection to prevent the exposure of underneath structure such as: ligament, tendon, bone or joint. Hence, achieving the concept of damage control in wound healing

Case 1: Wound healed within 3 months with minimal scarring not affecting the basic function of the hand.



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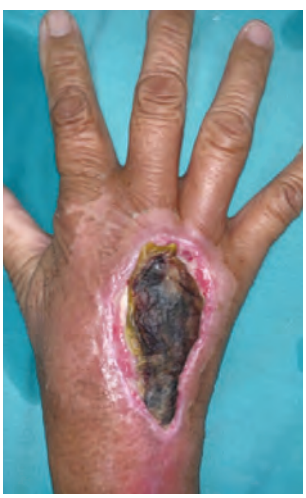

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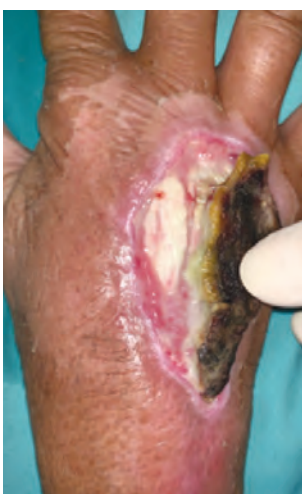

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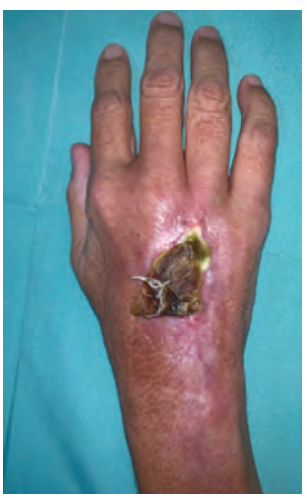

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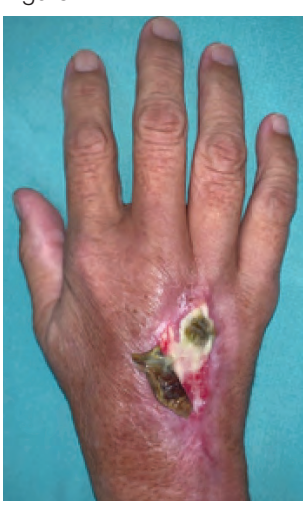

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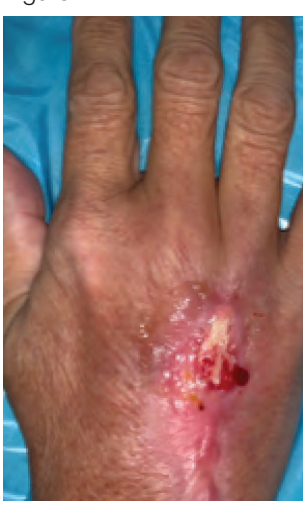

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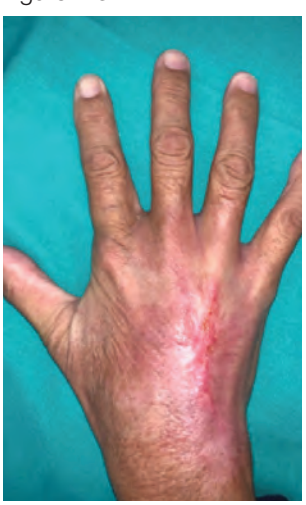


Figure 1.7

Case 2: Wound size reduced more than 50% within 1 month.

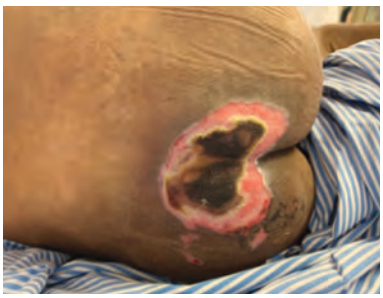
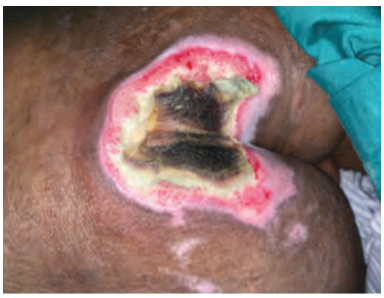


Figure 2.1



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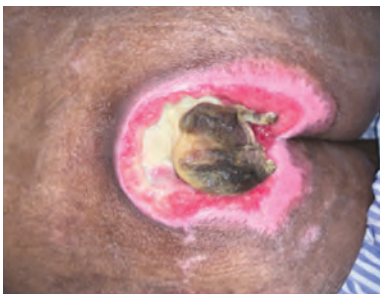

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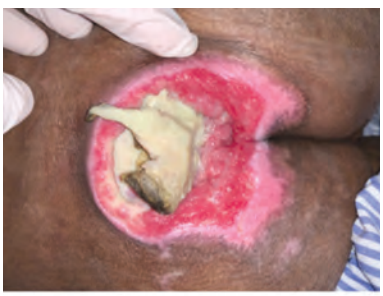

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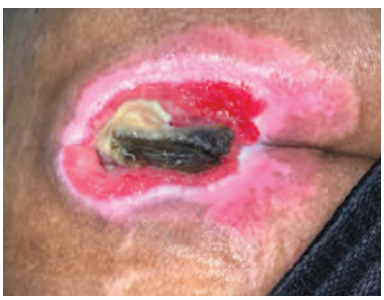

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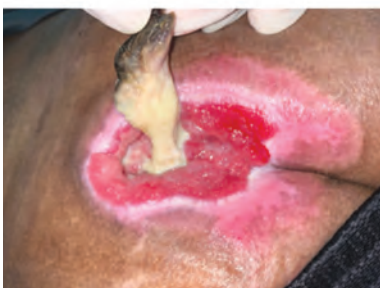

Figure 2.6

Conclusion: Regenerative medicine is creating a new era, leading to the revolution of wound care management. Normal physiological wound healing achieving wound closure via granulation, epithelialization and contraction, therefore, scarring is unavoidable. In contrary, regenerative wound healing achieving wound closure by regeneration of skin organ in situ. Hence, scarring is less and disability due to the scar can be greatly reduced. Moist Exposed Burn Ointment* is a simple dressing modality with regenerative property to achieve tissue repair.

**Moist Exposed Burn Ointment*

EP228 PAEDIATRIC WOUND CARE: USE OF ENZYME ALGINOGEL ON A FRICTION BURN

Geraldine McCormack[1]

[1]Children's Health Ireland (CHI) , Crumlin, Ireland

Aim: While friction burns represent a minority of paediatric burns injuries, they can create complex wounds which require a holistic management approach. This case study presents the management of Joe (pseudonym), a five-year old boy, who sustained a friction burn to his left ankle when it caught between the spokes of a bicycle wheel.

Method: Following initial treatment (wound cleansing, silicone dressing and antibiotics) in a regional hospital, Joe was transferred to the tertiary Burns Centre on Day 1 post-injury. X-rays revealed no fractures. Wound assessment revealed a large central area of full thickness surrounded by partial thickness injury. Treatment aims were: 1) debride wound and manage exudate, 2) prevent infection, 3) promote child's comfort and 4) minimize scarring. It was agreed that this wound could be managed effectively through

the nurse-led outpatient Burns & Plastics Dressing Clinic. The standard treatment in this service for this type of wound is an enzyme alginogel, with a silicone secondary dressing.

Results / Discussion: Initial challenges included exudate management. Joe could not weight-bear initially, and early mobilisation was facilitated by physiotherapy, occupational therapy and the wearing of a boot. Complete wound closure was achieved 61 days post-injury, with Joe and his parents being satisfied with the healed wound. Scar management is ongoing with occupational therapy.

Conclusion: The enzyme alginogel was easy to apply and remove, and caused no distress during dressing changes. This, coupled with the long wear-time, is an important consideration in promoting a positive patient experience in paediatric wound care.

EP229 AN ALGINOGEL IN THE MANAGEMENT OF A DIABETIC FOOT ULCER (DFU)

Steffi Born[1]

[1]University Hospital Mannheim, Mannheim, Germany

Aim: Diabetes is a global problem with DFUs a common issue; approximately 54% of DFUs become infected with 20% of patients with an infected foot wound undergoing a lower extremity amputation. This case study aims to provide insight into the management of a heavily exuding amputation site wound on the medial aspect of the right foot of Karl, a 73-year old male with a history of diabetes, heart failure, peripheral arterial disease (PAD) and kidney failure.

Methods: Karl had a sloughy heavily exuding and macerated wound approximately 4.6cms deep with bone visible necessitating daily dressing change. An enzyme alginogel with a high proportion of alginate was instilled into the cavity to promote wound healing from the base of the wound. It was important that the wound bioburden was reduced and the exudate controlled; a super absorbent polymer secondary dressing was utilised and covered with a light bandage. Dressings were renewed every three days and Karl had bespoke pressure relief footwear.

Results: There was marked improvement with the new dressing regimen within three weeks with the ulcerated area no longer probing to bone and a reduction in exudate and maceration.
Discussion: The emphasis in wound care for DFUs is repeated debridement, frequent inspection, bacterial control and moisture balance to prevent maceration; an alginogel facilitated this.

Conclusion: An alginogel addressed several key issues, namely sloughy tissue, bioburden and exudate in one primary dressing thus negating the need for multiple products. An important consideration with a DFU, to avoid complications from bulky dressings.

EP330 TREATMENT OF AN UNSTAGEABLE PRESSURE ULCER WITH MOISTURE ASSOCIATED SKIN DAMAGE: AVOIDING SURGICAL INTERVENTION USING AN ENZYME ALGINOGEL

Georgina Ayunge[1]

[1]*Medway Maritime Hospital, Gillingham, United Kingdom*

Aim: The aim of this case study is to evaluate the efficacy of an enzyme alginogel in the treatment of moisture associated skin damage (MASD) in a patient with multiple comorbidities. The patient is a 71yr. old male with Multiple sclerosis, type 2 Diabetes, hypertension and Bilateral leg ulceration. He lives alone, mobility is declining, is difficult to transfer and had been living in his chair for some time at home. The patient was not previously known to the team and was admitted for sepsis (unknown cause), he presented with an unstageable pressure ulcer to the right and left buttock and moisture damage to sacrum. Wound description, 10cmx11cm across both buttocks, 100% necrosis, peri wound erythema 2cm, skin very inflamed, wound bed wet, exudate + (unable to measure depth).

Methods: To debride the wound bed, control exudate, protect peri wound skin and prevent infection using an enzyme alginogel under silicone foam adhesive dressing.

Results: Following four weeks of treatment the peri wound skin has improved, erythema resolved and the moisture controlled, infection prevented with the wound reducing to a superficial depth
Discussion: Enzyme alginogels are an important part of wound bed preparation, creating a moist environment, encouraging continuous debridement, absorbing excess exudate and reducing the bacterial burden

Conclusion: The wound healed sufficiently negating the need for surgical debridement and the patient was discharged reducing cost to the trust.

EP231 THE MANAGEMENT OF A DEHISCED BREAST WOUND WITH AN ENZYME ALGINOGEL

Georgina McKay[1], Paula Smith[1]

[1]*Cleethorpes Primary Care Centre, Cleethorpes, United Kingdom*

Introduction: Whilst breast cancer surgery is considered a 'clean surgical procedure' it still runs the risk of post-operative surgical site infection (SSI). Women electing to have immediate breast reconstruction have a higher risk of SSI, of between 0% and 53% being quoted in the literature.

This poster describes the management of Emma (pseudonym), a 56-year old who underwent surgery for removal of malignant tumour followed by immediate breast reconstruction. She subsequently suffered dehiscence of the breast wound due to SSI.

Method: Emma presented to the TV team with a four-week-old painful, inflamed, exuding and malodorous wound measuring 8.5cms x 3.5cms, with a depth of 2.5cms, containing 40% slough and 60% granulation tissue. The aims of treatment were to control Emma's pain, autolytically debride sloughy tissue, reduce wound bioburden, control exudate and ultimately heal the wound.
The cavity wound was irrigated three times a week, after which an enzyme alginogel with alginate

containing two antimicrobial enzymes (glucose oxidase and lactoperoxidase), was used underneath a portable Negative Pressure Wound Therapy system.

Results: Emma tolerated the dressing regimen well, with clear improvement within seven days noted by a decrease in pain, slough, exudate and size. Time between dressing change was extended two twice weekly. The wound had fully debrided by the end of week three and healed after 11 weeks.

Conclusion: This case study demonstrates the effectiveness of an enzyme alginogel in assisting autolytic debridement coupled with control of exudate and the promotion of healing in a dehisced breast wound.

Professional Communication

EP232 PROTEAS -MODULATING POLYACRYLATE BASED HYDROGEL STIMULATES WOUND BED PREPARATION WHEN NPWT FAILED

Guy Duboccage[1], Marleen Dekeyzere[2], Ronald Cnockaert[3], Filiep Manderyck[4]

[1]woundnurse, westflanders, Wevelgem, Belgium; [2]woundnurse, westflanders, Langemark-Poelkapelle, Belgium; [3]Generaal Merchierstraat 53, eastflanders, Oudenaarde, Belgium; [4]woundnurse, westflanders, Ypres, Belgium

The case involves a 59-year old female patient.
After a mastectomy in October 2018 she received a surgical autologous breast flap reconstruction.

Complication after 14 days: flap necrosis November 2018.
NPWT was no option as the patient refused hospitalization for financial reasons.
Also NPWT in the home setting was not possible due to lack of support.
As a result of a positive wound progress within an acceptable time frame, home treatment was justified.

We used a wound-dressing consisting of super-absorbent granules of poly-acrylate (SAP), impregnated with a Ringer solution. This provides an easing out of necrotic tissue and a good absorption of the exudate.

Due to the SAP's, there is a reduction of the MMP-activity in the wound. The polyacrylate granules keep the exudate away from the wound. The integrated layer of the dressing avoids leakage.
The dressing can remain in the wound for up to 72 hours.

During the different dressing changes in December 2019 and January 2019, we saw a granulated wound bed and no signs of infection.

The hydrophobe silicone wound layer protects the dressing from sticking into the wound and in addition, the dressing change is much less painful.
The use of a dressing with super-absorbent granules of poly-acrylate (SAP) impregnated with a Ringer solution can be considered in chronic, non-healing or slow-healing wounds, even on wounds with an important amount of necrotic tissue.
The result was an extremely satisfied patient as she could be treated at home and a complete healing in three months time.

EP233 COMBINATION OF USING SOLUTION BASED ON HYPOCHLOROUS ACID, TOPICALLY HEMOGLOBIN SPRAY AND POLYESTER AND POLYESTER-COTTON RAPID CAPILLARY ACTION DRESSING IN TREATMENT OF HARD-TO HEAL CHRONIC ULCER CRURIS WOUNDS

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Aim: We present a patient with chronic wounds of both lower leg regions. There are chronic hard to heal wounds with tissue defect and secretion. In patients history we found that twenty months before admittance she was treated with lots of different types of dressing.

Method: We performed wide sharp debridement and lavage of the wound. We applied topically irrigation with wound irrigation solution based on hypochlorous acid and topically hemoglobin spray with wound dressing that consist of 3-layer structure of Polyester and Polyester-Cotton filaments, that mechanically works as a low level pump through capillary action. The procedure was repeated every two days.

Results / Discussion: After admittance in the surgical practice, sharp debridement was performed and cellular debris and traces of fibrin deposits were removed. Tissue sample for microbiological diagnostics were taken. Topically irrigation with wound irrigation solution based on hypochlorous acid and topically hemoglobin spray with wound dressing of Polyester and Polyester-Cotton filaments were applied.
After one week, wound contraction was present, with appearance of healthy granulations. The edges of wound began the epithelialization. We continued with same procedure. The surrounding skin had proper color and was euthermic. Medical examination after two months showed has shown significant progress in wound healing, with a marked tendency for further healing.

Conclusion: This procedure stimulated the creation of a “healthy” granulation tissue and allowed the epithelialization from the wound edges. The increased amount of oxygen and reducing oedema in the wound must have played a significant role in wound healing.

Acute Wounds

EP001 A NOVEL TISSUE PRESERVING APPROACH TO TREATMENT OF WOUNDS WITH UNDERMININGS OR WOUNDS WITH POCKETS: A CASE SERIES

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Aim: Introducing a novel approach to treat wounds with rolled edges, undermined areas, or wound pockets.

Method:
1) Debridement of all wound areas that come in contact with each other. This includes all epithelized parts of the rolled edges, undermined areas, or inside part of the pocket and wound base. This step converts a chronic wound into an acute wound and restarts a healing cascade.

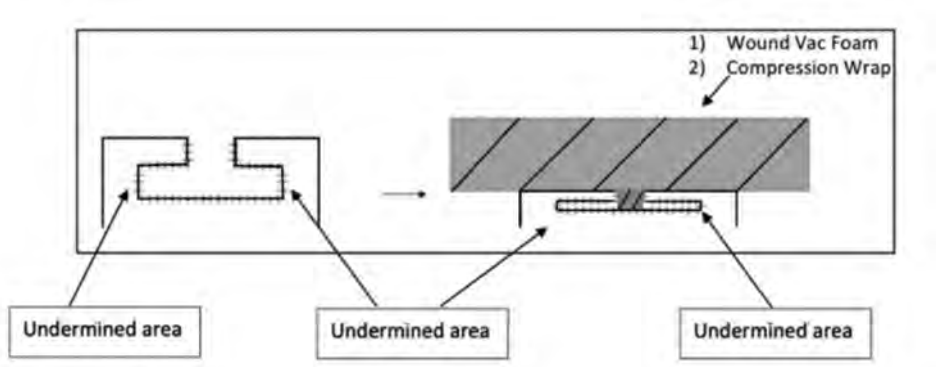
2) Utilization of either a compressive multilayered wrap, closed incision negative pressure therapy, or both. When debrided areas are compressed against each other, there is a diffusion of molecules from the debrided upper part of the wound to the base with subsequent merge of tissues.

3) Immobilization of tissues to prevent shearing forces so all tissues move "en bloque" allows collagen fibers from two sandwiched areas to develop cross-linking and for the two compressed areas to "glue" together.

Results / Discussion: Rolled edges form when the wound contracts while keratinocytes migrate from edges and follow the wall, forming an awning. The internal wall gets fully epithelized and does not grow together with the tissue in the wound base. It is recommended to either resect rolled edges or cauterize them with silver nitrate. Undermined areas and wounds pockets, usually, need to be unroofed. Sometimes these approaches are not possible or practical.

Our approach is based on Fick's law where molecules from high-pressure areas migrate towards areas with lower pressure.

Conclusion: Our methodology may be considered the initial step in treating unfavorable wound edges and wound pockets.



EP002 MODIFIED UNNA BOOT. A NOVEL COMPRESSION THERAPY TO TREAT DEHISCED INCISIONS AFTER BELOW-KNEE AMPUTATIONS.

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Aim: To provide a novel and cost-effective compression therapy used to treat stump site incision dehiscence in patients with below-knee amputation surgeries.

Method: A compression bandage system for below-knee amputation dehisced stump wounds that combines collagen dressing, zinc impregnated Unna boot, and long stretch compression bandages.

Results / Discussion: The modified Unna boot application is a promising new technique in treating dehisced stump incisions that combines the previously studied Unna Boot and a long-stretch compression bandage. Ultimately this novel therapy hopes to improve recovery time after surgery as well as minimize additional procedures. Furthermore, the supplies needed are readily available and the treatment is cost effective.

Conclusion: In the event of stump wound dehiscence, the modified Unna boot is an effective and cost friendly treatment that provides the necessary compression needed to combat phlebolymphedema as well as provide a favourable environment to facilitate wound healing. The only contraindications for use include severe PAD where patients may not be able to tolerate compression, as well as potential zinc allergies.

EP003 WOUND REMODELING. "EDGE TRENCHING" -- A NOVEL DEBRIDEMENT TECHNIQUE

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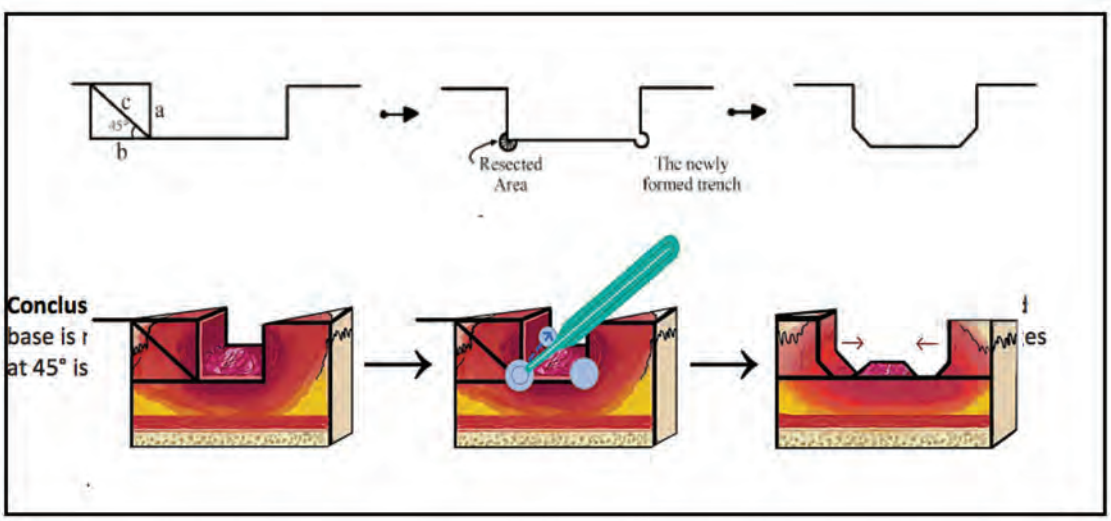
Aim: It is axiomatic that wound edges need to be debrided at 45° to produce favorable edges. When wound edges cannot be debrided at 45°, tissue or the wound base is not connected to the walls, and our novel technique "Edge Trenching" can be utilized.

Method: A small curette is used to excavate a trench at the point of merger between the wound base and the wound wall. The base of the wound and the edge get resected approximately at a ratio of half and half, creating a new wound where the base of the wound connects to the edge. The newly created trench undergoes typical healing stages. The trench involves two walls (base and edge) in equal proportion, and healing processes evolve simultaneously in both walls. Collagen fibers crosslink and create one wound – the missing connecting piece between the edges and wound base; this "glues" the two walls.



Results / Discussion: The newly created wound contracts, creating a smooth transitional wide angle allowing keratinocytes from the wound edge to migrate to the base. Immobilization of the wound edges is imperative for an uninterrupted crosslinking process. The procedure is repeated at each visit until the connection between two walls is visible to the naked eye. Results are usually seen within 2-3 weeks.

Conclusion: This series demonstrates how Edge Trenching can be utilized when tissue in the wound base is not connected to the walls or if vertical walls are present where debridement of wound edges at 45° is not possible.

EP004 CROSS-SECTOR INTERVENTIONS TO ENHANCE HEALING TIMES AFTER LEG AMPUTATION

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Aim: To ascertain whether a combination of interventions within both an orthopedic department and a community nursing service, could improve healing times after leg amputation.

Method: A project group, consisting of a specialist wound nurses and quality development nurses from both organisations, using a PDSA cycle, implemented post-operative interventions with all amputations during a 12-month period. Ethical consent was obtained. Interventions included:

- Notification of community TVN of patients' discharge
- TVN regularly contacted nurses for a wound status
- NWPT used when exudate present more than 5 days post-operatively or if dehisced.

Outcome measurements: Proportion of patients with delayed healing, and time to healed.

Results / Discussion: Fewer patients experienced delayed healing in the intervention year (41%; 11) than pre-intervention (50%; 16). Of the 11 patients not healed at 4 weeks - all had dehisced areas and received NWPT for 7-14 days. A higher proportion of these patients healed earlier, and time to healed was quicker, than in the pre-project year (see table).

Factor	Pre-project year (32 amputations)	Intervention year (27 amputations)
Healed within 4 weeks	50% Av. 3.2 weeks	59% Av. 3.1 weeks
- Healed between 4 and 8 weeks	50% Av. 6.5 weeks	64% Av. 5.5 weeks
- Healed after 12 weeks	25% Av. 18 weeks	18% Av.17 weeks
- average time for 80 % of delayed wounds to heal	17 weeks	11 weeks

Conclusion: The combined interventions resulted in more amputation wounds healing earlier and have been implemented as standard procedure in both organisations.

EP005 USE OF HYPEROXYGENATED FATTY ACIDS FOR SKIN PROTECTION DURING THE COVID-19 PANDEMIC IN SPAIN: SURVEY OF PROFESSIONALS.

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Aim: During the Covid-19 pandemic, a high number of professionals have been at risk of developing skin lesions secondary to the use of personal protective equipment. The clinical practice guidelines recommend the use of fatty acids to reduce the appearance of pressure ulcers.

Methods: Here are described the results of a survey conducted at the national level that included a total of 134 professionals.

Results: The moment of the application of the fatty acid was, 58.2%, after the removal of the individual equipment protection; in 25.4%, ten minutes before the placement of the protective equipment; in 7.5%, at the time of the donning of the protective equipment; in 6.7%, between 10-30 minutes before putting on the protective equipment, and in 2.2%, thirty minutes before the application of the protective equipment. The professionals who responded referred, in 73.1% of the cases, an improvement of the pre-existing erythema; in 56.7%, this substance provides hydration of the skin; in 50% of the cases, it contributes to the prevention of related skin lesions with the use of individual protection systems; in 26.1%, it provides an emollient effect on the skin.

Conclusion: Based on the results, the use of these topical substances (fatty acids) is recommended in the case of the use of personal protective equipment.

EP006 PREVENT TREAT RECOVER - TURNING AROUND SKIN TEAR MANAGEMENT

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Aim: To evaluate the latest ISTAP guidelines for Skin Tear Management for residents and health care workers in an Aged Care Facility. Prior to the evaluation our skin tear incidence was 15-20% with many taking >30 days to heal resulting in chronic wound care challenges. These included wellbeing of residents, increased clinical load, increased cost to care and an to improve strategic alignment to the Aged Care Standards.

Method: Implemented the protocols in one wing of the facility of 20 residents. The focus was on prevention with a pH balanced moisturizing regime twice daily on all residents, treatment with silicone dressings, and compression leg wear for those meeting the ISTAP criteria of lower limb assessment.

Results / Discussion: The one-month evaluation included an update on skin integrity and fragility in the ageing cohort, key elements on prevention, treatment and grading of skin tears and the importance of lower leg assess-

ment when implementing a recovery pathway using compression leg wear. Education was conducted across carers, nursing staff residents and their families as indicated. Zero skin tears occurred during the evaluation with a greater confidence and positivity from staff and residents.

Conclusion: Juniper Health Care are a leading Aged Care provider in Western Australia covering 32 sites. With such promising results this quality improvement programme will continue to be rolled out across further sites in 2021. We are looking to sustain and replicate improved outcomes for all stakeholders with reducing the healing time of skin tears, ideally less than 30 days, and longer-term benefits of reducing the incidence of chronic lower leg ulcers developing.

EP007 HYPERBARIC OXYGEN THERAPY IN THE TREATMENT OF POSTOPERATIVE ABDOMINAL WOUND INFECTION - A CASE REPORT

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Surgical wound infection can occur shortly after surgery and can be seen while the patient is still in the hospital, but it can also develop after discharge from the hospital. Hyperbaric oxygen therapy is 100% oxygen therapy under increased atmospheric pressure that promotes healing of chronic wounds (better collagen production) and stimulates capillary proliferation in bone, which causes osteoclastic activity and removes necrotic and infection-damaged bone tissue.

In this case, we described a 73-year-old patient with postoperative abdominal wound infection resulting from abdominal hernia surgery. Due to infection of the postoperative wound, the patient first reports to the Institute for Underwater and Hyperbaric Medicine, KBC Rijeka, in April 2019. From April 23, 2019 with surgical wound treatment, modern dressings (hydrofiber Ag) and antibiotic therapy, the patient was first treated with hyperbaric oxygen therapy. After 25 hyperbaric oxygen treatments and wound healing according to the requirements of the care process, healing is achieved.

Keywords: Infection, postoperative wound, HBOT, healing, contemporary dressings, multidisciplinary approach.

EP008 MANAGEMENT OF FULL-THICKNESS SKIN DEFECTS DUE TO HIGH-ENERGY TRAUMA: OUR EXPERIENCES WITH ACELLULAR DERMAL SUBSTITUTE

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Aim: To analyze prospectively the efficiency of acellular dermal matrix applied to full-thickness skin

defects due to high-energy trauma.

Methods: Retrospective review between August 2018 and October 2019 covering 10 patients with full-thickness skin defects of the upper extremity, treated with the acellular dermal substitute and unmeshed skin graft in a single-step procedure.

Results: 10 patients were enrolled in this study. Mean age was 34.5 years. Causes of the defects: de-gloving injury and high-energy trauma. The size of soft tissue defects was between 120 and 300 cm2. No complications or inflammatory response in all cases but one, which resulted in a seroma. All wounds were epithelized within 11 days without additional grafting. The overall survival rate of the matrix and the skin graft was 97%. The average VSS was 1.97.

Conclusion: High-energy trauma is caused by force (traffic injuries, crush, workplace accidents etc.). High amount of kinetic energy is applied to the tissue. Managing of those kind of injuries is complex and requires careful planning to provide stable coverage by the safest and least invasive method. Acellular dermal substitute represents a valuable alternative to other types of defect coverage and should be considered in the treatment of skin injuries.

EP009 EARLY INTERVENTION OF WOUND SPECIALIST FOR THE PREVENTION OF METATARSAL AMPUTATION AND OTHER MAJOR COMPLICATIONS: A CASE STUDY

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Background: 57 old man with unbalanced diabetes and peripheral neuropathy was administered to intensive care with septic shock and acute MI. The patient was connected to mechanical ventilation under sedation and vasoconstriction therapy for about 10 days. Limbs were swelling due to peripheral vein insufficiency and the patient developed multiple ulcers on both legs: on shins, feet and toes, mostly on the left side. Three toes on the left foot were necrotic and there was a large necrotic ulcer on the lateral side. There was a decision of metatarsal amputation of the left foot.

Objective: The early intervention of wound specialist and use of multiple technologies prevented an amputation, promoted healing process and quality of medical care.

Method: Swelling, ulcers and necrotic wounds were observed daily and later weekly by direct inspection and measurement, or by telemedicine. The patient was treated by advanced bandaging in combination with maggots, advanced technology treatments, such as Unna boot to minimize the swelling and to promote better blood supply.

Results: The swelling resolved, all the wounds healed in time depending on the depth and area of the wounds. There was angiogenesis to the necrotic toes due to the advanced bandaging and the amputation was prevented.

Conclusion: The early intervention of wound specialist and use of multiple technologies promotes healing process and quality of medical care, prevent complications and long hospitalization. It is of importance that the treatment of wounds is performed by a nurse specialist with knowledge of modern technologies.

EP010 PREVENTION AND MANAGEMENT OF MEDICAL ADHESIVE RELATED SKIN INJURY IN THE REPUBLIC OF KOREA

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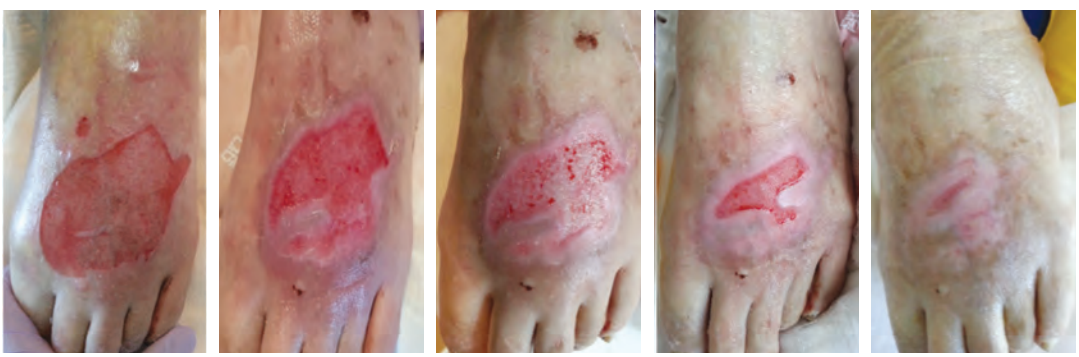
Aim: Medical adhesive-related skin injury (MARSI) is due to strong adhesive components such as medical adhesives tapes, and is mainly caused by improper application or removal. This is a very common problem that can occur in all patients in all clinical settings, but the importance of awareness and prevention of severity is underestimated.

Method: (A Case Report) A 67-year-old male patient during conservative treatment with DM, Left foot swollen and blisters occurred while receiving fluid therapy and 8*6cm wide abrasive wound occur during the removal of the medical adhesive tape and was referred WOCN. After assessment, according to skin tear management principles, the skin cleansed normal saline solution and fixed with mesh bandage instead of medical adhesive tape after non-adhesive polyurethane foam dressing. After plastic surgery consultation for multi-disciplinary care, we provided expert wound management for three weeks in the same manner as above.

Results: After accurate assessment of MARSI, with rapid and aggressive interventions re-epithelialization was completed in about 3 weeks without secondary complications such as infection.



Conclusion: The occurrence of MARSI is often overlooked as not only accurate reporting but also a problem that may occur during the treatment process. Not only does it take a lot of time and effort to treat it, it is also directly linked to patient safety. Correct application, removal and prevention of medical adhesives should be a priority for preventing unnecessary wounds at the clinical settings and for improving patient safety and quality of nursing through proper awareness and education.

EP011 MANAGEMENT OF OBSTETRIC SURGICAL SITE INFECTION IN A TERTIARY HOSPITAL USING POLYMERIC MEMBRANE DRESSING: A CASE SERIES

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[1]Hospital Tengku Ampuan Afzan Kuantan, Wound Care Unit, Department of Orthopaedics, Kuantan, Malaysia

Introduction: Acute surgical wound has variable surgical site infection (SSI) rates. The risk factors for SSI are usually multifactorial. SSI can lead to surgical wound dehiscence with high mobility and mortality. The management of SSI includes adequate wound management, along with targeted antimicrobial treatment.1
Method: This case series illustrated the management of SSI in a tertiary hospital over the abdomen post laparotomy or caesarean section under the care of obstetric and gynaecological department.

Case series: 32-year-old lady, para 2, presented with day 3 post emergency lower-segment caesarean section (LSCS) wound breakdown, complicated with SSI. Wound was managed holistically with assistance of polymeric membrane, and wound bed was ready for secondary suturing after 1 week.

54- year-old lady with underlying ovarian cancer, did operation total abdominal hysterectomy and bilateral salpingo-oophorectomy. Her wound was complicated with SSI one week post-operatively. After one week, the wound bed was ready for secondary closure.

35-year-old lady with underlying gestational diabetes post-partum day 5 with LSCS wound breakdown. Wound was managed holistically with assistance of polymeric membrane, and wound bed was ready for secondary suturing after 1 week.

Discussion: Contemporary wound management emphasises on optimal moist wound healing as well as the application of non-adhesive dressings which requires less changing. Not only does this accelerate wound healing, but it also leads to less pain and psychological trauma during dressing change.
Conclusion: The management of SSI among obstetric patients using standard of care leads to optimal wound care management.

EP012 MEDICAL GRADE HONEY FOR THE TREATMENT OF EXTRAVASATION-INDUCED INJURIES IN PRETERM NEONATES – A CASE SERIES

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Aim: Preterm neonates often depend on peripheral administration of nutrition and medication. Since their skin is not fully developed and very vulnerable, extravasation is a risk. Medical grade honey (MGH) possesses antimicrobial and pro-healing activity; however, its use in neonatal and young pediatric patients stays reserved. We present a case series of seven preterm neonates (28-36 weeks of gestation) with extravasation injuries secondary to peripheral administration of total parental nutrition and medication.

Method: All extravasation injuries were treated in the same manner, via daily cleaning and daily application of MGH. Some of the cases needed additional surgical intervention or assisted debridement.

Results / Discussion: All treated wounds rapidly presented granulation tissue formation and underwent epithelialization. Peripheral edema and inflammation decreased upon initial application. Necrotic tissue was effectively debrided when present, the slough was removed, and no signs of infection were detected, irrespective of initial wound presentations. Cicatrisation was minimal, and the full range of motion was preserved in all cases. A constant, thorough assessment of peripheral intravenous catheter displacement, leaking, and signs of extravasation is needed for fast discovery and prevention of further damage.

Conclusion: MGH possesses antimicrobial, anti-inflammatory, and anti-oxidative activity, enhancing wound healing. MGH was safe and effective for treating extravasation-induced injuries, even in these highly vulnerable patients, independent of location and severity. Therefore, we recommend MGH for treating extravasation wounds and consideration for other types of wounds.

EP013 TREATMENT OF DEEP WOUND DEFECTS IN TRAUMA SURGERY – USE OF A COLLAGEN MATRIX AND SPLIT-THICKNESS SKIN GRAFTS IN ONE-STEP PROCEDURE IN CRITICAL SITUATIONS

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Introduction: Treatment of deep skin defects is challenging, especially when they occur in highly strained regions like joints or tendons. In trauma surgery scar contractures and poor skin quality often result in bad function. The use of a collagen-elastin matrix* with a split-thickness skin graft (STSG) can prevent this.

Material / Methods: 16 patients with traumatic defect wounds (free tendons, joints, muscles or bare bone surface) of the extremities were treated with collagen-elastin matrix* (R), a bovine based collagen and elastin-hydrolysate dermal substitute, and STSG in a one-step procedure. Assessments were taken one week, six weeks and three months after surgery. Four patients are currently in the follow-up-process. Take in time, graft survival, skin quality (Vancouver Burn Skin Scale) and self-estimation were evaluated and compared with a matched group of patients with only STSG. is Collagen-elastin matrix*an open porous matrix based on native collagen and elastin of bovine origin. After six weeks collagen-elastin matrix* is completely replaced by newly synthesized collagen.

Results: There were no changes in graft survival between both groups. The patients with collagen-elastin matrix* and STSG showed better graft quality and higher quality of life, although time of surface remodelling was prolonged sometimes. The joint function was less affected.

Conclusions: The use of collagen-elastin matrix* and STSG offers a better outcome in highly strained regions with higher graft quality and better joint function in trauma patients. It should be used more commonly in traumatic deep defect wounds. Further studies with a higher number of patients would be needed to prove higher impact.
** Matriderm*

EP014 THE EFFECT OF TRANEXAMIC ACID ON POSTOPERATIVE ECCHYMOSIS AND EDEMA IN EXCISION OF LIPOMA

Young-Jun Choi[1]

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Aim: Tranexamic acid (TXA) is an amino acid derivative that exerts an antifibrinolytic effect. Previous studies showed that systemic TXA reduce for bleeding in orthopedic and various nasal surgeries and for

the reduction of postoperative edema and ecchymosis for surgical patients. We aimed to evaluate the effect of TXA on postoperative ecchymosis and edema in patients who underwent excision of lipoma. Method: Forty lipoma patients who underwent total excision between March 2017 and July 2019 were included. Retrospective chart reviews and photographic analyses were performed. In TXA group (n= 20), 1g daily of TXA was administered for 5 days after surgery and in the control group (n= 20), TXA was not administered. The severity of ecchymosis and edema at first visit after surgery was rated on 0-3 scale by two physicians.

Results / Discussion: The mean interval of first visit after surgery was 1.12 ± 0.52 days (range: 1-4 days). The mean scores of ecchymosis evaluated using numeric scale were 0.5 ± 0.8 and 1.2 ± 1.0 in the TXA and control group, respectively. Ecchymosis scores were significantly lower in TXA group compared with the control group ($p< 0.05$). But there was no statistical difference in edema scores between the two groups (0.5 ± 0.6 in the TXA vs. 0.7 ± 0.8 in the control group).

Conclusion: We observed that the postoperative administration of TXA could decrease ecchymosis in patient who underwent excision of lipoma.

EP015 EVIDENCE OF BACTERIAL BIOFILM FORMATION WITHIN ACUTE WOUNDS: A SYSTEMATIC REVIEW

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Aim: Within the UK, per annum, the NHS treats 2.2 million wounds, costing an estimated £5.3 billion, of this an average health board cares for 11,200 wounds a year, of which 40% are acute. The prevalence and role of biofilms within chronic wounds is well documented, however, it is relatively unknown within acute wounds 1,2. The aim of this study was to conduct a review of all literature for evidence of biofilms within acute wounds.

Method: Following PRISMA guidelines a search was conducted of 4 databases looking for “biofilm” or “bacterial aggregate” AND “acute wound”, “traumatic wound”, “burn”, papers between beginning of database and 2019 were searched. Resultant abstracts were screened for relevance, on inclusion full papers were obtained and reviewed. Of 399 full papers, 33 were included.

Results / Discussion: A total of 19 papers found a high prevalence of biofilm formation, in bacterial isolates of various species, from acute wound origins. These studies used in vitro analysis using microtiter plate biofilm model indicating biofilm present could be underestimated. Key findings were found in ex vivo studies where biofilm presence was found within burn wound biopsies 6-31 days after injury 3and three-armed trial by Bay et al. found bacterial aggregates on the edge of within 4 days acute wound in 18/24 patient biopsies 4. In vitro studies also found evidence of biofilms within 8 h 5.

Conclusion: Evidence found suggests that biofilms may be more prevalent in acute wounds than currently reported. Biofilm formation within acute wounds could be a key target to prevent wound progression to chronic, while also having implications in reducing the need for antibiotics, as well as reducing the financial burden of wound care on the NHS.

EP016 MICROGRAFTING FOR BURNS; REVIEW ON ITS OUTCOMES. SEARCHING FOR THE SUPERIOR SKIN GRAFTING TECHNIQUE

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Aim: Autologous split thickness skin grafting is the standard-of-care for most deep dermal and full thickness burns. Meshed grafting is most commonly used. Patients with extensive burn injuries have limited donor site availability. Micrografting is a well-known technique to enable larger expansions. We conducted a review on the outcomes of micrografting.

Method: A literature search in PubMed, Web of Science, Google Scholar and the Cochrane Library databases was conducted from the first report of micrografting in 1958 until February 2021, including the terms 'burns', 'micrografting' and/or 'Meek'. Original papers reporting outcomes of micrografting were included.

Results / Discussion: 1529 papers were identified and 15 articles were included. Most studies were rated as poor study quality. Weighted averages could be calculated for three outcome parameters; 82 ± 7% for 'graft take', 51 ± 18 days for 'time to wound healing' and 53 ± 23 days for 'length of hospital stay'. Scar quality was minimally described and often poorly assessed. Limited data was available on the outcomes donor site size, bacterial load and wound infection rate, number of operations and cost effectiveness.

Conclusion: Multiple outcomes of micrografting from the 15 included studies were evaluated. The overall study quality was poor and there is a specific lack of data on scar quality. Therefore it is not possible to draw conclusions on the outcomes of micrografting. To further investigate the performance of micrografting a randomized controlled trial is required.

Antimicrobials and infection

EP132 MEDICAL GRADE HONEY OUTPERFORMS CONVENTIONAL TREATMENTS FOR HEALING COLD SORES – A CLINICAL STUDY

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Aim: Cold sores are nasolabial blisters caused by herpes simplex virus (HSV) infections. Novel therapies that have antiviral activity and can simultaneously improve wound healing are warranted. The aim of the

study was to investigate the efficacy of medical grade honey (MGH) for treating cold sores.

Method: A crossover trial was performed in patients with recurrent cold sores (n=29). The majority (66%) of these patients experiences four or more episodes per year, and thus form a valid self-control group. In this study, patients applied an MGH-based formulation (L-Mesitran Soft) on the cold sore at onset of symptoms (62.1%) or appearing of blister (37.9%) and compared it to their conventional treatments. After complete healing, patients filled in a questionnaire comparing MGH treatment with conventional treatments evaluating healing, pain and itching.

Results / Discussion: Average healing time was 10.5 days with conventional treatment whereas MGH treatment took 5.8 days (45% faster). 86.2% of all patients experienced absolute faster healing (6.9% similar and 6.9% slower) and the subjective healing score was higher after MGH treatment in 79.3% of the patients (20.7% similar). In case the patients normally experience pain and itching during their cold sores, these levels were lower with MGH therapy compared to conventional treatment in 72.7% and 71.4%, respectively. Moreover, 100% of the patients prefer MGH treatment over conventional treatment and will use it again in the future.

Conclusion: MGH is a promising alternative treatment for cold sores, likely by having both antiviral and wound healing activities.

EP017 AN OZONIDE IN HYDROGEL FORMULATION TO DEBRIDE NECROTIC INFECTIOUS WOUNDS AND PROMOTE GRANULATION AT THE SAME TIME: PRELIMINARY RESULTS

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Aim: Very often necrotic wounds are also infectious and hydrogel dressings can debride them but are not effective against bacteria; so we need to treat infection with antibiotic systemic therapy or using antiseptic secondary dressings. The aim of this work is to prove that it's possible to debride necrosis, treat infection and promote granulation at the same time with only one dressing.

Method: The work is still ongoing. At the moment we enrolled 15 patients with infectious necrotic wounds and 13 of them completed the study; the enrollment target is 30. Primary dressing a hydrogel and secondary dressing a moist gauze, both containing Ozoile®, an olive oil derived ozonide with vitamin E acetate; in case of deep wounds Ca/Na Alginate to fill the loss of substance. Dressing change three times a week. We evaluated Debridement Rate (DR, as percentage reduction of necrotic tissue), Antiseptic Effectiveness (AE, according with Cutting & Harding Criteria) and Wound Area Reduction (WAR) after a 2 weeks treatment.

Results / Discussion: All treated wounds showed a DR reduction of more than 72%, a significant AE with the disappearance of infection signs within the observation time and a WAR of approximately 12%. No complications, no allergies, no induced pain.
Conclusion: This work demonstrated that this Ozoile® dressing can effectively debride necrotic wounds

even if there's infection; healing time can be reduced due to the contemporary actions of debriding, antisepsis and promoting granulation with a significant cost-benefit ratio.

EP027 THE IMPACT OF ANTIMICROBIAL RESISTANCE ON TOPICAL TREATMENT SELECTION

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Aim: When managing infected wounds and wounds at risk of infection, attention needs to be given to the potential of antimicrobial resistance (AMR) development. Although described for several antimicrobial agents, research is needed on the applicability of alternatives to reduce the current and future risk of AMR development in wound care. In this study, we investigated the potential of AMR development towards a patented antimicrobial enzyme-based complex.

Method: The potential development of gradual increases in the minimum inhibitory and bactericidal/fungicidal concentration of the enzyme-based complex against a series of "urgent threat" micro-organisms, including Gram-positive methicillin-sensitive and -resistant Staphylococcus aureus, the Gram-negative Pseudomonas aeruginosa and the fungal Candida albicans, was investigated using long-term serial passaging under different in vitro and ex vivo conditions (e.g. in microtiter plate-based and artificial wound model). In addition, at different stages of serial passaging, potential phenotypic changes that could be associated with AMR development (e.g. doubling time and microscopic morphology) were evaluated and compared with their untreated counterparts using an innovative optical screening instrument with a mathematical algorithm-based analysis software (oCelloScopeTM). Similarly, potential genotypic changes (e.g. incl. but not limited to differential expression of evasion mechanisms and other biochemical pathways described to be related to AMR development) were investigated using state-of-the-art RNA sequencing and subsequent comparative transcriptome analysis of enzyme complex-treated cultures and their untreated counterparts upon both single and repeated exposure.

Results / Discussion: In contrast to other traditional antimicrobial agents that showed a gradual development of AMR (e.g. for silver AMR was observed already after 8 exposure cycles), sensitivity to our enzyme-based complex remained identical to at least up to 100 exposure cycles. No difference was observed between the prokaryotic and eukaryotic test micro-organisms. Additionally, real-time imaging and subsequent image analysis based on mathematical algorithms showed no incremental change in both growth kinetics (i.e. on at least 5500 images per stage during serial passaging, per micro-organism tested) as well as microscopic morphology (i.e. on at least 3300 images per stage during serial passaging, per micro-organism tested) upon repeated exposure. Finally, comparative transcriptome analysis elucidated genotypic pathways correlated to the mechanism of action of the enzyme-based complex, confirming in turn our hypothesis that the antimicrobial activity is established via oxidative stress-induced damage. However, significant genotypic changes that could be directly linked to potential AMR development, such as prevention to reach the target sites or the differential expression of global cell adaptive processes, were not observed.

Conclusion: Defining a rational use of systemic and topical antimicrobials is an important tool to limit and control the development of microbial resistance in wound care. All systemic and topical antimicrobial agents used in wound care should be assessed at an early stage for their potential for selection of

resistance. Our results indicate that our patented enzyme-based complex could serve as a highly efficient antimicrobial approach with no direct potential for resistance development.

EP018 EFFECT OF NANOCRYSTALLINE SILVER†, DIALKYLCARBAMOYLCHLORIDE (DACC) COATED‡ & NON-MEDICATED GAUZE* DRESSINGS ON THE PROLIFERATION OF MRSA & P. AERUGINOSA ON SIMULATED CONTAMINATED WOUNDS

Daniel Fitzgerald[1], Matthew Hardman[2], Emma Forrest[1]

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Aim: Effect of nanocrystalline silver† (AG), dialkylcarbamoylchloride coated‡ (DC) and non-medicated gauze* (NM) dressings on the proliferation of MRSA and P. aeruginosa in simulated wound fluid (SWF) was assessed over their wear time in vitro.

Methods: Dressing samples (1 cm2) were inoculated (~50,000-100,000 bacteria) in SWF and initially incubated at 37°C for 60 minutes (attachment phase). Non-bound bacteria were removed by washing, placed in fresh SWF and incubated at 37°C for 3 days. Viable counts (n=12) or CLSM imaging (n=1) were undertaken after 24/72 hours to determine the effect on proliferation.

Results / Discussion: AG prevented proliferation and reduced (compared to 0 h control) viable counts on the dressing by mean >4 log10 colony forming units (CFU)/sample after 24 hours and maintained this over 72 hours. No bacteria were detected in the AG sample by CLSM. DC and NM allowed proliferation with mean >2.5 log10 CFU/sample increases observed within 24 hours which were maintained over 72 hours. Moreover, no significant difference ($p>0.05$) was found in the change from baseline (proliferation) between DC and NM dressings for either bacterium at 72 hours. CLSM confirmed bacteria between DC and NM fibers with no observed differences in bacterial binding between the dressings.

Conclusion: AG killed clinically relevant levels of MRSA and P. aeruginosa within 24 hours, while DC permitted proliferation and was not statistically different to NM after 72 hours despite claiming to irreversibly bind microorganisms. Nanocrystalline silver has been shown to reduce bioburden in wounds and help reduce the signs and symptoms of infection and infection rates.

EP019 EFFECT OF NANOCRYSTALLINE SILVER†, DIALKYLCARBAMOYLCHLORIDE (DACC) COATED‡ & NON-MEDICATED GAUZE* DRESSINGS ON THE PROLIFERATION OF MRSA & P. AERUGINOSA IN SIMULATED WOUND FLUID

Daniel Fitzgerald[1], Matthew Hardman[2], Emma Forrest[1]

[1]Smith & Nephew, Advanced Wound Management, Hull, United Kingdom; [2]Hull York Medical School, Hull, United Kingdom

Aim: Effect of nanocrystalline silver† (AG), dialkylcarbamoylchloride coated‡ (DC) and non-medicated gauze* (NM) dressings on the proliferation of MRSA and P. aeruginosa on simulated contaminated wounds (SCW) was assessed in vitro.

Methods: A: Dressing (n=6) samples (25 cm2) were directly inoculated (~16,000 bacteria cm2) and initially incubated at 37°C for 60 minutes (attachment phase). Non-bound bacteria were removed by washing, dressings placed on Mueller-Hinton agar (MHA) plates (SCW) and incubated at 37°C for 24 hours. Plates were imaged after 24 hours to determine the effect on proliferation.

B: Dressing (n=6) samples (1 cm2) were applied to surface inoculated (~5000 bacteria) MHA plates (SCW) and then incubated at 37°C for 24 hours. Dressings were removed and the SCWs imaged by CLSM to determine the effect on proliferation.

Results / Discussion: A: AG prevented bacterial proliferation with no observable growth adjacent to or within the footprint of the dressing on the SCW after 24 hours. DC and NM permitted bacterial proliferation with growth adjacent to and within the footprint of the dressings after 24 hours.
B: AG prevented proliferation and killed bacteria in direct contact on SCW after 24 hours. However, both bacteria proliferated and remained on the SCW after removal when treated with DC and NM.
Conclusion: AG killed clinically relevant levels of MRSA and P. aeruginosa within 24 hours, while DC permitted proliferation and demonstrated equivalent performance to NM despite claiming to irreversibly bind microorganisms. Nanocrystalline silver has been shown to reduce bioburden in wounds and help reduce the signs and symptoms of infection and infection rates.

EP020 IN VITRO EFFICACY OF A SILVER POLYABSORBENT DRESSING FOR THE PREVENTION OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS AND P. AERUGINOSA BIOFILMS FORMATION

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Aim: Few data are available concerning the ability of wound dressings to prevent biofilm development. The objective of this study was to develop and use an in vitro model to evaluate the efficacy of four wound-dressings to prevent formation of Methicillin-resistant Staphylococcus aureus (MRSA) and Pseudomonas aeruginosa biofilm.

Method: An in vitro model which mimics wound environment was developed. This model was used to evaluate the ability of a polyabsorbent dressing, a DACC-coated dressing, a silver polyabsorbent dressing and a silver Hydrofiber dressing to prevent biofilm formation of a MRSA and P. aeruginosa strains (ATCC 43300 and 9027). Samples of dressing were added after the initial bacterial cell attachment to the surface. The growth of adherent bacteria and biofilm formation was monitored after 24 and 48 hours of incubation.

Results: After 24 hours, the collagen-coated surface was completely colonized, and biofilms were successfully formed. The addition of polyabsorbent dressing and DACC-coated dressings significatively reduced the concentration of MRSA sessile cells after 48 hours but has not significant effect on P. aeruginosa biofilm. The two silver-containing dressings were able to inhibit the growth of adherent bacteria on the surface. A reduction (about 1 log10) of the concentration of MRSA adherent cells was also observed after addition of silver polyabsorbent dressing compared to the initial concentration.

Conclusion: In this in vitro model, the use of both silver containing-dressings inhibits prevents the formation of bacterial biofilms for 48 hours. For MRSA biofilm, and higher efficiency was obtained using the silver polyabsorbent dressing.

EP133 VALIDATION OF THE TILI (THERAPEUTIC INDEX FOR LOCAL INFECTIONS) SCORE FOR THE DIAGNOSIS OF LOCAL WOUND INFECTIONS: A RETROSPECTIVE EUROPEAN ANALYSIS

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Aim: To date, no validated score is available for clinical diagnosis of local wound infections. Therefore, a panel of experts from seven European countries has developed an easy-to use tool to diagnose local wound infection, the TILI (Therapeutic Index for Local Infections) score, dedicated to care givers not specialized in wound care, still to be validated in a European study.

Method: The experts on this panel, heads of various wound care clinics in their respective countries, had already adopted the latest TILI score into their clinical practice. They were asked to send us a copy of the completed TILI sheets of patients with leg ulcers and a photograph of the wound for analysis by two blinded reviewers.

Results: A total of 307 patients with leg ulcers from seven institutions in five European countries were included in this retrospective analysis. It was shown that the diagnosis of local wound infection can be documented very well with 5 of the 6 clinical criteria included in the TILI score. By summing up these facultative criteria in comparison with any direct criteria that may be present, there would have been an indication for local antimicrobial wound therapy in 22% of the patients examined.

Conclusion: The results of our study show that the documentation according to the TILI score are in very good agreement with the expert assessment of the patients. Thus, the scientifically validated TILI scores, which are easy to perform, could now be used in daily routine practice by caregivers.

EP134 HOST RESPONSE DURING COLONIZATION OF BURN WOUNDS BY STAPHYLOCOCCUS AUREUS DIFFERS BETWEEN STRAINS

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Aim: Patients with extensive burns are susceptible to opportunistic pathogens due to their large open wounds and compromised immune system. Despite high standards of care, colonization with microorganisms, Staphylococcus aureus in particular, is a common feature of larger area burn wounds. We have been using ex vivo human burn wound models successfully to test antibacterial therapies, but results with S. aureus were variable. Up to 50% of the inoculated skin models did not show viable bacteria after 24 h of incubation. Our aim is to gain insight into the factors that cause differences in survival and colonization of S. aureus in this model.

Method: The colonization potential of 10 S. aureus strains with different genetic background was determined in burn wound models with skin of different donors. Cytokine production and presence of antimicrobial peptides (AMPs) were analyzed.

Results / Discussion: Only small differences in survival were noted between donors. Colonization depended on the type of strain. Presence of a good colonizing strain in burn wound models resulted in reduced cytokine levels (MCP1, IL17A, IL10, IL33, IFNγ and IFNγ2) in the medium and reduced AMP expression in the skin. In contrast, high AMP levels were observed for a poor colonizing strain.

Conclusion: Together, our data indicate that the ability of S. aureus strains to direct the host response to conditions more beneficial for survival and colonization differs between strains.

EP021 ANTISEPTIC PERFORMANCE FOR CHRONIC WOUNDS USING AN ENHANCED EX VIVO HUMAN BIOFILM SKIN MODEL

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Aim: Development of an ex vivo wounded human skin model to assess biofilm formation of multidrug resistant organisms (MDRO) and potential biofilm prevention for antiseptic technologies.

Background: Biofilm-mediated infection is a significant causative agent for delayed infection associated with indwelling devices and chronic wounds. Antiseptics have potential to resolve infection and improve healing compared to ineffective topical and systemic antibiotics. The mechanism biofilms form in living tissue is distinctly different from biofilms forming on synthetic materials. The ability to grow biofilm in an ex vivo human tissue model more closely reflects real-life conditions and circumvents live animal testing.

Method: Wounded explants were placed on transmembrane inserts and wells filled with growth media. Methicillin resistant Staphylococcus aureus Xen30, Pseudomonas aeruginosa C3, and Acinetobacter baumannii QE613 were the MDROs inoculated into wound beds for 5d. Fluorescence and direct stain microscopy were performed to visualize biofilm within the wound bed. Viability of tissue was measured via MTT assay while adherence of bacteria was counted over duration of the experiment. Log reduction of bacterial load was enumerated after 5d infection and 24h treatment.

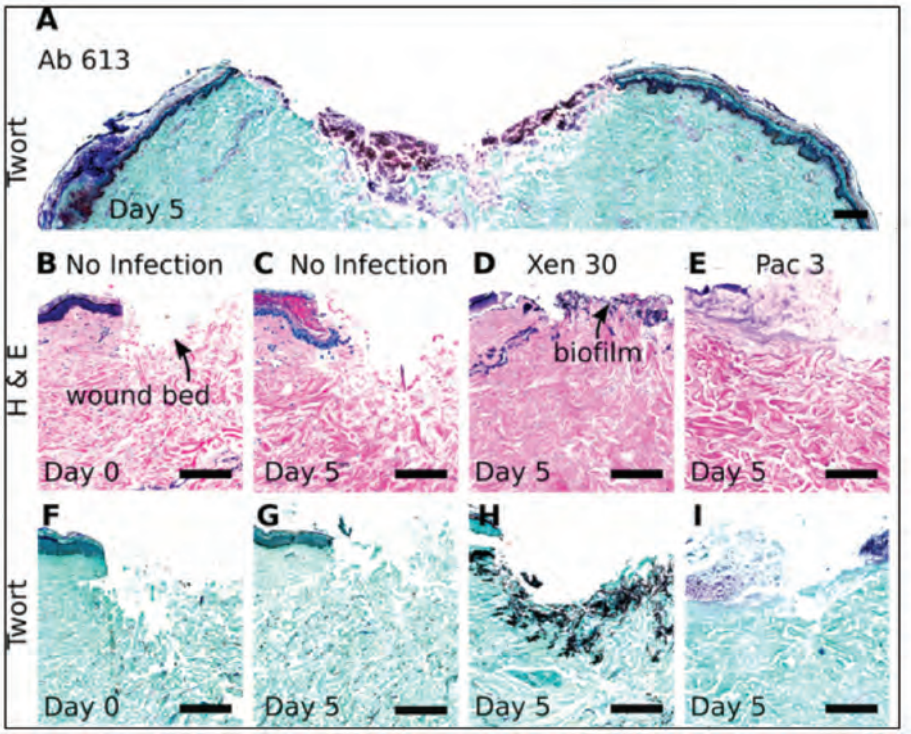

Figure 1

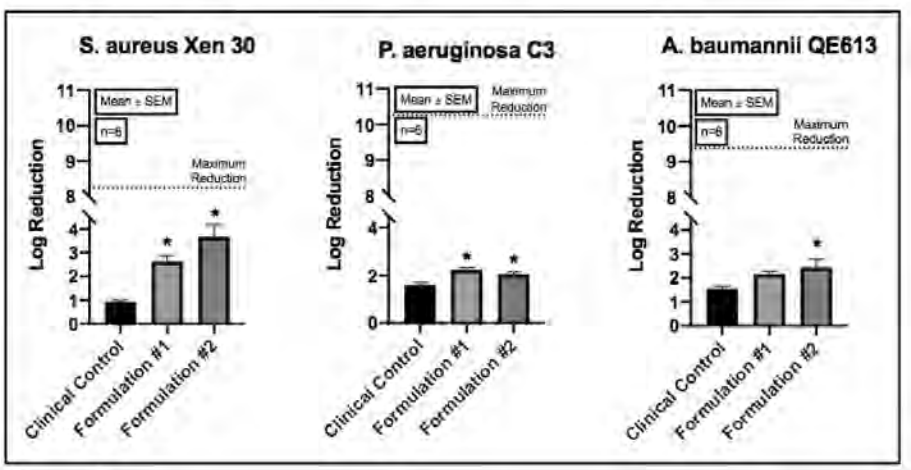

Figure 2

Results / Discussion: Support for biofilm formation was visible through stained histology (Fig.1) and adherence assays (not shown). Antiseptics containing polyhexamethylene biguanide show efficacy as log reduction from a growth control treated with PBS (Fig.2). Formulation #2 was significantly different for all 3 MDROs.

Conclusion: Biofilm formation of MDROs was established in an ex vivo wounded human skin model. Using this model, antiseptic efficacy against biofilm wound infections was determined with reproducibility. Antimicrobial efficacy for chronic wounds should be explored using ex vivo tissue models as an alternative to live animal testing.

EP135 ONCOLOGICAL WOUND. TREATED WITH HIPOCLOROUS ACID

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Aim:

- Pain management
- Odour control
- Edges: reduction of hardened granulomas

Method:

- Washing with physiological serum, after placing the local anesthetic in the injury bed.
- Saturated gauze with hypochlorous acid solution for 5/10 minutes.
- Thorough washing of the edges with hypochlorous acid solution and application of zinc oxide cream for protection.
- Secondary placement of the dressing
- The dressing changes every 48 hours if there is no dressing saturation before.
- One week treatment

Results / Discussion: After one week treatment:

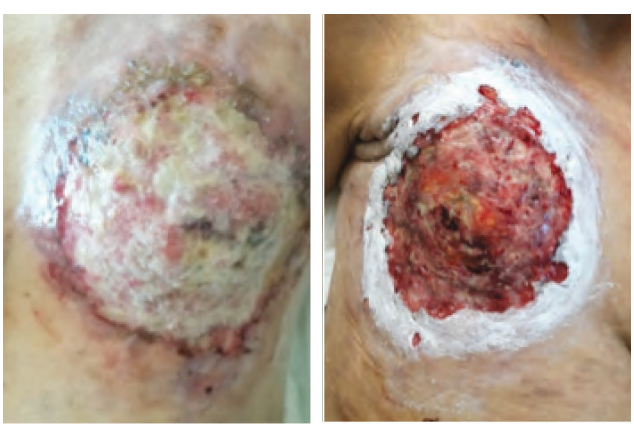
- Pain, the patient refers to improving pain on an EVA scale to 5/6, can rest at night better.
- The smell is absent and the patient increases her comfort.
- Edges, decreases the size of the granulomas, with less inflammation of these.

While providing improvement care in the injury, they served as the basis for psychologically preparing the patient at the beginning of chemotherapy treatment aimed at healing

Conclusion:

- Pain, the patient refers to improving pain on an EVA scale at 5/6, she can rest better at night.
- It smells, it is absent and the patient increases her comfort.
- Edges, decreases the size of the granulomas, with less inflammation of these.

With the application in topical cures of hypochlorose acid an improvement was achieved in the evolution of tumor injury, providing well-being and comfort to the patient while psychologically helping her to have a positive vision of her disease, preparing her acceptance to chemotherapy treatment.



Product: Microdacyn60 Wound Care

EP136 NECROTIZING FASCIITIS AFTER SURGERY - MANAGING THE WOUND CARE AND TREATING COMPLICATIONS

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Aim: Necrotizing fasciitis is a rare and lethal infection where swift and decisive treatment in combination with patient centered wound care safes lives. After radical surgery, before soft tissue reconstruction, wound care specialists must be able to prevent and treat secondary infections to lay the basis for a successful outcome.

Method: Based on selected cases of necrotizing fasciitis from our clinic the wound care and complication management methods regarding secondary infection of the tissue are described and further treatment options from literature and case reports are evaluated.
The presented cases from our clinic include a severe pseudomonas aeruginosa infection of the wound with a secondary pseudomonas meningitis, necrotizing fasziitis due to rectal tumor perforation and a necrotizing fasziitis from a perianal abszess.

Treatment of the wounds and infection is described, compared to literature from a search from pubmed.gov and Cochrane reviews.

Results / Discussion: Treatment of large soft tissue defects in critically ill patients with necrotizing fasciitis needs a multidisciplinary approach to tackle the problems of wound care, preservation of function, prevention of secondary infection and in the end cosmetic results. After the acute phase the secondary steps are similar to the treatment of large burn wounds mentioned in literature from pubmed.gov and the Cochrane foundation, so that this kind of wounds can possibly be treated similary.

Conclusion: Wound care specialists must know their options regarding the treatment of a necrotizing fasciitis to improve the outcome of this rare yet lethal disease.

EP022 ANTIBACTERIAL NANOSTRUCTURED POLYMERS FOR PREVENTION OF SKIN WOUND INFECTION

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Aim: Today, with a growing concern about the spread of antibiotic resistance, preventive wound care is an important practice for controlling skin infections before they turn into more serious complications. Antimicrobial peptides (AMPs) are promising candidates, given their high antimicrobial efficiency and broad spectrum of activity even towards resistant bacteria. However, poor stability of AMPs limits their clinical applications. A new AMP-material is introduced with enhanced stability and activity of AMPs as wound patches that prevent infections at the wound site.

Method: AMPs are covalently immobilized onto a soft nanostructured polymer. The polymer consists of ordered amphiphilic nanostructures for covalent attachment of AMPs. This improves stability, rapid antibacterial activity and prevents leaching of the AMPs.

Results / Discussion: >99% killing efficiency against multiple strains including MRSA, MDR E. Coli and Pseudomonas aeruginosa was confirmed in wound models (Fig. 1). Furthermore, the AMP-material retained its antibacterial properties for up to 4 days when exposed to 20% human serum. UV-spectroscopy and zone-inhibition tests confirmed covalent attachment of AMP to the material and it was also proven non-toxic to mammalian cells. A prototype of a wound plaster has been developed with easy applicability and functionality (Fig 2.). The AMP-material can be produced with tailorable geometry and thickness via casting or 3D-printing.

Conclusion: Covalent attachment of AMPs to nanostructured polymers show strong antimicrobial effect, improved stability, non-toxicity and can be formed into wound care products for preventing antibiotic resistant infections.

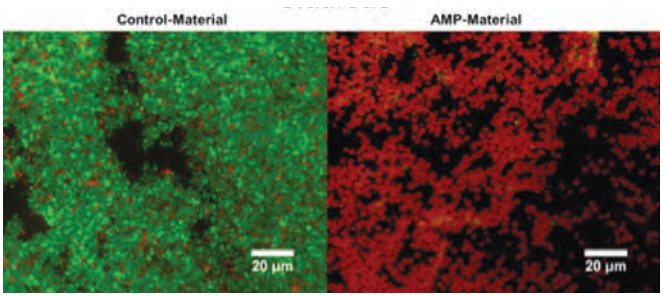

Fig 1. Live/dead staining on AMP-Material

Fig 2. Prototype of an AMP-material wound product

EP023 BIOFILM CONTROL IN NEGATIVE PRESSURE WOUND TREATMENT

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Background: Presence of biofilm in wounds treated by negative pressure may stop the treatment and prolong the healing time. Medical honey is known as a biofilm control resource.

Objective: The use of honey coated viscose net as the bottom layer provides biofilm control and prevents local infection of the wound.

Method: The new technique is used in surgical departments, such as gynecology, orthopedics, and in dermatology department. The honey coated viscose net was based under the foam while connection to negative pressure. The follow up photographs were taken before starting the treatment and in every change of dressing.

Results: During the year of study 16 wounds of different origins were treated with honey coated viscose net as the bottom layer under the foam. In all the cases no infection was developed. The honey was well tolerated. The honey coated net prevented growth of granulation tissue into the foam and provides atraumatic dressing removal.

Conclusion: Honey coated viscose net in negative pressure wound treatment provides biofilm control, atraumatic dressing removal, infection prevention. It is recommended to use the honey coated net in wounds with high infection risk using negative pressure therapy.

EP137 MANAGING NECROTIZING FASCIITIS TO REDUCE MORTALITY AND INCREASE LIMB SALVAGE

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Aim: Necrotizing fasciitis (NF) is a rare soft-tissue infection with high mortality rate. We describe our management protocol of NF focused on surgical approaches, which increased survival rate tremendously.

Method: Between March 2009 and December 2014, 34 patients underwent management of NF under the suspicion of NF. Among 31 patients with confirmation of NF, 18 patients who underwent free flap were included in this study. Nine patients were female and the mean age was 54.3 (range, 28-77) years. When a patient is suspicious of NF based on laboratory exams and MRI, surgical exploration is performed within 8 hours. The patients undergo serial debridement every 24-72 hours until infection has been fully eradicated, and then, reconstructive surgery is considered.

Results / Discussion: All 18 patient survived. The patients underwent 2 to 5 repeat debridements (mean 3.5). Reconstructive procedures were LD myocutaneous flap only in 11 patients, and LD chimeric flap in 6 patients, and the remaining patient received an LD myocutaneous flap, an LD perforator flap, and an anterolateral thigh flap all at the same time. 3 weeks after the final procedure, the patients were discharged from the hospital and returned to daily life. The mean length of follow-up was 34.8 months (range, 12 to 60 months).

Conclusion: With multidisciplinary management, NF has become a challenge that can be surmounted without mortality risk.

EP138 STERNAL TUBERCULOSIS: A CASE REPORT

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Aim: The sternum is very rare among extrapulmonary sites, accounting for less than 1 % of all cases of tuberculous osteomyelitis. The origin of sternal tuberculosis is not completely understood. Here we present a case of sternal tuberculosis, and review the literature.

Method: An 84-year-old female patient visited our hospital presenting a 2 × 3 cm chest wound with sternum exposure. She had undergone excision of a 3.8 x 1.8 x 0.7 cm sized irregular shaped yellowish soft tissue anterior chest mass with fluid collection at the Department of Thoracic Surgery at another hospital about 5 months before. Chest magnetic resonance imaging revealed a sternal bone marrow signal corresponding to sternal osteomyelitis. Wound cultures yielded Mycobacterium tuberculosis, and tuberculosis polymerase chain reaction was also positive for M. tuberculosis.

Results / Discussion: After application of negative pressure wound therapy and administration of anti-tuberculosis agents, negative pressure therapy was maintained without secondary surgery. The wound was totally epithelized one month after debridement and initiation of oral anti-tuberculosis agents.

Conclusion: Even though the prevalence of sternal tuberculosis is not high, when there is an unresolved infection or a chest wound that does not heal, sternal tuberculosis should be suspected and tests should be performed in order to obtain an early diagnosis and provide appropriate treatment.

EP024 PERFORMANCE OF ANTIMICROBIAL IRRIGATION SOLUTIONS AND ANTISEPTICS CHALLENGED WITH ACUTE AND CHRONIC HUMAN WOUND EXUDATE COMPARED TO STANDARD IN-VITRO CHALLENGE SUBSTANCES

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Aim: The wound micro-environments influence on the efficacy of antimicrobial and antiseptic agents is still underestimated. Besides generally higher protein and blood contamination, also pH, proteolytic potency, protein and peptide composition need to be considered. A comprehensive in-vitro approach was conducted comparing the most relevant antimicrobial agents in wound care challenged with human acute and chronic wound exudate compared to several standard challenge substances.

Method: Octenidine/phenoxyethanol, polyhexanide, povidone-iodine and sodium-hypochloride/hypochlorous acid were submitted to different challenge combinations including acute or chronic wound exudate (AWF/CWF), low and high peptide load (1 vs. 20 g/L) with and without additional protein load (30 g/L albumin) and/or sheep erythrocytes (30 ml/L). Their antimicrobial efficacy against S. aureus and P. aeruginosa after 1, 5 and 15 minutes was compared. A qualitative suspension method based on DIN EN 13727 was used.

Results / Discussion: AWF and CWF posed a differing challenge for agents, comparable to high and complex challenge substances. Different agents and classes of agents demonstrated diverging efficacy, depending on the level and kind of challenge they were submitted to: while antiseptics maintained their high efficacy under more complex challenge, especially chlorine-based irrigation solutions showed a remarkably reduced antimicrobial effect.

Conclusion: This emphasizes the influence of the complex wound micro-environment on therapeutic performance and the necessity to more accurately reproduce such conditions in pre-clinical evaluations. To more precisely estimate clinical antimicrobial performance and properly classify products, evaluation standards may need to be reconsidered, including more complex challenge conditions, for example standardized artificial wound exudate (artWF).

EP025 TRIPLE ALLIANCE AGAINST BIOFILM: A SOLUTION FOR CLEANSING, A PAD FOR DEBRIDEMENT, A GEL FOR PREVENTION. CHECKING RESULTS WITH A WOUND IMAGING DEVICE

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Aim: To develop a strategy to fight on equal terms with biofilm: using an antimicrobial solution to clean the wound, a microfibers pad to perform a soft debridement and an antimicrobial gel to prevent biofilm reformation.

Methods: We selected 20 patients, 14 women and 6 men, with hard-to-heal wounds from more than 3 months. Using a bacterial fluorescence imaging device, biofilm was detected even when there was no clinical sign of infection. A polyhexanide propylbetaine solution was applied for 10 minutes, then a microfibers pad soaked with 10-20 ml of antimicrobial solution, was used for at least 3 minutes for debridement. At the end of the treatment a second evaluation with the imaging device was performed, then a layer of polyhexanide gel was applied on the wound and covered with a secondary dressing.

Results: The application of a bacterial fluorescence imaging device allowed frequently to identify a higher concentration of bacteria on the edge of the wound. The combined action of the cleansing solution for the wound bed preparation, with microfibers pad used also on the edges of the wounds, established a reduction >75% of colonized area. The subsequent application of polyhexanide gel made possible to maintain the result until the next dressing change, after 3-4 days. The procedure was repeated 3 or 4 times for each wound.

Conclusions: This triple alliance against biofilm consented to achieve and maintain the purposes of the wound bed preparation, reducing biofilm and signs of bacterial contamination and improving the pain related to debridement.

EP026 NON-THERMAL AIR PLASMA MODULATES SKIN WOUND HEALING IN DIABETIC RATS

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Non-thermal plasma (NTP) is a partially ionized gas that has been shown as an effective tool for the treatment of chronic wounds and multiple skin pathologies. We have previously demonstrated NTP system generating atmospheric pressure air plasma that showed antibacterial effects and improved the healing efficacy of acute skin wounds in rats and small animals. In this study, we analyzed the effect of NTP treatment on the healing of the full-thickness skin wound model in streptozotocin induced diabetic (DB) rats, and compared it with the healing of the untreated DB and control non-DB wounds.

The DB wounds were exposed to three daily plasma treatments for 1.5 minutes and were evaluated 3, 7 and 14 days after the wounding by histological and gene expression analysis.

The NTP treatment significantly accelerated DB wound contraction on day 2 and 7 when compared to the untreated DB wounds. Moreover, NTP treated DB wounds demonstrated significantly lower expression of Il1b and monocyte chemoattractant protein 1 (Mcp1), and increased expression of gene related to proliferation Mki67 at day 7. On the other hand, histological analyses revealed no effect of the NTP treatment on the number Ki67+ proliferating cells, CD68+ macrophages or new collagen formation in the wound area.

Our results show that NPT treatment has positive effect on the DB wound healing and together with its antimicrobial effect might be useful in the healing of the wounds in diabetic patients.
Grant support: Ministry of Industry and Trade of the Czech Republic: FV10081.

EP139 THE CLINICAL EFFICACY OF A NOVEL DESICCANT AGENT IN THE TREATMENT OF CHRONIC SKIN WOUNDS; A CASE SERIES OF 50 PATIENTS

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Aim: Chronic skin wounds represent a major global health problem and a financial burden. The blocked healing process of chronic wounds involves excess inflammatory proteins, persistent microbial burden, and often drug resistant biofilm on the wound bed. Our new method provides a fast, easy `and safe solution.

Method: We developed and applied a novel and disruptive dissecating agent*.
It has a powerful affinity with water. When applied on the wound bed, it determines an immediate dissecating effect, thereby killing pathogens and denaturating any proteins present; it can thus be expected that the biofilm will be destroyed. A novel topical formulation composed of a mixture of strong and weak acids, stabilized. It has a powerful affinity with water.

Results / Discussion: In patients with a chronic infected wound that was treated with dissecating agent* for wound debridement, 92.2% of the cases (95/103) reached full granulation of the wound bed. The time to reach full granulation was 28 (IQR 14-49.5) days. Treatment success and time to full granulation are independent of age, sex, ulcer type, and ulcer dimension, although a trend towards longer time to granulation for pressure ulcers was noted in comparison to diabetic, posttraumatic, inflammatory and venous leg ulcers.

Conclusion: Debrichem treatment was highly effective in a large series of patients with chronic wounds of different etiology. If these results will be confirmed in future controlled studies, dissecating agent* could have the potential to become the standard treatment in chronic wounds.
* *Debrichem*

EP140 AN ALGINOGEL IN THE MANAGEMENT OF INFECTED INCONTINENCE ASSOCIATED DERMATITIS (IAD)

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Aim: This case study aims to demonstrate the value of an alginogel in extensive and infected IAD. IAD, a type of contact dermatitis caused by prolonged exposure to moisture from urine and faeces is characterised by inflammation, maceration, excoriation, skin breakdown and pain. Once superficial damage occurs, bacteria from stool can colonise skin, increase inflammation, whilst expanding size and depth of the lesion which may subsequently become infected.

This communication describes the management of a 64-year-old male with complex co-morbidities including malignancy, neuropathy and limited mobility. He developed IAD and skin loss to his sacrum and buttocks which became sloughy, malodorous and painful necessitating a stop to immunosuppressant therapy for six weeks.

Methods: The aims of the treatment plan were to reduce wound bioburden and slough, relieve pain, control exudate and malodour, thus improving the surrounding skin enabling his treatment to be recommenced. The area was redressed twice daily with an enzyme alginogel covered with a silicone foam.
Results: The improvement was so rapid that immunosuppressant treatment was recommenced within three days as the area was clean and granulation tissue present. The alginogel reduced the excoriation and soothed the area reducing the severity of pain. All areas were healed within nine days of treatment after suffering for over six weeks.

Discussion: An antimicrobial enzyme alginogel promotes rapid debridement, controls wound bioburden, as well as reducing exudate and pain in infected IAD.

Conclusions: Enzyme alginogels should be considered as first line treatment of infected IAD improving outcomes for patients.

EP141 SWAB – SMART WOUND ANALYSIS OF BACTERIAL VOLATILES

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Aim: Infections play a major role in the incessant growth of chronic wounds. The detection of volatile organic compounds (VOCs) emitted by pathogenic bacteria has been proposed as a potential non-invasive approach for characterising wound infections. The aims of this study were to: a) obtain the VOC signatures of four prevalent bacterial species present in infected wounds; b) differentiate these VOC signatures from each other using unsupervised learning methods; and c) assess how VOC signatures are affected with respect to bacterial growth. We propose that in the future this analytical method will provide a cheaper, more accessible alternative to current infection biomarker tests.

Method: VOC signatures of Staphylococcus aureus (S.aureus), Staphylococcus epidermidis (S.epidermidis), Pseudomonas aeruginosa (P.aeruginosa), and Escherichia coli (E.coli) were obtained using a simple headspace (HS) solid phase micro-extraction (SPME) sampling step coupled with Gas Chromatography - Mass Spectrometry (GC-MS) analysis. To assess the relationship between bacterial VOC emissions and bacterial growth, VOC emissions of S.aureus and P.aeruginosa were measured at various time points from 0 – 48 hours; bacterial growth was simultaneously measured using optical density (OD[600nm]) measurements.

Results / Discussion: All four bacterial species tested emitted characteristic VOCs and were clearly discriminated from each other. Each species emitted multiple unique volatile compound classes such as alcohols, ketones, acids, hydrocarbons, and fatty acid methyl esters. The VOC signatures of S.aureus and P.aeruginosa – in the case of specific compound classes – were found to correlate with the respective growth phase exhibited by the bacteria, which highlights the potential of using VOC signatures for the tracking the progression of bacterial growth.

Conclusion: The HS-SPME sampling step was capable of recovering VOC signatures that allowed the discrimination of various pathogenic and commensal species after only 20 minutes. A variety of unique compound classes were recovered from each species which allowed the construction of individual species-specific VOC signatures. Looking towards future applications of these techniques, one of the first objectives will be to expand on these results and determine if VOC signatures analysis can be used alongside clinical evaluations to assess the presence or absence of an infection. If bacterial VOC signatures can be used to track bacterial growth, could they be used – in the future - to track the progression of an infection?

Atypical Wounds

EP042 INTACT FRAGMENTED FISH SKIN GRAFT USED TO FILL A SINUS PILONIDAL WOUND: A CASE SERIES

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Aim: To assess the feasibility of using intact fish skin graft (FSG) to heal chronic post-surgical sinus pilonidal wounds. Pilonidal disease is a common condition of the skin and subcutaneous tissue near the upper part of the natal cleft of the buttocks. Cysts or abscesses can form due to ingrowth of hair, debris, or pressure. If infected results in severe pain, requiring surgical drainage, leaving a scar or a chronic sinus tract.

Method: Two female patients present with a history of chronic pilonidal sinus. HDM is a 21-year-old with a history of non-healing pilonidal sinus wound post-operation four years ago. LRJ is an 18-year-old patient with a pilonidal sinus for the last two years without previous surgical intervention.

Results / Discussion: Due to the chronic nature of the pilonidal sinus in these patients, the application of intact fish skin graft was considered to promote healing. HDM underwent further surgery to allow for complete sinus removal. FSG was initially applied two days post-operatively, followed by application 2x weekly. The wound is closed in 48 days post-op. LRJ has sinus removal surgery, where FSG was applied during the procedure and then x2 weekly. The wound was completely healed in 29 days.

Conclusion: Both cases showed rapid granulation with enhanced contracture allowing for earlier definite wound closure. The use of FSG is a novel and viable management option for earlier closure of post-excisional pilonidal sinus wounds, compared with traditional excision and wound management.

EP029 PYODERMA GANGRENOSUM A CHALLENGE IN DIAGNOSIS AND THERAPY

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Aim: Pyoderma gangrenosum (PG) is a necrotic, painful ulceration with rapid progression. This ulcer is usually treated as a banal wound that can lead to amputation over time

Method: We present a case of a 75-year-old female who was initially diagnosed as having infected ulcers, left lower leg dorsally. A venous or arterial pathology could be excluded.

Results / Discussion: There was an ulceration about 3/2 cm with necrosis and livid wound edges. An ambulant wound treatment was carried without success. Another presentation took place after 4 weeks in our wound ambulance with an extension of the ulceration over the entire dorsal lower leg on the left side, and a new ulceration on the dorsal lower leg on the right. There were massive painful necrosis, unclearly delimited.

The diagnosis of PG came after a histopathological exam and we adjusted weekly the treatment. Therapy

included local antiseptics, pain control, systemic corticosteroids, local compression therapy and surgical debridement. Despite the therapy, progression of the wound with necrosis in the first 3 weeks could not be avoided; additional lesions emerged in a circular ulcerative area of the right leg. The patient was followed-up weekly at our ambulance; at 3-months follow-up, the leg ulcer left was almost closed, right with red granulation tissue.

Conclusion: The diagnosis and treatment of PG is a challenge adequate therapy is necessary for this type of ulceration with rapid progression. Initially, because of the pain and ulcer, the patient's life was very limited. In this case, sepsis and amputation could be avoided.

EP030 SEVERE ERYSIPELAS TREATED WITH NEGATIVE PRESSURE THERAPY AND ADJUVANT HYPERBARIC OXYGEN THERAPY IN A PATIENT WITH FILARIASIS: A CASE REPORT

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Aim: The present study aims to describe the treatment of a patient with filariasis and other comorbidities affected by an erysipelas type lesion caused by multidrug-resistant germ with grade III tissue involvement.

Method: Upon admission, the characteristics of the lesion were: intense odor, voluminous and seropurulent exudate, large extension, cavity, irregular and friable border, edema and hardened perilesion, bed with granulation, fibrin, biofilm and slough. The Treatment performed (chart 1) consisted of mechanical cleaning, negative pressure therapy (NPT), hyperbaric oxygen therapy (HBO), cleaning with 0.9% saline in a light jet, chlorhexidine in perilesion, primary occlusion with mesh impregnated with silver, occlusion with polyurethane film (for compose NPT), antibiotic therapy with Ertapenem 1g, intravenous, once a day using Outpatient Parenteral Antimicrobial Therapy (OPAT), dipyrone and enteral nutritional therapy. During the hospitalization period, there was daily visitation by the curative nurses and periodic medical evaluation. The wound was cleaned and dressing changed every three days or less when the need for an immediate approach was identified.

Results / Discussion: There was adherence to treatment, good tolerance and no adverse effects. The

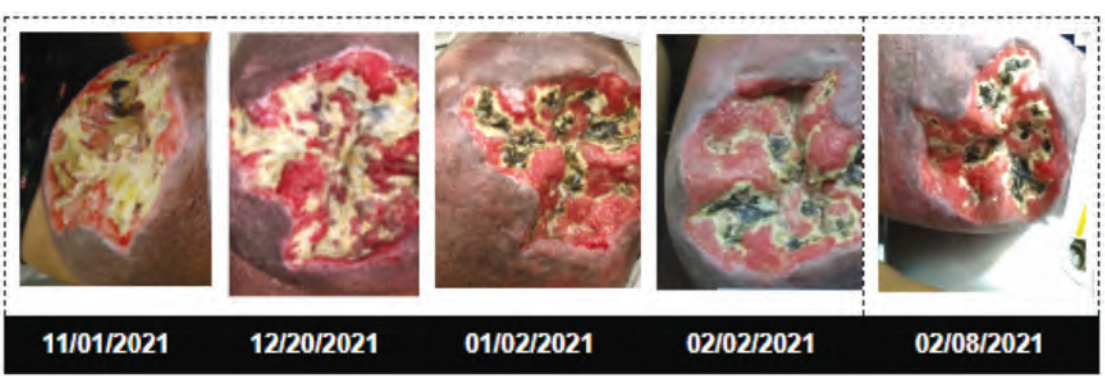

Illustration 1 - Evolution of the lesion aspect

medical evaluation considers that, until now, the evolution of the lesion (chart 02) is excellent, as shown in illustration 01. The patient is undergoing clinical treatment.

Conclusion: The findings in the literature and its correlation with the evolution of this case allow us to verify the benefits of integrative assistance in the treatment of wounds as well as the use of adjuvant therapies such as HBOT and NPT in complex and infected wounds

EP031 FOOT ULCER ASSOCIATED WITH EOSINOPHILIC FASCIITIS AGGRAVATED BY ARTERIOVENOUS FISTULA BENEATH THE ULCER

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Aim: This is a case about atypical wounds which can be complementary to the literature. In this case, we evaluated two atypical etiologies (EF and AVFs) of wounds. Through this case, we can learn about the diagnosis process and strategies of these atypical wounds which, we believe, can help our daily work about wounds.

Method: Summarize the case and review the literature by the keywords: Eosinophilic fasciitis (EF), refractory ulcers, chronic wound, arteriovenous fistula (AVF).

Results / Discussion: A 44-year-old male patient diagnosed with eosinophilic fasciitis presented with skin ulcers on the dorsum of both feet for 20 years. The ulcer on the right foot started to expand and was overgrown with granulation tissue 1 year ago. Pathological examination did not indicate malignant changes and there was no explanation for the development of the ulcer. Lower artery angiography revealed an arteriovenous fistula (AVF) beneath the ulcer, which may have been the cause. This case indicated a close relation between ulcers and AVFs. Skin ulcers are less likely to occur in EF patients than in those with scleroderma. Once an ulcer appears, however, it will be difficult to heal. Therefore, early detection, early diagnosis and identification of cause, and early comprehensive treatment are important.

Conclusion: In this case, chronic ulcer combined with trauma led to the formation of AVF, and there was a mutual relation between AVF and chronic ulcer. Early examination of correlated factors is helpful for the diagnosis and treatment of such patients.

EP032 EFFICACY AND EFFECTIVENESS OF USING PASTE TYPE OF ACELLULAR DERMAL MATRIX IN VARIOUS TYPES OF CHRONIC WOUND

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Aim: Chronic non-healing wounds, such as diabetic foot, Pressure ulcer, and postoperative intractable wounds can cause prolonged hospitalization and increase medical costs for patients. Moreover, exposure of vital structures (bone, tendon, etc) require complicated operative procedures. To decrease medical

costs, hospitalization, and number of operations, we used paste type of artificial dermis* for the patients who suffered from chronic wounds. In this report, we introduce paste type* of acellular dermal matrix and describe the effectiveness.

Method: Between Oct 2017 and Dec 2018, we applied paste* to 15 patients who suffered from chronic wounds. If wounds are suspicious of infection, debridement was done to exclude infected wound. Patients were randomly allocated to control or group*. In group*, we applied paste* 1cc or 2cc on 0, 2, 4 weeks and saline was applied to the control group with same schedule. The patient visit schedules were 0, 1, 2, 4, 8, 12 weeks and clinical photography was taken.

Results / Discussion: The study was designed as randomized controlled, prospective trial. There were no complications such as infection or inflammation in both groups. Both healing rate and final healed skin area (described as percentage) were superior with paste group*. In Paste group*, there was no remarkable complication related to the paste.

Conclusion: Paste* is one of the useful tool for chronic wound healing. It can accelerate wound healing process with stalled wound and decrease medical cost and hospitalization.
** CG paste, CGBio, Seoul, Korea*

EP033 PURE ALCOHOL SCLEROTHERAPY FOR MANAGEMENT OF LARGE CHRONIC COMPLICATED WOUND

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Aim: Despite recent innovative surgical techniques to solve the complicated wound, still surgeons encounter chronic wound which are not easy to manage with surgical methods due to numerous underlying factors with the patients. The aim of this study was to assess the safety and effectiveness of alcohol sclerotherapy for management of large chronic complicated wound.

Method: The patients with large chronic wound with non-healing raw surface over 30cm2 were enrolled to the study. Most of the wound was complicated chronic wound including opening with inner cavitation or non-adherent skin flap. The skin around the opening of the wound were protected with transparent film to prevent chemical burn, and the 100% ethanol were injected to the non-healing cavitary space up to 3 cycles.

Results / Discussion: The evaluation was assessed with the decrease of the cavity / non-adherent portion of the flap, along with the visual / radiological assessment of the biofilm removal. The rate of wound sized decrease was over 80% in every patients, and additional surgical procedure was not necessary, except for simple skin closure under local anesthesia. Especially in cavitied wound, overlying skin / skin-muscle flap was adhered to the basal surface of the wound without seroma formation.

Conclusion: In this study, we elicited the possibility of alcohol sclerotherapy for chemical elimination of chronic biofilm and converting the chronic wound to acute wound which leads to healing of large chronic wound.

EP034 ATYPICAL WOUNDS OF PYODERMA GANGRENOSUM WITH SIMULTANEOUS HIDRADENITIS SUPPURATIVA: A CASE REPORT

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Background: PASH syndrome is rare autoinflammatory syndrome characterized by the triad of Pyoderma Gangrenosum, acne and Hidradenitis Suppurativa. Widespread wounds can appear in sites already involved in inflammation by Hidradenitis Suppurativa. Treatment is challenging because of relapsing character of the disease.

Objective: Case presentation of atypical wounds in patient suffering from PASH syndrome.

Case: 29 years old woman with diagnosed Hidradenitis Suppurativa hospitalized because of rapid onset of widespread wounds in axillar, gluteal and chest areas was diagnosed with PASH syndrome. Over 3 years she was treated systemically with high dose steroids, antibiotics, Cyclosporine, Diaminodiphenil sulfone, Adalimumab and Rituximab with combination of different local treatments. In October 2018 the patient had an excision of wide wound at the right axilla with skin autograft. There was a partially skin graft take off, so negative pressure treatment was started. There was an improvement in granulation tissue formation, due to patient incompliance the treatment was discontinued. The wound at the right axilla extended to the arm and new wounds developed under the both breasts. Treatment with local application with a comprehensive wound care product* was started with some improvement and later was changed to enzyme alginogel due to big amount of exudate. The patient is treated in outpatient clinic twice a week in combination with systemic therapy.

Results: Partially closure of the wounds, with better results under the left breast.

Conclusion: Treatment of wounds in case of PASH syndrome is challenging. We are still looking for optimal treatment for our patient.
* *SilverStream*

EP035 DELAYED DIEP FLAP DURING CHRONIC INFECTION IN THE SETTING OF BREAST IMPLANT RECONSTRUCTION

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Background: Implant infections in the setting of breast reconstruction present a significant setback for breast cancer patients. Traditional management of implant infections is predicated on the operative removal of the implant and delayed replacement. Another option has emerged in which the soft tissue infection is neutralized, the implant is removed, the surgical site is washed out, and a new implant replaced. But, the use of autologous tissue immediately can save hospital stay and much safer for second breast reconstruction.

Methods: A retrospective chart review was performed of consecutive patients who underwent direct to implant breast reconstruction between 2015 and 2018 by the one surgeon. Demographic data, past medical history, hospital day, complications and reoperation method were reviewed.

Results: Fifty-one direct to implant breast reconstruction were performed with a mean age of 51.3. Mean mastectomy weight was 246.7g. Three patients experienced infection with culture positive but it did not improved with IV antibiotics. The implant was removed immediately, and reconstruction with DIEP flap was performed after a few days of aggressive wound care. The patients experienced no postoperative complications and the flap survived without vascular complications. There was no recurrence of infection. The cosmetic results were also good and the patient's satisfaction were very high.

Conclusion: Immediate implant removal and perforator free-flap breast reconstructions after several days of washing out the wound may result in good recovery in patient with implant infection. With a fast diagnosis aggressive wound care, and reoperation with autologous tissue can produce satisfactory results without recurring infection.

EP036 CHALLENGING ULCERS IN KID SYNDROME - A CASE REPORT

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Aim: We wish to describe how change in local wound management can heal and prevent wounds in hyperkeratotic plaques. Fissuring ulcers was challenging for a long period of time with recurrent infections by bacteria and dermatophytes.

Method: We present a case report of a 31 years old male with KID syndrome (verified by mutation analysis). He was consulting our outpatient dermatological clinic every week with hyperkeratotic plaques and ulcers in the skin of the lower legs and feet's. The local treatment was intensified with ongoing debridement using sparkling water, oil and mechanic instruments.

Results / Discussion: The new treatment was beneficial through a good cooperation between our patient, dermatological nurses, primary care nurses, chiropodists and doctors.

Conclusion: A good cooperation between all health professionals involved in treatment is essential, when to succeed a new and more aggressive debridement approach. This can improve healing and prevent ulcers in relation to hyperkeratotic plaques in a patient with Kid syndrome.

EP037 MARTORELL HYPERTENSIVE ISCHEMIC ULCER SUCCESSFULLY TREATED WITH APPROPRIATE WOUND CARE AND TIMELY SKIN GRAFTING

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Aim: Martorell Hypertensive Ischemic Leg Ulcer (HYTILU) is a rare painful condition that occurs in pa-

tients with long standing essential hypertension and diabetes type 2. This ulcerative disease presents a clinical and therapeutical challenge. Still in many countries the awareness of Martorell HYTILU is low, and the clinical management relies primarily upon case reports, case series and local practice. Early skin grafting has been suggested as an effective treatment to enhance pain reduction and wound healing in these patients. With our case series we were able to confirm this.

Method: The authors present two cases of Martorell HYTILU successfully treated with appropriate wound care and timely skin grafting. The first case illustrates the challenges we face when we are dealing with atypical wounds. The second case shows much quicker wound healing as a result of timely diagnosis and treatment.

Results / Discussion: Pain and necrotic progression were immediately controlled and complete epithelialization was achieved. Serial photographs of the evolution of the lesion and eventual healing of the ulcer are presented.

Conclusion: Early diagnostic and skin grafting is proved to be effective treatment of Martorell HYTILU. There is existing need for well-designed studies to further strengthen the evidence for the use of surgical treatments like skin grafting in the treatment of Martorell HYTILU.

EP038 EXPERIENCES WITH POLICRESULEN IN THE TREATMENT OF REFRACTORY OVERGRANULATION WOUND

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Aim: The treatment of exuberant granulation tissue in a nonhealing wound remains a stubborn problem in many patients. Policresulen* a topical hemostatic and antiseptic agent. has been reported to improve healing of common oral disorders, such as infectious stomatitis, and for gynecological infections. With a strong acidity of pH 0.6, it can act as a strong corrosive, therefore, the use of policresulen* can be also useful for chronic wound with overgranulation.

Method: We retrospectively reviewed patient with overgranulated diabetic ulcer admitted to our unit from January 2016 to April 2019. A total of 43 patients were included in our study, of whom 27 had policresulen* topical dressing. The remaining 16 patients were treated with conventional foam dressing and served as matched controls.

Results / Discussion: After treatment of the overgranulation tissue with policresulen solution* all cases showed a regression of overgranulation tissue and did not require skin grafting. In the policresulen* group, the length of hospital stay was significantly shorter and the infection rate was significantly lower.

Conclusion: Overgranulation is a common problem in chronic wound management. Policresulen is an organic acid of high molecular weight with hemostatic activity. It promotes selective chemical debridement and this contact provides the denaturation of cellular proteins, facilitating their removal. Its acidity, together with coagulating properties, give policresulen antimicrobial activity against staphylococcus spp., streptococcus spp. and Candida albicans. With these features of policresulen make it a valuable therapy for difficult-to-treat overgranulation chronic wound.
**Albothyl®*

EP039 PLATELET GEL IN TREATMENT OF SKIN GRAFT DONOR SITE CHRONIC WOUNDS

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Aim: There are several different approaches in the treatment of chronic wounds, as well as in the treatment of skin graft donor site. The features of platelet gel present play a significant role in the easy treatment of patients with chronic wounds.

Method: A patient aged 70 years was hospitalized after traffic accident and fracture of tibia and skin defect of distal-third front of the lower leg. After preoperative preparation, the patient was operated using a method of covering the skin defect by autotransplantation of the skin, harvested from the both front femoral region. After two weeks autotransplantation of the skin was accepted, but two months after the surgery, donor site was not healed using standard each day plastic surgery dressing. For the next two months conservative treatment continued with use of allogenic platelet gel, once a week, on both front femoral region, and after that only one front femoral region was treating with platelet gel, while the other one was treating by standard each day plastic surgery dressing.

Results / Discussion: Four months after treatment of platelet gel, skin graft donor site was healed in 80% of surface, while skin graft donor site which was not treated with platelet gel was healed less than 50%.

Conclusion: Treatment of chronic wounds is very complex, due to the presence of associated diseases. It needs a good knowledge of indications for using different approaches in certain phases of treatment.

EP041 ULCERS ON THE NASAL DORSUM: A DIAGNOSTIC AND THERAPEUTIC CHALLENGE

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Aim: The most common cause of ulcerated facial lesions in elderly patients is cutaneous carcinomas due to their connection to photocarcinogenesis. However, other less frequent causes should be considered when these injuries are assessed. The aim of our study is to review an uncommon cause of chronic ulcers on the nasal dorsum: pressure ulcers due to CPAP devices (Continuous Positive Airway Pressure); we also address its therapeutic approach.

Method: In this study we present three patients with ulcers on the nasal dorsum who were initially suspected of tumor etiology, when really all of them were only related to the use of a CPAP device. We review their diagnostic process and clinical evolution.

Results / Discussion: After ruling out the neoplastic etiology and finding its relationship to the decubitus of the CPAP mask, an alternative device was sought out. All the lesions evolved very favorably after the

device responsible was eliminated. Nevertheless, one patient presented lesions in another location due to the new device, and only the alternation of both allowed complete nasal cutaneous integrity.

Conclusion: Although ulcers on the nasal dorsum in elderly patients frequently have neoplastic etiology, other less frequent causes (as pressure ulcers or factitious dermatoses) should be included in the differential diagnosis. Nasal ulcers in relation to the decubitus of CPAP masks are a diagnostic and therapeutic challenge. We must know the differential diagnosis of these lesions and help patients search for alternatives.

Basic and translational Science

EP194 CHARACTERIZATION OF POLY(ADP-RIBOSE) POLYMERASE (PARP) INHIBITORS AS POTENTIAL NEW DRUGS FOR CHRONIC WOUND THERAPY

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Aim: Poly (ADP-ribose) polymerase (PARP) is involved in DNA damage detection and repair, inflammation and metabolism. In a functional ex vivo assay for chronic wounds, measuring the effect of human wound exudates on fibroblast proliferation and extracellular matrix formation, the PARP inhibitor Veliparib was identified as a hit compound which reversed the inhibitory effect of several exudates. Different PARP inhibitors were investigated concerning their potential suitability for wound therapy.

Method: Human fibroblasts were grown in 384-well plates in 2D and 3D cultures. PARP inhibitors were added to the cells in the presence of wound exudates from different chronic wound patients. Incubation times were 72 hours for 2D cultures and 4 – 8 days for 3D cultures. Supernatants were then harvested for the determination of cytokines, RNA was extracted for RT-PCR or cells were fixed and stained for cellular protein.

Results / Discussion: Veliparib reversed inhibition of wound exudate-induced fibroblast proliferation with 77/164 exudates from chronic wounds of different etiologies. Additional, chemically distinct PARP inhibitors showed differential effects in the presence of exudate: 6/9 compounds promoted fibroblast proliferation while 3 compounds were inactive. The same activity pattern was observed for fibroblast-derived matrix formation and was confirmed by an increase of collagen mRNAs.

Conclusion: In functional ex vivo assays for chronic wounds, several PARP inhibitors reversed the detrimental effects of wound exudates on fibroblast proliferation, matrix formation and proinflammatory cytokine secretion. Veliparib showed activity with ~45% of exudates. To select the patients best suited for therapy with this compound, theranostic pretesting is recommended.

EP195 REPURPOSING AN IRON CHELATION DRUG TO TREAT MUSCLE PRESSURE ULCERS IN MICE.

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Aim: We aim to repurpose an inexpensive FDA-approved iron chelation drug, deferoxamine (DFO), for treatment of muscle pressure ulcers. The effects of DFO on muscle regeneration have never been tested in animals.

Method: Endogenous stem cells of muscle were genetically labelled to express confetti-fluorescence in C57BL6 mice (via tamoxifen-inducible Cre recombinase in Pax7+ satellite cells). Pressure ulcers were induced on the dorsal skinfold using 12mm magnets. Saline or DFO (30mg/kg BID) was injected subcutaneously for up to 16 days. Tissue was harvested at 3, 10, and 40 days.

Results / Discussion: At 3 days after injury, DFO-treated wounds showed a decrease in iron, DNA damage, lipid peroxidation, and heme oxygenase-1 (an antioxidant enzyme for heme detoxification). Because oxidative stress can trigger extracellular traps (NETosis or METs) that impair wound healing, we measured citrullinated histone-H3, which was high in saline-treated and undetectable in DFO-treated.

At 10 days, DFO-treated wounds showed an increase in angiogenesis, granulation, pro-regenerative factors (VEGF, endoglin CD105), and Arg1-expressing ("alternately-activated" or M2) macrophages.

At 40 days, DFO-treated wounds exhibited 3-fold greater muscle regeneration, which had not yet finished (shown by myoblastic progenitor cells and thin central-nucleated myofibers). Unexpectedly, muscle fibers in the DFO-treated wounds also showed improved shape and morphology.

Conclusion: Although DFO had been reported to cause mild side-effects in healthy muscle, DFO-treatment of damaged muscle caused improvement in the speed, duration, extent, and morphological quality of muscle regeneration. It decreased several measures of excessive inflammation, and it increased several measures of pro-regenerative macrophage function.

EP044 A 3D CELL PRINTED MUSCLE TISSUE FOR FUNCTIONAL MUSCLE RECOVERY IN VML INJURIES

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Reported tissue engineered skeletal muscle repair constructs remodeled into a fibrotic tissue and showed limited functional improvement in volumetric muscle loss(VML) model. Therefore hydrogel-based 3D engineered muscles and the decellularized extracellular matrix (dECM) have been considered for VML treatment, but they also have shown limited efficacy. The authors established the skeletal muscle construct composed of cell-laden dECM bioink generated with a granule-based printing reservoir.

To mimic the hierarchical architecture of vascularized muscles, coaxial nozzle printing method was used. Human umbilical vein endothelial cell(HUVEC) and human skeletal muscle(hSKM) were printed with the muscle and vascular dECM bioink. In vitro studies revealed well aligned and striated muscle fibers with high cell viability without hypoxia of the 3D cell printed muscle constructs. About 15x6x4mm sized

vascularized skeletal muscle constructs were implanted to 40% defect of tibialis anterior(TA) muscle of Sprague-Dawley rats.

After 4 weeks, the coaxial printing group showed a significantly improved TA muscle weight than other control groups and achieved recovery at 78.6 ± 3.2% of the contralateral native TA muscle. Masson's trichrome staining demonstrated very few fibrotic tissues with well-organized de novo muscle fibers in the coaxial printing group. In situ force production showed that the coaxial printing group yielded an isometric torque of 87.2 ± 3.44 N mm/kg, which corresponds to 85% of the uninjured muscle, superior than other groups.

Our present results suggest that a 3D cell printing and tissue-derived bioink-based approach could effectively generate biomimetic engineered muscles to improve the treatment of VML injuries.

EP045 AN IN VITRO INVESTIGATION ON PHOTOBIOMODULATION EFFECTS OF BLUE LED LIGHT IN HUMAN HEALTHY AND KELOID-DERIVED FIBROBLASTS

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Aim: To Investigate the photobiomodulation effects of blue LED light on cellular metabolism, proliferation, in cultured keloid-derived fibroblasts (KFs), in fibroblasts isolated from perilesional keloids (PKFs) and in healthy fibroblast cells (HFs).

Methods: In all the experiments, we used a blue LED light device emitting in the visible range (410 - 430 nm) on primary cultures. Six different fluence doses (3.43 – 6.87 – 13.7 – 20.6 – 30.9 – 41.2 J/cm2) were applied. Cell metabolism, proliferation and viability were evaluated using three different biochemical assays: WST-8, Sulforhodamine B and Trypan Blue, respectively. All the tests were performed 24 and 48 h after the irradiation.

Results / Discussion: The blue LED light decreases both cell metabolism and proliferation of KFs and PKFs in a dose-dependent manner. HFs exhibit a metabolic biphasic dose-response of photobiomodulation: the low doses increase cell metabolism while the higher doses reduce it. Similarly, also cell proliferation decreases at the increasing of fluences applied; this effect is evident just after 24 h and becomes more pronounced after 48 h from the irradiation. Cell viability experiments demonstrated that KFs and PKFs were more sensitive to the blue light irradiation (41.2 J/cm2 applied) when compared to HFs.

Conclusion: The blue LED light directly affects KFs and PKFs inducing a reduction in cell viability, metabolism and proliferation. The effect on cell viability was not showed in HFs. However, HFs showed an increase in cell metabolism when low doses of blue light were applied.

EP196 IN VITRO EVIDENCE OF PHOTOBIOMODULATION BY BLUE LED LIGHT IN WOUND HEALING

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Aim: To study the contribution of the blue LED light in primary human dermal fibroblasts (HDFs) and keratinocytes cell line (HaCaT) to inspect the involvement and the role of photobiomodulation in skin wound healing process.

Methods: A blue LED light device (410 - 430 nm, 0.69 W/cm2) was used and six doses (3.43 – 6.87 – 13.7 – 20.6 – 30.9 – 41.2 J/cm2) were applied on cultured cells. Cell metabolism, proliferation and cell viability were tested; the ionic membrane currents were acquired by electrophysiological recordings. Cytochrome C redox state was assessed by microraman spectroscopy and scratch-test was evaluated until 72 h from the scratch induction.

Results / Discussion: High fluences of the blue LED light significant decrease cell metabolism in HaCaT cells. Only HDFs exhibit a metabolic biphasic dose-response of photobiomodulation: the low doses increase cell metabolism while the higher doses reduce it. The application of 41.2 J/cm2 induces cell death only in HaCaT cells, but not HDFs after 48h from the irradiation. The 20.6 J/cm2 applied can increase the outward potassium currents in HDFs, whereas this effect was not found in HaCaT cells; furthermore, this dose directly affects Cytochrome C only in HDFs, which changes its redox state. The same dose is able to induce cell migration in scratch test assay, which exhibit a complete closuring respect to the untreated sample.

Conclusion: Our results show that the blue LED light induces photobiomodulation both in HDFs and in HaCaT cells. Scratch test assay confirms the efficacy of blue light to stimulate wound healing process.

EP046 OSCILLATORY SHEAR STRESS PROMOTES ANGIOGENIC EFFECTS IN ARTERIOVENOUS MALFORMATIONS ENDOTHELIAL CELLS

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Aim: Vascular endothelial cells (ECs) are subject to continuous shear stress due to blood circulation.

Mechanical stress due to high shear flow can also cause arteriovenous malformation (AVM) when ECs respond hyper-sensitively to shear flow. This study was conducted to test the hypothesis that angiogenesis could be promoted in response to mechanical stress via regulation of pro-angiogenic factors in AVM cells. Method: Vascular endothelial cells (ECs) were extracted from the tissue samples from six AVM patients and six normal patients. Shear stress at 7 dynes/cm2 were applied for 24 hours. Before and after application of shear stress to each group, RT-PCR was performed to access the expression levels of angiopoietin2, aquaporin1 and TGFßR1. Immunofluorescences was also performed to evaluate the level of protein expressions.

Results / Discussion: In both normal and AVM tissues, angiopoietin2(AGP2) and TGFßR1 under the shear stress showed increased expression in the ECs compared to the non-sheared samples. When AVMs and normal arteries were compared, the expression levels of both AGP2 and TGFßR1 in AVMs were higher when compared to normal tissue with or without shear stress. Immunofluorescence-based protein analysis also confirmed shear-induced AGP2 and TGFßR1 in both samples of normal and AVM patients. Conclusion: AVMs exhibited higher sensitivity to shear stress by producing higher expressions of some marked genes and proteins that regulate the endothelial functions upon exposure to shear stress. While the physiological mechanism for AVMs remain elusive, our study shows the plausibility of physical stress imposed by the shearing flow can cause the occurrence of AVMs.

EP047 THE EFFECT OF THREE DIFFERENT TYPES OF SILICONE IMPLANT SURFACE TOPOGRAPHY ON CAPSULE FORMATION AROUND SILICONE IMPLANTS IN VIVO AND IN VITRO

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Aim: In using the silicone breast implant, capsular contracture shows a high incidence, but cause of it is still not known. In this study, the authors investigated capsule formation and capsular contracture around silicone implant using three types of implants with different surface topography in vivo and in vitro study.

Method: In vivo study, three types of implants (smooth, macrotexture and nanotexture type) with different surface topography were inserted for each individual, total of 48 wistar rats. After 4 weeks and 12 weeks, the samples were analyzed by histological, immunohistochemical and western blot examination. And in order to identify the movement of the implant, the degree of change in the position of the implant was measured. In addition, the surface topography was characterized using a scanning electron microscopy, three dimensional confocal laser scanning microscope. In vitro study, NIH 3T3 cells were evaluated after 1, 3 and 7 days with cell viability analysis.

Results / Discussion: In H&E staining, nanotexture type implant resulted in significant decreases in capsule thickness at 12 weeks($P<0.05$). Masson trichrome staining showed decreased collagen fiber density in nanotexture type implant. In the immunohistochemical and western blot examination, fibrosis markers (macrophage, myofibroblast and Transforming growth factor beta-1) were reduced in nanotexture type implant. In implant location evaluation, movement of implant were significantly increased in nanotexture and smooth type implant($P<0.05$) and in cell viability analysis, nanotexture type implant resulted in significant increases($P<0.05$).

Conclusion: Nanotexture type implant is thought to be an ideal implant that can reduce capsular contracture in terms of capsule formation and biocompatibility.

EP197 GLYCOSAMINOGLYCAN-BASED HYDROGELS IMPROVE WOUND HEALING IN CHRONIC WOUNDS

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While an initial inflammation is required as part of the wound healing process, chronic, non-healing wounds display a persistent inflammatory response that delays healing for weeks or even months. Capturing and neutralizing chemokine signals, a central mediator of inflammation, has been previously shown to offer a powerful new strategy for the treatment of chronic wounds 1. Based on this technology, we designed a hydrogel wound dressing that selectively sequesters pro-inflammatory chemokines while leaving pro-regenerative growth factors unaffected. Trapped inside a glycosaminoglycan-based polymer network, pro-inflammatory chemokines can be easily removed from the wound bed and thus allow for the resolution of the inflammation and subsequent healing. The developed dressing was tested with human exudate from venous leg ulcer patients where it effectively scavenged and neutralized inflammatory chemokines. In a porcine model of delayed wound healing the hydrogel wound dressing supported full healing of full-thickness wounds within 28 days, while no wound closure was observed in conservatively treated wounds (silicone contact layer with occlusive film dressing). The developed hydrogel wound dressings enable for the first time direct targeting of the wound bed inflammation as a new approach for therapeutic intervention of chronic wounds.

1. Lohmann, N. et al. Glycosaminoglycan-based hydrogels capture inflammatory chemokines and rescue defective wound healing in mice. Sci. Transl. Med. 9, (2017).

EP198 BIOCOMPATIBILITY INDEX (CYTOTOXICITY AND ANTIMICROBIAL EFFICACY) OF ANTISEPTICS

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Aim: The ideal antiseptic should be more toxic to bacteria than to eukaryotic skin cells. We investigated antimicrobial activity and cytotoxicity of octenidine dihydrochloride, PHMB, silver, PVP iodine, triclosan, chlorine and honey.

Method: We used an antiseptic microdilution method (CLSI M07) to determine minimal inhibitory concentrations of the antiseptics to Pseudomonas aeruginosa and Staphylococcus aureus. Inhibition zone

of the antiseptics was determined with a direct contact method. Cytotoxicity was measured with the MTT method with HaCaT keratinocytes, and 3T3 fibroblasts and IC50 was calculated. IC50 divided by MIC yielded a biocompatibility index (Müller and Kramer, 2008).

Results / Discussion: The antiseptics least toxic to skin cells and efficient against bacteria are in the order of the highest biocompatibility: octenidine > PHMB > PVP-I > triclosan > silver > honey > chlorine. All tested antiseptics produced bacterial inhibition zones around the dressings. The inhibition zones differed among the dressings or solutions with the same antiseptic. This highlights the importance of overall dressing construction on the antiseptic release. Müller and Kramer (2008), Hirsch et al. (2010), van Meurs et al. (2014) and Reddersen et al. (2019) also tested antiseptic antimicrobial efficacy and cytotoxicity with different cell types and methods. These authors also concluded that octenidine and PHMB are the least toxic yet efficient antimicrobials.

Conclusion: Antiseptic toxicity depends on concentration. However, at given concentrations, octenidine and PHMB were efficient against bacteria and nontoxic to skin cells. In contrast, silver, honey or chlorine at concentrations efficient against bacteria were toxic to skin cells.

EP048 COMPARATIVE STUDY OF THE VOLUME REPLACEMENT EFFICACY OF VARIOUS DERMAL FILLERS

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Aim: Numerous fillers are increasingly used for augmentation of volume loss and relaxation of facial wrinkles. In this study, we compared the effects of collagen and hyaluronic acid fillers with newly developed paste type of artificial dermal matrix.

Method: A total of 24 female hairless mice (SKH1-Hrhr) were injected with hyaluronic acid filler, collagen filler, and paste type of artificial dermal matrix with or without gelatin. Durability of fillers was assessed at 0, 3 days, and 1, 2, 4, 8, 12 weeks. Ultrasonography and computed tomography were used to evaluate the biodegradability of the fillers after the injections. To determine biocompatibility and neocollagenesis, histologic evaluation was performed at 4, 8, and 12 weeks after injection.

Results / Discussion: Paste type of artificial dermal matrix had excellent durability and effectively maintained volume compared to that of hyaluronic acid fillers and collagen fillers.

Conclusion: Our data suggest that newly developed paste type of artificial dermal matrix might be a safe and effective option for correction of volume loss.

Burns

EP050 THE EFFICACY OF HYALURONIC ACID COMBINED WITH SILVER SULPHADIAZINE IN THE MANAGEMENT OF SECOND DEGREE BURNS WITH DIFFERENT ETIOLOGY

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Aim: The management of burns depends of the surface and depth of burn, etiology, localization, general status, comorbidities and associated lesions. Hyaluronic acid is an essential component of the extracellular matrix, playing an important role in epithelialization. Our study confirms all of this, proving that using hyaluronic acid with silver sulphadiazine represents an important component of second degree burns management.

Method: We made the study based on 38 patients between 18 and 76 years old, with different etiology burns: hot liquid, contact, flame, electric arch. The burn lesions were second degree superficial and deep, with less than 15% body surface implicated. We included in the study: the epidemiologic status of the patients, the time of starting treatment with hyaluronic acid, other therapy used before the hyaluronic acid, bacterial status of the wound, healing time, hospitalization time, other surgical interventions.

Results / Discussion: The ethiology of burns was: in 23 cases hot liquid, 5 cases contact burns, 4 cases electric arch burns and 6 cases were flame burns. In cases of hot water burns, hyaluronic acid was applied from the first day of hospitalization, after surgical cleansing of the wound. In other cases, application varied between 3 and 5 days post-burn, following NPWT (10 cases) and classic dressing (8 cases) used for exudates absorption. Healing time varied between 10 and 24 days.

Conclusion: Because of its hygroscopic proprieties, hyaluronic acid provides a proper environment for tissue regeneration, with important use in scar management.

EP051 APPLICATION OF MEDICAL GRADE HONEY IN HEALING BURN WOUNDS

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Aim: Due to the wound aetiology in children and infection risks which increase with surface area of the injury, burn wounds form a global major epidemiologic problem (1, 2). The physicochemical properties of medical-grade honey (MGH) maintain moisture in the delicate wound bed while quickly eradicating and preventing infection (3). Here, we present a range of diverse burn injuries in 6 paediatric and 5 adult patients to demonstrate the safety, versatility, and efficacy of using MGH monotherapy.

Method: Wound healing data were collected from inclusion until resolution of the wounds. Wounds included thermal burns (n=7), a chemical burn (n=2), and full-thickness electrical burns (n=2). Differ-

ent dressing types of a MGH product were applied depending on the wound state. Similarly, dressing changes were performed daily (n=8), tri-daily (n=2) or weekly (n=1).

Results / Discussion: Median healing times in both paediatric (n=6, 14 days) and adult patients (n=5, 23.5 days) were recorded without any signs of infection, pain or side effects. Studies demonstrating the antimicrobial and wound healing abilities of L-Mesitran support our findings (4-7). Furthermore, the application of MGH formulation L-Mesitran proved to be safe and cost-effective in treating persistent and life-threatening infections, as shown in a recent clinical case series report (8).

Conclusion: Regardless of the type of burn or age of the patient, the application of L-Mesitran occurred without discomfort and successfully promoted wound healing. Our findings emphasize the safety of using MGH in preventing infection and promoting healing, even in paediatric patients.
L-Mesitran, Triticum Exploitation BV, the Netherlands

EP052 EFFECTIVENESS OF THE ARGININE-CARNITINE DRUG USAGE IN PATIENTS WITH BURN WOUNDS

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Introduction: Burn injury leads to formation of severe hemodynamic disorders, the release of cytokines, organs and systems. One of its leading mechanisms is endothelial dysfunction which plays a substantial role in the pathogenesis of burn wound healing.

Aim: To study the effect of the combined arginine-carnitine drug (CACD) on endothelial dysfunction in patients with burn wounds.

Method: Studies were conducted in the acute period of a burn disease: on 2-3th days, on 7-8th days and on 13-14th days. The use of CACD was carried out from 2-3 days after the burn injury for 5 days, intravenously in a volume of 100 ml once per day.

The contents of such markers of endothelial dysfunction as endothelin-1 (ED-1) in blood and wounds, sodium nitrite as the final NO-metabolite and TNF-∂ in peripheral blood were investigated.

Results / Discussion: Are presented in table 1. and pic.1

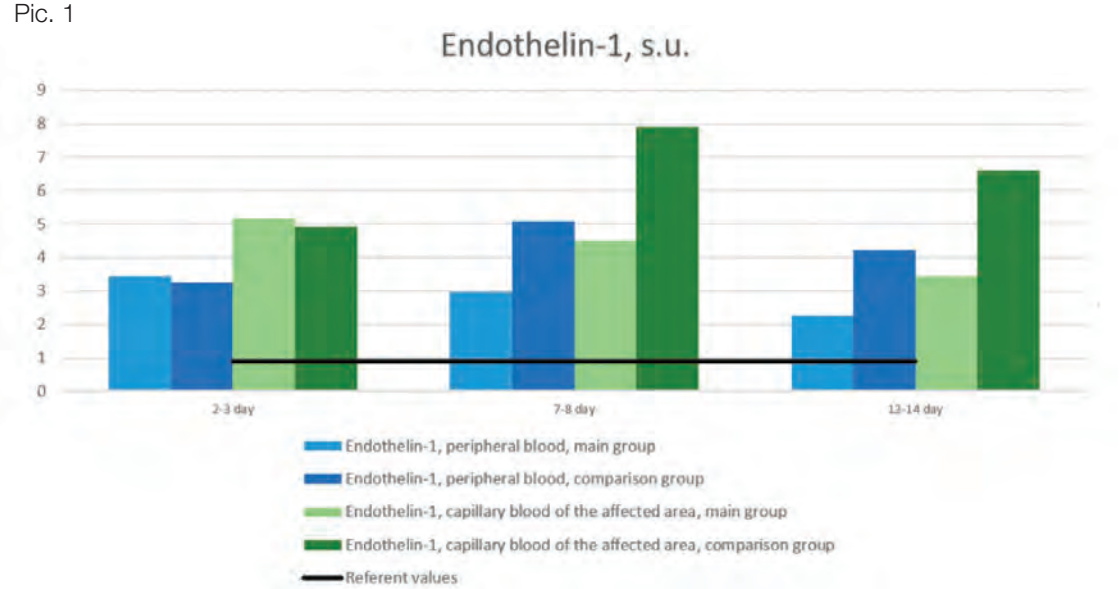
After a course of CACD there is a decrease in peripheral blood ED-1 levels and a significant decrease in wound ED-1 ($p < 0.001$) while in the comparison group there were observed significant increase of this indicators.

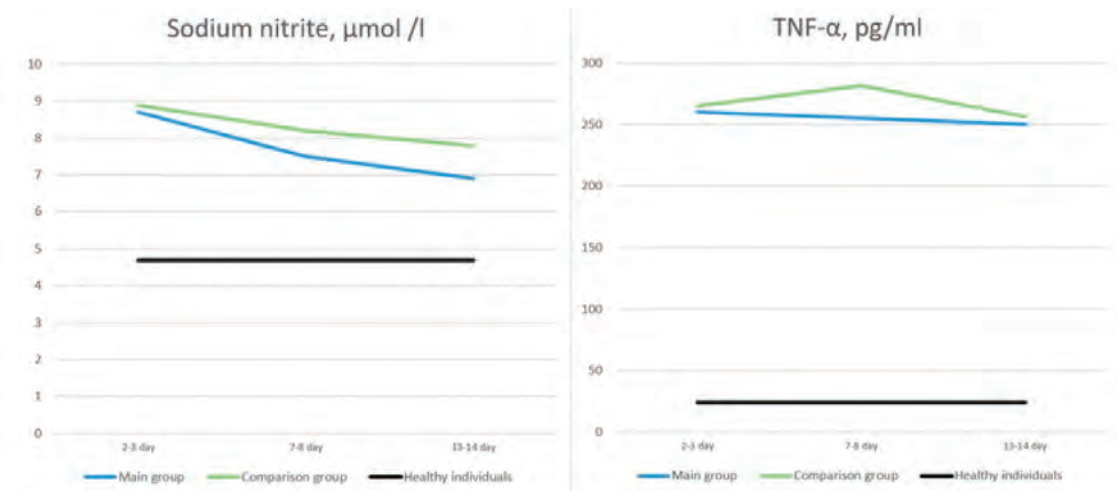
A tendency to a decrease in sodium nitrite levels is more pronounced in the main group. TNF-∂ in the main group tended to decrease while the comparison group showed an increase over baseline values.

Table 1

Investigated indicators	Main group M±m, (n= 18).			Comparison group (n=20)			Healthy individuals, n=20
	day after the burn injury						
	2-3 day	7-8 day	13-14 day	2-3 day	7-8 day	13-14 day	
Endothelin-1, peripheral blood, s.u.	3,43 ± 0,56	2,97 ± 0,56	2,27 ± 0,46	3,25±0,37	5,20±0,44	5,09±0,36	0,9±0,1
Endothelin-1, capillary blood of the affected area, s.u.	5,17 ± 0,22	4,51 ± 0,27	3,43 ± 0,25	4,92±0,3	7,9±0,2	6,6 ±0,1	0,9±0,1
Sodium nitrite, µmol /l	8,7±0,15	7,5±0,12	6,9±0,52	8,9±0,17	8,2±0,11	7,8±0,14	4,69±0,42
TNF-α, pg/ml	260,24 ± 6,98	255,07 ± 6,50	249,83 ± 8,23	265,0±11,55	281,2 ± 14,67	256,35±15,70	24,2±6,0

Pic. 1





Conclusion: We found that combined arginine-carnitine drug usage in the complex treatment in the early period of burn wound healing promotes reduction of inflammatory reaction manifestations and reduces the degree of endothelial dysfunction.

EP053 THE USE OF INTACT FISH SKIN GRAFTS AS A NOVEL METHOD OF MANAGEMENT FOR DERMAL BURNS FOLLOWING ENZYMATIC DEBRIDEMENT: A CONTROLLED RETROSPECTIVE CASE SERIES

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Aim: To determine optimal burn wound management using enzymatic debridement (ED)* and intact fish skin graft (FSG)**. Optimal therapy for deep burn wounds is based on rapid necrotomy and coverage to avoid systemic inflammatory response achieving the best possible outcomes for scarring. Limited infrastructure and patients' underlying medical conditions present challenges in burn care.

Method: In this retrospective case series, 12 patients with superficial or deep dermal burn wounds were treated with ED followed by FSG, an alloplastic skin substitute dressing***, or a split-thickness skin graft (STSG). The patients were examined objectively and subjectively for healing and scar quality in a 12-month follow-up after burn injury.

Results / Discussion: Wounds treated with FSG demonstrated accelerated wound healing and significantly higher water storage capacity amongst functional and cosmetic outcomes such as improved elasticity, thickness, pigmentation, and pain relief. The decrease in pain and itch was expressed as POSAS score (Patient and Observer Scar Assessment Scale) compared to wounds treated with STSG or alloplastic skin substitute. Furthermore, FSG treated wounds had significantly improved sebum production. Skin elasticity was significantly better than alloplastic skin substitute but not but reached no significant superiority compared to STSG treated wounds.

Conclusion: The combination of ED with FSG resulted in faster healing of burn wounds with better functional and aesthetic outcomes than STSG or alloplastic skin substitute dressing. The results indicate that FSG is an excellent skin substitute following ED of burn wounds and may further reduce the need for autografts.
**(NexoBrid®)*
***(Kerecis® Omega3 Wound,)*
****(Suprathel®)*

EP054 CLINICAL EXPERIENCE IN BURNS TREATMENT USING LMW-HYALURONIC ACID TOPICS

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Aim: To describe the importance of hyaluronic acid topics in partial thickness burns treatment, corresponding to each chronological stage of the burn injury, reducing the healing time, with a good control of pain management during the dressing change and improving the quality of newly formed tissue.

Method: Descriptive study developed on 20 patients between December 2019- January 2021, including I, IIA, IIB burn lesions and skin graft donor zones, on a total surface area 5-10%, in different zones of the body such as upper/lower limb and trunk.

Results / Discussion: For all the patients (aged 21-58 years, 14 female), we preceded the LMW-HA application by the lesion debridement with topics based on hyaluronic acid and collagenase. In 7 cases we performed surgical excision of IIB eschar followed by reconstruction using split-thickness skin grafts harvested from the thigh. We obtained good functional and aesthetic results in all the cases, with total healing time of 14 - 21 days.

Conclusion: Because of its contribution as a modulator to many of the biological processes, LMW-HA (200 kDa) became a part of therapeutic options for burns lesions and skin graft donor zones. The ease of use and biocompatibility were also considered as important points.

EP055 AN ALGORITHMIC APPROACH FOR DIFFERENT DEGREES OF FACE BURNS

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Aim: The Face constitutes of various three-dimensional aesthetics units. The reconstruction of the burn face with the same principles of other parts of the body, usually results in poor aesthetic results. It is mandatory to evaluate the burned structures according to the depth and location, and create an algorithm to achieve best results.

Methods: The burned face is investigated on an everyday basis and the depth changes are noted. Usually, debridements are accomplished at the first 10 days, gently at the first week. Ultrasonic and water assisted debridements are preferred to blade and curettage usage. Skin and dermal substitutes are frequently used. When the TBSA burn area is increased and full thickness grafts are required, tissue expanders are preferred.

Results: Eleven patients with various parts of burned face and are presented in detail. The reconstructive options are; skin and dermal substitutes, expanded flaps, full thickness and split thickness grafts, local and regional flaps. Fat graft injections and additional non-invasive procedures are not discussed here. Full face, half face, nasal, periorbital, chin, and ear burns are discussed in detail.

Conclusion: In the University of Health Sciences, Faculty of International Medicine, Kartal Dr Lütfi Kirdar Burn Center, the surgeons perform over 500 surgeries every year. Our team constitutes of general surgeons, plastic surgeons and a pediatric surgeon. All face burns are reconstructed by the plastic surgeons. The team approach to the burned patient enables various strategies to be performed.

EP056 ENZYMATIC THERAPY IN BURNS TREATMENT : EFFICIENCY AND LIMITS

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Aim: To describe how enzymatic debridement provides an important alternative to the surgical approach in deep burn care, as is able to remove thermally damaged tissue rapidly, with minimal bleeding and with no sacrifice of the viable dermis.

Method: Between 09/2018-09/2019, we selected 12 patients hospitalized with deep partial to full thickness burns, ranging between 5-15% TBSA, aged 18-88 years old, who underwent enzymatic debridement in our Burn Center and we evaluated additional surgery needed, time for wound healing and the quality of the scars.

Results / Discussion: For 10 of the 12 cases, we obtained spontaneous healing by epithelialization and we performed daily dressings using local topics containing hyaluronic acid. Only for 2 patients, who developed a pseudoeschar, we applied surgical debridement and skin graft. We managed to obtain a selective removal of the eschar, reducing blood loos with no sacrifice of the donor zone. Due to it's early removing eschar, the evolution of the scars has improved.

Conclusion: Although our study has its limits because of the small number of patients, enzymatic therapy proved to be a minimal invasive method in burns treatment and became a part of our therapeutic options with good results regarding function and aesthetic outcomes.

EP058 FLUORESCENT LIGHT ENERGY IN SECOND DEGREE BURNS: A PRELIMINARY EXPERIENCE

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Aim: Fluorescent Light Energy is based on the specific capability of external cromophores to be activated by a blue Led light in order to improve wound healing. With the aim of verifying its efficacy and safety on burned patients, we used this technology on second degree burns. Here we present our preliminary results.

Method: We selected 10 patients affected by second degree burns (superficial and deep) on upper and lower extremities; after informed consent and pictures, we applied the gel with cromophores on the bed of the burn and we activated it with the blue Led light for 5 minutes+5 minutes/1 time per week. All the subjects were adults.

Results / Discussion: All the patients healed avoiding the surgery with a complete rehepitelization; in particular in patients affected at the beginning by a deep second-degree burn, it "superficialized" the burns bringing them to a complete rehepitelization without scarring. The average number of sessions required has been 4 (minimum 2-maximum 6). There has been no complication during the treatment, and all the patients reported a great compliance.

Conclusion: Fluorescent Light Energy can be a good novelty in burn's treatment because of: 1) the great compliance of the patients, 2) the easiness of the application, 3) the absence of scars at the end of the healing process.

EP059 ADVANCED FACIAL BURNS MANAGEMENTS IN SEVERELY BURNED PATIENTS: A SERIES OF 10 CASES

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Aim: To show the outcomes of an innovative therapy to manage superficial and deep partial-thickness facial burns (AB-A/AB-B) secondary to scalds and fire in severe burned patients.

Method: Descriptive, observational. Series of cases to monitor the effect of a comprehensive therapy over healing process in facial burns. Description: Pain management prior procedure. 1. Irrigate face with Saline Solution. Carefully apply moisturizing cream 2. Perform a soft massage to remove previous coating and debris. Gently cover ears, nose, and lids. Repeat step one if needed 3. Male patients: perform shaving to facilitate mechanical debridement 4. Cleaning and decontamination: Gauzes soaked with

Polyhexanide-Betaine were left over the face including lids, ears and lips for 10 minutes. Compresses were carefully removed 5. Soft mechanical debridement by using debridement pad moistened in Polyhexanide-Betaine 6. Polyhexanide-Betaine Gel X applied over the face plus Sterile Paraffin gauze as a secondary dressing to maintain moisture environment. Dressing changes twice per day until exudate controlled and signs of epithelization are observed.

Results / Discussion: Face and special zones as lids, ears and lips were moistened avoiding retraction of the tissue and burn deepening. Promoted burns healing in moisture and aseptic environment. Relieved pain. Very well tolerated by patient. Excellent results functional and aesthetic. Complete healing after 15 days average.

Conclusion: Facial burns are challenging and their healing conditions future patient's Quality of Life. This protocol shows the benefits of healing in a moist physiological environment.

Devices & Intervention

EP061 PHOTOBIOMODULATION IN PRESSURE INJURIES AND IAD: PRELIMINARY RESULTS OF A NEW THERAPEUTIC APPROACH

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Aim: The use of light in the treatment of chronic wounds (photodynamic therapy) is quite recent. Lately, technology provided a new treatment with "blue light" (photobiomodulation) which has further improved the performance of this type of local treatment.

Method: The work is still ongoing. At the moment we enrolled 7 institutionalized elderly patients with pressure ulcers and/or Incontinence Associated Dermatitis (IAD); the enrolment target is 20. The treatment protocol is a "blue light" application twice a week of two minutes every 25 cm2. The dressing for pressure injuries is Ozoile® (an olive oil derived ozonide with vitamin E acetate) in spray, cream, alginate or moist gauze formulation, and the dressing for IAD is Silver Spray Powder or Ozoile® in cream formulation. Dressing change two/three times a week for pressure injuries and daily for IAD. We're evaluating Wound Area Reduction (WAR) and Depth Reduction (DR) after a 10 weeks treatment with weekly controls, using Visitrak™ System.

Results / Discussion: All treated wounds showed significant improvement, especially in terms of WAR (more than 50% within 4 weeks). Deep pressure injuries reduced depth of more than 50% within 3 weeks of treatment; IAD healed very quickly (about 3 weeks). No complications, no allergies, no induced pain. Conclusion: This work has shown that photobiomodulation can improve both pressure injuries and IAD very rapidly; the most significant finding is that fungal colonization, very frequent in IAD, can be eradicated within 2-3 weeks of treatment (investigated with Wood's lamp) without the use of drugs.

EP062 HOW TO IMPROVE TELEMEDICINE- NON-CONTACT APPROACH: INFRARED THERMOGRAPHY

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Aim: It is observed that most of the wound patients are elderly with reduced mobility which makes it harder for them to attend to hospitals. In addition, their conditions do not enable them to easily reach out to their wounds to check at home. The phone adapted camera would make it easy to take a thermal picture or video and share with the wound care unit allowing the patient to be actively involved within the process.

Method: Thermal imaging is a remote, non-contact and non-invasive technique. It is easy to use enabling real-time monitoring which only records the natural radiation from the skin surface and has no harmful radiation. It is also suitable for prolonged and repeated use. The non-contact infrared thermal camera has been used to select and follow up of patients in a wound care unit where over 15,000 pictures and videos were taken during a six-year period.

Results / Discussion: The measurement of increased skin temperature with infrared thermometry can be used to detect metabolic activity. Skin thermometry can help the clinician to assess and monitor an increased risk of neuropathic foot ulceration, localized sign of deep inflammation and surrounding infection. The camera has been very effective to analyze critical situations as it clearly detects inflammation and circulation on diabetic foot, venous ulcers and other wounds.

Conclusion: With this clinical experience and success rates, the thermal camera would prove itself to aid the telemedicine approach especially for people with non-healing wounds.

EP063 PHOTOBIOMODULATION WITH BLUE LIGHT AS ADJUVANT THERAPY IN WOUND MANAGEMENT: THE EXPERIENCE OF MARCHE REGIONAL HEALTH UNIT – ZONE 2, ITALY.

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Aim: To use a medical device for Photobiomodulation with blue light, as an adjuvant therapy to promote the healing process of hard-to-heal wounds.

Method: 28 outpatients and home care patients with wounds of various aetiology were treated in the territory of Marche Regional Unit – ZONE 2, Italy. Application of Blue Light was carried out for 60 or 120 seconds in case of diabetic patients, with a frequency of once/twice a week. Blue Light was applied in addition to SoC therapy. A portable medical device was used, equipped with LEDs emitting blue light with a maximum power density of 120mW/cm2 and a wavelength range of 400-430 nm. The evolution of the following parameters was observed: wound area, wound bed, and pain trend.

Results / Discussion: An average of 10.6 treatments were performed per patient. 27 patients responded to the Blue Light treatment achieving a wound size reduction or complete healing and registering a significant reduction in pain. In a group of 14 patients an assessment of wound bed and pain was performed through Wound Bed Score (WBS) and VAS Scale: the final WBS (average 13.2), recorded an improvement of 5.7 average points respect to initial WBS (average 7.5). Patients showed an average pain reduction of 5.7 points on VAS scale.

Conclusion: According to clinical observations, we registered a response to the Blue LED Light therapy in 27 out of 28 patients. The healing process occurs starting from the lesion edges activation and a granulation tissue increase, with a significant pain reduction.

EP064 CLINICAL EVALUATION OF THE RESPONSE RATE TO A CONTINIOUSLY ACTIVE, SINGLE-USE ELECTRICAL STIMULATION DEVICE IN STATIC NON-HEALING WOUNDS

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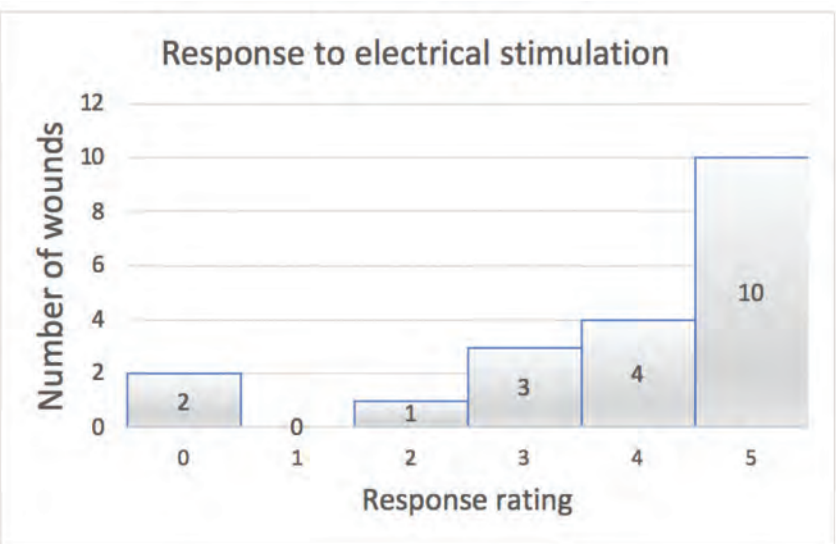
Aim: Whilst the in vitro and clinical evidence for beneficial effects of Electrical Stimulation (ES) on the mechanisms of wound healing are now quite significant, ES has yet to become a mainstream therapy. One reason is the predominant use of expensive, periodic, clinic-based ES treatments. This evaluation assessed the response of static non-healing wounds to an automatic, continuously active, single-use low-voltage pulsed microcurrent ES device*.

Method: 20 wounds (19 patients: 8 female 11 male, mean age 69.6) were recruited: 5 post-surgical, 5 diabetic, 3 pressure, 3 venous and 1 arterial ulcer and 3 trauma wounds had been present a mean 35.7 months and static in this study for a mean 3 weeks despite a range of interventions. ES therapy was then applied for 12 days during which time a 30-min ES was program was automatically applied every 2-4 hours; 8 wounds received a further 12-day ES therapy. Responses were scored on a 0-5 scale (5-excellent – 0-no response).



Results / Discussion: Overall, 14/20 wounds showed a significantly positive response: reductions in pain, peri-wound oedema, exudate, inflammation, and increases in granulation and re-epithelialisation were typical. Changes were often observed within 14 days.
Conclusion: Continuously active, single-use ES is a small portable easy-to-use device which allows patients to be treated at home. It has a significant ability to kick-start healing in a range of difficult non-healing wounds. Further studies with greater numbers of wounds will reveal its full potential.
** Accel-Heal (Accel-Heal Technologies – Hever, Kent, UK)*

EP065 INFLUENCE OF DIFFERENT PHOTOBIOMODULATION PARAMETERS ON MULTIPOTENT ADIPOSE TISSUE MESENCHYMAL CELLS IN VITRO.

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Aim: To investigate the effect of different parameters of photobiomodulation (PBMT) with low power LASER in multipotent mesenchymal stem cells (MSCs), derived from adipose tissue, on cell proliferation and death.

Method: Mesenchymal stem cells derived from adipose tissue, at a concentration of 2x104 maintained in *a*MEM medium (minimum essential medium) with 15% FBS (Fetal Bovine Serum), were seeded in 24-well plates and subjected to FBM applications with the parameters physical: 660 nm and 830 nm wavelength; the energy of 0.5 J, 2 J and 4 J, powers of 40 mW and 100 mW. The analysis of the plates with MSCs was carried out with the MetaXpress® software at 24, 48, and 72 hours, and the statistical analyzes were carried out with the GraphPad Prism® 7.0 software.

Results / Discussion: The results obtained in the experiments showed that irradiation promoted a significant increase in cell proliferation, especially using the variables 830 nm, 100 mW, 2.0 and 4.0 J, and 830 nm, 40 mW, and 0.5 and 4.0 J compared with the other parameters used. PBMT with 660 nm and power of 40 mW was the one that produced more significant cell death compared to the other irradiation parameters.

Conclusion: The results found show that both wavelengths were effective in cell proliferation. The 660 nm wavelength produced more cell death.

EP066 MINIMAL INVASIV APPROACH USING COLD ATMOSPHERIC PLASMA TO AVOID A HIGH RISK OPERATION - SUBJECT-SPECIFIC CONCEPT FOR COMPLEX WOUNDS IN CARDIAC SURGERY

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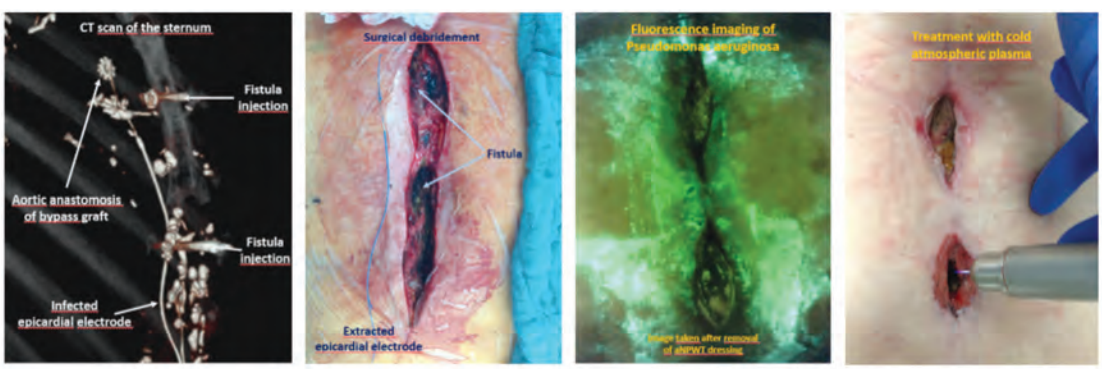
Aim: Complex wounds are a serious problem for patients of various medical disciplines. Whereas standard wound care is sufficient for most of the patients some patients are in need for a specialized treatment concept. Early detection of patients with special problems related to the primarily operation procedure is important and requires an individualized treatment regime.

A case report of a 64-year-old patient is presented, who had undergone multiple operations due to a postoperative infection after coronary artery bypass grafting (CABG) surgery.

Method: The patient underwent CABG-operation in March 2019 and was readmitted three weeks later due to severe sternal infection. The patient was treated in hospital for 138 days and underwent a total of 11 operations with the use of standard NPWT.

The patient was transferred to our clinic in May 2020 with two persisting fistulas infected with pseudomonas aeruginosa.

Initial debridement with extraction of an infected epicardial electrode was performed in minimal invasive technique. Pseudomonas aeruginosa was eliminated by focused treatment with fluorescence imaging and a treatment concept using cold atmospheric plasma and aNPWT.



Results / Discussion: Overall stay in our hospital was 81 days with only three operations.
Conclusion: An individualized treatment concept using cold atmospheric plasma is able to treat complex infection caused by pseudomonas aeruginosa. The high-risk operation with opening the chest as standard procedure could be avoided. This treatment concept could have avoided high costs caused by the unsuccessful initial approach and could have shortened the overall length of stay in hospital.

EP067 DECELLULARIZED FISH SKIN GRAFT IN WOUNDED CHILDREN DURING THE COVID-19/20 ERA

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Aim: During the pandemic, more specific strategies are needed to support children requiring skin grafting. Our goal was to identify procedures that reduced OR times, SSI, postoperative complications, pain and hospital stay. Patients' safety, optimal wound bed support and quick microdebridement with locoregional anesthesia were a priority. We ultimately selected a novel acellular fish skin graft (AFSG) derived from cod.

Methods: We admitted 12 consecutive pediatric patients with various lesions requiring skin grafting for definitive wound closure. The average age was 8yrs and 9mo (4.1yrs-13.5yrs). All AFSGs were applied and bolstered in the OR following debridement. Ten patients received Negative Pressure Wound Therapy (NPWT). Operating times, interval for definitive wound closure and complications were recorded.

Results / Discussion: We observed rapid wound healing in all children, with a coverage area of 100%, and complete healing in 95%. The AFSG reduced the final wound area to 70%. Time until engraftment in NPWT patients was reduced by 50% (12 days). Ten patients received locoregional anesthesia and discharged after day surgery. The operating time was <60', and no complications or allergic reactions were reported. Excellent pliability of the healed wound was achieved in all children. This case series is the first and largest using FSG to treat children with wounds of different etiology. We attribute the rapid transition to acute wounds status and the new epidermal-dermal complex's good pliability to AFSGs' preserved molecular components, including Omega3.

Conclusion: AFSG represents an innovative and sustainable solution for pediatric wound care that resulted in shorter surgery time and hospital stay in the COVID-19 pandemic.

EP068 EASE OF USE OF WEARABLE, SINGLE-USE ELECTRICAL STIMULATION DEVICE FOR THE MANAGEMENT OF HARD-TO-HEAL WOUNDS

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Aim: Electrical stimulation (ES) has been shown to promote wound healing and pain reduction in hard-to-heal wounds. Traditional ES devices have proved difficult to use in everyday practice; this has limited adoption of the technology. This evaluation aimed to demonstrate the ease of use of a single-use, wearable ES device*.

Method: Fifteen patients with hard-to-heal wounds were treated with ES* for a 12-day treatment period.

Electrode pads were positioned either side of the wound and were connected to a small electronic device which was changed every 48-hours. The healthcare practitioner's (HCP) experience with each patient's treatment was evaluated, via a questionnaire.

Results / Discussion: The simplicity of applying the electrode pads, changing the electrode pads and connecting the device, was "good" or "very good" in all 15 patients. In 93% (14/15) of cases, "very good" comfort with the device was reported with the remaining case reporting a 'good' degree of comfort. In 12 cases with painful wounds, HCPs reported a positive perception of pain reduction following ES; pain reduction was perceived as "very good" in 25% of cases, "good" in 50% and "fair" in the remaining 25%. Satisfaction with the device was high; in all cases, HCPs reported the overall experience with the device to be "very good" or "good".

Conclusion: The ES device* was easy to apply and manage in outpatient settings. This device may enable HCPs to adopt an evidence-based technology that has previously been difficult to implement.
**Accel-Heal, Accel-Heal Technologies Limited, Kent, UK*

EP069 INTACT FISH SKIN GRAFT (FSG) RESULTS IN FASTER TIME TO HEALING AND LOWER COST IN PATIENTS WITH VENOUS LEG ULCERS (VLU) AND DIABETIC FOOT ULCERS (DFU) COMPARED TO STANDARD OF CARE (SOC): AN OUTCOME-BASED PRICING MODEL

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Aim: A novel outcome-based pricing (OBP) model can help manage healthcare expenses associated with chronic wounds. Skin substitutes are recommended if wound area reduction is <50% after 4 weeks of SOC treatment, but are underutilized due to high initial costs. We want to evaluate the OBP model focusing on VLUs and DFU management using SOC treatment or FSG.

Methods: The OBP model determines that treatment with FSG should accelerate wound healing by a minimum of 25% over the expected healing time trajectory with SOC. If criteria were met, the health institution would cover cost of the treatment. If the FSG failed to meet the criteria then no institutional cost was incurred. We recruited 44 patients, 23 VLUs and 21 DFUs. After 4 weeks of SOC, 18 wounds received treatment with FSG, and 26 wounds continued SOC for week 5-8.

Results / Discussion: Cost of treatment was based on a weekly cost for SOC treatment ranging from $100- $2000/wk. Cost saving was seen at $500/wk (~16K for treatment) to 2000/wk (~90K). Cost savings of FSGs increased as the cost of SOC per week increased. Use of FSG outperformed the projected healing trajectory between weeks 4-8 by >25% in 67% of patients treated with FSG. Most wounds healed >50% sooner than predicted by the SOC model. There was no product cost for 4 wounds.

Conclusion: We showed that treatment with FSG results in cost savings and faster wound healing than predicted by SOC treatment. New pricing models make it possible to adopt innovative products while lowering healthcare costs.

EP071 TWO PROOF-OF-CONCEPT CASE STUDIES USING MESHED FISH SKIN IN COMBINATION WITH MESHED SLIT SKIN GRAFTS FOR IMPROVED HEALED WOUND RESULTS

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Aim: A novel approach was explored using meshed fish skin grafts (FSG) in 2 wound beds overlaid with meshed split thickness skin grafts (STSG) following debridement for early wound closure. The goal was to reduce surgical intervention and speed healing time with better healing outcomes.

Methods: Two patients were treated. Patient 1 had a malignant melanoma of the right ankle surgically excised. The patient received negative pressure wound therapy (NPWT) followed by grafting. Patient 2 presented with fasciitis in the left leg and had a history of secondary venous insufficiency and recurrent ulceration of the left lower leg. Application of FSG with STSG was completed in a one-step procedure. STSG grafting in a meshing ratio of 1:3 and FSG in 1:1.5 ratio and vice versa were applied in patients 1 and 2, respectively.

Results / Discussion: Use of meshed FSG with STSG in a one-step procedure allowed the use of a thinner and higher mesh ratio of the STSG without compromising graft take rate and wound closure. Different ratios were tried to find the best outcome that could inform future studies. Wounds were in good condition 5 days post-procedure, with an excellent improvement over 3 to 4 weeks.

Conclusion: Both patients had good healing outcomes in a timely fashion. These case studies are a proof-of-concept that fish skin could be used as an integrated matrix layer to improve final results in a one-step procedure.

EP072 USE OF PLASMA ENRICHED IN PLATELETS AND MONOCYTES FOR TISSUE REGENERATION: 25 CLINICAL CASES.

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Aim: The continuous and incessant evolution of science is a stimulus to find innovative techniques, also in Wound Care: for the healing of skin lesions we now have the potential of Regenerative Medicine available. The use of plasma enriched in platelets and monocytes (PRP / MNC) is an example of "enhanced", biological and regenerative tissue repair, which, through the formation of new tissue (non-scarring) and the modulation of inflammation, leads to rapid healing even for long chronic injuries.
The purpose of this work is to evaluate the effectiveness of this technique and its effective applicability, even in skin lesions that are difficult to manage.

Method: We treated 25 patients with PRP / MNC (applied in form of gel or by infiltration) on surgical and traumatic wounds, decubitus, vascular ulcers and diabetic foot, after suitable preparation of the wound bed according to the principles of WBP.

WBP score, size, pain, patient and operator feedback were taken into consideration, within a maximum period of 1 month after treatment.

Results / Discussion: All the treated lesions showed immediate resumption of the repair process, already at the first check-up at 7 days, reaching complete healing within 2 weeks. In chronic lesions, the reduction of inflammation and pain was significant.

Conclusion: This cellular preparation has certainly demonstrated, in our experience, its enormous potential in terms of tissue regeneration in a very short time; extension of the study is necessary (even in lesions of different etiology and phase of WBP) to test its effectiveness at 360°.

EP073 BLUE LIGHT EMISSION IN THE MANAGEMENT OF CHRONIC WOUNDS: OUR EXPERIENCE

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Background and aim: A hard-to-heal wound has been defined as one that fails to heal despite standard therapy. The aim of the study was to promote the healing process of hard to heal wounds by using a portable and easy to use device, equipped with an adjustable optical head with Light Emitting Diodes (LED)*, maximum optical power density of 120 mW/cm2 covering a diameter of 5 cm.

Methods: We enrolled, obtained informed consent, 20 patients affected by venous leg ulcers. We divided the patients in two groups, 10 patients treated with the blue light once a week, 10 patients treated with the standard of care, both for 16 weeks. The wound assessment, including wound size by centimetric scale, pain with VAS scale and EQ-5D-5L were provided. We performed a follow up visit after 4 weeks.

Results: At the end of the study, the blue light-treated group showed an average area reduction (58%) in 8 patients, an area increase (23%) in 1 patient, and complete healing in 1 patient. The NRS score showed a total reduction of 50% in 8 patients, and an increase of 20% in 2 patients. The follow-up visit showed that 5 wounds had an average area reduction of 47%, 3 wounds showed an average size increase of 10%, and 2 wounds showed complete healing. The control group showed a mean reduction in area (48%) in 6 patients, a mean increase in area (20%) in 2 patients, and complete healing in 2 patients. The NRS score showed a total reduction of 30% in 6 patients, and an increase of 40% in the remaining 4 patients. The follow-up visit showed that 6 wounds had an average area reduction of 22%, 1 wound had a 15% increase in size, and 1 wound showed no change in size. Quality of life assessment showed in the treated group an increase of 65% in 8 patients and an increase of 55% in 2 patients. The control group showed a 45% improvement in quality of life in 6 patients, a 30% increase in 2 patients, whereas 2 patients showed no change in quality of life.

Conclusions: According to these preliminary data, the blue LED device is promising in terms of wound healing promotion and patient quality of life improvement. Further studies will be necessary to confirm our results.

EP074 EFFICACY AND SAFETY OF CO2 LASER IN WOUND BED DEBRIDEMENT OF CHRONIC LEG ULCERS

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[1]University of Pisa, Dermatology, Pisa, Italy

Background and aim: Chronic wounds are an important medical health problem, affecting patients' quality of life. The laser CO2 represents one of the new proposals in the field of tissue repair. The aim of study is to evaluate efficacy and safety of CO2 laser and light emitting diode in wound debridement and tissue biostimulation.

Methods: We enrolled 20 patients affected by chronic leg ulcers, resistant to standard treatment. We compare a group of 10 patients received laser treatment (A) with a group of 10 patients treated with surgical debridement (B). Wound assessment was performed by using 3D imaging system (Star Aranz™), the VAS scale and EQ-5D-5L quality of life, twice a week for 6weeks.

Results: After 6 weeks of treatment the Group A showed a reduction of fibrin (70%), a wound size reduction more than 50%, and a significant improvement of quality of life. At the end of treatment, the Group B showed a reduction in terms of fibrin (40%) and a wound size reduction (20%).
Conclusion: According to our preliminary data, the laser CO2 device is a promising therapeutic strategy in terms of wound healing promotion and patient quality of life improvement. The laser treatment was considered safe and tolerable during the study period.

EP075 A CASE STUDY: COMPLETE HEALING OF A CHRONIC VASCULAR WOUND-POST-GANGRENE AMPUTATION/SKIN GRAFTING- UTILIZING MATRIX RHYTHM THERAPY- A NON-INVASIVE MECHANO-MAGNETICAL APPROACH

Sowkhya Sagare[1], Ozlem Hammond[2], Ulrich Randoll[3]

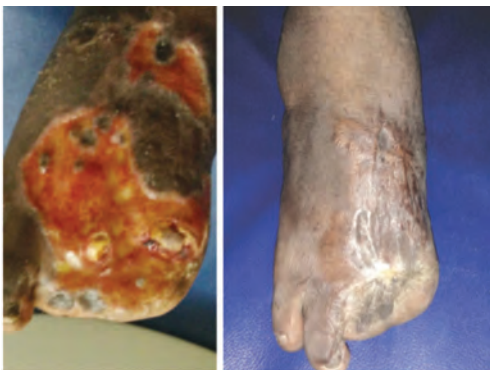
[1]Ayush and Ayrvedic Rehabilitation Centre, Sangli, Maharashtra, India; [2]Matrix Rhythm Therapy, Research and Development, United Kingdom; [3]Dr Randoll Institute, Munich, Germany

Aim: Peripheral Vascular Disease (PVD) is associated with significant morbidity, high cost to health care, and loss of productivity and quality of life. The effect of a new noninvasive therapy where mechano-magnetical (8-12Hz) vibrations applied leading to increased circulation, oxygenation, entrainment leading to complete healing is summarized.

Method: Wound was measured approximately 9 cm by 9 cm at referral. Therapy* was applied with the handheld resonator**, around the wound edges and the whole of the affected limb by a trained physio-otherapist. Sixty minutes therapy* was applied twice weekly until the wound was completely healed. No other active therapies were applied except the continued standard wound care.

Medical History / Results: This patient is a 50-year-old male chain smoker presented with a non-healing (15 months) chronic vascular wound. He had amputation of 1st- 3rd right toe with gangrene diagnosis in September 2016. In January 2017, he presented with non-healing wound post amputation. The CT Angiography showed thrombosed and calcified right popliteal artery. He received femoral distal bypass of

popliteal artery and skin grafting for the foot. The graft was rejected. In March 2018 patient was referred to the Ayush Rehabilitation Clinic where he was offered therapy*. The wound was completely closed by the 8th month, 64 sessions of application*.



Conclusion: This is a non-invasive therapy and has demonstrated complete wound closure in a very difficult to heal case with PVD. This case demonstrated very important evidence that theraphy* could be a very effective therapy and needs to be studied further.
**MaRhyThe®*
*** Matrixmobil®*

EP076 NEW MEDICAL DEVICE IN WOUND HEALING: OXYGENATED COPPER (CU2O) IN MULTILAYER DRESSING

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Background: Copper is an essential trace element involved in all stages of wound healing process and bacterial control. Dressings with copper reduce the risk of local infection and directly stimulate wound repair. The dressings are indicated for wide range of acute and chronic wounds.

Objective: New technology study for promoting wound healing process and local bacterial control with copper containing wound dressing.

Method: A case study of a patient with chronic wounds treated with dressing containing oxygenated copper (CU2O). 60 years old man with chronic venous ulcers for 20 years with alternating healing and new wounds appearance, the last episode of worsening for two and a half years. He was treated with hydrofiber combined with medical honey and Unna-boot on top. There was an improvement in edema but slowly improvement in wound contraction. A decision was made to change the treatment. The new dressing with oxygenated copper was applied twice a week with Unna-boot on top in outpatient clinics. The follow up photographs were taken before starting the treatment and in every change of dressing.

Results: An improvement was noted with the new treatment with multilayer dressing containing oxygenated copper. There was a reduction and closure of parts of the wounds after the second change, further improvement of edema and discharge.

Conclusion: In this case the new multilayer dressing with oxygenated copper was effective in treatment of chronic venous ulcers. The dressing is cost-effective, easy to apply, with no side effects and provides biofilm control.

EP077 THE CURRENT STATE OF PLAY OF PHOTOBIOMODULATION AT 5 YEARS FROM INTRODUCTION ON THEMARKET: OBESRVATIONAL ANALYSIS ON 500 PATIENTS

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Aim: The PhotoBioModulation (PBM) with chromophore gel has now a role in the treatment of chronic skin lesions.

With this analysis we wanted to takethe state of play regarding the treatment's applicability in various kind of lesions, not only chronic, but also acute ones at risk of chronicity, evaluating their effectiveness.

Method: 500 patients treated with PBM were analyzed, dividing the lesions (572), for the different etiologies, into two groups:
- chronic, further subdivided according to the interfering factor with the healing process (microbial imbalance, stalled bed / margins, inflammation, maceration).
- acute at risk of becoming chronic (burns, other traumas, surgical wounds).

Healing times and the number of applications performed were evaluated.

Results / Discussion: In maximum 2 application cycles (each of eight sessions) 97% of the lesions showed signs of recovery of the healing process or even the achievement of complete epithelialization. In the same way, 97% of the acute lesions "at risk" chronic have recovered without further complications.

Conclusion: This observational analysis shows without any doubt the convenience of treatment with PBM on all kind skin lesions, not only chronic but also acute "at risk", deserving a place even in the preventive treatment of chronicity in traumatic and surgical wounds.

EP078 USE OF KINESIOTAPING FOR THE REDUCTION OF POST-SURGICAL COMPLICATIONS IN DERMATOLOGY

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Aim: Kinesiotaping (KT) is an elastic adhesive bandage which has a large number of therapeutic applications due to its properties; one of these is generating a skin traction that elevates subcutaneous tissue, which generates additional space under the application area that improves blood and lymphatic circulation. This is the characteristic of KT for which the ability to reduce hematoma, inflammation and post-surgical pain is attributed.

Our study aims to investigate the short and medium-term effects of KT on the reduction of postsurgical

complications after the reconstruction of complex surgical cutaneous defects.

Method: We collected 9 patients (3 men and 6 women) who underwent skin-tumor surgery with a risk of post-surgical complication in which the KT bandage was applied. All surgeries are in areas of great vascularization and high risk of bruising, inflammation and pain. Demographic data, complication risk factors, application technique, evolution in the immediate postoperative period, as well as its follow-up in the medium-term (at least 7 months) are collected retrospectively.

Results / Discussion: In all clinical cases (except in one in which the bandage had to be removed 12 hours later) we can observe a notable subjective decrease in hematoma, inflammation and pain compared to clinical expectations. There was either a very good or good evolution of wound healing, with hardly any edema or bleeding; and considerable decrease in pain.

Conclusion: Although more standardized studies remain necessary, our experience suggests that KT may be an aid in reducing the postoperative complications of complex dermatological reconstructions.

EP079 PROOF OF PRINCIPLE: A HYGROSCOPIC CHEMICAL COMPOUND FOR THE RAPID REMOVAL OF BIOFILM AND NECROSIS IN HARD TO HEAL ULCERS AND WOUNDS

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[1]Hermans Consulting Inc., Netherlands

Aim: Topical desiccation agent (TDA) is a chemical compound, designed to debride through strong hygroscopic action. This leads to quick desiccation of tissues and microorganisms, causing rapid dissolution of biofilms and necrosis, thus assisting in granulation development and reepithelialization. The aim of this study was testing the compound for safety and efficacy.

Method: An IRB-approved proof-of-principle study in Italy (submitted for publication) was conducted with 54 patients with hard to heal lesions. The main objective of the study was assessment of safety, efficacy (debridement, development of granulation tissue), and healing.

Results: The study proved TDA to be safe and effective with 92.5% of all lesions reaching complete granulation and 74.0% reaching complete reepithelialization.

Three representative cases are presented, an 81-year-old male patient with a non-healing lesion on the left posterior lower leg, a 77-year-old female suffering from a non-healing, post-trauma lesion over the right Achilles tendon, and 83-year-old diabetic female with severe peripheral arterial disease and previous toe amputations, who was suffering from a gangrenous lesion of the left foot. The three patients had been treated with different materials and techniques for a while, without healing progress.

In all patients one application of TDA was enough to remove the biofilm and necrosis. All lesions proceeded to granulation and subsequent reepithelialization with only regular dressing changes.

Conclusions: The cases presented here are indicative of TDA having the potential to remove biofilm and necrosis rapidly and efficiently, thus increasing the chance of healing of stalled wounds.

Diabetic Foot

EP080 A NOVEL METHOD FOR THE ASSESSMENT OF EFFECTIVENESS OF ANTIBIOTIC THERAPY IN DIABETIC FOOT – PRELIMINARY DATA (DFIATIM STUDY)

Vladimíra Fejfarová[1], Radka Jarosikova[1], Jitka Husakova[1], Veronika Woskova[1], Ivana Nováková[2], Jan Polak[3], Petr Tüma[4], Alexandra Jirkovská[1], Michal Dubský[1], Robert Bem[1], Jakub Mrázek[5]

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Background and aims: Instances of amputation due to DF infection can be prevented by administering antibiotic (ATB)therapy at levels conducive to optimal bactericidal activity in serum and tissue. However, time-dependent ATBs usually used for infectious complications are not routinely monitored in DF patients. The aims of our study were to introduce a novel diagnostic procedure determining ATB concentrations in peripheral tissue and to verify safety of such method.

Methods: We have enrolled in our pilot study 8 patients with DF (DF ulcers of WIfI stages (2-3)-(0-3)-(2-3)) requiring intravenous ATBs for progression of infectious complications. These patients were admitted to the Diabetes Centre and treated for 6-7 days by intravenous ATBs. We have analysed the serum and tissue concentrations of beta-lactam (amoxicillin-AMC;n=5) and cephalosporin (ceftazidime-CTZ;n=3) ATBs administered by boluses. After their steady state (5 ATBs applications) microdialysis assessment(0-360 minutes) of peripheral tissue ATBs availability was performed in diabetic foot ulcer location.

Results: Preliminary results show our first practical experiences with microdialysis techniques – insertion technique, serum and tissue samples processing and novel biochemical analysis used to analyse concentrations of selected ATBs. Peripheral tissue AMC concentrations reached almost 8-31% of serum concentrations; the significant differences between serum and peripheral concentrations were found between 0-180 minutes after ATB bolus administration (p=0.006-0.04). Peripheral tissue CTZ concentrations achieved 13-21% of serum levels. No complications of microdialysis technique were found.

Conclusions: Our preliminary data suggest that microdialysis is a suitable method for monitoring the tissue concentration of selected antibiotics. This novel approach can improve anti-infection strategy and improve the prognosis of patients with DF infection.
NU20-01-00078

EP081 GRAFT OF 3D BIO-PRINTED AUTOLOGOUS MINIMALLY MANIPULATED HOMOLOGOUS ADIPOSE TISSUE FOR THE TREATMENT OF DIABETIC FOOT ULCER: A PILOT PROSPECTIVE CLINICAL STUDY

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[1]Health Science University, Medical School, Department of General Surgery,, Istanbul, Turkey; [2]Ankara City Hospital, General Surgery, Ankara, Turkey; [3]Head Ankara City Hospital, Health Science University,

Medical School, Department of General Surgery, Istanbul, Turkey; [4]Rokit America, Los Angeles, United States

Aim: To confirm efficacy of the new treatment method using a novel 3D bioprinting technology, we performed single center clinical study with diabetic foot ulcer (DFU) patients.

Method: Twenty patients with a non-infected, non-ischemic DFUs were studied. The patient's wound area was scanned with a camera and the image file sent directly to 3D bioprinter Dr. INVIVO (ROKIT Healthcare, South Korea). Autologous adipose tissue was harvested from patient's abdomen by liposuction and micronized immediately. With 3D bioprinter, personalized adipose patch was manufactured in the operating room and applied directly onto the ulcer. After a single treatment, patients received standardized gauze dressing. They were followed for up to 13 weeks or healing.

Results / Discussion: The mean age, duration of wound and wound size was 60.7 years, 48.7 days, and 7.53 cm2, respectively. Patients were treated with 3D bio-printed autologous adipose patch and successfully absorbed onto the wound. All DFU patients demonstrated successful graft take and these results revealed a significant and immediate wound size reduction. The mean percentage of area reduction for the 20 patients at week 8 was 96%, and complete healing at the ninth week was 19/20. Weekly decrease was significant till week seven (p=0.000, p=0.002, p=0.004, p=0.014, p=0.016, p=0.045, p=0.038, respectively).

Conclusion: The results of this pilot study suggest that a novel 3D bioprinter delivering adipose-derived concentrated pluripotent cells is feasible and potentially promising. The convergence between cell biology, optical scanning and 3D bioprinting technology implies a potential paradigm shift in personalized care for people at high risk for lower extremity amputation.

EP082 INCREASING TRANSCUTANEOUS OXYGEN PRESSURE (TCPO2) IN PATIENTS WITH NEUROISCHAEMIC DIABETIC FOOT ULCERS TREATED WITH A SUCROSE OCTASULFATE DRESSING

José Luis Lázaro Martínez[1], Marta García-Madrid Martín de Almagro[1], Josep Garcia[2], Serge Bohbot[3], Jose Luis Garcia Klepzig[4], Yolanda García Álvarez[1]

[1]Universidad Complutense de Madrid, Diabetic Foot Unit, Madrid, Spain; [2]Laboratoires Urgo, Medical Director, Barcelona, Spain; [3]Laboratoires Urgo, Medical Director, Paris, France; [4]Hospital Clínico San Carlos, Servicio de medicina interna, Madrid, Spain

Aim: To analyze TcPO2 values within the treatment of neuroischaemic diabetic foot ulcers (DFUs) treated with a sucrose octasulfate (TLC-NOSF) dressing.

Methods: 11 patients with neuroischaemic DFUs treated with sucrose octasulfate dressing were included in a prospective pilot study. TcPO2 values were measuring using TCM400 device (Radiometer, Copenhagen) on the pedis or tibial posterior artery angiosome according with ulcer location. TCPO2 values were assessed at day 0 and every 4 weeks until wound healing. Student "T" test for dependent samples were used.

Results: 11 patients were included (8 male) with a mean age of 61.91 ± 8.87 years old, 8 with Diabetes

Type 2 and 3 with Diabetes mellitus type 1. HbA1c mean values was 7.62 ± 1.15. 6 ulcers were IC and 5 were IIC according with Texas classification. The mean area of the DFUs was 1.45± 0.45 cm2 and the mean duration was 62.87+116.49 weeks. Wollina Score mean was 4.18 ± 1.72 at baseline. Nine ulcers were located in the forefoot, one in the midfoot and one in the heel. Mean TcPO2 values at day 0 were 29.45 ± 7.38 mmHg and 46.54 ± 11.45mmHg at wound closure (p= 0.016). The ulcer healing time was 8.80+2.87 weeks

Conclusion: Local treatment with a sucrose octasulfate dressing in neuroischaemic DFUs showed an increase in TcPO2 values within the treatment. An improvement of the local angiogenesis has been previously mentioned as a part of mechanism of action of this dressing. The increase of the local microcirculation could support this theory.

EP083 RESULTS OF A MULTICENTRE OBSERVATIONAL SURVEY ON HEALING PROPERTIES OF A TLC-AG POLY-ABSORBENT DRESSING ON WOUNDS AT RISK OR PRESENTING SIGNS OF LOCAL INFECTION FOCUS ON DIABETIC FOOT ULCERS

Ralf Lobmann1, Michael Dietlein2, Winfried Keuthage3

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Aim: Evaluation of the clinical impact of a TLC-Ag dressing with poly-absorbent fibres* on the healing process of wounds at risk or with clinical signs of local infection in diabetic foot ulcers (DFUs) patients treated under real-life conditions.

Method: A large, German, prospective, multicentre, observational study was conducted on 2270 patients with acute and chronic wounds. Main outcomes included the reduction of the number of infected wounds, evolution of the clinical signs of local infection, wound healing rate, relative wound area reduction (RWAR), tolerability, handling and acceptance of the dressing. The results presented focus on DFUs patients.
Results: 545 DFUs patients (mean age 71 years old, 57% male) were presenting with a diagnosed infection (9.7%) or with clinical signs of infection (61.7%).

The clinical signs of local infection and the diagnosed wound infections were substantially reduced. A clinical improvement of the wound healing was reported with a wound closure rate in 17.8%, improvement in 69%, stabilization in 9.2% and a worsening in 4% of the cases. A median RWAR of 38.8% was achieved. Similar results were reported regardless of the exudate level and healing stage (sloughy/granulation) at baseline. The dressing was very well tolerated and very well accepted by patients and healthcare professionals.

Conclusion: These results, documented in a cohort of 545 DFUs patients treated in current practice, comfort and complete the clinical evidence on the good healing properties and safety profile of the TLC-Ag dressing in the management of wounds at risk or with clinical signs of local infection.
** UrgoClean Ag, Laboratoires URGO*

EP084 DIABETIC FOOT

Hasan Murat Arslan[1], Serife Kelle Dikbas[1], Emine Güvenir, Cardiovascular Surgery, Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Turkey

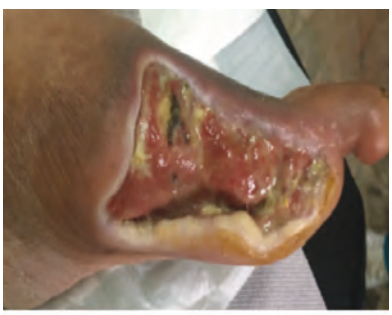
[1]Fatih Sultan Mehmet Hospital

Introduction / Aim: Diabetes mellitus is a serious health problem that is common worldwide and affects mortality (1). Ischemia, which is a consequence of neuropathy, which is a diabetes-specific complication, and peripheral artery disease accompanying diabetes, is a complication that leads to excessive pressure on the ground and infection with diabetic foot, organ (2)

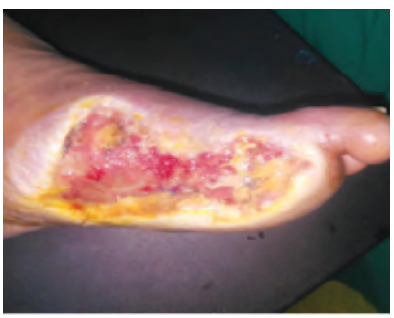
Case: I.Ç 76-year-old male patient, D.M patient since the age of 40, D.M disease, the patient with HT, CRF (in need of dialysis) and Carotid Artery Disease was hospitalized for wound care.

Results / Discussion: Radiological imaging (CT Angio, DSA Angiography) was performed for the evaluation of peripheral vascular disease. Regular follow-ups were made by infectious diseases, endocrinology department and orthopedics during the ward.

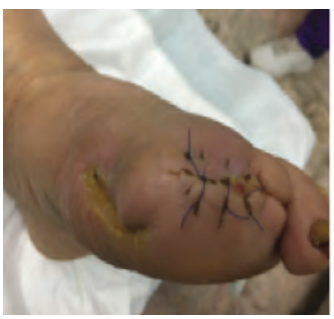
Conclusion: Vascular structures should be evaluated for rapid healing of wounds. Blood sugar regulation should be provided, a nutrition program should be implemented, and training support should be provided to foot care and primary caregivers.



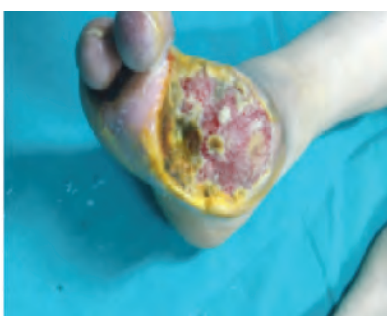
1. Left foot end of the first month



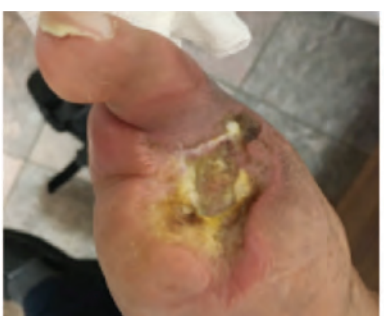
2. Left foot end of the second month



2. Left foot end of the third month



4. Right foot after amputation



5. Right foot before exitus

Resources: 1) Sukmana. M, Sianturi. R, Aminuddin. M, Application of International Best Practice Guideline in Diabetic Ulcer Patients, Journal of Nursing Practice,2019,3(1):50-62
2) Biçer. K. H, Çelik. S, Diyabetli Hastalar ycin Kapsamlı Ayak Muayenesi ve Risk Deyerlendirmesi, Türkiye Klinikleri Dergisi, 2016;8(1):62-70

EP085 BLUE LIGHT PHOTOBIOMODULATION (PBM) TREATMENT AND DIABETIC FOOT: PRELIMINARY RESULTS

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Aim: Diabetic neuropathic foot lesions are frequent disease complications. They represent common causes of major (above) or minor (below the ankle) amputation starting with superficial ulcers (Texas University Classification I or II) or bone deformity (TUC 0). Concomitant limb ischemia worse the already negative prognosis because of defective skin regeneration. The aim of our study was to explore if innovative new technologies could reverse homeostatic skin imbalance in type two diabetic patients (T2D).

Method: "Blue Light PBM treatment was delivered with a portable device (EmoLED) that uses LED sources emitting Blue Light in the interval of 400-430 nm with a maximum optical power density of 120 mW/cm2 and a 5 cm diameter light beam at target".

Results / Discussion: We recruited 11 neuropathic T2D with (4) or without (7) peripheral ischemia. 4 patients resulted with (TUC III) and 7 without (TUC II) osteomyelitis. 2 pz suspended treatment because of Covid positivity; 1 for critical limb ischemia, 1 for sepsis. 4 (TUC II) ulcers healed after complete treatment (10 sessions); 2 (TUC II) partially closed more than a half after 5 sessions and are moving on. All patients received standard medications and targeted antibiotic therapies.

Conclusion: Emoled is a satisfactory tool for diabetic neuropathic ulcers and represents potential regenerative therapy able to reverse defective tissue homeostasis of diabetic skin legs. New randomized studies are necessary to standardize duration and frequency of sessions and to address optimal schedules of treatment based on ulcer depth, concomitant osteomyelitis and treated or untreated ischemia.

EP086 COST EFFECTIVENESS ANALYSIS OF A TLC-SUCROSE OCTASULFATE DRESSING IN COMPARISON TO A NEUTRAL DRESSING WITHIN THE TREATMENT OF DIABETIC FOOT ULCERS

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Aim: Specialisation and multidisciplinary approach for patients with diabetic foot ulcers (DFU) lead to improved outcomes (e.g. reduction of major amputations and reduction of treatment costs) [1-4]. The application of innovative dressings with TLC-Sucrose Octasulfate* leads to a significant increase of wound closure rate (WCR) and a reduction of healing time [5]. For the therapy of venous leg ulcers higher cost effectiveness for a TLC-Sucrose Octasulfate dressing in comparison to a neutral one was already demonstrated [6]. This cost effectiveness analysis (CEA) aims to compare two options of local wound

therapy for patients with DFU, a TLC-Sucrose Octasulfate dressing (test) versus (vs.) a neutral dressing (control), in order to demonstrate a higher cost effectiveness based on Explorer also for this indication [7].

Method: Clinical results and direct costs for wound dressings, time of care, inpatient care in hospitals were analysed from the perspective of German statutory health insurance.

Results: Direct costs for therapy of DFU were 2,864.21 € with the TLC-Sucrose Octasulfate dressing (test) vs. 2,958.69 € with the neutral dressing (control) after 20 weeks. A modelling according to Markov over 100 days showed even higher differences in costs with 5,882.87 € (test) vs. 8,449.39 (control). Sensitivity analysis confirmed the robustness of these results.

Conclusion: This CEA demonstrates that therapy of DFU with a TLC-Sucrose Octasulfate-dressing is reasonable regarding health economics. Both therapy costs as well as cost effectiveness were superior to the local wound therapy of DFU vs. a neutral dressing.
**TLC-Sucrose Octasulfate dressing (TLC-NOSF): UrgoStart Tül*

EP087 RESULTS OF A MULTICENTRE, PROSPECTIVE, OBSERVATIONAL STUDY ON THE HEALING PROPERTIES OF TLC-NOSF POLY-ABSORBENT DRESSINGS* IN CHRONIC WOUNDS. FOCUS ON THE DIABETIC FOOT POPULATION

Claas Lüdemann[1], Joachim Dissemond[2], Steffen Luetzkendorf[3], Udo Möller[4], Elisa Becker[4], Serge Bohbot[5]

[1]Evangelisches Waldkrankenhaus Spandau, Internist/Angiologist, Berlin, Germany; [2]Hospital University, Dermatologist, Essen, Germany; [3]General Surgeon, Helbra, Germany; [4]Urgo GmbH, Sulzbach, Germany; [5]Laboratoires Urgo, Paris, France

Aims: This work aimed to evaluate the efficacy and safety of new TLC-NOSF dressings with poly-absorbent fibres in an unselected population of patients under real-life conditions. Here are the results for diabetic foot ulcers (DFUs) patients.

Methods: A large, prospective, multicentre observational study with TLC-NOSF poly-absorbent dressings* was conducted in Germany between July 2017 and December 2018. Patients suffering from chronic wounds of various aetiologies were treated and followed-up for a maximum duration of 12 weeks or four documented visits.

Results: A total of 1,140 patients with chronic wounds were treated; among them, 250 patients with DFUs were treated in 76 centres for a mean duration of 56±38 days. By the last visit, 43.6% of wounds had healed and 44.4% had improved, with a median relative wound area reduction of 94.0%. Similar results were reported regardless of the wound healing stage (debridement/granulation) at the beginning of the treatment. According to the subgroup analysis by wound duration, the sooner the TLC-NOSF treatment was performed, the higher the wound healing results achieved. The dressings were very well tolerated and accepted by the patients and the health care professionals.

Conclusions: These results are consistent with those published in articles on randomized controlled trials (RCTs) with TLC-NOSF dressings. They complete the evidence on the good healing properties

and safety profile of these dressings, especially in non-selected patients treated in current practice and regardless of the characteristics of wounds and patients.
**UrgoStart Plus Pad and UrgoStart Plus Border, Laboratoires URGO, France*

EP088 FISH SKIN GRAFTS ARE A COST-EFFECTIVE TREATMENT OPTION FOR DIABETIC FOOT ULCERS

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Aim: Standard treatment of chronic diabetic foot ulcers (DFU) is expensive and, for more than half of DFU patients, unsuccessful. Health care policy decision makers should seek the most effective treatment options at the lowest cost, and cost-benefit analysis is one of the tools that can be used to this end. This retrospective comparative cohort study's objective was to evaluate the cost effectiveness of fish skin graft therapy compared with standard of care (SOC) on DFUs.

Method: Retrospective data on 59 DFUs treated with fish skin grafts* was used to calculate transition probabilities for a Markov model in which fish skin treatment was compared with SOC. The cost was from the perspective of the payer, and the time horizon was set at 1 year.

Results / Discussion: The model indicated that fish skin* treatment could result in lower costs ($11 210 vs. $15 075 per wound), more wounds healing (83.2% vs. 63.4%), fewer amputations (4.6% vs. 6.9%), and a higher quality of life (0.676 vs. 0.605 quality-adjusted life year [QALY]) than the SOC. A probabilistic sensitivity analysis, based on a Monte Carlo simulation, indicated that the fish skin* treatment (on DFUs) would be 93.6% likely to be cost effective for a willingness to pay at $100 000 per QALY and 71.4% likely to be cheaper than SOC.

Conclusion: The results of this analysis suggest that including fish skin grafts* in the SOC for DFU treatment has the potential to reduce costs while improving patient outcomes.

EP089 OUTCOMES OF FOOT ULCERS AMONG INDIVIDUALS WITH TYPE 2 DIABETES IN AN OUTPATIENT FOOT CLINIC

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Aim: Identify rates and risk factors for outcomes of diabetic foot ulcers in the outpatient foot clinic (major amputation, minor amputation, recurrence, and persistently unhealed).

Method: This was an ambispective cohort analysis of persons with diabetic foot ulcers consulting at the diabetic foot clinic of East Avenue Medical Center. Data were analyzed through multiple logistic regression.

Results / Discussion: 216 patients with Type 2 Diabetes Mellitus and diabetic foot ulcers were included in the analysis; 50.9% were males and the mean age of the cohort was 55.8 ± 9.9 years. Outcomes of foot ulcers were: healed 44.5% (healed with no recurrence 30%, healed with recurrence 14.5%) and not healed 55.5% (major amputation 11%, minor amputation, 21.5%, and persistently unhealed 23%). Multivariate logistic regression showed the following were independent risk factors for non-healing: smoking ($p<0.0001$), low hemoglobin ($p<0.0001$), PAD ($p<0.0001$), Osteomyelitis ($p<0.0001$), and Neuropathy($p=0.01$). Independent risk factors for ulcer recurrence were: plantar location ($p=0.031$), multiple ulcers ($p=0.006$), and neuropathy ($p=0.01$). Mean healing time identified was 14 ± 3 weeks. Healing time was significantly reduced from 12 weeks to 4.5 weeks ($p<0.001$) if patients consulted less than 4 weeks from sustaining an ulcer.

Conclusion: The presence of PAD, smoking, dyslipidemia, low hemoglobin, neuropathy, and osteomyelitis increase the likelihood of amputation or persistent non-healing. The presence of multiple ulcers, plantar location, and neuropathy increase the risk for ulcer recurrence in patients whose foot ulcers have healed. Primary prevention through regular foot screening and foot care education is key to avoid adverse foot outcomes.

EP090 INCREASING TRANSCUTANEOUS OXYGEN PRESSURE (TCPO2) IN PATIENTS WITH NEUROISCHAEMIC DIABETIC FOOT ULCERS TREATED WITH A SUCROSE OCTASULFATE DRESSING

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Aim: To analyze TcPO2 values within the treatment of neuroischaemic diabetic foot ulcers (DFUs) treated with a sucrose octasulfate dressing*.

Methods: Eight patients with neuroischaemic DFUs treated with sucrose octasulfate dressing* were included in a prospective pilot study. TcPO2 values were measuring using TCM400 device (Radiometer, Copenhagen) on the pedis or tibial posterior artery angiosome according with ulcer location. TCPO2 values were assessed at day 0 and every 4 weeks until wound healing. Student "T" test for dependent samples were used.

Results / Discussion: Eight patients were included (7 male) with a mean age of 61.3+10.3 years old, 7 with Diabetes Type 2 and 1 with Diabetes mellitus type 1. HbA1c mean values was 7.55+1.19. 4 ulcers were IC and 4 were IIC according with Texas classification. The mean area of the DFUs was 1.45±0.45 cm2 and the mean duration was 62.87+116.49 weeks. Wollina Score mean was 3.62+1.68 at baseline. Seven ulcers were located in the forefoot and one in the midfoot. Mean TcPO2 values at day 0 were 30.87+11.01. mmHg and 46.25+15.54 mmHg at wound closure ($p= 0.018$). The ulcer healing time was 8.80+2.87 weeks

Conclusion: Local treatment with a sucrose octasulfate dressing in neuroischaemic DFUs showed an increase in TcPO2 values within the treatment. An improvement of the local angiogenesis has been previously mentioned as a part of mechanism of action of this dressing. The increase of the local microcirculation could support this theory.

** TLC-NOSF dressing*

EP091 EFFECTIVENESS OF OXIDATIVE STRESS CONTROL IN ISCHEMICAL DIABETIC FOOT ULCERS: CASE SERIES TREATED IN A THIRD LEVEL HOSPITAL

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Aim: The control of oxidative stress in the wound is being considered in recent years as a key aspect, in order to activate wounds that are difficult to heal.

Methods: Analysis of the cohort of patients diagnosed with diabetic foot ulcer associated with peripheral arterial disease, treated with antioxidant dressing from 1st January, 2018 to 31st October, 2019.

Results: A total 10 patients who needed treatment with antioxidant dressing were analized. Mean age was 75.6 years (SD 12.2), 70% were men, and 60% of the patients had previous history of revascularization surgery of same limb where the wound was placed. 20% patients were treated with antibiotics in the previous 2 months to start the antioxidant healing therapy. Changes of antioxidant dressing were performed every 5 days. Healing was completed at 54(SD 26) days in 7 patients, and increasing of granulation tissue was seen in the rest of patients. No complications related to dressing were recorded. Pain was reduced in 5(SD2) points in Visual Analog Scale and only in 1 patient, and skin maceration was found in 1 patient (that was solved increasing the frequency of the cures of wound every 3 days). Due to infection of the wound by S. aureus Meticillin-resistant, was needed to start oral antibiotic in one patient.

Conclusions: Antioxidant dressing reduces the time of healing in chronic wounds in our cohort of diabetic foot with peripheral arterial disease, without any adverse event and excellent tolerance, reducing the costs related to health care and needs of further antibiotherapy.

EP092 DESCRIPTIVE STUDY OF HYPERBARIC OXYGEN THERAPY ON DIABETIC FOOT AND ASSOCIATED RISK FACTORS OF LOWER LIMB AMPUTATION

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Aim: The use of hyperbaric oxygen therapy (HBOT) has been suggested to improve ulcer healing reducing the risk of lower limb amputation (LLA). The objective of this study is to evaluate the efficacy of HBOT in DF and asses the risk of LLA in this group of patients.

Method: Description of the cohort of patients diagnosed with DF that received HBOT from 1st of January,2010 to 31st of July of2019 in the U. Hospital Marqués de Valdecilla.

Results / Discussion: 81 patients with a mean age of 67.27+/-14.16 years, received 16.23+/ 8.21sessions of HBOT. Characteristics of patients were: 82.7% men, 88.88% had hypertension,76.5% were no smokers, 61.72% had chronic renal failure, 39.5% had COPD,55.55% were diagnosed of ischaemic cardiopathy and 41.97% had polineuropathy. Mean development time of the wound was 5.32(7.23) months. Indication of HBOT was infection in 89.04% of patients (24.69% due to chronic ostemyelitis). Wounds were located: (39.5%) in calcaneus and17(20.98%) in interdigital area. Revascularization treatment of the lower limb was needed in 76.54% patients. Granulation tissue at the beginning of HBOT was presented in 14.81% patients and 39.50% at 14 days. Wounds were closed in 9.8% patients at the first month, 30.86% at third month, 62.96% at sixth month and 79.01% in the first year after treatment. 15 (18.51%) patients needed LLA, with a mean of 24.5(35.42) days after HBOT.19 patients did not receive antibioteraphy. 7.4%patients died due to no related HBOT cause. Associated risk factors for amputation were the presence of infection (3.823,p=0.023)and no related-DF returns to the system (7.02,p=0.001). Conclusion: In our cohort, HBOT was used as adjuvant treatment in 66 patients. We observe increasing rates of granulation tissue after HBOT that persists in the first year of follow up. Risk of amputation is lower than other series however, it still remains high, mostly associated to the presence of infection. However, a multidisciplinary approach and further long-term evaluation are needed to define patient selection.

EP093 BASIC FIBROBLAST GROWTH FACTOR (BFGF) COMBINED WITH NEGATIVE-PRESSURE WOUND THERAPY IN THE TREATMENT OF DIABETIC LEG ULCERS

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Aim: We have treated patients with chronic diabetic ulcers using basic fibroblast growth factor (bFGF)* and combined with negative pressure wound therapy (NPWT) immediately after surgical debridement, rather than skin grafting. The purpose of this exploratory study was to report the clinical results of this treatment strategy.

Method: This retrospective study included 35 patients with chronic diabetic ulcers from January 2016 to October 2019. Twenty patients were treated by using surgical debridement with conventional NPWT (group 1) and 15 patients by using surgical debridement, basic fibroblast growth factor (bFGF)* with NPWT(group 2). Healing time along with the percentage of complete wound closure and other complications within 8 weeks were evaluated.

Results / Discussion: Group 2 was found to be more effective in treating diabetic leg wounds compared with Group 1. Group 2 as quicker at forming granulation tissue, achieving wound closure, and decreasing wound dimensions. Data also showed greater incidence of skin grafting in those patients treated with conventional NPWT in group 1.

Conclusion: This exploratory study suggests that surgical debridement, bFGF combined with NPWT may be successfully used to patients with chronic diabetic ulcers. We look forward to larger pivotal studies to confirm or refute these initially promising findings.

* Fiblast spray®

EP094 EFFECTIVENESS OF DEBRIDEMENT OF PLANTAR CALLUS IN PREVENTING DIABETIC FOOT ULCERS AT THE SEVERANCE HOSPITAL IN THE REPUBLIC OF KOREA

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This paper is the research to confirm the effectiveness of debridement of plantar Callus in preventing diabetic foot ulcers

High foot pressures are one of the important contributory factor. Callus can be a predictor of plantar foot ulceration and Removal of callus reduces high foot pressures. The study examined patients with diabetic who had visited the treatment room between January and November 2019 and removed callus with/without ulcer. The effect was verified by checking the patient's medical record.
Before regular removal of the callus, the patients underwent an average of 1.65 minor amputation. 75% were neuropathy patients who did not need PTA. Patients removed callus every 3.2 weeks on average, with 9 (45%) being the most removed in 2 weeks. The most frequent visit was to the hospital every two weeks (45%). Twelve patients developed severe infections during regular visits to the hospital. Six out of eight patients developed sever infection were poor compliance of visit hospital, but nobody had major amputation. 2 patients were charcot and the two were treated well but were not enough to do off-loading for working.

Pressure relief must be addressed when treating diabetic foot ulcers and diabetic neuropathy. The wound care nurse plays a vital role as well in providing a gold standard when it comes to Diabetic patients with plantar callus.

EP095 GEL OBTENTION FROM CHILEAN PLANTS REDUCES INFLAMMATORY CYTOKINES IN DIABETIC FOOT ULCERS

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[1]Biocellix spa , R&D, Santiago , Chile; [2]Resultados de búsqueda Resultados de la Web ACCHIEHC, R&D, Santiago , Chile

Background / Aim: 15% of diabetic patients suffer from ulcers in the lower extremities, and a third of these ulcers will de amputed. On the other hand, there has been an increase in phytopharmaceuticals development. Part of the population directly relates "natural" to a better quality of life and shows dissatisfaction with conventional medicines and medical treatments, this led us to determine the anti-inflammatory effect of a gel obtained from Chilean plants in Diabetic Foot Ulcers (DFUs).

Method: We standardized a method using vegetal biotechnology to obtain a preparation enriched in polyphenols and flavonoids from Chilean endemic plants with potential use as a phytopharmaceutical. This was tested on cell cultures as well as on biopsies obtained from patients with DFUs, measuring pro-inflammatory interleukins and TNF-*a*. Additionally metalloproteases levels were also measured.

Results: We produced an enriched in polyphenols and flavonoids preparation from Chilean plants extracts. We observed reduction in TNF-alpha levels and proinflammatory cytokines IL-1, IL-4, IL-6 levels

in cell cultures and patient biopsies exposed to this preparation. Additionally, we tested metalloproteases levels, in all cases the differences were found to be significant ($p \leq 0.05$).

Conclusion: We were able to develop a preparation from Chilean plants, rich in polyphenols and flavonoids using environmentally friendly plant biotechnology. This preparation proved to be efficient in reducing the levels of inflammatory markers. These first results obtained here are promising, in the development of a future phytopharmaceutical however, further analysis is needed.

EP096 THE USE OF PLATELETS DERIVED LYOPHILIZED GROWTH FACTORS IN CHRONIC WOUNDS HEALING

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Aim: The aim is to evaluate the effect of subcutaneous infiltration of platelets derived lyophilized growth factors (LGF) on healing of chronic resistant non healing diabetic wounds and ulcers.

Method: All patients had intra-lesional injections of LGF, twice weekly, into the borders and at the base of the wound/ulcer. The lesion was covered immediately after that with a sterile vaseline gauze for 48-72 hours, then exposed for evaluation and follow-up.

Results / Discussion: All treated wounds/ulcers have shown a significant response measured by the percentage of soft tissue restoration achieved, in periods ranging from 2-8 weeks, depending on the severity of the lesion and its site.

Lyophilized Growth Factors (LGF) is a virally inactivated, pathogen free, standardized and lyophilized platelet releasate obtained from healthy tested donors. Thus, it could be described an advanced refined form of allogenic PRP that is safe and easy to use, and presented as an over the shelf product.

Conclusion: LGF can play an important role in the management of wounds recalcitrant to conventional therapies. While PRP is currently considered a well established modality in regenerative medicine, there is still some controversy, and even disappointment as regards results obtained in its clinical use. The main reason for this could be lack of standardization due to variations in methods of preparation or in initial platelet count. LGF appears to be a more feasible option when compared to conventional non-lyophilised platelet rich plasma (PRP), bypassing all its limitations.

EP097 TOPICALLY APPLIED AUTOLOGOUS BLOOD CLOT: CLINICAL OBSERVATION AND PROPOSED MECHANISM OF ACTION OF CELLULAR AND TISSUE BASED THERAPY

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Aim: Diabetic Chronic wounds are a great clinical challenge. Topically applied blood clot, a stromal matrix contains viable cells, which was found to be safe, effective, and cost efficient, has garnered significant interest1.

Method: A registry study on autologous blood clot was conducted in the USA, Europe, and Israel (NCT04699305). To further understand the mechanism of action of the autologous blood clot, a review of clinical and scientific literature hypothesizes on how autologous blood clots may stimulate healing while lowering bioburden and fostering angiogenesis, was conducted.

Results / Discussion: The autologous blood clot was found to be highly effective in initiating the healing process in hard to heal chronic wounds. The proposed mechanism suggest that the scaffold created by the autologous blood clot tissue provides a medium in which the body can transform a non-healing chronic wound condition into a healing “acute” condition. This transient scaffold recruits surrounding fibroblasts and promotes granulation and tissue remodeling3. This well-orchestrated mechanism includes signals from soluble molecules, substrate/matrix to which the cell is adherent, mechanical or physical forces acting on it, and contact other cells. The blood clot tissue can lower bacterial bioburden while stimulating angiogenesis and fostering the movement of keratinocytes and fibroblasts.

Conclusion: Topically applied autologous blood clot represents a formidable cellular and tissue-based product that has been shown to be safe and effective. The autologous clot tissue creates a scaffold that performs as a biologic delivery system that functions to control the release of growth factors and cytokines over several days.

EP174 DEVELOPING RISK-ADJUSTED QUALITY INDICATORS FOR PRESSURE ULCERS IN LONG-TERM CARE HOSPITALS IN THE REPUBLIC OF KOREA

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Aim: This was a retrospective, observational, methodological study to develop quality indicators related to pressure ulcer development and validate risk adjustment factors for pressure ulcer development.

Method: We performed a literature review to develop risk adjustment factors, and an expert group performed a content validity test. To validate risk adjustment factors for pressure ulcer development using electronic medical records, 127 patients admitted to a long-term care hospital in South Korea from June to September 2020 were enrolled in the study.

Results / Discussion: Pressure ulcer risk factors were peripheral vascular disease, end-stage disease, past pressure ulcer history, high risk group for pressure ulcer development, fever, haemoglobin, and albumin (all $P < 0.05$); only albumin (odds ratio: 0.210, $P < 0.001$) was significantly associated with pressure ulcer development as an independent risk factor.

Conclusion: Risk-adjusted quality indicators for pressure ulcer development can be used to evaluate the quality of nursing care and compare outcomes after preventive pressure ulcer care activities or between long-term care hospitals.

EP098 PROSPECTIVE MULTICENTER OBSERVATIONAL STUDY WITH AN ABSORBENT BACTERIA-BINDING FOAM DRESSING – IMPACT ON PATIENTS' QUALITY OF LIFE

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Aim: Living with a wound can affect the wellbeing and decrease the Quality of Life (QoL)1. Interpretation of QoL scores placing the patient at the centre of their treatment regime and allowing them to reflect upon their treatment and consider future implications2. The aim was to assess the impact of a new dressing on patients' wound-related quality of life.

Method: Under routine clinical conditions patients with venous leg ulcer or diabetic foot ulcer were observed for 28 days in 2018 in Germany and Poland. Data on wound related QoL were collected at initial and final visit via the validated questionnaire Wound-QoL3,4. Scores were compared with the Minimal Important Difference (MID) to detect a clinically relevant change. MID is defined as a change in QoL that a patient would consider meaningful.

Results / Discussion: 62 patients (36 males, 26 females) with a median age of 67 years were analyzed. Global QoL score improved from 1.93 to 1.31 with a difference (Δ) of 0.62 which is above the MID value of 0.5. Subscale QoL score related to 'Psyche' (Δ=0.63) can also be regarded relevant. QoL scores related to 'Body' (Δ=0.56) and 'Everyday Life' (Δ=0.46) were less clear as the scores fell within the range of MID estimates (0.47-0.57; 0.41-0.62).

Conclusion: The use of QoL tools is useful for supporting patient engagement, concordance, and adherence with recommended treatment regimes. Analysis of the Wound-QoL demonstrated that the use of the absorbent bacteria-binding foam dressing had positive implications for patients' QoL.
**Cutimed® Siltec® Sorbact®*

EP117 IN VITRO TESTING OF THE MMP BINDING CAPACITY OF TWO POLYURETHANE FOAM DRESSINGS

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Aim: Numerous factors can cause impaired wound healing, including increased concentration of matrix metalloproteinases (MMPs) in the wound exudate. Ability to bind MMPs is an important material property of wound dressings. The aim of this study was to develop an assay to determine MMP-9 and MMP-2 binding capacities of two polyurethane (PU) foam dressings with* and without# superabsorbent layer.

Method: MMP-2 and MMP-9 binding capacities were investigated for two PU foam dressings. The dressings were incubated 24h in enzyme solutions with MMP concentrations of 100 ng/mL in fetal bovine serum (FBS) or assay buffer solution (ABS). Enzyme concentrations were determined by ELISA. MMP-binding capacity was calculated as the difference between MMP uptake and release.

Results / Discussion: The PU foam dressing with superabsorbent layer* showed binding capacities for MMP-2: 93.2% and MMP-9: 94.7% in FBS and MMP-2: 84.0% and MMP-9: 96.9% in ABS.
The PU foam dressing without superabsorbent layer# showed binding capacities for MMP-2: 76.2% and MMP-9: 88.5% in FBS and MMP-2: 53.3% and MMP-9: 93.9% in ABS.

In both types of dressing, MMP-9 showed a higher binding capacity than MMP-2 due to higher release values for MMP-2. At pH 7.4, MMP-2 has a higher net charge than MMP-9, which may account for the lower adsorption and higher release from the dressing materials.

Conclusion: A test design was successfully developed to investigate the MMP-binding capacity of wounds dressings and the two tested PU foam dressings were both characterized by a high MMP-binding capacity.
**Biatain Silicone, #Biatain Foam, Coloplast A/S*

EP099 3D-PRINTED ELASTOMERIC POLY (GLYCEROL SEBACATE) ACRYLATE SKIN DRESSING

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Aim: To develop poly (glycerol sebacate) acrylate (PGSA) inks to 3D print elastomeric dressings. The effect of monomer ratios and printing parameters were investigated to optimize the ink formulations and printing efficiency.

Method: Ink were prepared by acrylation of PGS prepolymer considering different molar ratios (1:1; 4:3; 3:4) of glycerol:sebacic acid. The modification of PGS and the degree of acrylation (DA) were confirmed by 1H-NMR and FTIR. Inks were then prepared by mixing PGSA with a photoinitiator and dichloromethane (DCM) as a solvent. Photo-rheology of inks was analysed to study the ink viscosity and photo-crosslinking efficacy considering photopolymerization in the presence and in the absence of DCM. The selected formulations were printed layer-by-layer and the printing parameters were adjusted to obtain 3D elastomeric structures/dressing.

Results / Discussion: The chemical structure of PGSA was confirmed by the presence of protons peaks from the acryloyl group (5.9, 6.2 and 6.4 ppm) (1H-NMR) and the absorption band at 1635 cm-1 (FTIR). DA between 29.08%-35.09% were reached. Minimal changes in viscosity were observed for different ratios. Upon exposure to UV light, PGSA was rapidly cross-linked (in seconds), and the presence of DCM didn't affect this. However, the polymer tends to shrink over time therefore, 3D PGSA structures with a minimum fiber diameter of 200 µm were printed without DCM.

Conclusion: PGSA-based elastomeric 3D printed structures that can be used as dressings to counteract wound contraction and minimise scarring were attained.

EP100 THE EFFICACY OF HEMOGLOBIN SPRAY IN WOUND MANAGEMENT: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS OF COMPARATIVE STUDIES

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Aim: There is an unmet need for novel therapies that promote healing and provide more efficient care of complex, hard to heal wounds. Standard of care fails to heal approximately 25% of venous ulcers and 50% of diabetic foot ulcers. Oxygen and adequate blood supply are essential for wound healing and are potentially effective interventions for chronic wounds. Topical haemoglobin therapy is a novel therapeutic technology approved for use in chronic wounds that binds atmospheric oxygen and improves the availability of oxygen at the wound site. A systematic review and network meta-analysis (NMA) were conducted to compare the efficacy and safety of topical haemoglobin spray with that of hyperbaric oxygen therapy (HBOT) in the treatment of chronic wounds.

Method: The systematic review and NMA were conducted following the Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA) guidelines and PROSPERO. Twenty-four studies (16 randomised controlled trials and eight cohort studies) met the inclusion criteria.

Results / Discussion: Topical haemoglobin spray as adjunctive therapy was shown to have a significant beneficial effect compared with HBOT in improving the healing rate of chronic wounds, with the proportion of wound healing 2.36 and 1.62 times greater than control, respectively. Topical haemoglobin spray was also associated with 1.32 times higher treatment success than HBOT and had a higher chance of treatment success (67.9%, surface under the cumulative ranking curve [SUCRA] = 0.8) compared with HBOT (32.1%, SUCRA = 0.7).

Conclusion: Topical haemoglobin spray is recommended as an adjunctive treatment with standard wound care, regular wound monitoring, and debridement.

EP116 EPICITEHYDRO - AN ADVANCED TYPE OF BIOSYNTHETHIC CELLULOSE FOR THE TREATMENT OF CHRONIC WOUNDS

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Aim: The hydroactive wound dressing epicitehydro has gained increasing reputation in the treatment of burn injuries. [1-3] However, although the moist environment provided by the dressing can help to facilitate wound healing in chronic wounds as well, the application on severely exudating wounds can pose a challenge due to its high initial moisture saturation.

Method: A multi-center observation study in 50 patients was performed, evaluating the bacterial cel-

lulose based hydroactive dressing in a chronic wound setting. Subsequently, epicitehydro was modified to decrease moisture saturation and compared in-vitro to six other commercial advanced wound care products according to EN-13726 regarding exudate absorption, moisture vapor transmission rate and fluid donation.

Results / Discussion: The study outcome demonstrates the potential of epicitehydro to reduce irritation and fibrinous tissue and induce healing even in stalling wounds. Since exudate management of the moist dressing showed room for improvement, a modification of the material was developed showing increased absorption capacity while remaining positive characteristics such as moisture vapor transmission rate and fluid donation capability.

Conclusion: Although further clinical observations are needed to fully explore the potential as well as the limitations of epicitehydro in the treatment of chronic wounds of different types and stages of healing, the outcome of the first clinical study was found to be very promising. Furthermore, a modification of the material with enhanced exudate handling properties may provide a suited candidate in the treatment of chronic wounds with different exudate levels and contribute to a fast and successful wound healing process.

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EP101 THREE-DIMENSIONAL SHAPE-CONFORMATION PERFORMANCES OF WOUND DRESSINGS TESTED IN A ROBOTIC SACRAL PRESSURE ULCER PHANTOM

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Aim: Effective exudate retention by dressings requires close and intimate dressing-wound contact, immediately and continuously after the dressing application. Any dressing-wound spaces may allow for build-up of non-retained fluids, causing exudate pooling which forms a favourable environment for pathogen growth. Maceration may follow if the pooled exudates spread to peri-wound skin. Dressings with a claimed 3D-shape-conformation technology are commercially available, however, their effectiveness in minimizing dressing-wound gaps has never been scientifically investigated. We present a novel bioengineering methodology for testing the effectiveness of such 3D-shape-conformation dressings, using our recently reported robotic phantom of sacral pressure ulcers.

Method: By means of 3D laser scanning and bespoke software, we reconstructed dressing shapes after

simulated use and calculated the goodness-of-fit between each dressing (swelled to near-saturation) and the corresponding simulated wound geometry. Two dressing sizes (10×10 cm and 12.5×12.5 cm) and two wound depths (2.5 or 2 cm) were considered.

Results / Discussion: All the tested dressings were far from reaching sufficient contact with the simulated wounds: Approximately 1/3 of the wound volume and nearly half of the wound surface were not in contact with the swelled dressings. Our present findings question whether 3D-shape-conformation dressings are effective, by revealing their previously unknown swelling behaviour.

Conclusion: The evident and considerable gaps shown to occur between the applied dressings and simulated wound beds are conducive of exudate pooling. Therefore, clinicians should consider the present findings and make informed decisions with regards to their dressing selection for each individual wound.

EP102 RESULTS OF A MULTICENTRE, PROSPECTIVE, OBSERVATIONAL STUDY ON THE PERFORMANCES OF TLC-NOSF POLY-ABSORBENT DRESSINGS* ON CHRONIC WOUNDS

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Aims: This evaluation aimed to assess the efficacy and safety of TLC-NOSF dressings with poly-absorbent fibres in the local management of chronic wounds in an unselected patient population under real-life settings.

Methods: A large, prospective, multicentre observational study with three TLC-NOSF poly-absorbent dressings* was conducted in 105 centres across Germany between January 2019 and June 2020. The main endpoints included wound healing rate and progression, quality-of-life improvement, and dressing tolerability and acceptability.

Results: Altogether 961 patients with chronic wounds (390 leg ulcers, 217 diabetic foot ulcers, 92 pressure ulcers and 262 chronic wounds of various other types) were treated with the evaluated dressings for a mean duration of 61.5±36.5 days. By the final visit, 50.9% of the wounds healed, 41.1% improved, 3.3% were stabilized, and 2.7% worsened. At baseline, the patients were mainly affected by fears of wound deterioration and frustration due to long-healing time. At the final visit, a clear improvement was reported in nearly all Quality-of-Life items and 74.6% of the patients documented that their current situation was much better than previously. The dressings were very well tolerated and accepted in the large majority of the cases (84.7% and 79.7%). Similar outcomes were reported whatever the aetiology of the wounds.

Conclusions: These results show the effective healing properties and good safety profile of these dressings, are consistent with the previous clinical evidence on TLC-NOSF dressings, and support their use in the management of chronic wounds.
**UrgoStart Plus Pad, UrgoStart Plus and UrgoStart Plus Border, Laboratoires URGO, France*

EP103 EFFICACY, TOLERANCE AND PRACTICALITY OF HYDROFIBER FOAM AND THIN FOAM HYDROCELLULAR DRESSINGS FOR THE MANAGEMENT OF ACUTE AND CHRONIC WOUNDS: A SURVEY CONDUCTED AMONG REGISTERED NURSES WORKING IN COMMUNITY SETTINGS ACROSS FRANCE

Pierre-Jérôme Pello[1], Séverine Bailly[2], Mohamed Frimane[3], Céline Saint-Martin[4], Valérie Cluzan[5], Grégory Vericel[6], Audrey Varutti[7], Jacky Goslan[8], Christopher Jarvis[9], Claude Yvon[10]

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Evaluation of two hydrocellular (HC) dressings for efficacy, tolerance and practicality in outpatient management of chronic and acute wounds.

Conducted over 6 months, participating nurses working in community settings across France recruited consecutive patients with acute and chronic wounds managed using a hydrofiber foam dressing (highly absorbent HC) or a thin foam dressing (HC for low exudate). Nurses responded to 18 questions for each patient, at baseline and after 10 to 14 days follow-up.

539 nurses recruited 3086 patients, 67% with acute and 33% with chronic wounds. Lower-limb pressure ulcers represented 54% of the chronic wounds. Prior to the survey, 68% were managed using another dressing, most frequently another HC. Exudate levels were moderate to high for 46% of wounds, 52% had altered perilesional skin. After 10 to 14 days using hydrofiber foam (58%) or thin-foam (42%) dressings, 87% of wounds were fully healed or improved, including hard-to-heal wounds. Application was scored as easy or very easy in 97% of cases, and wound-bed conformation was scored as satisfactory or very satisfactory in 96% of cases. Dressing removal was scored as “atraumatic” in 96% of cases, an important aspect for patients. Nurses reported that the study dressings were easier to use than other HC dressings previously encountered and fulfilled their clinical needs and patient expectations.
Supported by the efficacy, tolerance and practicality results from this cohort of >3000 patients, 98% of the nurses recommended the use of these dressings as part of their standard practice.
Aquacel Foam and FoamLite, ConvaTec

EP104 EFFICACY OF SEQUENTIAL TREATMENT OF TECHNOLOGY LIPIDO-COLLOID IMPREGNATED WITH SILVER (TLC-AG) AND TECHNOLOGY LIPIDO-COLLOID NANO-OLIGO SACCHARIDE FACTOR (TLC-NOSF) IN THE MANAGEMENT OF VENOUS LEG ULCERS (VLU)

Hui Min Tan[1], Cheng Cheng, Karine Goh[1], Peiting Lai[1], Sivakami D/O Muthuveerappa P[1], Mohamed Maliki Bin Mohamed Nasir[1], Shanying Liang[2], Wei Leong, Glenn Tan[2], Sadhana Chandrasekar[2], Qiantai Hong[2], Enming Yong[2], Rhan Chaen, Lester Chong[2], Li Zhang[2], Zhiwen, Joseph Lo[2]

[1]Tan Tock Seng Hospital, Wound and Stoma Care, Nursing Specialty, Singapore, Singapore; [2]Tan Tock Seng Hospital, Vascular Surgery Service, Department of General Surgery , Singapore, Singapore

Aim: We aim to prospectively study the efficacy of Technology Lipido-Colloid impregnated with silver

(TLC-Ag) and Technology Lipido-Colloid Nano-Oligo Saccharide Factor (TLC-NOSF), along with multilayer compression therapy in venous leg ulcers (VLU) wound healing.

Material / Method: 30 patients with VLU were enrolled into this 14-week study protocol. Participants were treated with 2 weeks of TLC-Ag dressing, followed by 12 weeks of TLC-NOSF dressing for local wound management along with a multilayer compression therapy during this treatment period. Variables for assessment includes evaluation of wound area reduction and complete wound closure within these 14 weeks of treatment period and assessing the improvement in quality of life during the study duration.

Results: Our patients' profiles include 57% female (n=17) with a mean age of 61 years old and a mean initial wound duration of 18 weeks. 53% (n=16) of them were diagnosed with concurrent deep venous reflux while the rest of our patients were suffering from superficial venous reflux. Mean wound area reduction of 76% were observed in 82% of our patient population (n=25) and Kaplan-Meier analysis showed that the greatest mean wound area reduction of 31% were observed at week 7 of this treatment protocol. 37% of our study subjects (11 of 30) achieved complete wound closure within this treatment period and an improvement rate of 23% were observed in their quality of life. Conclusion: VLU requires prolonged healing period (months to years) despite having appropriate management and can cause distress to patient; physically, socially and psychologically. This sequential protocol demonstrated that it aids in expediting wound healing duration and improved patients' overall quality of life.

EP105 OPEN PROSPECTIVE OBSERVATIONAL CLINICAL STUDY: LEUKOMED CONTROL (LMC), A HYDROPOLYMER POLYURETHANE FILM DRESSING, APPLIED FOR 14 DAYS TO IMPROVE INDIVIDUAL DAILY ROUTINE

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Aim: Usage of LMC for up to 14 days on surgical incisions after arthroplasty, to improve the physical, psychological conditions, level of independence.
Methods: N=10 received total hip arthroplasty; N=4 total- and N=6 unicompartmental-knee arthroplasty. LMC was applied on the surgical incision line within the operating theatre. Dressing changes/follow ups: d14and d20. Following parameter were documented: (1) Wound status; (2) Healing process; (3) Wound visual access; (4) Dressing performance.

Results: Surgeons graded the post-operatively wound visibility of LMC as very good on day 0. On day 14, 19 Patients (1 drop out) underwent dressing changes. 25% dressings were completely intact, whereas 75% showed curling edges with intact, isolated wound pad. Wound visibility was good to very good (85%), 10% showed impaired visibility (saturated dressings). No clinical infection signs. On day 20, 19 patients had no impairments in daily routine/hygiene. Post-operatively, patients graded the wearing comfort as very good, with reduced pain during dressing change. Visual wound healing (self-monitoring) was appreciated by patients (psychological aspect). All over impression of LMC was very satisfying according to the surgeon.

Conclusion: LMC enables up to 14 days wear time, which promotes improvements, allowing enhanced

recovery, mobility within the home environment. Features include the transparent hydrogel pad and PU film, which permits wound inspection while reducing dressing change intervals, promoting wound rest, finally saving financial resources due to extended wear time. With these positive post-operative outcomes, LMC will be an important part of future dressing protocols due to its product features.

EP106 EVALUATION OF THE USE OF A SOFT SILICONE-COATED WOUND CONTACT LAYER ON ACUTE WOUNDS

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[1]Mölnlycke Health Care Global Headquarters, Sweden

Aim: To evaluate the safety and performance of a soft silicone-coated wound contact layer (WCL)* when used as intended as part of the management of acute wounds in a real-world setting.

Methods: This was a non-comparative, retrospective registry study. Exudate handling (evaluated by lack or presence of maceration), safety aspects of the WCL* (evaluated by lack or presence of peri-wound skin rash), and wound healing progress (wound area / volume) were assessed using data collected by Net Health (US) between 2017 and 2018.

Results: Data from 330 patients (1,409 visits) with 507 wounds (skin tears, abrasions, lacerations, or blisters) were analysed. The WCL* was used in a wide range of populations in terms of age and ethnic group. All wound types were reported to be 'improving' at over 80% of visits with maceration observed at less than 2% of visits. In terms of safety, rash was not observed around any of the wounds.

Conclusion: While the limitations of registry studies should be considered, these findings indicate that the WCL* performs well as intended across a wide range of ages and ethnicities in routine real-life clinical practice. The use of the WCL* was associated with good wound healing progression, exudate handling (nearly no maceration), and the absence of rash.
**Mepitel® with Safetac® (Mölnlycke® Health Care, Sweden)*

EP107 EFFICACY AND SAFETY OF COPPER OXIDE IMPREGNATED WOUND DRESSINGS – RESULTS OF A PHASE I/IIA CLINICAL STUDY

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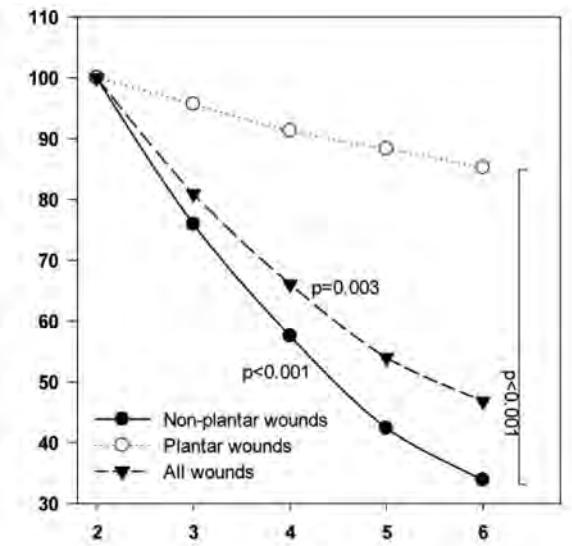
[1]Rambam Medical Center, Department of Orthopaedics, Haifa, Israel; [2]MedCu Technologies Ltd., Herzliya, Israel

Aim: Evaluate the efficacy and safety of wound dressings with copper oxide (COD) when applied on chronic foot wounds in diabetic patients.

Method: Pivotal single arm Phase I/IIa study divided into three Phases: Screening Phase (SP- 1 week); Treatment Phase (TP - 1 month); and Follow-up Phase (two weeks).

Results / Discussion: 13 stable chronic diabetic patients, whose wounds were not infected and the

wound size did not decrease by more than 25% per week by the standard of care (SOC) treatment, were treated by applying the COD for 4 weeks. The COD were replaced twice a week. The mean wound area at baseline ranged between 1.35-23.6 cm2. No significant differences were noted in the blood parameters, kidney and liver functions, and in the overall physical medical condition, before and after one month of the COD application. No infections of the wounds occurred during the trial. The mean wound size decreased by 56.2% during the study (p=0.003). The wound size reduction achieved in 10 patients with non-plantar wounds was 76.8% (p<0.001). In 3 patients with plantar wounds, there was a mean reduction in the area of the wounds (25%), but it did not reach a statistically significant reduction. There was a gradual increase in the percent of granulation tissue following the COD use (p<0.001) already after one week of COD treatment (p<0.01).



Conclusion: The study clearly supports the safety and efficacy of copper oxide impregnated dressings in stimulating wound healing of diabetic chronic wounds.

Dressings

EP108 THE USE OF A NEW ADVANCED DRESSING TO A OLEIC MATRIX: RESULTS OF A CLINICAL STUDY

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[1]Azienda USL toscana sud est, Home care, AR, Italy; [2]Azienda USL toscana sud est, Home care, Arezzo, Italy

Aim: In wound care both the improvement and the greater availability of care materials have made possible the relevant increase of the quality of care. The effective evaluation of devices through scientific methods together with the use of the results is a value for professionals and scientific community members. The monitoring of silver-free dressings used in infected lesions that no longer respond to its use.

For this purpose, a study project was set up to compare the efficacy of a hydro-fiber silver dressing and a gel composed of oxygen-enriched natural oils with no animal o human components and chemical additives free. The aim is to define significant changes in the use of them.

Method: In the study 120 patients with infected lesions of various etiology in home care were enrolled, randomized in two groups: Arm A (control) Arm B (case). Six variables were detected (type of lesion, age, gender lesion area (in cm2) pain score (VAS scale), presence of bacterial load. Lesion area is observed at baseline TO, at the last follow-up T30 (days). Pain score and presence of bacterial load (valued with bacterial test) are observed at baseline (T0), after 7 days (T7), at the last follow-up (T30): Preliminary analysis was carried out on 83 patients.

Results / Discussion: Comparison results of the variables of the two arm groups. Wound area reduction, bacterial load reduction and pain Reduction. Higher percentage of yes responders in lesion area, bacterial load variables are present in arm B, no differences of pain reduction.

Conclusion: In conclusion, it is essential that wound care professionals supported by technology, constantly implement innovative action strategies to face new challenges.

EP109 CARE OF SKIN GRAFT DONOR ZONES USING HYALURONIC ACID

Camelia Tamas[1], Dan Moraru[1], Iosip Bogdan[2], Costel Dobre[1], Ioana Tamas[3], Clara Larisa Popa[1], Diaconu Oana[1], Ilan Marcovici[1], Angela Tecuceanu[1], Catalina Pintilie[4], Cezar Doru Radu[5]

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Aim: The aim of our study is to compare different protocols used for skin graft donor zone (DZ) care and their efficiency.

Method: We present our observations regarding the healing process of skin graft DZ on 126 patients, treated in our service. Two protocols for postoperative care were used: 1) calcium alginate dressings (for the first 72 hours) followed by hyaluronic acid-based topical agents, in 66 cases (36 burns); 2) sterile non-medicated ointment dressing made from open-weave gauze in 60 cases (28 burns). The skin grafts (0.4mm width) were harvested from the patient's thigh or leg, using the electrodermatoma. 20 burned patients from the first group and 17 from the second group had DZ covering 10-15 % of total body surface area, as a result of 3-4 surgery sessions.

Results / Discussion: We evaluated the healing period duration and the bleeding (within the first 48 hours, then between 48-96 hours and after 96 hours post-surgery). To compare local pain, constriction sensation and difficulty in walking (starting from the 7th day after surgery) we used a scale with 5 levels. The bacteriological monitoring of the DZ during the healing period demonstrated "sterility" in most of the cases (27 patients with burns injuries from the first group and 20 burned patients from the second group). Conclusion: The use of calcium alginate, followed by hyaluronic acid based topical agents in local applications facilitates less bleeding, low pain levels and decreased discomfort during the healing period of the DZ resulted after skin graft harvesting.

EP110 A COMPARATIVE STUDY OF NOVEL HYDROGEL DRESSINGS AND COMMERCIAL WOUND DRESSINGS FOR THE TREATMENT OF EXUDATING WOUNDS

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Aim: A wide range of wound dressings is already commercially available today with hydrogels being the most relevant due to their strong exudate uptake capacity. However, these often lack mechanical strength. This research focuses on the development of a novel hydrogel-based wound dressing with tunable mechanical strength and high exudate absorption capacity. The developed materials were processed into UV-cured sheets and electrospun membranes and benchmarked against 10 commercial dressings.

Method: Acrylate-endcapped urethane-based precursors with a varying poly(ethylene glycol) backbone molecular weight (2–20 kg/mol) and (multi-)acrylate endcaps were selected. Both synthesized and commercial dressings were characterized in terms of swelling (water, PBS and simulated wound fluid) and mechanical properties (tensile testing and texturometry). The morphology was studied with scanning electron microscopy (SEM).

Results / Discussion: The swollen AUP hydrogel sheets (30 wt%) could combine both high mechanical strength (up to 0.63 MPa) and high exudate uptake capacities (up to 34.9 gwater/gmaterial), compared to the commercial dressings which have an inferior swelling capacity (up to 17 gwater/gmaterial). Some commercial dressings have a superior mechanical strength, due to either being hydrophobic or multi-layered. Interestingly, upon processing the hydrogel precursors through electrospinning, SEM indicated a homogeneous fiber morphology (0.7-1.5 µm). The fibrous commercial dressings had diameters ranging between 10 and 25 µm (Fig.1).

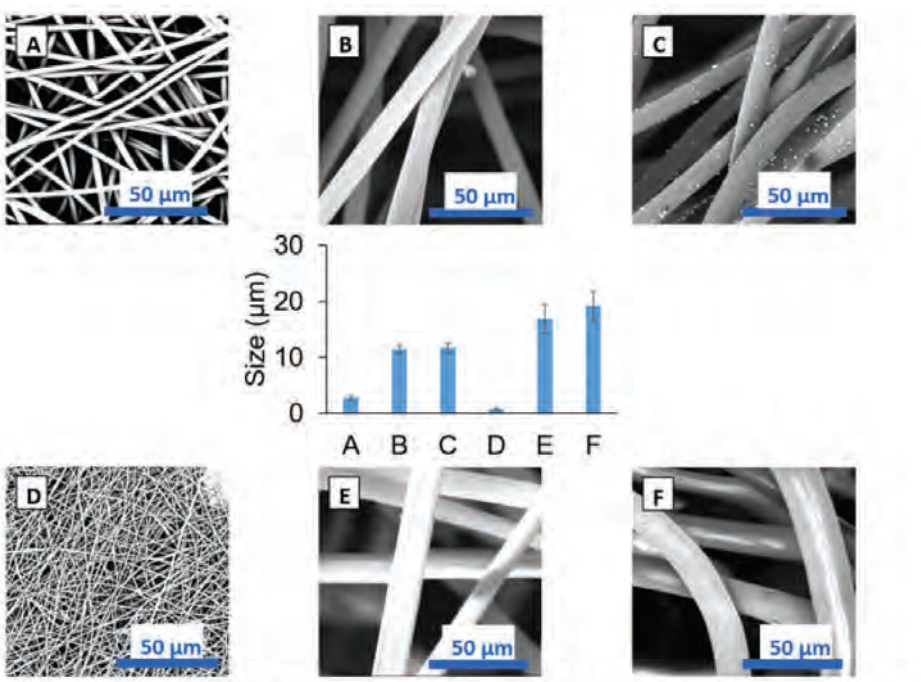

Figure 1: SEM images. A and D: processed AUP hydrogels. B, C, E and F: Commercial dressings.

Conclusion: The developed materials offer great potential with a superior swelling capacity than current commercial dressings and tunable mechanical properties. The characterization of the 10 commercial dressings gives a never before performed overview, as a correlation is made for several application possibilities.

EP111 WOUND HEALING EFFECT OF REGENERATED OXIDIZED CELLULOSE VERSUS FIBRIN SEALANT PATCH: AN IN VIVO STUDY

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[1]Wonkwang University Hospital, Plastic and Reconstructive Surgery, Iksan, Korea, Rep. of South

Aim: Topical hemostatic agents are used when conventional hemostatic methods are impractical. Because a hemostatic agent is a foreign body, we should select hemostatic agents after considering their effects on wound healing. We compared the effects of hemostatic agents on wound healing in rats.

Method: Twelve Sprague Dawley rats were subjected to creation of a 6 × 6 mm defect in the rectus abdominis muscle and divided into four groups: control; A, fibrin sealant patch*; B, oxidized regenerated cellulose**; and C, oxidized regenerated cellulose***. For the histologic analysis, biopsies were performed on the 3rd, 7th, and 27th days.

Results / Discussion: The foreign body reaction was the weakest in group A and most significant in group C. Muscle regeneration differed among periods. The rats in group A were the most active initially, while those in group C showed prolonged activity.

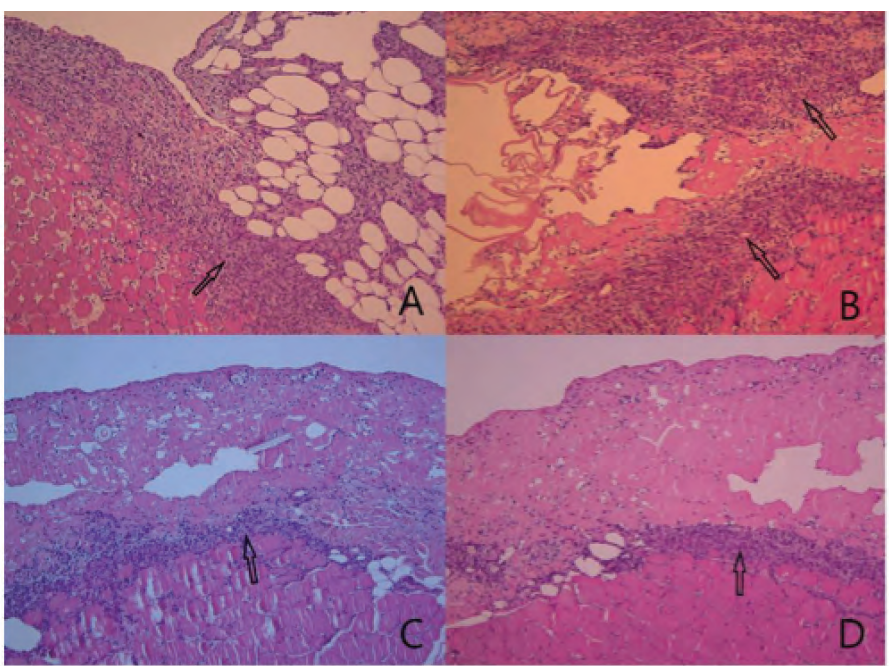

Fig. 1. Three days (H&E x100)
(A) Control (B) fibrin sealant patch* (C) oxidized regenerated cellulose**; (D) oxidized regenerated cellulose***.

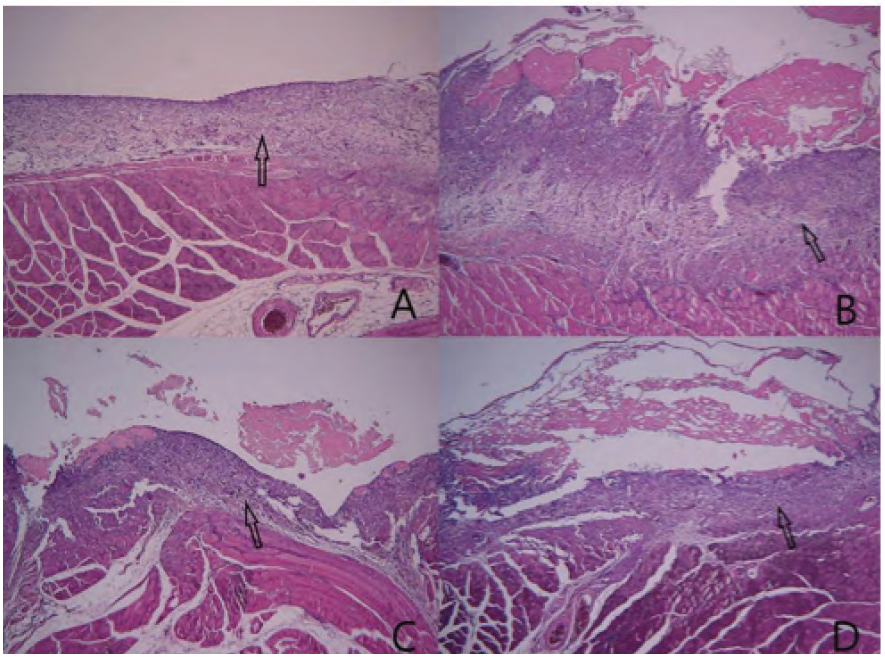

Fig. 2. 7-days (H&E x40)
(A) Control (B) fibrin sealant patch* (C) oxidized regenerated cellulose**; (D) oxidized regenerated cellulose***.

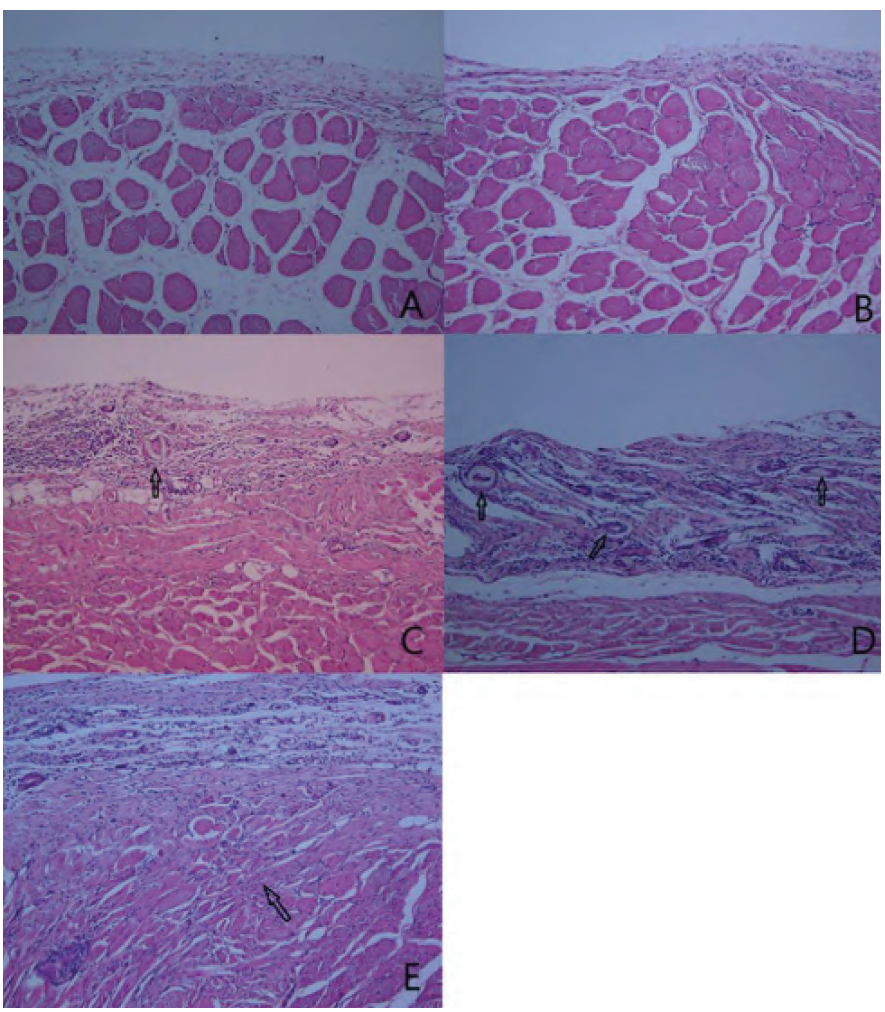

Fig. 3. 27-days (H&E x100)
(A) Control (B) fibrin sealant patch* (C) oxidized regenerated cellulose**; (D, E) oxidized regenerated cellulose***.

Conclusion: Fibrin sealant patch*; and oxidized regenerated cellulose**administration increased inflammation via foreign body reactions, but the overall wound healing process was not significantly affected. The increased inflammation in the groups** was due to a low pH. We recommend using fibrin sealant patch*; because it results in less intense foreign body reactions than ** and faster wound healing due to the fibrin action.

* *Tehsil®*

***Surgicel® Fibrillar™*

**** Surgicel® Snow™*

EP112 EVALUATION OF COMBINATED THERAPY WITH ANTIOXIDANT DRESSINGS AND TWO LAYER COMPRESSION SYSTEM IN CHRONIC VENOUS ULCERS

Ana María Arnáiz Garcia[1], María Elena Arnáiz García[2], Javier Arnáiz-García[3], María Abando Casuso[1], Sara Bellisco Roncal[1], Laura Carrasco Cortijo[4]

[1]University Hospital Marqués de Valdecilla, Infectious Disease Department, Santander, Spain; [2]University Hospital Marqués de Valdecilla, Cardiac Surgery, Salamanca, Spain; [3]Aspetar Hospital, Radiology, Doha, Qatar; [4]University Hospital Marqués de Valdecilla, Unit of Diabetic Foot, Santander, Spain

Aim: Stablish the efficacy of the combinated therapy with antioxidant dressing and two layer compression systema in chronic venous ulcers, in order to activate wounds that are difficult to heal.

Methods: Analysis of the cohort of patients diagnosed with chronica venous ulcers, treated with antioxidant dressing from 1st January, 2018 to 31st October, 2019.

Results: A total 8 patients who needed treatment with antioxidant dressing were analyzed. Mean age was 72.4.6 years (SD 12.2), 75% were women and 62.5% had hypertension and 25% were diabetic. 37.5% were treated with oral anticoagulants due to arrythmias and 25% due to previous venous thrombosis in limbs. 50% patients were treated with antibiotics in the 2 months previously to start the therapy with antioxidant healing. Oxidative dressing was combined with two layer compression system in all patients. Changes of antioxidant dressing were performed every 5 days. Healing was completed at 63(SD 14) days in 6 patients, and increase granulation tissue in the rest. No complications related to dressing were recorded. Pain was reduced in 7 (SD 1) points in Visual Analog Scale and skin maceration was found in 1 patient, that it was solved performing the frequency of wound cures every 3 days.

Conclusions: In our series, combination of antioxidant dressing with two layer compression system reduces the time of healing in chronic venous ulcers. We did no record any adverse event, the tolerance was excellent, reducing pain and timing of healing, as well as health care costs.

EP113 THE MODERN APPLICATION OF MOIST EXPOSED BURN OINTMENT IN CHRONIC WOUND

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[1]Hospital Tengku Ampuan Afzan Kuantan, Wound Care Unit, Department of Orthopaedics, Kuantan, Malaysia; [2]Hospital Tengku Ampuan Rahimah , Wound Care Unit, Department of Orthopaedics, Klang, Malaysia

Aim: The prevalence of chronic wound is increasing due to the aging population and concurrent chronic non-communicable diseases.1 The types of chronic wounds are mainly diabetic foot ulcers, venous leg ulcers, pressure injuries and others. Moist exposed burn ointment

Method: This case series demonstrate the effectiveness of using moist exposed burn ointment* in the treatment of chronic wounds in two tertiary centres in Malaysia.

Results: Five cases of chronic wound, with no signs of healing after months, underwent a comprehensive wound care assessment and were then started on moist exposed burn ointment* dressing. The wounds have since shown signs of healing.

Discussion: Moist exposed burn ointment* has been widely used traditionally as an effective treatment for burn injuries.2 The innovative application of moist exposed burn ointment* has led to success in the management of some chronic wound in Malaysia. A through assessment of chronic wound, particularly the identification and management of the underlying aetiology is the mainstay treatment. The use of moist exposed burn ointment* then facilitates and accelerates the natural wound healing process.

Conclusion: The innovative usage of moist exposed burn ointment* has demonstrated effectiveness in managing chronic wounds besides its conventional use in burns.
**MEBO*

EP114 A PROSPECTIVE CLINICAL TRIAL EVALUATING A NOVEL DRESSING* ON PATIENTS WITH CHRONIC AND ACUTE WOUNDS IN THE POST-ACUTE SETTING

Thomas Serena[1], Laura Serena[1], Khristina Harrell[1], Nicole Schrecengost[1], Keyur Patel[2], John Timmons[2]

[1]SerenaGroup; [2]D&P Medical Group

Introduction: The ideal dressing promotes wound healing by optimizing the environment in the wound bed. In addition, reducing pain during wear, and removal increases patient comfort and adherence. A longer wear time decreases the need for frequent dressing changes reducing cost and needless disruption of the healing process. A novel dressing* consists of five layers: a silicone interface reducing trauma to the ulcer bed and peri wound skin; a highly absorbent polyurethane foam; a spreading layer distributing the exudate across the dressing; a retention layer trapping bacteria and protease rich fluid; and finally, a protective backing layer. The technology features Y-shaped cuts in the spreading and retention layers that make the dressing more flexible increasing patient comfort and extending wear time.

Methods: A prospective clinical trial conducted in a variety of post-acute patient care settings evaluated

wound size, pain during dressing wear and removal, wear time, exudate control, patient comfort, and clinician satisfaction. The ethics committee approved protocol included surgical wounds, skin tears, venous leg, diabetic foot, and pressure ulcers. The subjects were followed weekly for four weeks. At the end of the four weeks study coordinators conducted interviews with patients and clinicians. A total of 30 subjects were enrolled.

Results: The majority of ulcers reduced in size during the four-week trial with several ulcers achieving complete closure. The investigators observed the greatest healing effect in pressure ulcers. The average wear time was one week. The dressing effectively controlled exudate. All of the patients reported reduced pain during dressing wear and removal. Nurses favored the longer wear time and ease of use.

Conclusions: In this limited investigation, the study dressing promoted healing, reduced patient discomfort, decreased exudate and extended wear time. Further study in the home health care setting evaluating wear time is in progress.
**Mepilex Border Flex (Molnlycke; Gothenburg, Sweden)*

EP115 RESULTS OF A MULTICENTRE, PROSPECTIVE, OBSERVATIONAL STUDY ON THE PERFORMANCES OF A NEW TLC-NOSF POLY-ABSORBENT DRESSING* ON CHRONIC WOUNDS

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Aims: This evaluation aimed to assess the efficacy and safety of a new TLC-NOSF dressing with poly-absorbent fibres and super-absorbent properties in the local management of chronic wounds in an unselected patient population under real-life settings.

Methods: A large, prospective, multicentre observational study with the new TLC-NOSF poly-absorbent dressing was conducted in 60 centres across Germany between January 2019 and June 2020. The main endpoints included wound healing rate and progression, sloughy tissue and exudate management, tolerability, acceptability, handling of the dressings.

Results: A total of 233 patients with chronic wounds (101 leg ulcers, 55 diabetic foot ulcers, 17 pressure ulcers and 60 chronic wounds of various other types) were treated with the evaluated dressing and followed up for a maximum of 12 weeks. By the final visit, 54.9% of the wounds healed (median time-to-heal: 49 days), 38.2% improved, 1.7% were unchanged, and 2.1% worsened. Sloughy tissue reduced by 64.5% and exudate level and peri-wound skin improved in 71.0% and 67.8% of the cases, respectively. The dressings were judged 'very conformable' (71.7%), 'very well tolerated' (85.8%) and 'very well accepted' (79.4%) with 'very good handling' (73.4%) and 'pain-free dressing changes' (75.2%) in the large majority of the cases. Similar results were reported regardless the patients' and wounds' characteristics at baseline.

Conclusions: These clinical data document the good healing properties and safety profile of this new

TLC-NOSF poly-absorbent dressing and support its use in the management of chronic wounds.
** UrgoStart Plus, Laboratoires URGO, France*

Leg Ulcers

EP142 PREDILECTION SITES OF 112 PATIENTS WITH CLEARLY CONFIRMED PYODERMA GANGRENOSUM

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Aim: Pyoderma gangrenosum (PG) is a rare, non-infectious, neutrophilic dermatosis that is often difficult to diagnose. Therefore, it was considered as a diagnosis of exclusion. Today, the PARACELSUS score is available as a validated diagnostic tool. Based on this score, patients with PG should be evaluated for anatomic manifestations.

Method: In this study, data of all patients diagnosed as PG in the Department of Dermatology at the University Hospital Essen (Germany) within the last 20 years were evaluated. The diagnosis was now reevaluated using PARACELSUS scores, so that only the data of patients with clearly confirmed PG were analyzed.

Results / Discussion: 112 patients with PG have been evaluated. The age of patients at initial diagnosis ranged from 15-95 years (median 59). Lower legs showed to be the most frequently affected predilection site in 79.4%. Thighs were affected in 14.2% each, mammae in 9.1%, and arms in 7.2% of patients; others <6.0% each. On the lower leg, PG was found in 78.9% on the extensor sides, in 44.8% on the lateral, in 39.2% on the medial, and 26.2% on the dorsal lower leg.

Conclusion: PG occurs most frequently on the lower legs, with the extensor sides of the lower legs being the preferred sites of predilection. PG should be considered as a rare differential diagnosis in chronic recurrent wounds, especially on the lower legs. Today, the often difficult diagnosis should be made with the easy-to-use PARACELSUS score, so that only patients with clearly confirmed PG are examined in scientific analyses.

EP143 KNOWLEDGE, TEACHING AND LEARNING ABOUT ULCERS OF VENOUS AETIOLOGY IN NURSING PROFESSIONALS AND STUDENTS: A SCOPING REVIEW

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Aim: To synthesise the published evidence on the degree of knowledge and teaching-learning methods in nursing professionals and students on the care of people with ulcers of venous aetiology.

Method: For this scoping review, a search was performed in January 2021. To identify sources of evidence, a systematic search was conducted in Medline, Embase, Cinahl, WOS, SCOPUS, Cuiden, ERIC

and ScienceDirect. All types of evidence associated with knowledge, teaching and/or learning regarding venous leg ulcers in nursing were included.

Results / Discussion: Nineteen documents met the inclusion criteria. The content focused on compression therapy, anatomy, physiology, aetiology and/or pathophysiology, topical treatment and care, assessment and healing and diagnosis to recognize injury, ITB and use of Doppler. Intervention Teaching/ Learning was varied in modality, content and duration.

Conclusion: Although results suggest a lack of knowledge, the educational interventions studied demonstrate their effectiveness, without being able to determine which may be the most effective. The most relevant topics were varied, but there is a consensus at European level to implement a common tiered training program. It can be said that the implementation of these programs into undergraduate education can be beneficial for future nurses, using methodologies that promote understanding, knowledge and confidence in caring for people with venous leg ulcer.

EP144 COMPRESSION TREATMENT WITH CONTROLLED PRESSURE IN COMBINATION WITH A NOVEL WOUND DRESSING MAY IMPROVE PATIENT SELF-CARE AND REDUCE HOSPITAL VISITS

Andreas Nilsson[1], Charlotta Arrhenius[2], Torbjörn (Toby) Lundh[3]

[1]PressCise, R&D, Gothenburg, Sweden; [2]S2Medical, S2Clinic, Linköping, Sweden; [3]University of Gothenburg and Chalmers University of Technology, Gothenburg, Sweden

Aim: Nursing time required for application of compression garments and changes of wound-dressings is a major cost driver in venous leg ulcer (VLU) care. The aim was therefore to evaluate a new wound-dressing and a novel compression technology clinically proven to deliver a well-defined pressure even without frequent reapplications.

Method: Four patients with active VLUs and a history of VLUs were enrolled in this limited study. Wound duration, before enrolment, was between 2.5 and >6 months. Both the compression bandages and stockings used, were made with a technology that guarantees the correct pressure, also over time. The wound dressing used adheres to superficial wounds, and can stay on until healing is achieved.

Results / Discussion: The wound healing times were short compared to the patients' past VLU history. Even the largest wound, 41x24 mm, healed in 3 months. The patients reported better self-management compared to standard treatment. It was estimated that the number of visits to the clinic was reduced by more than 50%, due to choice of a wound dressing that could stay on for an extended period of time in combination with the compression technology that did not require frequent refitting. These promising results should be validated by a larger study.

Conclusion: The combination of the new wound dressing and controlled compression has the potential to reduce the number of hospital visits, improve cost-effectiveness and allow for better self-care.

EP145 EFFICACY AND SAFETY OF AN INNOVATIVE COMPRESSION SYSTEM FOR THE TREATMENT OF VENOUS OR MIXED LEG ULCERS – FREEDOM CLINICAL TRIAL OUTCOMES

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Aim: Assessment of the efficacy, safety, acceptability and patient comfort of an innovative compression system in the treatment of venous leg ulcers

Method: This prospective, multicentre, non-comparative clinical trial was conducted across hospital wards or specialised wards of private-practice physicians in France and Germany. Patients were treated for 6 weeks with a new compression system (UrgoK1®) which is a multicomponent system in one bandage, based on an innovative 3D-knitting. Weekly evaluation by investigators, including clinical assessments and surface measurements were documented. The primary outcome was the relative wound surface area reduction (RWAR) at Week 6. Acceptability and patient's comfort were also documented throughout the study (including ankle mobility, itchiness, heat sensation, …).

Results / Discussion: Fifty-two patients were included. At baseline, the mean wound duration was 5.6 ±4.9 months with a wound surface of 5.7 ±4.3 cm^2. At Week 6, the median RWAR was just below 90%, with a wound closure rate of 34.6% (18/52) at a mean time of 32 ±11.4 days. Comfort was noted as very good/good by 93.2% of patients, and application as very easy/easy by 98% of clinicians. Investigators were satisfied/very satisfied with this new system for 88.5% of their patients.

Conclusion: This pilot clinical trial shows the benefits of this innovative compression system regarding efficacy, acceptability and patient's comfort to treat venous leg ulcers. Further evaluation should be performed to support these encouraging results.

EP146 ADJUNCTIVE INTERMITTENT THIGH COMPRESSION FOR THE TREATMENT OF LOWER LIMB ULCERS

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Aim: Intermittent pneumatic compression (IPC) is an adjunctive therapy that can applied to improve healing of leg ulcers. This case series evaluation assessed the efficacy of a novel, thigh-administered IPC device designed to apply compression to the afflicted leg for the management of hard-to-heal leg ulcers.

Method: Sixty-one eligible patients from 11 wound care centres, with hard-to-heal leg ulcers consented to take part in. Mean ulcer duration before inclusion in the evaluation was 50 ± 24 months (median: 24 months). Hard-to-heal was defined as 'failure of the wound to progress in the opinion of the responsible wound care specialists'. Patients were instructed to use the device for two hours-a-day alongside their standard wound care for a 16-week period.

Results / Discussion: Forty-eight participants with a total of 58 ulcers were included in the analysis. 33% of ulcers (n=19) healed within the study period; mean healing time = 10 weeks. A further 60% of ulcers progressed towards healing, with a mean surface area reduction of 56% (23cm2). One wound care centre assessed patient reported pain scores; 5/19 participants reported complete resolution of their ulcer-related pain, 10/19 participants reported a reduction in pain with a mean reduction of 47%.

Conclusion: Recalcitrant lower limb wounds progressed towards healing following the addition of thigh IPC to standard wound care within these case series evaluations. IPC garments are typically worn over wound sites which may produce discomfort or interfere with treatments; the novel thigh garment utilised in these evaluations addressed this issue and produced encouraging results which support the next step of a multi-centre RCT.

EP147 CANNABIS-BASED MEDICINES-A NOVEL TREATMENT FOR WOUND-RELATED PAIN

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Aim: Introduce Topical Cannabis-Based Medicines (TCBM) as a novel and viable option to treat wound-related pain associated with integumentary wounds (cutaneous membranes & mucous membranes).

Method: Prospective open-label study of patients with painful integumentary wounds with average daily pain scores exceeding 5 out of 10 on an eleven-point Numeric Rating Scale (NRS). Total of 6 patients, 4 with cutaneous wounds and 2 with mucous membrane wounds were studied. Wound diagnoses included pyoderma gangrenosum, herpes zoster, skin cancer, vasculitis, and sickle cell disease. TCBM, composed of a proprietary mixture based on extracts from legalized medical grade cannabis, was self-applied directly to the wound bed once per day. Patients tracked utilization of their previous analgesics in pursuit of keeping average daily pain scores below 5 out of 10 on NRS.

Results / Discussion: Clinically significant pain relief (mean>30% on NRS) was noted in 100% of cases. Pain relief occurred rapidly, within 5-10 minutes, and lasted for up to 4-6 hours. Additional positive outcomes observed included decreased utilization of opioids (mean reduction of 55% of daily morphine sulfate equivalents). No adverse events, neither systemic nor local, were observed.

Conclusion: TCBM demonstrates significant promise in their ability to promote analgesia in painful integumentary wounds. Given their rapid onset of action in this case series, TCBM could be considered to treat both wound-related baseline pain and breakthrough pain, especially wound-related procedural pain. Published pre-clinical research suggests that the analgesia is largely mediated through multiple receptors, ligands, enzymes, and transporters of the integumentary endocannabinoid signalling system.

EP148 ACCELERATED HEALING OF CHRONIC LEG ULCERS WITH EARLY TOPICAL OXYGEN THERAPY VIA HAEMOGLOBIN SPRAY : A RETROSPECTIVE CHART REVIEW OF A COHORT FROM SINGAPORE

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[1]Molnlycke Health Care Asia-Pacific Pte Ltd, Clinical, Singapore, Singapore; [2]Essen University Hospital, Dermatology & Venereology, Duisburg, Germany

Aim: Local tissue hypoxia, a component of multifactorial pathogenesis in nearly all chronic wounds, can be circumvented with topical oxygen therapy such as haemoglobin spray, which may accelerate wound healing. Thus, we aimed to determine haemoglobin spray's effect on wound healing time and the association between the wound's age when spray therapy began and the likelihood of wound healing.

Methods: We conducted a retrospective chart review of patients with chronic leg ulcers treated with haemoglobin spray for 2 to 16 weeks at an acute hospital in Singapore. Descriptive statistical analysis and survival analysis of patient's age at treatment, type of chronic leg ulcer, wound age before therapy and wound dimensions before and after treatment, among other variables, were performed in R.

Results: Of 90 patients with chronic leg ulcers treated with haemoglobin spray, fifty-eight patients (64.4%) achieved wound healing within 16 weeks, and all others with longer wound-healing times were excluded from analysis. Whereas wounds that healed in less than 16 weeks showed no difference in mean size, wounds not given haemoglobin spray therapy generally took longer to heal. Our analysis of the effect of sex, age, type of ulcer and wound age revealed wound age as the sole variable associated with the likelihood of healing, such that younger wounds generally healed faster.

Conclusions: Our preliminary results suggest that early treatment with haemoglobin spray positively affects how various types of chronic wounds heal, especially by promoting healing outcomes and accelerating wound closure.

EP149 THE EFFECT OF MATRIX RHYTHM THERAPY ON WOUND HEALING: A COLLECTION OF SIX CASES WITH CHRONIC LEG ULCERS (CFU)

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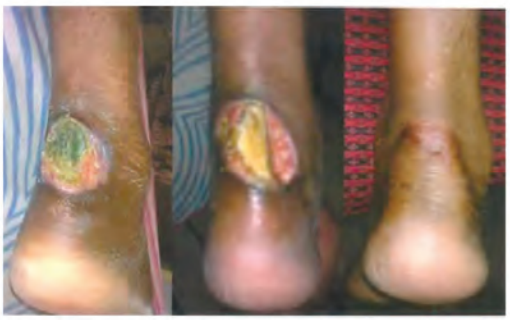
[1]Niramay Rehab , Solapur, India; [2]Dr Danish pain and wellness clinic , Haldwani , India; [3]Alloveda Clinic, Pune, India; [4]Niramay Physiotherapy Center, Belagavi, India; [5]IMT, India; [6]Matrix Rhythm Therapy , Research and Development, United Kingdom; [7]Dr Randoll Institute, Munich, Germany

Aim: Chronic leg ulcer (CLU) is associated with significant morbidity and high cost to healthcare. This study summarizes the results of a new therapy that uses non-invasive mechano-magnetical (8-12Hz) vibrations thereby allowing increased circulation, oxygenation that triggers wound healing.

Method: Six cases with CLU, were treated with the therapy* using hand held resonator** by trained therapists. The cases have all received appropriate therapies prior to the referral, however failed to heal. The therapy* was applied around the wound edges and the whole of the effected limb for 45-60 mins

once weekly or twice weekly depending on the size of the ulcer until the wound is completely healed. All cases were followed up regularly to confirm wound closure post treatment period.

Results / Discussion: The median was 42 (15-67) years. The non-healing median period was 16 (2,5-30) months. The underlying age cause of the ulcer was diabetes in 4 cases, heamatologic in one case and vascular in one case. The median time to healing was 13.5 (3-24) weeks. In all cases proliferation was observed following on from the first treatment session and improved with every therapy week.



Conclusion: This therapy* is a non-invasive, safe therapy and has demonstrated complete wound closure in these retrospective cases. A controlled prospective pilot study is planned to further investigate the effectiveness as well as the impact on quality of life and on the healthcare costs.
**MaRhyThe®*
*** Matrixmobil®*

EP150 RISK BASED WOUND TREATMENT AS ALTERNATIVE TO AMPUTATION

Hildegard Moser[1]

[1]Wundversorgung Hildegard, Brixlegg, Austria

Aim: Increase awareness for Risk based Wound Treatment as Alternative to Amputation

Method: Risk based Wound Treatment following the process with 5 key success factors as defined by Wound Treatment Hildegard. Further details see next page.

Results / Discussion: What are limitations for Risk based Wound Treatment?

Conclusion: Risk based Wound Treatment might prevent an amputation in certain circumstances.

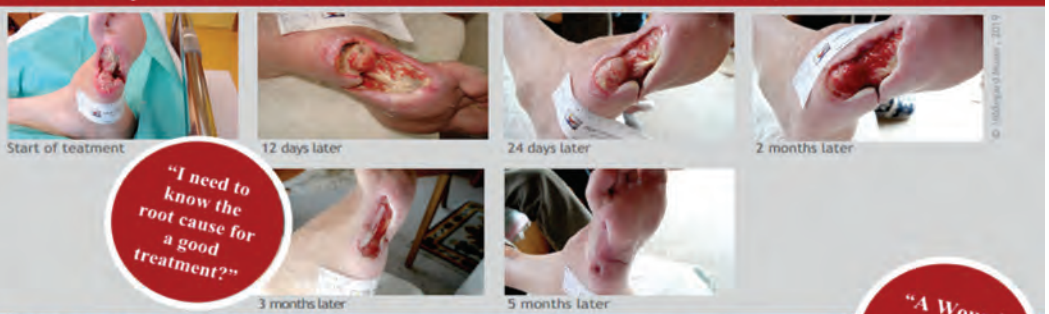
Risk based Wound Treatment as Alternative to Amputation?

Case Studies from ambulant Wound Treatment
Wound Treatment DGKS ZWM Hildegard Moser, 6230 Brixlegg, Austria

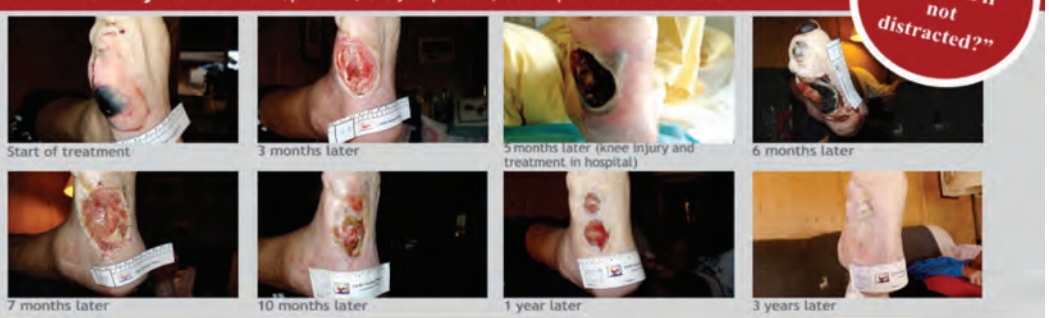
The 5 Factors of Success according Hildegard Wound Treatment:

1. The first discussion with patient, Risk Assessment and Target agreement
2. Working plan with clear risk based criteria for the wound treatment
3. Periodic visits and verification of treatment
4. Ongoing communication with Doctors and other service teams
5. Foster awareness for success

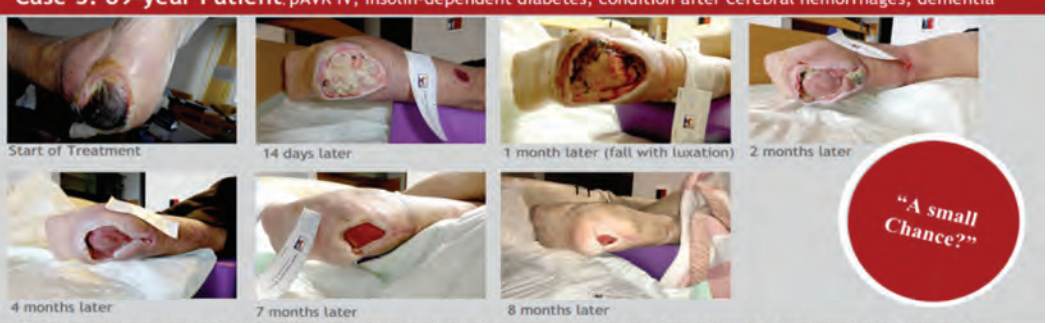
Case 1: 77-year Patient, pAVK IV, renal insufficiency, chronic heart failure, COPD, exposed metatarsal bone



Case 2: 74-year Patient, pAVK IV, dialysis patient, decompensated heart failure



Case 3: 89-year Patient, pAVK IV, Insolin-dependent diabetes, condition after cerebral hemorrhages, dementia



Take away: concept of risk based treatment criteria is a success factor. A treatment plan needs the trust of the patient. A network with medical experts is the basic for the treatment. Qualified wound treatment might prevent an amputation in certain circumstances.

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EP151 THE CORRELATION BETWEEN REDUCING WOUND TIME TO HEALING AND IMPROVED QUALITY OF LIFE

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Aim: Due to the evidence related to reduced healing time and when used in conjunction with compression therapy, the use of an innovative technology dressing* for the local treatment of leg ulcers ensures a fully evidence based approach to treatment. The Trust decided to implement this regime in one clinical setting with the aim of assessing clinical efficacy and the impact on the Quality-of-Life (QOL) for the individual patients.

Method: Thirteen patients with lower limb wounds, suitable for compression, were selected for inclusion in the evaluation. Wound duration range 3-312 weeks (mean duration = 56 weeks). All patients were treated with compression therapy and local application of an innovative technology dressing *, polyabsorbent fibre derivative. Wound surface area was measured and recorded every 2 weeks. A QOL questionnaire was completed on initiation and every 4 weeks thereafter.

Results / Discussion: All patients demonstrated an improvement in wound bed condition and 62%(N=8) experienced wound area reduction compared to previous assessments. The number of dressing changes decreased for many patients from thrice weekly to twice a week. The QoL scores improved in-line with wound healing and reduced visits. Positive impacts include sleeping in a bed rather than a chair and being able to return to work.

Conclusion: The impact of living with a chronic wound and its effect on QOL cannot be underestimated. This poster illustrates an evidence based approach to improve both healing and overall patient reported QOL.
**TLC-NOSF*

EP152 USING INNOVATIVE DRESSING* TO TREAT LOWER LIMB ULCERATION TO OPTIMISE HEALING TIME

Christopher Webb[1], Fiona Marris[2]

[1]Urgo Medical , Clinical Team, Loughborough, United Kingdom; [2]Leg Ulcer Clinic Lead, Lincoln Community Health Services NHS Trust, Lincoln

Aim: To implement a NICE recommended topical wound care treatment for venous/mixed aetiology leg ulcers alongside compression thus improving clinical outcomes. The dressing with polyabsorbent fibers* acts locally inactivating MMPs and promoting angiogenesis. The secondary action is gentle mechanical debridement removing devitalised tissue. All this achieved with the application of a simple dressing.

Method: 18 patients with venous or mixed aetiology leg ulcers were selected within the local leg ulcer clinic ranging in duration from 4–200 (mean 49). All patients had been treated with compression appropriate to the APBI and a wide variety of wound dressings prior to the introduction of treatment with dressing with polyabsorbent fibers*. Standard of care (compression appropriate to vascular assessment)

was commenced on all participants along with the polyabsorbent fibre dressing*. Progression would be measured via wound area reduction and improvement in the TIME assessment parameters including pain scores.

Results / Discussion: Over 4 months 72% (n=13) of all leg ulcers healed and all remaining reduced in size. Average wound surface area was 7.8cm which reduced to 3.3cm. 100% (n=18) showed evidence of significant improvement during the evaluation period. The polyabsorbent fibre dressing* was the only factor which changed during the period of the evaluation, demonstrating its efficacy. 100% (n=18) who received the treatment with polyabsorbent fibre dressing* reported reductions in pain.

Conclusion: The polyabsorbent fibre dressing* treatment demonstrated that used in conjunction with effective compression in this group of patients expedited their healing time in view of their previous wound duration. This being despite previous appropriate compression and varying wound bed interventions.
**TLC-NOSF*

EP153 A COMPARISON OF INTERFACE PRESSURES OF 3 COMPRESSION THERAPY SYSTEMS: A FRENCH NURSES ASSESMENT IN REAL-LIFE CONDITION

Serge Bohbot[1]

[1]URGO Medical, Chenove, France

Objective: To compare the interface pressures, the Static Stiffness Index (SSI) and the application time achieved with commonly used compression therapy systems for venous leg ulcers: two different two-layer bandages (2LB) and a Short Stretch Bandage (SSB).

Methods: 32 French experienced community nurses applied three times, each of the tested systems*, on healthy volunteers, randomly assigned. The interface pressures were measured with a pressure monitor*** after each application. In addition, the time to apply the tested compression systems and a questionnaire was completed after, by the nurses.

Results: After the 96 applications per tested compression system, the interface pressure measurements show that the therapeutic level (40 mmHg) is achieved in 45%, 22% and 4% for the bandages*(for which 80% of the applications are under the level of 30 mm Hg).
The mean SSI value is between 7,3 and 9.7 mmHg, the SSB being the more rigid of the three systems and the application time is quite similar between the three systems, reported around three minutes. The analysis of the questionnaire showed that the nurses rate the first system** better than the other systems on few criteria such as ease of application, safety and comfort.
Conclusion: These results suggest that the innovative 2LB is the compression system which most achieves the required therapeutic pressure probably due to its etalonnage, necessary for the management of venous leg ulcers, is easy to apply, being a suitable alternative to other compression systems.
** UrgoKTwo®, Coban®2 and Rosidal K®*
*** UrgoKTwo*
****Kikuhime*

EP154 CLINICAL EVIDENCE OF A TWO LAYER COMPRESSION THERAPY SYSTEM: FROM HEALTHY VOLUNTEERS TO REAL LIFE DATA

Jean Patrick Benigni[1], Serge Bohbot[2]

[1]Polytech Paris-UPMC, Paris, France; [2]URGO Medical, Chenove, France

Objective: To provide caregivers managing leg ulcers, the elements that led to establish the effectiveness of a two-layer compression system (2LB) all other Europe.

Methods: A first randomized controlled trial (RCT) was undertaken in 24 healthy volunteers in Germany to compare interface pressures of three compression systems (a 4LB, a two-layer (2 LB, UrgoK2), and a short stretch (SSB) systems) recorded over seven days. Thus, a French non-comparative trial was performed on 42 patients with VLUs, with this 2 LB system during 6 weeks, looking for safety and patient's compliance. After, a European RCT was conducted on 187 patients with VLUs; efficacy of the 2LB and a well-established 4LB systems was assessed (closure rate, Week 12). Finally, a UK evaluation with 32 nurses was performed to document if the therapeutic pressure is achieved to manage a VLU (40 mm Hg), when using different compression systems (2LB, 4LB and SSB).

Results: On healthy volunteers, the 2LB system maintained, over one week, a similar level of pressure, similar to the 4LB and better than SSB, but was considered more comfortable than the control systems. Very good tolerance and compliance was shown in the French trial, followed in the RCT, by a 2LB system being as effective as the 4LB (48% vs 38% wound closure) and easier to apply (p=0.038). Finally, the UK nurses reached more often the therapeutic pressure with the 2LB.

Conclusion: The innovative 2LB provides a suitable alternative to other compression systems, used in VLU management.

EP155 IDENTIFICATION AND MANAGEMENT OF PHLEBOLYMPHEDEMA IN/ON LOWER LIMBS. A CASE REPORT

Carmen Romero Rodríguez[1], Celia Horcajada Reales[1], Alejandro Lledó Carballo[1], Agustín Crespo Moreno[1], Jesus Borbujo[1]

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Aim: Phlebolymphedema is a mixed-etiology swelling due to chronic venous insufficiency and lymphatic insufficiency. Primary phlebolymphedema is usually caused by a congenital malformation that affects the lymphatic and venous system. Secondary phlebolymphedema, which is much more frequent, usually begins with a chronic venous insufficiency that in its evolution also deteriorates the lymphatic system. The purpose of this project is to review its usual manifestations, improve care for patients with phlebolymphedema, and motivate wound care professionals to consider adding phlebolymphedema patient care to their clinical practice, while highlighting the role of therapeutic compression.

Method: A clinical case is presented. The usual cutaneous manifestations of secondary chronic phlebolymphedema are reviewed. In addition, the main interventions that improve the pathophysiology and clinic of these patients are reviewed, and the evolution of our case is shown.

Results / Discussion: Through establishing proper measures, the skin changes improved markedly. In addition, there is a marked improvement in the feeling of heaviness and itching. It also achieves a unification in the volume of the limbs and elimination of edema.

Conclusion: The early diagnosis of skin changes associated with phlebolymphedema and early intervention in the pathophysiological process would prevent the formation of venous ulcers secondary to phlebolymphedema. Most cases of phlebolymphedema are due to an overload of the venous system which overwhelms the lymphatic system´s ability to remove interstitial fluid. When possible, treatment should include manual lymph drainage, skin care, exercise, and compression bandaging with short-stretch compression bandages.

EP156 RESULTS OF A MULTICENTRE, PROSPECTIVE, OBSERVATIONAL STUDY ON THE PERFORMANCES OF TLC-NOSF POLY-ABSORBENT DRESSINGS* ON LEG ULCERS

M Delonge[1], Udo Möller[2], Joachim Dissemond[3], Hauke Groth[4], Steffen Luetzkendorf[5], Winfried Keuthage[6]

[1]General Practitioner, General practitioner group practice, Aachen, Germany; [2]Medical Affairs and Clinical Research Department, URGO GmbH, Sulzbach, Germany; [3]Dermatologist, University Hospital, Essen, Germany; [4]Internist, Internist practice, Hamburg, Germany; [5]Surgeon, Surgical practice, Helbra, Germany; [6]Diabetologist, Diabetes practice Münster, Münster, Germany

Aims: This evaluation aimed to assess the performances of TLC-NOSF dressings with poly-absorbent fibres in the local management of leg ulcers in an unselected patient population under real-life settings.

Methods: A large, prospective, multicentre observational study with three TLC-NOSF poly-absorbent dressings* was conducted in 85 centres across Germany between January 2019 and June 2020. The main endpoints included wound healing rate and progression, quality-of-life improvement, and tolerability and acceptability of the dressings.

Results: Altogether 390 patients with leg ulcers (288 venous leg ulcers, 39 arterial leg ulcers and 63 leg ulcers of mixed origin) were treated with the evaluated dressings for a mean duration of 65.9±42.5 days. Throughout the study period, compression therapy was consistently applied in 56.4% of the patients. By the final visit, 45.6% of the ulcers healed, 46.4% improved, 3.8% were stabilized, and 2.6% worsened. A clear improvement was reported in several quality-of-Life items, in particular regarding concerns towards the wound (63.6%), fears of wound deterioration (60.6%), disturbing discharge (75.0%) and bad odour (58.3%), sleep disturbance (62.1%), pain (58.3%) and frustration due to long-healing time patients' pain (55.3%). The dressings were very well tolerated (83.8%) and very well accepted (78.5%) in the large majority of the cases.

Conclusions: These results show the good performances of the dressings in real-life practices on wound healing and quality-of-life improvement along with good safety profile and acceptability, and support their use in the management of leg ulcers.
**UrgoStart Plus Pad, UrgoStart Plus and UrgoStart Plus Border, Laboratoires URGO, France*

Pressure Ulcers

EP175 PRESSURE INJURY CHALLENGES RELATED TO PRONE POSITION FOR COVID PATIENTS

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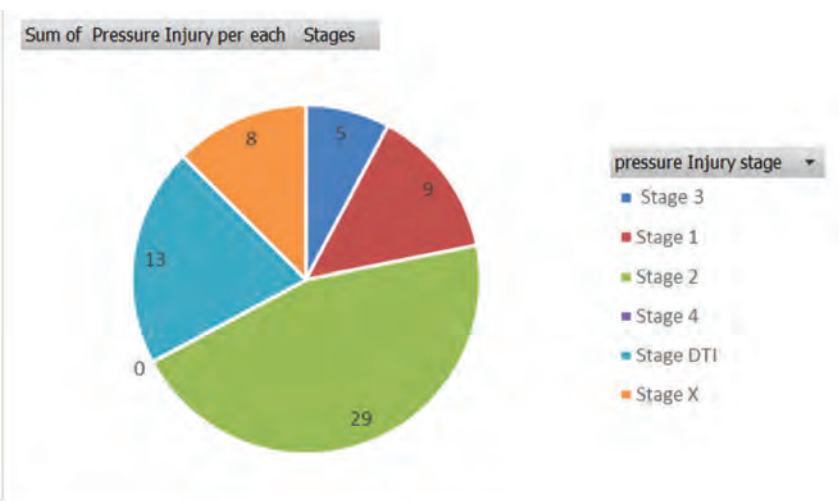
Background: Sometimes COVID-19 management requires prone positioning for extended periods of time. studies revealed that prone positioning is associated with higher incidence of HAPI compared with supine positioning

Aim: To describe the characteristics of prone positioning pressure injuries, and to highlight the importance using appropriate support surfaces and pillows as pressure injury preventive measures

Method: Patient with covid 19 placed on mechanical ventilator, required to position them on prone position and minimal handling, micro turning was introduced to the unit nurses, patient developed Hospital Acquired Pressure Injury (HAPI) on March was reported as (HAPI) and patients assessed by wound management team and confirmed cases of HAPI due to prone position

Results / Discussion: Patient characteristics result expressed in mean for Age, Braden score and Length of hospital stay
Age 51.64705882
Braden score 11
Length of hospital stay 34.11764706
18 Confirmed (HAPI) cases due to prone position
Male (14), Female (4). Pressure Injury affected location shows, the most affected location was nose, penile then cheek and lip, 9,7,6,6 respectively similar findings with other studies, Pressure injuries stages in figure1. As per patient status, discharged from hospital (7), present in hospital (6), expired (5)



Conclusion: Prone position for covid cases is effective for oxygenation improvement but requires efforts from dedicated teamwork while positioning the patients. As a result, pressure injuries developed, increasing cost in treating patients, impact patient quality of life and imply of social stigma. Recommendation to raise additional awareness about pressure injuries prevention due to prone position.

EP176 INCIDENCE AND ANALYSIS OF MEDICAL DEVICE RELATED PRESSURE ULCER : KOREA ACUTE CARE HOSPITAL

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Aim: The objectives of the study were to identify the incidence rate and characteristics of medical device related pressure ulcers (MDRPU) in acute-care patients

Method: In a cross-sectional, descriptive study, PU incidence was measured from January to December in 2017 using a pressure ulcer reporting form. Hospital acquired pressure ulcers included those that occurred 24 hours after hospitalization.

Results / Discussion: The overall incidence rate of hospital-acquired pressure ulcers per 1000 hospital stays and MDRPU was 0.75‰ (350/467,456*1000) and 0.25% (120/467,456*1000). Incidence rate of intensive care units was 4.85‰ (146/30087*1000) and general wards was 0.47‰ (204/437369*1000). MDRPU occurrence rate of intensive care units was 1.60‰ (48/30087*1000) and general wards was 0.16‰ (72/437369*1000). Most of MDRPU stage was stage I 20(16.7%), stage II 61(50.8%), Stage III 4(3.3) and suspected deep tissue injury 35(29.2%,). The most common location for MDRPU was thigh 48(40.0%), nose 32(26.7%), wrist 20(16.7%), head 4(3.3%), ear 4(3.3%) and heel 12 (10.0%). The most common Medical devices causing pressure ulcer were treatment aid tools 20(16.7%), antiembolic stocking 40(33.3%), Levin tube 30(25%), angiocatheter (include A-line) 20(16.7%), oxygenations 7(5.8%), and monitoring devices 3(2.5%).

Conclusion: Intensive care unit patients had a higher rate of MDRPU compared with other departments. But MDRPU has been underreported, especially pediatric population. It is necessary to perform more frequent skin assessment for patients using medical devices, and collaborate with other health care provider to prevent MDRPU in various clinical setting involving pediatric population.

EP177 WHAT MAKES A HYDROGEL-BASED DRESSING ADVANTAGEOUS FOR THE PREVENTION OF MEDICAL DEVICE-RELATED PRESSURE ULCERS

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Aim: To test the suitability of a hydrogel-based dressing for prevention of medical device-related pressure ulcers (MDRPUs).

Methods: Hydrogel-based dressings were evaluated through laboratory testing of their mechanical and thermal properties. Specifically, using an electromechanical material testing system, we characterized the viscoelastic stress relaxation of the dressing and determined its long-term elastic modulus. We further measured the static coefficient of friction (COF) of the dressing at skin-dressing and dressing-device interfaces, using a tilting table technique. Lastly, we measured the thermal conductivity of the dressing, using a heat-flow meter and infrared thermography-based method. All measurements considered dry and moist dressing conditions, the latter simulating skin perspiration effects on dressing performances.

Results: The long-term stiffness of the hydrogel-based dressing matched that of human skin for both the dry and moist dressing conditions. Additionally, the dressing demonstrated a relatively high COF at its skin-facing and device-facing aspects. Finally, the thermal conductivity of the hydrogel-based dressing is ~4-times greater than those of foam dressings, which facilitates more effective transfer of body-heat through the dressing, to the environment.

Conclusions: The hydrogel-based dressing meets the primary requirements from a potent material for prevention of MDRPUs, namely, it exhibits modulus-matching with skin, it stays in place under devices which eliminates frictional skin-device sliding and its superior thermal conductivity lowers the risk for heat trapping under a device. Taken together, these properties make the tested hydrogel-based dressing advantageous for prevention of MDRPUs.

EP178 NATIONWIDE EPIDEMIOLOGICAL ANALYSES OF PRESSURE ULCERS – TEN YEARS FOLLOW UP

Andrea Pokorna[1], Petra Búfilová[2], Dana Dolanová[1], Simona Saibertová[1], Lenka Krupova[3], Klára Benešová[4], Miloslav Klugar[1], Jitka Klugarová[1]

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Aim: To evaluate the prevalence of Pressure ulcers in National Health Registries in the years 2010-2019.

Method: Analyses from National Health Registries – inpatient and outpatient care.

Results / Discussion: We have analyzed the prevalence of cases with diagnose L89.0 according the ICD-10. The number of records with L89.0 increases (in 2010 total of 21.844 cases, and in 2019 total of 30.590). In contrary there was 48 777 patients with PUs reported in the National Adverse Event Reporting System. Over the last 10 years, the number of people with a reported PUs of the 2nd to 4th category has increased. In the last 5 years, in an average of 16% of patients the degree of PUs was not classified. The average age of men with pressure ulcers has increased from 70 to 73 years in the last 10 years, and the average age of women has increased from 79 to 81 years. The number of deaths with PUs is constantly growing. In 2019, the PUs had been reported in 12.5 thousand deaths (11.1% of all deaths in that year in the Czech Republic).

Conclusion: The prevalence of PUs increases over the last 10 years in the Czech Republic. In 2019 there was 287 cases with PUs per 100 thousand inhabitants. PUs are more frequently reported as the cause of death.

Acknowledgement: This work was supported by the Ministry of Health of the Czech Republic under grant no. NU20-09-00094“Cost analysis of pressure ulcers treatment - determinant of care”.

EP179 IMPROVEMENT IN QUALITY OF LIVE, REDUCTION IN HOSPITAL STAY AND COSTS FOR PATIENTS WITH FOURTH STAGE PRESSURE ULCERS BY USING NEGATIVE PRESSURE DRESSINGS

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Aim: The incidence of pressure ulcers (PU) has greatly increased in clinical practice of the last years. This debilitating pathology can cause severe pain, infection, sepsis, long hospital stay, further some authors consider that patients with (PU) have a two times higher risk of death compared to patients without (PU).

Methods: We included in this report 21 patients with stage 4(PU) admitted to our department between January 2015 and December 2019.The patients were aged between 25-78 years old, 13 of them being men and 8 women. In 16 patients the (PU) was located over the sacrum and in 5 patients over the ischial tuberosity in all cases with exposure of the bone. Most of the (PU) at presentation were highly exudative, infected, and with residual necrotic tissue. At the presentation we applied the negative pressure dressing which was changed every 3 to 6 days. In 6 patients the wound closure was achieved without surgery and in 15 patients we used local.

Results / Discussion: The hospital stay ranged between 14 and 45 days. The signs of infection were significantly reduced after the first dressing. The patients did not complain about pain and they did not need daily analgesia for dressing change. The daily dressing costs and spending time was considerably reduced due to delay in dressing change up to 6 days without increasing the risk of infection or excessive exudate. In 15 cases we obtained a clean granular tissue and local septic outbreak after the second dressing and in the rest of the cases after the third.

Conclusion: Negative pressure dressings can effectively treat fourth stage(PU), reduce pain, hospital stay, and costs. Also, this therapeutic protocol stimulates the development of granulating tissue, reduces the germs concentration and edema.

EP180 PRINCIPLES OF PRESSURE ULCER PREVENTION AND TREATMENT

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Aim: The aim of this paper is to highlight the management of pressure ulcers, the importance of prevention and the steps of the treatment. The prevention of pressure ulcers avoided the long-term hospitalization, multiples surgeries, high cost and a long suffering of the patient. Availability of appropriate treatment modalities combined with early recognition and regular monitoring, ensures rapid healing.

Method: Our study is based on 23 patients, aged between 35-80 years old, 10 men and 13 women, pressure ulcer were localized at the ischial tuberosity, the heel and sacrum: 10 patients stage III, 1 stage IV and 12 stage II. Our strategy for prevention the evolution of the pressure ulcers includes recogniz-

ing the risk, daily skin care, assessing nutritional status, position changes. The principles of treatment include assessing severity, correcting nutritional deficits, reducing pressure, daily wound care, removing necrotic tissue, using negative pressure dressing, surgical treatment with local flaps and managing bacterial contamination.

Results: For all cases a good management is the best choice. In 5 cases stage II-III we used debridement and direct suture, in 5 cases stage III-IV we used debridement and gluteal flaps for tissue coverage, In 7 cases we used negative pressure therapy and in 6 cases we used daily wound care dressing and topical agents for pressure ulcers.

Conclusion: Pressure ulcers represent complex challenges for healthcare workers. The best management of pressure ulcers is prevention, through a variety of means, including nutritional support, proper supportive surfaces, rotation therapy and an appropriate use of dressings.

EP182 THE USE OF NEGATIVE PRESSURE WOUND THERAPY AND HYPERBARIC OXYGEN THERAPY IN THE INTEGRATED CARE OF SACRAL PRESSURE ULCER COMPLICATIONS: A CASE REPORT

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Aim: The aim of this case report was to describe the evolution and outcome of a hospitalized patient with a pressure lesion in the sacral region after integrated care of the injury and the use of adjuvant therapies.

Method: The following interventions were performed cleaning with saline 0.9% in a light jet, chlorhexidine in perilesional, primary occlusion with gauze impregnated with polyhexanide solution (PHMB), primary occlusion with sterile gauze, secondary occlusion with microporous tape, occlusion with polyurethane film for composition of negative pressure wound therapy (NPWT), NPWT in the sacral region, primary

Illustration 1 - Evolution of the lesion aspect

Table 1 - Time frames for the start of interventions.

Interventions	Objective	08/31 Admission	09/02	09/11	09/14	02/01 Upper
SF 0.9% in light jet	Hygiene and hydration of the wound.					
Chlorhexidine in perilesion Antiseptic	antibacterial action in perilesion.					
Primary coverage with gauze impregnated with Polyhexanide Solution (PHMB)	Primary coverage with antimicrobial activity. It promotes cleaning, hydration and odor removal as well as bacteria and biofilm of the lesion bed.					
Secondary occlusion with sterile Gazes	Primary coverage for the purpose of humidity control.					
Secondary occlusion with microporous tape	Secondary coverage. Porous fixation of the primary covering.					
Occlusion with Polyurethane film (To compose NPT)	Secondary cover with airtight seal.					
Negative pressure therapy (NPT) in the sacral region.	Maintenance of the moist environment of the wound; increased local blood flow; removal of exudate from the wound; promoting the formation of granulation tissue; infection reduction .					
Primary occlusion with Silver Calcium alginate	Primary coverage with antimicrobial activity, also promoting exudate absorption.					
Hyperbaric oxygen therapy in a single-seat chamber at 2.5 ATA, with a 90-minute session. (57 sessions)	Increased partial pressure of tissue oxygen, optimizing wound healing; enhancing the action of some antibiotics, making them more efficient in fighting infections.					
Enteral Nutritional Therapy 1x daily.	Support healing.					
Tazocin 4.5g EV 6 / 6h (for 10 days).	Antibiotic Therapy					

Table 2 - Damage assessment characteristics described in medical record.

Review Injury	08/31 Admission	09/02	09/11	09/14	02/01 End Monitoring
Bed	Granulation Biofilm slough	Granulation Biofilm slough	Granulation Biofilm slough	Granulation Biofilm slough Incenter	Granulation epithelializati on
Odor	Absent	Absent	Absent	Absent	Discreet
Exudate	Gift	Gift	Gift bulky	Gift bulky	present not bulky
Exudate type	serous	serous	purulent	purulent	Seropurulent o
Dimension	14 cm deep 8cm diameter	14 cm deep 8cm diameter			
Edge	Irregular	Irregular	Irregular	Fragile scaly	Invaginata Regular Bounded scaly
Perilesion	desquamative	fragile	fragile	fragile	scaly,Dried

coverage with silver calcium alginate, hyperbaric oxygen therapy (HBOT) 2.5 ATA, each session lasting 90 minutes (57 sessions), and enteral nutritional therapy. Periodic medical evaluation was performed during the hospitalization period, in conjuction with daily visits of the curative nurses to assess the injury. The wound was cleaned and the dressing changed every three days or less when the need for an immediate approach was identified.

Results / Discussion: There was complete adherence to the treatment and good tolerance, with only one isolated episode of adverse effect related to hyperbaric oxygen therapy due to claustrophobia.

Conclusion: In addition, it can be inferred that the hypothesis that integrative wound care including the use of adjuvant therapies such as HBOT and NPWT should be widespread and widely used in the treatment of complex wounds.

EP183 PRESSURE ULCERS OF COVID-19 PATIENTS RELATED INTENSIVE CARE UNIT ACQUIRED WEAKNESS

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Aim: There has been a surge in intensive care admissions following the COVID-19 outbreak. Muscle weakness regarding to the intensive care unit stay is referred to as “intensive care unit acquired weakness” (ICUAW). We aimed to present pressure ulcer cases developed after ICU discharge secondary to weakness in post COVID patients.

Methods: From our database, we retrospectively analyzed the clinical data of 4 patients who were operated between December 2020 and February 2021. Demographic characteristics of patients, duration and degree of pressure ulcers, parts of body affected, and treatment results were evaluated.

Results: All of the patient were male with a mean age of 55 years (range 39 to 66). The patients stayed in intensive care for an average of 35 days, with an average of 17 days being intubated.

One had bilateral trochanteric; two had sacral, one had medial thigh pressure ulcer. Chronic axonal polyneuropathy was detected in all patients as a result of EMG. Creatine kinase levels were normal for all patients. All of the wounds were covered with local flaps under spinal anesthesia (Figure 1). One had minor wound breakdown. There was no other complication.

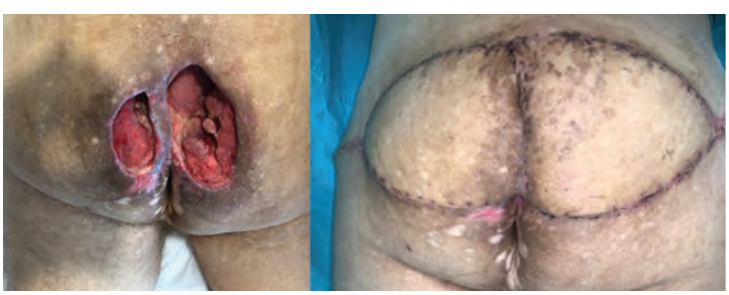

Figure 1

Conclusion: Critical illness polyneuropathy could be serious problem in survivors of COVID-19 patients and may cause pressure sores even after discharge from the ICU. Although prone positioning is recommended in non-intubated patients, ICUAW may cause pressure ulcer in posterior trunk. It should be considered in the differential diagnostic workup and further rehabilitation is required in these patients.

EP185 ADVERSE EVENTS AFTER SURGERY

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Aim: Pressure ulcers represent a major postoperative complication. We analysed data and identify risk factors for the development of pressure ulcers in patients undergoing surgery.

Methods: We used data from the hospital's information system and electronic database (I-hojeni.cz). Statistical analysis was performed using Pearson's chi-square at a significance level of 0.05the variables used: age, Body Mass Index, number and grade of pressure ulcers and comorbidities .

Results: 5,851 inpatients underwent surgery (91.15% of the total of 6,419) between 2017 and 2018. Pressure ulcers newly developed in 86 patients (1.46%), 40 men and 46 women. The patients' average age was 79.85, age was confirmed as a predictive factor for pressure ulcer formation. The average BMI value was 24.13, the relationship between BMI and development of pressure ulcers was not statistically significant. The average pressure ulcer grade was 2.04 and the average number per patient 1.5. Pressure ulcers mostly developed on the heels, buttocks and sacrum. On average the period between a patient's admission and operation was 2.79 days (0–16 days), it did not prove to be a factor. 56 patients (65.11%) had a history of neurological disorder – a predictive factor – the correlation was not statistically significant, similarly to oncological diseases 30 (24.41%). 19 patients (22.09%) with pressure ulcers died.

Conclusion: Our study is unique in expanding our understanding of multiple risk factors for the development of pressure ulcers, it suggests that age and a history of neurological disorder in particular are key risk factors.

EP187 A SURVEY OF 2 NATIONS PRACTICE OF PRESSURE ULCER CARE

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Aim: To assess General Practitioner's (GPs) and nurse's attitude, knowledge and management of Pressure Ulcer (PU) across two countries in Europe.

Methods: A two-part online survey was specifically conducted among GPs in Germany and nurses in United Kingdom; in a previous qualitative study they were both identified as the key stakeholders of PU care management in each of its countries. First part entailed a survey on knowledge and the second part collected data on healed PU cases recently managed.

Results: 130 nurses were interviewed in the UK and 120 GPs in Germany. 260 questionnaires were collected for first part and second part included management of 590 PU cases of their 4 last patients with PU stage II or III (UK: 298, Germany: 292). There were on average 47 PU patients currently managed in both country, about 50% of PU stage II or III and 30% stage I. 60% of patients are more than 71 years old and 4/10 patients with PU have recurring PU.

Key attributes when choosing a dressing for treatment of PU are severity of PU and optimize wound healing, and especially for the UK the level of exudates. About 2/3 of patients had medium, high or very high level of exudates. More than 80% of Health care professionals would like to improve current treatment of PU (95% in UK). Main suggestions are trainings, either practical or specific on PU Care.

Conclusions: The analysis of patient's cases is really powerful due to the large number of PU reported. The communication will detail the keys points on each stage of PU management, will show the differences of care between these 2 countries and lastly will allow for the reconstruction of the patient journey.

Prevention, Home Care, Covid-19 and Quality of Life

EP189 MANAGEMENT OF SKIN MOISTURE IN HEELS: A SECONDARY ANALYSIS

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Aim: To evaluate the efficacy of multilayer silicone foam (intervention) compared to the transparent polyurethane film (control) in managing skin temerature and moisture in heels of individuals undergoing elective surgery.

Method: Secondary analysis from an intra-patient randomized clinical trial conducted in a university hospital in Brazil, from March 2019 to February 2020. Skin temperature was measured by a digital infrared thermometer in degrees Celsius (ºC). Skin moisture was measured by bioelectrical impedance in percentage (%). These variables were measured before the start of surgery (baseline - without dressings), randomization and dressing application were performed. At the end of the surgery these were measured again. Analysis was performed per protocol, through 2-way repeated measures Anova. A significance level of 5% was considered. The study was approved by the Brazilian Registry of Clinical Trials (RBR-5GKNG5).

Results / Discussion: Data from 77 patients (154 heels) were analyzed, with a mean age of 58.6 years. It was identified that in intervention group there was a reduction in temperature (26,5 to 19,1ºC), while in control group there was a temperature increase (26,5 to 29,8ºC) between the beginning and the end of the surgery ($p<0.001$); in intervention group there was a smaller increase in moisture (20.1 to 24.8%), while in control group there was a higher increase in moisture (21.2 to 33.1%) between the beginning and the end of the surgery ($p<0.001$).

Conclusion: Multilayer silicone foam is more efficacious than transparent polyurethane film in managing skin temperature and moisture in heels of individuals undergoing elective surgery.

EP060 A MULTI-METHODS STUDY INVESTIGATING THE IMPACT OF COVID-19 ON ACTIVE DIABETIC FOOT ULCERATION: A SCOPING REVIEW AND PILOT PATIENT STUDY

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Aim: COVID-19 pandemic has been a concerning time for those living with active diabetic foot ulceration (DFU), who rely on regular consultations with their foot protection team. The study aimed to establish the current evidence base regarding the impact of COVID-19 on the care of DFU, investigate the patients' perception on the changes to the provision of care during the government imposed pandemic restrictions and establish the impact this had on the physical and psychosocial wellbeing of this patient cohort.

Method: Scoping review exploring the impact COVID-19 had on DFU status and management was conducted. The methodology of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping reviews (PRISMA-ScR) was employed. The pilot study consisting of a patient questionnaire and semi-structured interview, included patients who had active DFU prior to or during the government imposed restrictions.

Results/Discussion: The literature showed varying approaches to the management of DFU internationally during lockdowns. A triage system was established in five of the studies, others showed a reduction in presentation of DFU but an increase in amputation. The patient pilot study show patients are highly satisfied with the care despite the necessary changes imposed. Contrary to this, Clinical outcomes as reported by the patients do not correspond.

Conclusion: A gap in the literature was identified with regards to investigating the holistic impact of the COVID-19 restrictions on those living with DFU. The relocation of services to the community were positively welcomed by service users however patient self-reported outcomes do not correspond.

EP129 INTERMITTENT PNEUMATIC COMPRESSION AND THE EFFECT OF DIFFERENT COMPRESSION SEQUENCING FOR TREATING LOWER LIMB LYMPHOEDEMA

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Aim: Intermittent pneumatic compression (IPC) devices represent an adjunctive treatment for lymphoedema. Advances in technology have led to the development of devices designed to mimic the process of manual lymphatic drainage (MLD) instead of typical sequential compression. The study aimed to assess the efficacy of IPC designed to mimic the MLD process compared to sequential IPC.

Method: Forty eligible patients were recruited onto this 3-phased, self-controlled, randomized trial. Participants followed a treatment regime consisting of a five-week control period, followed by a five-week intervention period during which they applied IPC daily. Finally, participants underwent a five-week washout period where IPC therapy was discontinued. Outcomes assessed at each clinic visit included: changes in limb volume and impact on quality-of-life scores.

Results / Discussion: The MLD IPC regime was significantly more effective in reducing distal leg volume than the sequential mode (mean volume reduction: 230 ± 135 versus 140 ± 84 mls respectively, p=0.01). Improvements in leg volume were transient as both groups demonstrated a rebound in volume during the wash-out period (LymphAssist: 238 ± 168 ml, sequential: 276 ± 158 ml, p=0.3). Overall, IPC was effective in improving quality-of-life scores (mean reduction: 10 ± 11, p<0.001).

Conclusion: IPC is effective in reducing limb volume and improving quality-of-life for patients with lower limb lymphoedema. IPC which mimics the MLD process has been shown to be more effective in reducing distal leg volume compared to traditional sequential IPC. The increase in leg volume observed after discontinuation of IPC suggests that regular treatment is required to maintain its associated effects.

EP192 COMPARATIVE STUDY ON WOUND CLOSURE AFTER MINIMAL INVASIVE SURGERY USING SUTURES VS. CLOSURE STRIPS

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Aim: For the closure of surgical incisions, in addition to common traumatic closure methods such as needle and sutures, there is also the alternative of atraumatic wound closure using wound closure strips. These are particularly suitable for pain-sensitive and anxious patients, with a focus on young children, but also people who are afraid of injections of anaesthesia. In addition to the general advantages of atraumatic treatment as mentioned the cosmetic result also plays a major role, such as undesirable scarring, for example, on highly visible parts of the body.

Method: In an ongoing case series knee arthroscopy, shoulder and anterior cruciate ligament (ACL) minimally invasive procedures were closed using a wound closure strip (Leukosan® Strip, BSN medical GmbH) and compared with traditional suture method. Futhermore, the patient's pain and the cosmetic outcome were evaluated.

Results / Discussion: Subsequent to the follow-up examination, the results of the wound closure were comparable to closure with needle and suture. The evaluation of the patients questionnaires revealed a low to very low pain sensation as well as a highly satisfactory cosmetic outcome.
Overall, the studies showed no disadvantages in terms of successful wound closure compared to conventional procedures with needle and stich. In addition to the easy application, the procedure is almost pain free for the patient and leads to a satisfactory cosmetic outcome.

Conclusion: Due to the excellent ease of preparation and use, combined with the successful treatment with minimal pain, wound closure strips are a suitable alternative to traditional treatment. In particular, the good satisfactory cosmetic result is an advantage of wound closure strips, since scar tissue has a high impact on the quality of life.

EP190 ACTIVITIES TO PREVENT PHLEBITIS IN PATIENTS USING COMPREHENSIVE NURSING CARE SERVICE IN REPUBLIC OF SOUTH KOREA

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Introduction: Although intravenous (IV) injection is the most fundamental and frequently used invasive method for patients who are admitted to the hospital. More specifically, due to the increased number of elderly patients in the aging society from the comprehensive nursing care service project.

Methods: This project was performed using the Plan-Do-Check-Act method. 1) Nurses' knowledge of IV injections, 2) compliance rate of IV injection guidelines, and 3) incidence rate of phlebitis. We performed a pre-test and observed that the mean score for index 1) was 77.6, and the following categories had below-average scores, for index 2), we assessed 170 nurses and the mean compliance rate was 88.3%. Lastly, for index 3), we confirmed the incidence rate to be 2.47% (117 out of 4,736 patients with a VIP scale score of ≥2).

Results: The post-test outcomes used to assess the efficacy of the improvement activity were as follows: 1) increased by 4.9 points, from 77.6 in the pre-test to 89.7 in the post-test, 2) improved by 6.7%, from 88.3% in the pre-test to 95% in the post-test; lastly, 3) reduced from 2.47% in the pre-test to 0.90% in the post-test.

Conclusion: Through this activity, we were able to promote the active prevention of dangerous side effects and complications in patients via immediate treatment, which was made possible through the nurses' management of IV injection sites, use of a phlebitis assessment tool and nursing records, and information sharing with other medical staff immediately after the early detection of phlebitis.

EP130 PHOTOBIOMODULATION THERAPY, PBMT TREATMENT OF DIFFICULT TO HEAL ULCERS, IN FRAIL ELDERLY SUBJECTS, WITH MUNICIPALITY HOME HEALTHCARE

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Aim: Purpose of this study is to find out if low level laser therapy, LLLT, in addition to traditional dressing in the municipality home healthcare, has a positive effect on difficult to heal ulcers, time to heal in frail elderly subjects.

Methods: Frail elderly subjects with 25 difficult to heal ulcers, treated in municipality home healthcare. With low level laser therapy, LLLT, as an addition to traditional dressing according to ulcer diagnosis. The laser types applied was infrared GaAs, 904 nm, 60mW, 700Hz, 12 x 7,2 J, and visible Red GaAlInp, 660 nm, 75mW, 250Hz, 1 x 2,25 J. The treatment included laser therapy over central lymphatic area and local ulcer area.

Results:

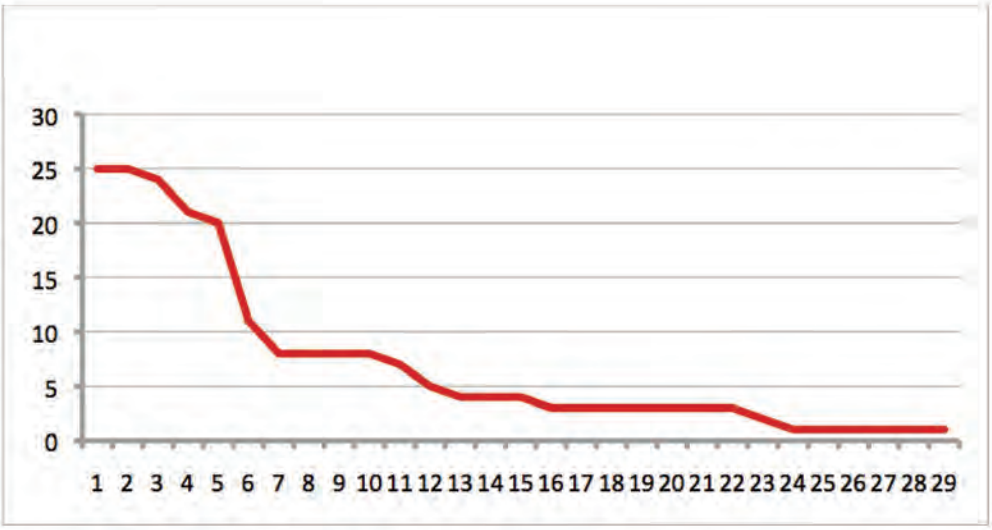

Diagram 1: Shows the treatment time of the 25 healed ulcers. X axis shows treatment time in weeks, Y axis shows remaining number of ulcers under treatment for each specific week.

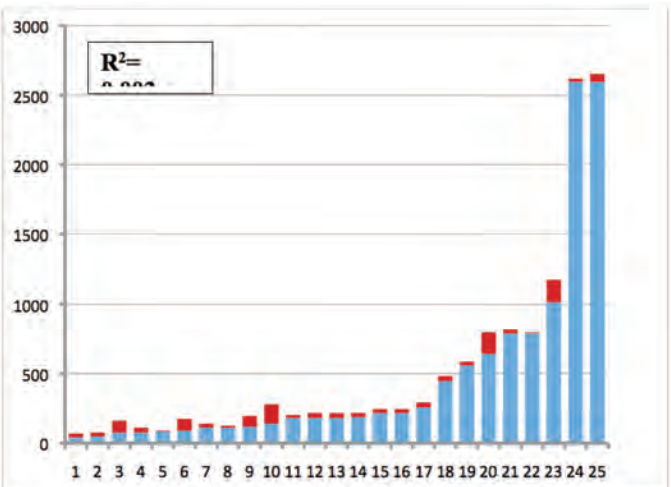

Diagram 2: The diagram shows the duration of the 25 ulcers, in days. The blue bar shows ulcer duration before LLLT treatment, red shows number of days with LLLT treatment to healing. The R2 value expresses the coefficient of multiple determination based on linear regression fit, between ulcer age and LLLT treatment time to healing.

	Venous ulcers	Pressure ulcer	Arterial ulcers
Mean	7.5	5.3	3.8
Standard deviation	5.09	4.19	0.96
n	11	10	4
Conf. Int Student´s t-test (+/-)	3.42	3.00	1.52
alfa	0.05		

Table 1 Observed differences between the different ulcer diagnoses included in the study and calculated 95% confidence interval (Student´s t-test).

Conclusions: 50% of the ulcers healed after an LLLT treatment period of 6 weeks, 80% after 12 weeks. There is no liaison between the duration of the ulcer and the LLLT treatment period necessary to heal the ulcer.

There was very little difference between the different diagnoses of ulcers and LLLT treatment time to healing, showing no significant differences on a group level.

EP131 MEDICAL GRADE HONEY SWITCHES STAGNATED WOUNDS TO HEALING IN COMPLEX GERIATRIC PATIENTS

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Aim: Aging is associated with many pathologies, and this leads to hampered wound healing in the elderly with an already general bad health. Conventional therapies frequently used in a home care setting can be unsuccessful, resulting in chronic wounds with a decreased quality of life. Medical grade honey (MGH) holds much promise but surprisingly is often used as last resort. We present a representative case of a geriatric patient at risk of bad wound healing treated with MGH to demonstrate MGH therapy should more often be considered.

Methods: We present a case study of a 91-year-old female patient with two trauma-induced leg ulcers. The patient is at risk of bad wound healing, because of her age, and having several co-morbidities, such as a medical history of heart failure, renal failure, stroke, right hip replacement, lumbar hernia surgery, and suffering from diabetes and venous insufficiency of the lower limbs. She receives twelve different drugs to treat these pathologies and their symptoms. Previous treatment with poviodine iodine, antibiotics, vaseline, and bepanthen plus were all unsuccessful.

Results / Discussion: While other treatments were ineffective, MGH led to complete wound closure. MGH has both antimicrobial and pro-healing activities. MGH has osmotic effects and leads to acidification of the wound environment, both stimulating autolytic debridement. In addition, MGH stimulates angiogenesis and provides important nutrients that promote cell proliferation and reepithelialization.

Conclusion: The presented case represents a widely experienced problem in geriatric wound care and supports the use of MGH for the treatment of these complicated chronic wounds.

EP193 EXAMINING THE IMPACT OF IMPLEMENTING AN EVIDENCE BASED PATHWAY AND MEASURING THE EFFECT ON IMPROVING QUALITY OF LIFE PATIENTS WITH A LEG ULCER

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Aim: An evidenced based leg ulcer pathway was implemented in a large community NHS Trust. The pathway has demonstrated a reduction in time-to-healing and associated economic benefits, including clinician time. Patient reported Quality-of-Life (QoL) was measured to demonstrate if there was a link between QOL and wound healing.

Method: Data was collected from the weekly wound assessment charts and monthly QoL checklist from 25 patients being treated in the leg ulcer clinic. Analysis was undertaken comparing wound progression with the corresponding QoL scores for the individual patients. Identifying if there were any common themes within the parameters measured and to test the hypothesis that QoL will improve with wound healing progression.

Results / Discussion: The analysis identified a correlation between Wound Area Reduction (WAR) and increased improvement in patient reported QoL scores. Additionally, it demonstrated that by working in partnership with patients to capture QoL information it also revealed other factors that impacted on the patient e.g. the need to shower daily; uncontrolled pain due to arthritis. This enabled proactive intervention by the nurses including provision of a waterproof leg protector and referral for orthopaedic surgery. Conclusion: Through the effective implementation of the evidence-based pathway and associated reduction in healing times, the hypothesis was that the QoL scores would improve. The analysis identified that as well as wound healing, proactive intervention that addresses patient concerns and other health issues will also potentially improve patient reported Quality of life.

EP191 PREVENTION OF STERNOTOMY DEHISCENCE WITH NEGATIVE PRESSURE WOUND THERAPY IN PAEDIATRICS

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Aim: Sternal wound dehiscence and surgical site infection are major complications in the postoperative care of paediatric population after cardiac surgery, moreover when the sternal closure is delayed (depending on hemodynamic stability). It significantly increases the risk of dehiscence of the sternotomy and infection by up to 20 to 40%, contributing to increased use of antibiotics, hospitalization and health costs, while decreases substantially health related quality of life. Prevention is the key point for these complications and using negative wound pressure therapy could be the answer.

This study reports the initial experience using polyhexanide based incisional negative wound pressure therapy, in paediatrics after cardiac surgery, for prevention of dehiscence and infection.

Method: In this initial experience, twenty-two consecutive paediatric patients submit to cardiac surgery by sternotomy, between 1st January and 31st May of 2019 were included. There were 14 girls and 8 boys, with a median age of 2,5 years, the youngest had 10 months and the oldest 17 years old. The incisional negative pressure wound therapy was implemented until 24 hours after sternotomy closure. The pressure applied was variable, according to weight and age (between minus 50mmHg to minus 125mmHg). This new wound care protocol made possible to take off all suture material 14 days after sternotomy closure.

Results / Discussion: Negative wound pressure therapy proved to be very useful in the prevention of wound dehiscence, promoting an efficient healing of the surgical wound by removing excess exsudate, while reducing edema and enhancing circulation. This new protocol reduced the necessity of repeated dressings, the risk of wound dehiscence to 4,5%, abolished surgical site infections and promoted a more functional scar without keloid formation. This allowed a faster recovery with reduced wound related morbidity and consequently an earlier discharge, impacting positively on the reduction of health care related costs, for both patients and health providers.

Conclusion: Using negative wound pressure therapy in association with polyhexanide is very important to prevent wound dehiscence in paediatric patients, we saw that is the better way to target our goals, reducing the length of stay, the health costs but offering the best quality of life to children and families after cardiac surgery.

Wound Assessment

EP199 ULTRA HIGHT FREQUENCY ULTRASOUND ASSESSMENT OF LOWER LEG EDEMA BEFORE AND AFTER COMPRESSION BANDAGING

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Background and aim: The chronic edema in lower extremities often it's sign of venous or lymphatic insufficiency, that it produces complications such as ulcers. For its anti-inflammatory and antioxidant properties, zinc oxide bandage is a key treatment in wound care reducing the chronic edema. To prevent complications of edema we need early diagnosis and prompt treatment. The aim of this study was to evaluate the effectiveness in reducing edema of the inelastic zinc oxide by means the ultra-high frequency ultrasound (UHFUS).

Materials and methods: We enrolled 20 patients with lower limb edema. We compared a group of 10 patients received zinc oxide bandages and short stretch (A) with a group of 10 patients treated only with short stretch bandage (B). For each patient we evaluated the circumference of the calf level, the thickness and the eco-structure of the tissues placed between the medial surface of the tibia and stratum corneum using a high-resolution linear ultrasound probe (48 MHz), once a week for 4 weeks. At the same site was performed an examination by ecocolor Doppler (3.7cm/s).

Results: After 2 weeks of treatment the Group A showed a reduction of edema (65%), circumference reduction (20%); Group B showed respectively (40%) and (8%). At the end of treatment, the Group A showed a reduction of edema (90%) and circumference (25%) while Group B showed respectively (46%) and (10%).

Conclusion: Our study showed the importance to include the use of a non-invasive instrumental method to assess the lower leg edema.

EP200 PH, TEMPERATURE (C°) AND TCPO2 MEASUREMENT IN HEALING WOUNDS

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Aim: To observe, measure and examine the pH, temperature and TcpO2 in wounds by measuring these parameters in different types of wounds (skin tears, pressure ulcers, venous/arterial ulcers, diabetic foot ulcers, burns, trauma, …) and wounds in different healing situations (acute/chronic).

Can wound healing be predicted or not, by measuring some physical parameters. The ultimate goal could be to see if by using some medical devices these parameters can be altered and if wound evolution can be influenced this way.

Method: Wounds of patients that are present or manifest in the resident home were observed, followed and evaluated using different parameters.

We follow up the non-healing wounds, 1x/week. Acute wounds are measured immediately after injury and followed up 2x/week until healed.

Following parameters were measured:
- TcOp2 of the wound environment*
- Temperature in the wound (before cleansing) **
- Temperature in the wound (after cleansing, before wound care)
- Temperature of surrounding skin**
- pH of the surrounding skin**
- pH in the wound (before cleaning)
- pH in the wound (after cleaning, before wound care)
- Temperature of the patient ***
- Ankle Brachial index measurement using dopplex device (one measurement)****

Any underlying diseases (diabetes, arterial or vascular difficulties) or comorbidities (smoking) and age have been taken in consideration in the study.

Results / Discussion: Can pH, temperature and TcpO2 have an influence on wound healing?
- Evidence based literature and theoretical knowledge about temperature in wound healing, showed that wounds where the body temperature is low(<33°C) or high (>37-38°C) there will be an in crease of wound healing. Therefore we will also measure the body temperature of the patient that's involved.
  Temperature in the wound bed is optimal at 33°C but there is evidence that, after removing the wound dressing, the temperature of the wound increases very quickly. An increase of 2°C can slow down or stop wound healing. We will show that the duration of the wound dressing application has a role in the fluctuations of temperature of the wound and can create a negative effect on wound healing.

- Evidence based literature also shows that healing/acute wounds have a more acidic wound bed (pH <8) in opposite to non-healing/chronic wounds that show a more alkaline wound bed (pH ≥8). Through measuring the pH in wounds with different healing situations we will show that we found results matching the evidence based literature.

- Theoretical findings and evidence based literature suggests that as we measure acute and chronic wounds, we will find that in acute wounds without wound impairment, there is a lower to normal temperature (33°C-38°C), a lower pH level (pH <8) and a normal to high TcpO2 (>40 mmHg). This in opposite to chronic wounds with symptoms of wound impairment that will show a low (<33°C) or high (< 38°C) temperature, a high pH level (≥8) and a low TcpO2 (<40 mmHg).

- Our last measurement is ABI. Evidence based literature informed us that in chronic wounds we most likely will find an abnormal ABI (>1.2-1.4/ <0.8) in comparison to acute wounds, who will show us normal ABI measurements (>0.8-0.9/ <1.2-1,4).

Measurements done on skin tears, venous and arterial ulcers pressure ulcers show ranges from
- pH surrounding skin 5,2 - 5.83
- pH before cleansing 6.12 – 8.28
- pH after cleansing 6.18 - 8.34
- Body T°C 34,4°C – 36.9 °C
- TcpO2 10 mmHg – 83 mmHg
- T°C surrounding skin 21,6°C – 29.8°C
- T°C wound bed before cleansing 21,5°C -33.9°C
- T°C wound bed after cleansing 20,4°C -33.7°C

Conclusion: For now we can observe some clarities:
- Underlying diseases and/or comorbidities have an influence on the measuring results.
- Healing wounds have a lower pH level in comparison to non-healing wounds. How better the evolution of wound healing, how lower the pH.
- The difference in skin temperature in healing wounds is less than the comparison with the surrounding skin and wound bed temperature in non-healing wounds. We see a higher level of temperature, in comparison to the surrounding skin, in non-healing wounds.
- When we have a low TcpO2 results we also see a distorted ABI. The anamnesis can be a predictor for low TcpO2/ABI.

** TcOp2 meter*
*** Hanna®Instruments pH skin electrode meter*
**** ear thermometer*
***** Huntleigh® dopplex ABI kit*
Cleansing = Sanoskin®cleanser (pH 5,31)

EP203 EXPERIENCE OF WOUND MANAGEMENT IN A PRIVATE TERTIARY CARE TEACHING HOSPITAL IN MUMBAI, INDIA – OVER PERIOD OF 3 YEARS

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Aim: To manage different types of wounds with various techniques at different stages of wound healing and its complications.

Method: All the patient admitted in our hospital with open wounds both acute and chronic were included. Wounds were assessed based on degree, severity, Infective markers (WBC, CRP, cultures) and respective modalities of wound management was initiated.

Results / Discussion: Total wounds managed=60.
Sternal-3, Sacral-25, Abdomen-4, Extremities and Groin=28

Management was started with surgical debridement for all the cases, followed by application of antimicrobial wound dressings at different stages of wound healing. In selected patient Negative pressure wound therapy was offered (NPWT). Most of the wound healed completely with above techniques. Few patients in addition to NPWT were subjected to Surgery-Secondary suturing and closure with local or advancement of flaps.

Conclusion: We are at the crossroads of selecting the most suitable, desirable and appropriate wound healing techniques in the right type of the wound.

Therefore detailed history taking, thorough local wound examination, Appropriate wound grading, timely Laboratory work up, Cultures and antibiotics, proper imaging modalities, Surgical debridement aids us in timely wound management and selection of wound dressings at different stages of wound healing.

Education, e-Health, Nutrition and Health Economics & Outcome

EP118 WOUND CARE WARRIOR PROGRAM

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Aim: The aim of the Wound Care Warrior Program is to upskill nursing staff across the organisation in basic Wound Care knowledge over a 12-month period. The program provides mentorship and leadership to enhance nursing workforce and capability.

Method: The program started in 2018 and is the first of its kind in this organisation. Recruitment is obtained using an expression of interest (EOI) to ensure commitment. Participants must display an interest and passion in Wound Care and commit to the 12 months, also complete a Quality Improvement (QI) at the end of the year to showcase their work.

Results / Discussion: This program seeks and invites feedback from participants to improve and to ensure recruitment is obtained each year. A network of alumni Wound Care Warriors is built over the years and ongoing support and mentorship is provided by the Wound Care CNC. Past graduates are encouraged to attend the local Wound & Skin Integrity Day workshops annually to refresh their skills and knowledge.

Conclusion: Wounds and Pressure Injuries are assessed and managed earlier due to the increase in knowledge and representation across all the wards in the organisation. Increase in reporting and early identification of pressure injuries. Appropriate referrals and escalation is made to the Wound Care CNC. Wound Care assessments are being completed using best practice guidelines and treatment is implemented early and efficiently from the time of assessment to minimise harm to the patient.

EP119 SIMULATIONS IN WOUND CARE

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Aim: To introduce the developed and recently opened Simulation Center at the Faculty of Medicine of P.J. Šafárik University in Košice, Slovakia, and present the future vision of innovative education methods in the field of wound management and wound care using simulators.

Method: Report on the Center of Simulator and Virtual Medicine for Nursing and Medical students. Results / Discussion: The pandemic has forced educational institutions around the world to resolve the clinical practice in hospitals. The faculty managed to advance and improve its educational environment by equipping simulators predominantly of medium and high fidelity. Students can manage patient cases with different types of wounds using clinical scenarios with virtual patients (general and local assessment, specific interventions, decision making, problem solving, leadership and team playing) using an interactive touch table. They can also experience situations with advanced and teacher-controlled human body simulators. An interactive touch table and VR are available for anatomy, physiology and pathophysiology. There are simulators for training aseptic wound dressing changing, wound cleaning, debridement, bandaging, incisions, suture, and removal of stitches. All simulators are suitable for undergraduate to postgraduate nursing student as well CNS, ANP, and medical students as indicated.

Conclusion: Simulations are an innovative teaching method that allows students to practice skills repeatedly, learn at their own pace and offer a safe learning environment. They allow to manage stressful situations, because it copies a real- life experience according to the level of fidelity. Simulators provide an opportunity to train multidisciplinarity in wound management among students.

EP127 COST-EFFECTIVENESS OF CLOSED INCISION NEGATIVE PRESSURE THERAPY FOR SURGICAL SITE MANAGEMENT AFTER REVISION TOTAL KNEE ARTHROPLASTY: SECONDARY ANALYSIS OF A RANDOMIZED CLINICAL TRIAL

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Aim: Health Economic Evaluation based on randomized, controlled trial comparing closed-incision negative pressure therapy (ciNPT*) to antimicrobial dressings (SOC§) after revision total knee arthroplasty (rTKA) in 294 patients.1

Method: Frequency of surgical site complications (SSC)-related interventions were extracted from study data and clustered into surgical and non-surgical. Per-patient costs were calculated based on the cost of postoperative dressings and cost of SSC related care such as: surgical interventions, readmission, and non-surgical interventions. A health economic model was used to determine the mean per-patient cost.

Results / Discussion: Patients with SSC were readmitted at significantly higher rates compared to patients without SSC (31% vs. 4%; p=0.0001). Among patients with SSC, readmission rates were 20% in the ciNPT group versus 33% with SOC. Patients treated with ciNPT required significantly fewer non-surgical (2.7% vs. 12.9%; p=0.0017) and fewer surgical (0.7% vs. 4.8%; p=0.0666) interventions to manage SSC. Mean per-patient cost of postoperative dressings was $666 and $52 for ciNPT and SOC, respectively. Mean per-patient surgical costs were $135 for ciNPT and $944 for SOC; cost of readmission was $231 and $970, respectively. Mean costs for non-surgical interventions were $15 for ciNPT and $70 for SOC. In total, per-patient cost of care was $1,047 for ciNPT and $2,036 for SOC, indicating a mean cost savings of $989 per rTKA patient when treated with ciNPT.

Conclusion: Despite having higher upfront costs for postoperative dressings, ciNPT was cost-effective,

decreasing the costs of surgical site management after rTKA by 49 % in this study population.
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EP120 KRATOM AND WOUND HEALING – A SCOPING REVIEW

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Aim: Also known as "biak", "kratom" or "ketum," mitragyna speciosa is native to Southeast Asia and works similarly to opiates and cannabis. The majority of mitragyna research has centered on its analgesic and pain-relieving effects. Currently, no systematic literature review exists to determine kratom's wound healing benefits. This scoping review was conducted to assess current knowledge about mitragyna and wound healing.

Method: The search procedure begins with the formulation of the study's topic and the identification of keywords. We conduct literature searches in five databases during a ten-year period: PubMed Central, Ovid, Web of Science, Science Direct, and Scopus. 11 pre-final articles were obtained after assessing the titles and abstracts of 60 publications. Two field experts evaluated these final articles for coherence, and eight final articles were analysed. Thematic analysis was conducted using the Atlas.ti software.

Results / Discussion: Six papers assert that mitragyna promotes wound healing. One paper focuses on the dose-dependent migration of cells, while another study discusses mitragyna's antibacterial and anti-inflammatory characteristics. Additionally, three papers discuss how kratom was traditionally used to treat various types of wounds, including boils, burns, and malignant tumors. There has been no direct assessment of mitragyna's influence on the epithelialization phase.

Conclusion: There is a paucity of information on the relationship between kratom or mitragyna and wound healing. While a few studies support the positive notion, greater study is needed to establish a general consensus regarding mitragyna's overall effect on wound healing.

EP122 SUPPORTING CLINICAL DECISION-MAKING WITH A DIGITAL WOUND MANAGEMENT CHECKLIST

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Aim: The research objective was to explore how "Wound Navigator", a digital wound management checklist affects the clinical decision-making process. In addition, the aim was to understand how physicians experience the usage of digital checklists in clinical setting.

Method: The research was conducted as a case study. The data collection was conducted as an end-user testing. The nine testers represented two groups: medical students and junior physicians.

Testers evaluated seven fictional patient cases. Five cases were typical lower limb wounds. Two cases represented atypical wounds. Testers stated their conclusions and defined the follow-up procedures first themselves and then with Wound Navigator.

Results / Discussion: The testers reported that Wound Navigator brought additional structure to the examination. It provides procedure recommendations, which the testers reported to support the clinical decision-making process. Wound Navigator helped to either verify testers' initial presumptions or reconsider the etiological factors. With Wound Navigator the testers were able to identify all cases correctly. Eight testers reported they would use Wound Navigator in clinical setting. Even though the testers viewed Wound Navigator to be an asset in clinical wound management setting, they emphasized that the tool must be easy and quick to use.

Conclusion: A digital wound management checklist can support clinical decision-making, especially in complex and multi-etiological wounds. It does not however provide a diagnosis, but provides structure to the clinical examination and procedure suggestions. To be useful in clinical setting, digital tools must be straightforward to use.

EP173 THE EFFECT OF BEE POLLEN ON HEALING OF PRESSURE ULCERS IN DIABETIC PATIENTS

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Aim: In recent years, there has been significant increase in the number of diabetic patients, the rate of hospitalization and non-traumatic lower limb amputation. The last two mentioned are known as the major complications of diabetes.

In addition to it, there has been a considerable tendency among the medical therapist in applying Apitherapy in this specialized field. Following what was explained we decided to reexamine the effects of Bee pollen as a natural support to promote the process of diabetic pressure ulcer healing.

Method: This study is a one-blinded clinical trial study included 84 diabetic patients suffering from diabetic ulcers. These patients were referred to the wound clinics under supervision of Alborz University of medical sciences in Karaj. The study group was divided into two groups: the experimental group (E.G) and the control group (C.G.) . Equal care was provided to all patients by wound experts over a twelve week period of time. During this time the PUSH questionnaire was completed for each patient by wound experts twice weekly.

Results / Discussion: During the intervention period, 15 patients were excluded from the study, 6 of whom were in the intervention group and 9 in the control group. There was no significant difference in demographic characteristics such as age (P = 0.233), sex (P = 0.75), education (P = 0.54), marital status (P = 0.8), and underlying disease (P = 0.597). Also before intervention, variables such as body mass index (P = 0.476), fasting blood sugar (P = 0.65) and patient hemoglobin (P = 0.613), location of wound (P = 0.486), duration of wound (P = 0.573), extent of wound (P = 0.573). There was no significant difference between groups (P = 0.249).

There was no significant difference in PUSH score before intervention (P = 0.356). Comparing the PUSH scores in the intervention and control groups at the end of the 6, 12, 18 sessions, we found that the PUSH score was lower in the intervention group than the control group, but there was no significant difference. At the last session, session 24, PUSH score was lower in the control group than in the intervention group, but there was still no significant difference between using bee pollen to accelerate pressure ulcer healing in diabetic patients.

Conclusion: In this study, though it seems that the use of Bee pollen had no considerable positive effect in facilitating of diabetic pressure ulcers healing, yet considering to bee pollen's medicinal benefits, we need more studies to reach much more reliable results.

Of course, taking to account the statements of patients and nurses about positive effects of bee pollen on gastrointestinal tract, hair and skin and also effects on the general health condition of the patients, we can accept bee pollen as an effective substance in the process of medical wound care.

Key words: Bee pollen, diabetic wounds, apitherapy

EP121 FACTORS INFLUENCING NURSING PERFORMANCE OF INCONTINENCE-ASSOCIATED DERMATITIS

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Aim: The purpose of this study is to provide basic data for developing various strategies for enhancing the quality of nursing and nursing practice performance in clinical practice by identifying nursing knowledge and performance of Incontinence-Associated Dermatitis (IAD) of nurses and analyzing factors affecting nursing performance.

Method: It was conducted from May to July 2019 for 139 nurses. This study is designed as descriptive research. The collected data was processed through SPSS WIN 25.0.

Results / Discussion: Nursing knowledge of IAD averaged 66.8%. The correct answer rate for each subarea was 73.1% for knowledge of assessment, 73.5% for knowledge on prevention and management, 76.9% for knowledge related to education, and 55.8% for ability to detect IAD. Nursing performance for IAD averaged 3.751 out of 5. The correlation between nursing knowledge and performance (r=.347, p<.001) showed a significant amount of correlation. Factors affecting nursing performance for IAD are service department (ß=.219, p=.006), education experience (ß=.274, p=.001) and the ability to detect IAD (ß=.661, p<.001), assessment knowledge (ß=.274, p=.005).

Conclusion: IAD assessment knowledge and the ability to distinguish are factors affecting nursing performance of IAD. Education to improve the quality of IAD nursing performance is important, especially education to improve the knowledge of visual discrimination ability of IAD should be strengthened. The choice of teaching methods or media for visual training is important for accurate identification of cases in clinical practice. In addition to the development of customized education programs considering clinical experience, more educational opportunities are needed.

EP123 FEASIBILITY AND ACCEPTABILITY OF DIGITAL WOUND ASSESSMENT SOLUTION IN PRIMARY CARE SETTING

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Aim: A complete assessment of chronic wounds is essential to improve healing and to enable evidence-based care. Today, wound data collection is inconsistent due to non-standardized practices across different stakeholders. The objective was to examine the feasibility and acceptability of a digital wound assessment solution in a primary care setting. The solution enabled clinicians to complete a full wound assessment with a dedicated mobile app, generating data on the number of wounds, healing progression, and treatments used to aid in patient wound management.

Method: Training and smartphones were provided to 8 nurses in 3 treatment rooms. Data was securely uploaded to a portal allowing clinicians to review patients' wound images from previous visits. Nurses were given a survey and focus groups were conducted regarding the usefulness and suitability of the solution in practice.

Results / Discussion: The average number of wound assessments per patient using the digital solution was determined. Other characteristics such as co-morbidities, wound etiologies, and wound surface area were also recorded. This data was used to determine percentage of wounds that healed, average time to heal, and treatment modalities. In terms of acceptability to nurses, the mean time to complete an assessment using the digital tool as well as perceived benefits (e.g. ease of use, recall of care guidelines, collaboration with care team, improved quality of care) were recorded.

Conclusion: These findings suggest that digital wound assessment solutions hold significant promise to improve the delivery of wound care by providing consistent data and images over time.

EP124 ACCURACY VALIDATION STUDY FOR CHRONIC WOUND SURFACE AREA MEASUREMENTS ALGORITHM

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Background: Optimal and efficient chronic wound care relies upon consistent assessments that include a detailed patient profile, wound size measurements, tissue type analysis, and signs of infection. The amorphous shape of wounds results in subjective length and width measurements and can make it hard to assess the healing progress objectively.

Study design: The objective was to evaluate the accuracy of semi-automatic measurements captured by healthcare professionals in a clinical setting via smartphones with no additional hardware.
Wounds varying in their types, shapes and sizes were selected. The semi-automatic surface area measurements were compared to the standard of care - planimetric paper and a paper ruler.

Results / Discussion: The results were analysed using a Bland-Altman plot to include confidence intervals of the limit of agreement. The results measured during the clinical study demonstrate agreement with the current standard of care for wound care.

Conclusions: These results support the use of the device as an accurate method applicable for point-of-care use measurement by a healthcare professional for the measuring of wound surface area. The study results confirm the device reliable clinical performance by demonstrating a high degree of agreement with the standard of care.

EP128 DIAGNOSTIC DELAYS OF THE WOUND PATIENT WITHIN THE PRIMARY CARE

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Aim: The aim was to evaluate diagnostic delay in a primary care setting.

Methods: We collected a cohort of 198 patients who were referred to the multidisciplinary wound care team during year 2016. The following data was analyzed from patient records retrospectively: approximate of the date when wound appeared, the dates of first visit to primary care (mainly nurse appointment) and the first appointment with physician as well as the date when the treatment started at the wound care team focused on the diagnosis of chronic wounds. Primary endpoint was wound healing within one year, secondary endpoints were amputation and death. Primary outcome measure was time to wound healing, secondary endpoint measures were freedom from amputation and amputation-free survival.

Results: In primary care, 21,2% of all the patients did not meet a physician. In addition, the etiology of the wound was not diagnosed in 18.6% of the patients who met a physician. Altogether, the total amount of undiagnosed patients was 71 (35.9%). The average delay from the wound appearance to the first contact in the primary care was 57 days, from the first contact to doctor´s appointment average 44 days and from the wound appearance to the first visit in the wound care team average 179 days. Median wound healing time was 188 days.

Conclusions: There is still too long timeframe for a wound patient to meet a physician and to receive accurate diagnosis and treatment.

EP125 TELEMATICS WOUND CARE ASSISTANCE STAGE 3-4 PRESSURE ULCER IN TIMES OF COVID -19

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Aim: To show the benefits of the implementation of Telematics Wound Care Assistance as a real alternative to support clinicians and nurses during pandemic times

To evidence the effectiveness of wound bed preparation and local infection control actions to promote wound healing in a stage 3-4 sacral pressure ulcer.

Method: Case study. Male 54. Diagnosed of Diabetic Coma. Admitted in ICU. Due to its severity, it was indicated not to mobilize. Patient developed a Sacral Pressure Ulcer stage "INCLASSIFICABLE". After debridement it was classified as stage 3 Pressure Ulcer.

After two months in ICU, he was discharged with a sacral Stage 4 PU to continue with traditional wound care at home. Silver Sulfadiazine (SSD) was applied for two weeks. Oral systemic antibiotic therapy initiated. Pressure Ulcer condition worsens. It was decided to change the strategy. Advanced Wound Care by telematics assistance initiated. Stage 4 Pressure Ulcer was diagnosed. Cleaning and decontamination with Polyhexanide-Betaine Solution. Polyhexanide in Gel to promote autolytic debridement and antimicrobial effect. Ionic Silver Dressing with an absorbent polyurethane foam layer to control infection and exudate. Edges management with Hyperoxygenated Fatty Acids and breathable skin barrier.

Results / Discussion: Complete closure of Pressure Ulcer was achieved after 3 months of treatment. Wound care was assisted by specialist through video call.

Conclusion: Advanced Wound Care promoted wound healing and telematics wound care assistance is a useful tool to provide professional guidance to perform dressing changes at homecare settings in Covid-19 times.

EP126 AN INTEGRATIVE APPROACH TO PROMOTE WOUND HEALING IN FACIAL-STAGE 3 PRESSURE ULCER SECONDARY TO PRONE POSITION IN COVID-19 PATIENT: THE BENEFITS OF TELEMATICS ASSISTANCE

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Aim: To evidence the need of an integrative approach that included telematics assistance to promote wound healing in a sensitive area as the face in an isolated patient.

Method: Descriptive-observational case study. Male 62. Obese. Acute Respiratory Syndrome due to Covid-19. Treated with mechanical ventilation in prone position. After four days, a facial stage 3 pressure ulcers was developed that worsened to stage 4. At the beginning, 90% of the wound was covered by necrotic tissue. 10% covered by devitalized tissue firmly adhered to wound bed. Low level of exudate. Dehydrated perilesional skin and edges. Due to pandemic, remote guidance and support to nursing staff was provided to perform wound care. Cleaning and decontamination with Polyhexanide-Betaine Solution left in place for 10 minutes. Polyhexanide-Betaine Gel X left applied to promote autolytic debridement and bacterial load control. Mechanical debridement performed afterwards. Polyurethane foam used as a secondary dressing. Hyperoxygenated Fatty Acids and breathable skin barrier to manage edges. Once wound bed was debrided, ionics Silver Dressing was incorporated. Frequency of dressing changes: Twice per week.

Results / Discussion: After 62 days of treatment, with dressing changes twice per week, definitive

and complete closure of PU was achieved.

Conclusion: Advanced Wound Care promoted wound healing and telematics wound care assistance is a useful tool to provide professional guidance to perform dressing changes in Covid-19 times.

Negative Pressure Wound Therapy

EP157 THE EFFECT OF FOAM AND GAUZE ON STERNUM WOUND IN NEGATIVE PRESSURE WOUND THERAPY

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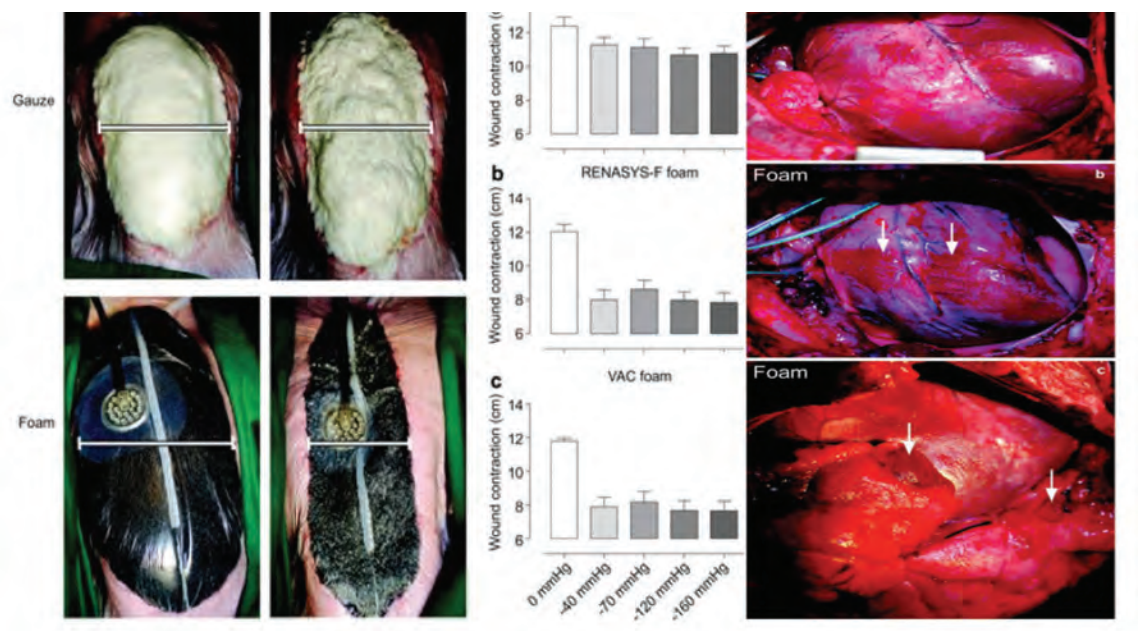
Aim: Negative-pressure wound therapy is a closed drainage system in which controlled and draws the wound edges together and contracts the wound.

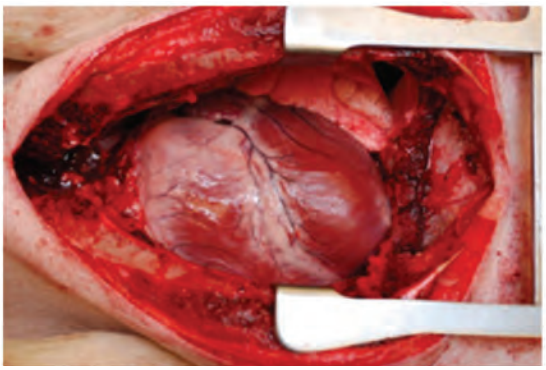
Sternotomy is a type of surgical procedure in which a vertical inline incision is made along the sternum, after which the sternum itself is divided, or cracked.

The aim of the present study was to examine the effect of foam and gauze on sternum wound contraction, distention and the thoracic organs in NPWT.

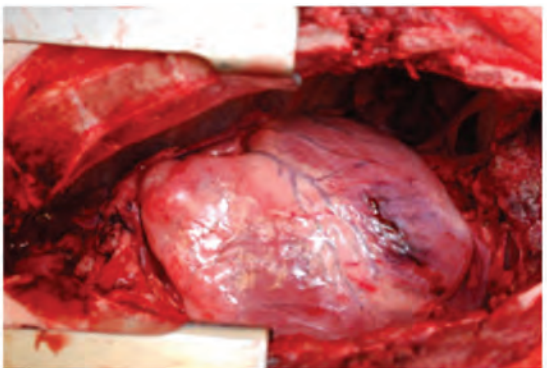
Method: This review study was conducted by reviewing and summarizing interventional articles from authoritative scientific sites PubMed, Cochrane and Magiran with keywords of negative-pressure wound therapy, Sternotomy wound during 2011 to 2021.



Intact heart after NPWT with the disc



Heart rupture after NPWT without the disc



Results / Discussion: After NPWT using foam, the surface of the right ventricle of the heart was red and mottled, and lung contusion and emphysema were observed in all cases. Lung rupture was seen in two of the six animals. After NPWT using gauze, the thoracic organs were macroscopically unaffected. The reason for this difference could be that foam allows the wound edges to move in a lateral direction to a greater extent than gauze, causing abrasion on the underlying organs. The present results showing damage to heart and lungs during NPWT is in line with previous clinical evidence.

Conclusion: The studies provide clinical evidence that foam allows greater wound contraction and distension than gauze. This movement of the wound edges may cause damage to the underlying organs. There is less damage to the heart and lungs when using gauze than foam.

EP158 NEGATIVE PRESSURE THERAPY IN PATIENTS WITH PRESSURE ULCERS

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Aim: Incidence of pressure ulcers increases with age and is frequent to elderly persons with a lot of comorbidities and reduced self-care abilities. NPWT increase the blood flow in the wound and the migration of the fibroblasts and decrease bacterial count.

Method: We made the study based on 23 patients (10 males and 13 females) with age interval between 60 and 87 years old, with deep pressure ulcers. In all cases, patients had multiple comorbidities. In all cases continuous NPWT had been used. We analysed in the study the average length of NPWT usage, average level of the pressure, bacterial count in the wound, hospitalization time, reconstructive surgery used, total cost of hospitalization, patients' satisfaction.

Results / Discussion: The median age was 73 years old. In all cases the wound was infected with different pathogens, requiring general administration of antibiotics in all cases studied. Average time between dressing change was 3.5 days, average negative pressure of 109.3 atm, average usage was 16,5 days. In 5 cases, the NPWT obtained a wound closure without other reconstructive techniques. The average length of hospitalization was 21 days. In all cases the patient's satisfaction was very good.

Conclusion: NPWT is efficient in pressure ulcers because it reduces the number of wound dressings and the pain associated with it, it allows the patient to move, it continuously absorb the fluids in the wound, reducing the bacterial count, it helps reducing the hospitalization time and the hospitalization costs, maintaining the level of patient satisfaction high.

EP159 CLINICAL EVALUATION OF A NOVEL, SINGLE-USE, NON-ELECTRICAL INCISIONAL-NEGATIVE PRESSURE SYSTEM BASED ON SOLID-STATE OXYGEN REDUCTION

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Aim: This study evaluates a novel FDA-approved device1 that utilizes a solid-state chemical reaction to partially reduce the level of oxygen within a rigid vacuum chamber connected to an adhesive dressing with an innovative silicone gasket seal. Oxygen represents 21% of atmospheric pressure (760 mmHg). Reduction of O2 creates negative pressure. The single-use system applies NPWT (negative pressure wound therapy) to closed incisions. Pre-clinical studies show an initial pressure of -105 mmHg is typically achieved which reduces to -60mmHg after 7 days. Wound healing is normal.

Method: A planned-interim analysis is presented after recruitment of 5 participants from a 30 patient first-in-human clinical open label study (NCT04488666). The primary endpoint is the longevity of the delivery of negative pressure to the wound over 7 days. Follow up was for 30 days.

Results / Discussion: The first 5 patients in the study (mean age 69.2; mean BMI 26.0) had a mean wound length of 6.3 cm following elective plastic surgical procedures. All 5 patients were discharged with a single iNPWT device that maintained negative pressure and managed wound exudate for a total of 7 days. There were no adverse events. Participant and clinician assessments showed that the devices were easy to use and totally silent in operation.

Conclusion: The novel device performed as anticipated in clinical use. A further 25 patients will be recruited including spinal and cardiothoracic incisions. This simple, disruptive, low-cost device, which contains no electrical or magnetic components, provides new options to reduce complications in surgical wounds.

EP160 EVOLUTION OF VIEWS IN THE SURGICAL TREATMENT OF PATIENTS WITH WOUND DEFECTS OF THE CHEST WALL

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Aim: To analyze the current trend in surgery for wound defects of the chest wall.
Materials and methods: Over the 8-year period of work (2012-2019), 221 patients with wound defects of the chest wall were operated in the surgical thoracic department. Post-sternotomy mediastinitis was

observed in 171 patients, osteomyelitis of the sternum and ribs of other etiology - in 50 patients.

Results: The scope of the operation at the first stage consisted of wound debridement and the use of NPWT. The nature of the interventions during the second, plastic stage of treatment has changed significantly over time. In the period from 2012 to 2016 among 121 patients, in 33 cases omentoplasty was performed, in 8 patients - metal and synthetic implants were used, in 26 patients - myoplasty (flaps pectoralis major muscle and rectus abdominis muscle), in 22 patients - plastic with the use of fascial skin flaps, in 12 patients - healing by secondary intention of the tissues. Period from 2017 to 2019 characterized by a complete rejection of the use of synthetic and metal implants in an isolated form, an increase in the proportion of myoplastics. Among 100 patients, myoplasty was applied in 44 patients, omentoplasty - in 8, in 26 - fascial skin flaps were used, in 20 patients - healing by secondary tension of tissues.

Conclusion: The NPWT allows the widespread use of various implants. However, the main trend in reconstructive surgery for chest wall defects has become the use of muscle flaps and omentoplasty.

EP161 TRAUMATIC WOUND TREATED IN SPECIALIZED SERVICE OF WOUNDS USING ADJUVANT THERAPY WITH HYPERBARIC OXYGEN THERAPY AND NEGATIVE PRESSURE THERAPY: A CASE REPORT

Niomar Aparecida Castro Machado[1], Laís Oliveira Lima Barbosa[1], Arthur César Pacheco Lopes[1], Luis Humberto Souza Junior[2], Bianca Bastos[3], Clezio Figueiredo Martins[4]

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Aim: The objective of this study was to describe the treatment of a trauma victim, by being run over, in the lower limbs after adjuvant treatment with smart wound coverings, hyperbaric oxygen therapy, and negative pressure therapy.

Method: The patient, hypertensive, diabetic, obese, underwent treatment consisting of Sanitization with SF 0.9% in a light jet, lorexidine in perilesion, andopeningprimarywith gauze impregnated with polyhexanide solution (PHMB), the primary clusion with sterile gauze, the secondary with crepe bandage, clusioncalcium lginate with silver, negative pressure(NPT), Hyperbaric Oxygen Therapy in a single-seat

Illustration 1 - Evolution of lesions aspect

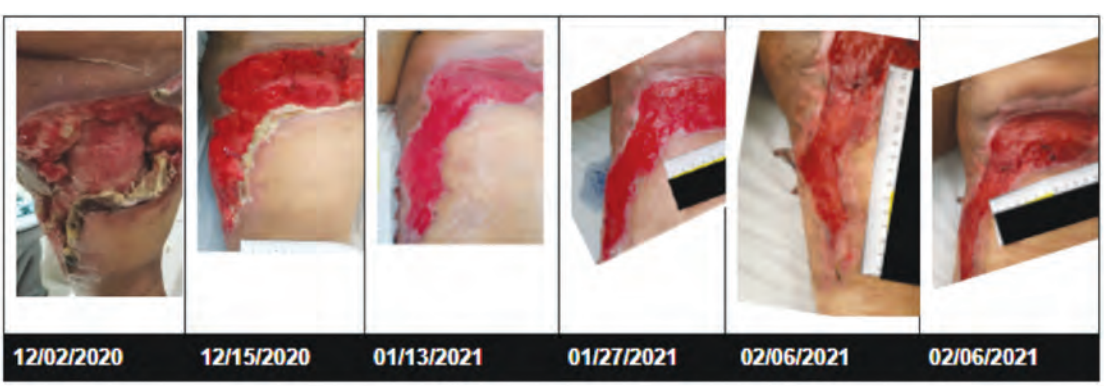
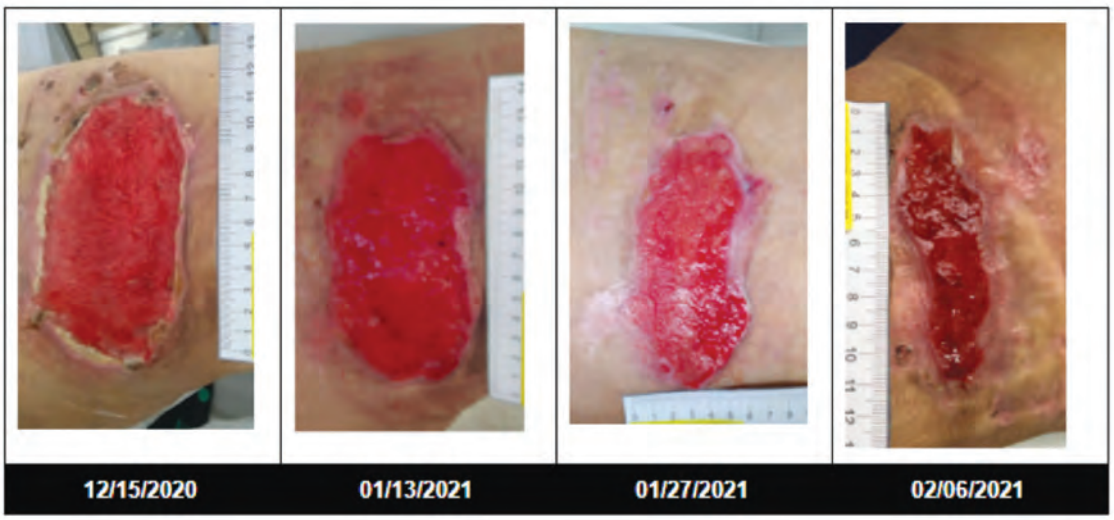


Illustration 2 - Evolution of lesions aspect



chamber at 2.5 ATA, with a 90-minute session (20 sessions), enteral nutrition therapy once a day, with iprofloxacin 500mg every 12 hours for 10 days, andlindamycin 300mg every six hours for ten days, levofloxacin 500mg once a day for 10 days for 14 days. During the care period, there was monitoring of the team of curative nurses and periodic medical evaluation. The cleaning of the wound and dressing changes were performed with an average of every 3 days, or shorter interval when necessary.

Results / Discussion: The patient presented a good evolution which can be seen in illustration 1 and 2. Conclusion: As can be seen, the results reinforce the protagonist role of integrative wound therapy in the treatment of complex wounds, and the optimization of the results of this when combined with therapy by negative pressure and hyperbaric oxygen therapy, which when well established, bring great benefits to the patient's evolution, favoring healing and functional recovery.

EP162 THE USE OF NPWT FOR CHRONIC WOUND MANAGEMENT

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Aim: Negative pressure wound therapy, first described in 1985 (N. Bagaontdinov), is a procedure used as a modern solution of wound management, highly effective in stimulating wound healing.

Method: Our study includes 30 patients, organized in two groups (15 patients each). For the first group (9 males,6 females), we used the NPWT to prepare the soft tissues defects for reconstruction. The patients from the other group (8 males, 7 females) were treated using multiple excision stages, followed by local, loco-regional flaps or free transferred omentum flap.

Results / Discussion: We used NPWT on 15 patients (aged 19-70 years old). In 10 cases we prepared wounds located on the lower limb for skin grafting (one posttraumatic large defect on the right thigh, after femoral arterial reconstruction performed in emergency; wounds localized on the leg, developed after compartment syndrome and fasciotomy, or trophic ulcers (4); defects located on the foot (4)). We used NPWT for the management of pressure sores in 5 cases, before reconstruction with local or loco-regional flaps. For the second group of patients (24-80 years old) we could not use NPWT because of chronic anticoagulant medication (4 cases), granular tissue with histological findings of sarcoma (1 case), open fracture with ostheosynthesis material exposure (1 case in the leg, 1 case on the vertebral column) or external fixation for both legs (2 cases), extensive necrotizing fasciitis (2 cases).

Conclusion: Although the NPWT has a wide range of indications, several limitations are possible, depending on the characteristics of each patient.

EP163 NPWT INDUCED EFFECTIVE WOUND HEALING IN THE TREATMENT OF VASCULAR GRAFT INFECTIONS

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Aim: Vascular graft infections (VGI) can be challenging primarily due to life-threatening profuse bleeding. Between PAD patients had been undergone vascular graft implantation, the lack of circulation, low nutritional status, co-morbidities and - in some cases - thick adipose tissues can often lead to surgery site infections (SSI). In cases of SSI based exposed grafts neither the wound management is feasible nor primally wound closure. Negative pressure wound therapy (NPWT) could be a proper solution lowering the morbidity and mortality of these cases.

Method: In our clinical practice between February 2018 to August 2019 12 patients were treated with NPWT due to VGI related to SSI. Etiopathology involved postpunction haematoma (2 cases), femoral reconstruction with direct suture lines (1 case), femoroprofundal synthetic graft infection (1 case), femoropoliteal synthetic graft infection (5 cases), and femorocrural GSV reconstruction (3 cases). After initial surgical wound debridement, VAC was applied for 9 ± 6 days on average. All patients were received systemic antibiotic therapy from 2 to 6 weeks postoperatively. Complete wound healing was achieved by either secondary closure or skin grafting.

Results / Discussion: Complete wound healing was feasible in all cases. During observation period (6-12 months), 2 SSI were occurred and also being healed with NPWT.

Conclusion: As long as prosthetic grafts are used to treat PAD patients, higher morbidity of VGI have to be expected. NPWT induced wound healing can be a viable graft preserving treatment option even for high-risk patients avoiding surgical complete graft removal.

EP164 NEGATIVE PRESSURE TREATMENT IN MULTIPLE TRAUMA OF AN EIGHT MONTHS INFANT

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Background: Negative pressure is known technology for wound treatment. In infants and children the treatment can be challenging due to different factors: pain control, collaboration, anesthesia, acute medical conditions, electrolyte balance.

Objective: A case report of an eight months girl with multiple injuries after car accident.

Method: An eight months girl was admitted to trauma unit in hypovolemic shock after major car accident. She was in critical condition and suffered from external ileac artery and vein rupture, multiple fractures of pelvis, left leg hanging and deep laceration of perineum and left gluteal muscle, and head epidural hematoma of occipital area. After stabilization and few simultaneous surgical interventions the blood supply to left leg was established, external fixation of pelvis, reconstruction of perineum and diverting colostomy were done. The deep and extensive wounds in perineal and gluteal area were closed with negative pressure in PICU. The closure of wounds with negative pressure was challenging because of the depth of the wounds, extensive area and external fixation pins. After three weeks of negative pressure skin autograft was performed.

Results: The negative pressure therapy promoted granulation tissue formation and enabled skin grafting. As a result all the wounds closed and the girl was transferred to rehabilitation hospital.

Conclusion: Multidiscipline approach saved the girl's life. The treatment with negative pressure makes the difference: prevents local infection and promotes granulation tissue formation.

EP165 MAJOR COMPLICATIONS DURING NEGATIVE PRESSURE WOUND THERAPY IN POSTSTERNOTOMY MEDIASTINITIS AFTER CARDIAC SURGERY

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Aim: The aim of this study was to analyse major complications and possible preventive methods during negative pressure wound therapy in patients with deep sternal wound infections.

Method: We analyzed 59 consecutive patients treated with negative pressure wound therapy for poststernotomy mediastinitis between January 2010 and September 2019.

Results / Discussion: Four (6.8%) patients sustained major complications during negative pressure wound therapy. Bleeding from coronary artery venous bypass grafts was observed in 4 patients during routine dressing changes of the negative pressure wound therapy system.

Conclusion: Bleeding is the major complication during negative pressure wound therapy for postster-

notomy mediastinitis. Covering the heart with several layers of paraffin gauze is a necessary protective maneuver but cannot completely prevent major complications during negative pressure wound therapy. All operative procedures, including dressing changes, should be performed in the operating room under optimal hygienic and monitoring conditions to increase the salvage rate and to guarantee optimal surgical and anesthesiologic conditions in case of negative pressure wound therapy–related complications.

EP166 POSITIVE RESULTS WITH NEGATIVE PRESSURE, ANALYSIS OF 389 PATIENTS TREATED WITH NPWT

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The amount of exudate needs to be regulated by means of an appropriate wound dressing to prevent skin maceration while, at the same time, it is necessary to maintain sufficient moisture in wound as it unequivocally speeds up the wound healing process. In case of excessive volume of exudate, application of NPWT is appropriate.

Methods: Retrospective analysis of patients treated by NPWT, evaluation of length of NPWT therapy, amount of exudate in individual diagnoses and comparison of our results with studies.

Results: Within our group we assessed 389 patients treated by means of NPWT with the average age of 62.93 years. The average number of dressing changes per one patient reached 3.75 and the average length of treatment was 16.80 days. Age of the patients had no impact on the length of this therapy. The highest volume of exudate occurred in 122 patients treated with open abdomen with average volume of 3,026 ml per case, the average length of treatment was only 15.64 days while 20% patients with OA died. In case of patients with open fractures and injuries with loss of the soft tissue with defects of upper and lower limbs, the average time of treatment reached 19.7 days. The average volume of exudate was 84.6 ml per case. In spite of this, healing of fractures following the NPWT treatment was affected in a negative way.

Conclusion: NPWT represents an excellent method in wound treatment. We need to have in mind though, that the treatment must be performed rationally.

EP167 THE EFFICIENCY OF NEGATIVE PRESSURE WOUND THERAPY (NPWT) IN PLASTIC SURGERY – WOUND BED PREPARATION IN SOFT TISSUE DEFECTS

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Aim: This paper highlights the efficiency of using negative pressure wound therapy (NPWT) in the treatment of soft tissues defects of different etiologies, with exposed tendons, nerves or denuded bone. We use NPWT in those cases in which we can't cover the defect with simple split-thickness skin grafts due to the

local condition of the wound or the long-lasting intervention is not recommended due to comorbidities.

Method: Our paper is based on 19 patients, 11 men and 8 women, aged above 62 years, 12 patients with lesions in the upper limb and 7 patients with lesions in the lower limb, treated in the last 24 months. The etiology of the soft tissue defects was various: 9 cases were posttraumatic lesions, 3 soft tissue defects secondary to catheter thrombophlebitis complications and 7 cases of leg infection. In all cases, our standard protocol implied the application of NPWT, immediately after the initial debridement and we maintained it until the appearance of granulation tissue which was covered by a split-thickness skin.

Results / Discussion: In all the cases, the NPWT assured a significant reduction of the necessary healing period of time and the achievement of a qualitative granulation bed, which provided protection of exposed noble elements lesions (nerves, tendons, etc.). The patients' comfort level was increased, reducing the healing time, hospitalisation period and pain (Stanford Pain Scale applied, from 6-8 initially rated to 1-3 after NPWT). By applying this type of therapy, we managed to avoid many of the complications which could have result from complex and long surgeries, associated with other risk factors like age, comorbidities or general state of the patients.

Conclusion: The advantages of this technique are shortening the healing time by stimulating the development of granulation tissue, decreasing the concentration of germs into the wound, obtaining a local septic outbreak, analysis of the container secretions, decreased demand and surgical wound toilet frequency and increased patient comfort.

EP168 EXTENSIVE WOUNDS IN CHILDREN - TREATMENT RESULTS

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The prognostic severity of the wounds is determined by the depth of the lesion, the degree of trauma to the underlying tissues, trophic disorders in the margins due to poor blood circulation, impaired lymphatic flow and innervation, which complicates their ability to heal quickly and almost always become infected.

Aim: To study the results of surgical treatment of extensive wounds in children with their complex treatment.

Materials and methods: For the period 2015 - 2019 were treated 20children with extensive wounds. Of these, 13 were boys (65%), 7 girls (35%). 11 patients (55%) had extensive crushing of soft tissues with a complex nature of the fracture. A full range of examinations was carried out: laboratory, clinical data, X-ray and CT. Repeated surgical treatment of wounds with ultrasonic cavitation of cavities with the Sonoka180 ultrasound dissector, vacuum drainage of wounds with subsequent closure of wounds. On average, there are 3 surgical interventions per patient. Average stay in bed – 19.4±7.2days. Duration of observation: from 6 months to 2 years.

Results: 14 patients (70%) obtained a good result. In 4patients (20%), the result was rated as satisfactory, and 2 (10%) patients – an unsatisfactory result.

Conclusions: Timely and adequately performed primary surgical treatment using ultrasonic cavitation of cavities, vacuum drainage of wounds helps to prevent the spread of purulent infection. The early stabilization and fixation of fractures in children using intramedullary osteosynthesis with flexible nails, the Illizarov apparatus, also promotes earlier healing of both wounds and fractures.

EP169 THE ROLE NPWT OF OPEN ABDOMEN IN THE PERIOD 2011 - 2020

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[1]Masaryk University, First Department of Surgery, Brno, Czech Republic; [2]Petr Doležal, Consulting s.r.o., Karlovy Vary, Czech Republic

Aim: Analysis of the results of NPWT treatment of the open abdomen in the period 2011 - 2020 in the surgical workplace.

Method: The open abdomen is an option for emergency surgery patients with severe peritonitis and septic shock. NPWT as the preferred technique for temporary abdominal closure. Prospective analysis of patient data from the hospital and i-wound.cz database.

Results / Discussion: In the period between 2011 and December 2020 we observed 168 patients with an OA were treated using NPWT. We evaluated the length of treatment, onset of infection, the price of treatment. The patients' average age was 64.7 years, ranging between 19 and 89. Treatment with NPWT averaged 15.3 days, and number of dressings were median 4. The time of the treatment NPWT was 14.5 days does not depend on age, but time of hospitalization was deepened on age. The incidence of death in our group was 17.2%. The incidence of enteral fistulas was very low at only 7%.

Conclusion: Rapid closure with the assistance of NPWT should be the primary objective in the management of patients with open abdomen, in order to prevent severe morbidity such as fistulae, loss of domain, and incisional hernias. The NPWT is an excellent method of treatment for OA, reduces mortality, hospitalisation, shortening of the economic burden of health care providers.

EP170 NEGATIVE PRESSURE WOUND THERAPY WITH INSTILLATION AND DWELL TIME: THE FIRST 100 CASES

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Aim: Negative pressure wound therapy with instillation and dwelling (NPWTi-d) of topical wound solutions can be applied to various wound types to improve wound healing. In these last years its application has incorporated in our daily wound management plans. Here we present the results in our first 100 cases.

Method: We performed an observational retrospective review of 100 patients managed with the NPWti-d. The study population were composed by 53 male and 47 female, ranging from 22 to 95 yo. The wound included peripheral vascular ulcers, surgical wounds, dehiscences, and trauma, and they were located on different areas of the body. Depending both on patients and wound characteristics the dwell time has

been 3-10 minutes, followed by a negative pressure cycle length of 2-3.5 hours at -75 to -125 mmHg. Dressings were changed approximately every 3 days. In order to avoid bias, we excluded patients treated with “through holes foam”.

Results / Discussion: In our cases we noted: 1) after a median of 11 (range: 1-35) days, wound surface area significantly decreased, 2) the percent of infected wounds declined from 72% to 46%, and wound closure was achieved in 91% of cases.

Conclusion: In summary, we reviewed the records of 100 patients and we noted: reduced wound surface area, improve bacteria bioburden control, and wound closure. Considering these results, NPWTi-d has presently become one of our most used treatments especially in the management of patients affected by chronic or acute ulcers that are infected or at high risk of infection.

EP171 THE NEGATIVE PRESSURE WOUND THERAPY IN THE TREATMENT OF STERNAL DEHISCENCE

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Aim: Cardiothoracic patients can present postoperative sternotomy dehiscence complicated by infection. Here we analyzed our experience in the management of these patients with negative pressure wound therapy (NPWT).

Method: We performed a retrospective analysis on 10 patients treated from 2017 to 2020 affected by sternal dehiscence and infection. The study population has been composed by 5 male and 5 female, the average age was 70 y (min 55- max 82). Preoperative average wound area was 176 cm2 (min 25 cm2-max 220 cm2). After informed consent and pictures, the patients all have been treated with traditional NPWT. After 3 weeks, the negative pressure therapy has been removed and we provided the final closure with direct suture or flaps.

Results / Discussion: Depending on the patient and wound characteristics (small or large dehiscence, granulation tissue quality), after NPWT removal, we performed direct suture in 2 patients affected by small and superficial lesions, 8 patients underwent to major pectoralis muscle flaps. No recurrence has been reported.

Conclusion: In our preliminary experience Negative pressure wound therapy can be considered a very useful tool in the treatment of sternal dehiscence. In order to provide a good quality tissue and coverage, it’s preferable to perform flaps reserving direct suture only to very small and superficial lesions. In our experience we also noted that if osteosynthesis bodies were exposed it’s mandatory to remove them prior to final closure in order to avoid recurrence of infections. Finally silver foam is to prefer in order to control bacterial load.

EP172 NEGATIVE PRESSURE WOUND THERAPY WITH INSTILLATION AND DWELL PLUS THE "THROUGH HOLES FOAM": AN OBSERVATIONAL RETROSPECTIVE CASE CONTROL STUDY

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Aim: Nowadays Negative Pressure Wound Therapy with Instillation and dwelling time is a very helpful tool for improving wound healing. In these last years a new reticulated open cell foam with through holes has been suggested for patients in which surgical debridement cannot be performed or must be delayed, In order to verify if this new kind of dressing is more efficient than the traditional foam, we performed an observational retrospective case-control study on 22 patients, ranging in age from 55 to 95 years old, all affected by peripheral vascular leg ulcers.

Method: We selected 22 patients, ranging in age from 55 to 95 years old, all affected by peripheral vascular leg ulcers. The patient population has been divided in two groups: A) case patients treated with the through holes foam plus NPWTi-d, B) control patients treated with traditional foam plus NPWTi-d. All the patients have been treated with a dwell time of 10 minutes, followed by a negative pressure cycle length of 3.5 hours at -125 mmHg. Dressings were changed every 72 hours.

Results / Discussion: In our study the case group presented a reduction in days of application and hospitalization; we also highlighted an important wound area reduction. No correlation between the topical solutions and wound area reduction, swab negativization or days of application have been reported.

Conclusion: In conclusion we suggest that NPWTi-d and the "through holes foam" is a very useful tool in order both to obtain a faster wound bed preparation and improve wound healing.

Oral presentations

Basic and translational science

OP86 MICROPATTERNING OF A CULTURED SKIN SUBSTITUTE WITH FOLLICULOID APPENDAGES

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Aim: Commercially available skin substitutes represent a simplistic version of the native skin, far from replicating its complexity and main functions. The hair follicle (HF) strongly contributes to the most important physiological functions of the skin and is endowed with regenerative capacity. Thus, recreating HFs would represent a breakthrough in the development of clinically useful substitutes with improved integration and healing capacity for wound management, while allowing the construction of more reliable skin 3D-models for drug screening. Herein, we used microscopy-guided laser ablation (MGLA) to elicit HF formation in a cultured dermal-epidermal skin substitute

Method: Hair forming units (HFUs) containing follicular dermal papilla cells surrounded by keratinocytes were included in a dermal equivalent (DE) and MGLA was used to create microchannels bridging the HFUs and the surface of the DE. Epidermal keratinocytes were then seeded on top and the standard procedure for the construction of bilayered skin substitutes was followed.

Results / Discussion: MGLA manipulation of a DE layer of fibroblasts in collagen successfully guided the migration and integration of keratinocytes towards the HFU, in a process reminiscent of the initial steps required for HF development. Histological and immunological analysis of the constructs confirmed the formation of folliculoid structures that recapitulate the HF microphysiology and architecture within the skin construct.

Conclusion: The biofabricated skin bearing follicular units opens new avenues in engineering skin substitutes with improved functionality while also representing a promising in vitro tool to study mechanisms controlling HF development or for the screening of bioactive substances.

OP87 IMPACT OF THE CHRONIC WOUND MICROENVIRONMENT AND THE EFFECT OF MARINE OMEGA-3 FATTY ACIDS ON IN VITRO WOUND HEALING

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Aim: Marine long chain omega-3 polyunsaturated fatty acids (*w*3FA) are involved in numerous cell responses and therefore vital for the mammal organism. Because of the attribution of immunomodulatory effects, a favorable impact on the inflammatory response in chronic wounds and cells involved in wound healing can be suspected.

Method: In the experimental setup Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) were investigated regarding their impact on metabolic activity, cell proliferation and migration of human skin fibroblasts and keratinocytes. For simulation of the microenvironment of a chronic wound, human chronic wound fluid (CWF) was used.

Results: Skin cells demonstrated a significant increase in metabolic activity under *w*3FAs after 72h as well as 24h (fibroblasts) and 48h (keratinocytes). Treatment with *w*3FAs combined with CWF first resulted in an increased metabolism versus control (fibroblasts 6h; Keratinocytes up to 24h). With extended exposure (48h and 72h) however, metabolic activity decreased steadily, resulting in a significant reduction for CWF and CWF+EPA after 48h and 72h for all CWF treatments ($p \leq 0.05$). Regarding proliferation CWF, CWF+EPA and CWF+DHA application lead to an increase within the first 6h (fibroblasts) and 24h (keratinocytes), followed by a continuous, significant decrease up to 72h ($p \leq 0.05$). Histomorphological evaluation showed numerous and healthy cells in control and under *w*3FAs, while in all CWF applications with/without *w*3FAs cells were decreased and partially apoptotic. Analysing cell migration CWF with/without *w*3FAs, no significant difference was observed; wound closure stagnated after 30-36h. Generally, fibroblasts challenged with CWF with/without *w*3FAs showed a significantly delayed migration versus control within 24h to 48h. ($p \leq 0.05$).

Conclusion: CWF exhibited the expected adverse effect on both skin cell types, especially inhibiting in vitro wound closure. *w*3FAs showed a slightly positive, yet rarely significant effect on skin cells. Overall the addition of DHA or EPA showed no relevant benefit for cells challenged with human chronic wound fluid.

OP88 SIDE EFFECTS OF FREQUENTLY USED ANTIHYPERTENSIVE DRUGS AND ANTIDIABETICS AT WOUND HEALING IN-VITRO

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Aim: Due to increasing prevalence of so-called “life style diseases”, such as diabetes, obesity or hypertension, the number of wound healing disorders is also increasing. While a negative effect on wound healing is postulated for drugs such as cortisone or NSAIDs, the “side effects” of antihypertensive and oral antidiabetics on wound healing are largely unknown.

Method: Effects of the five antihypertensive and four antidiabetics on human skin cells were analyzed in 2D- and 3D-wound models regarding promotion of cell metabolism, activity, migration and apoptosis.

Results: The metabolism of keratinocytes was more sensitive to the application of glibenclamide and metformin compared to fibroblasts. Both exerted significant adverse effects, except for the long-term application. Sitagliptin and repaglinide led to a cell metabolism that was comparable to control. Metformin and glibenclamide administration induced a significant delay in wound closure by fibroblasts versus control while in keratinocyte differences between antidiabetics were not significant. In the immunohistochemical analysis incubation with metformin significantly decreased CXCR4 (migration) and enhanced caspase-3

(apoptosis) compared to sitagliptin and repaglinide. In 3D-wound models the number of fibroblasts was significantly reduced in response to metformin or sitagliptin compared to control after 12 days.

Hydrochlorothiazide and ramipril exerted inhibiting effects in nearly all analyses. In contrast, candesartan and amlodipine induced slight positive effects on both cell types in 2D- and 3D-models. Regarding cell migration only HCT had negative impact on both cell types compared to control. All other antihypertensive tended to enhance the migration for candesartan having the highest effect. In the immunhistochemical analysis fibroblasts treated with metoprolol and candesartan showed a faintly increased of CXCR4 (migration) compared to all others. A significant higher rate of caspase-3 (apoptosis) was detected after hydrochlorothiazide, amlodipine and ramipril application compared to control. Wound models treated with hydrochlorothiazide and ramipril developed a significantly thinner epidermal layer compared to control. Metoprolol induced the thickest layer of all antihypertensive by trend.

Conclusion: Antihypertensive and antidiabetic drugs have an impact on the "key players" of wound healing. Metformin and hydrochlorothiazide tend to have a negative effects, although there are clear differences between the substance classes. Based on these preliminary in-vitro results no patient`s therapy should be replaced, but a possible drug influence should not be ruled out.

Basic Science

OP13 DOES THE IMMUNOSUPPRESSIVE TREATMENT REDUCE THE HEALING POTENTIAL OF STEM CELLS SEPARATED FROM BONE MARROW OF DIABETIC PATIENTS?

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Aim: Autologous stem cell therapy (ACT) is a new treatment option for patients with diabetes mellitus and foot ulcers. Diabetic patients (DPs) treated with ACT often undergo the solid organ transplantation, after which they use immunosuppressive drugs (ISs). The effect of ISs on stem cells (SCs) are still not fully explored. The aim of our study was to evaluate the impact of ISs on functional characteristics and healing potential of SCs.

Method: Mononuclear fraction isolated from bone marrow (BM) of DPs was separated by gelofusine, cultured and characterized by flow cytometry. BM-SCs were cultivated nonstimulated or stimulated with proinflammatory cytokines in presence of different ISs. The metabolic activity was measured by WST-1 assay, the gene expression of immunoregulatory molecules was evaluated by RT-PCR, the production of cytokines was detected by ELISA and the ratio of apoptosis and necrosis was analyzed by flow cytometry. Results / Discussion: BM-SCs contained mesenchymal SCs (CD45-, CD105+), myeloid angiogenic SCs (CD45+, CD146-), endothelial colony-forming SCs (CD45-, CD146+) and others. ISs decreased the metabolic activity in dose-dependent manner. ISs downregulated the expression of genes for immunoregulatory molecules as COX2, TGF-ß, PD-L1 and iNOS. After cultivation with ISs, the production

of cytokines as VEGF, HGF (both p<0.001), CCL2, IL8 and IL6, which are involved in wound healing, were significantly reduced in presence of tacrolimus more than sirolimus or mycophenolate mofetil. ISs increased necrosis of BM-SCs.

Conclusion: Our data showed that ISs, especially tacrolimus, could decrease the surviving of transplanted BM-SCs and inhibit the healing effect of ACT.

OP14 MYOGLOBIN CREATES A HOSTILE WOUND MICROENVIRONMENT

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Aim: We hypothesize that hemoglobin-rich vascular ulcers and myoglobin-rich pressure ulcers share a similar dysfunction. Hemoglobin is known to cause toxicity when released from ruptured erythrocytes (e.g., venous stasis ulcers, sickle cell ulcers), but little is known about the impact of myoglobin from ruptured muscle. Studying muscle pressure ulcers, we assess the toxic effects of myoglobin on the wound microenvironment, and the beneficial effects of an iron scavenger.

Method: Myoglobin-knockout mice were generated by CRISPR germline deletion. Pressure ulcers were created in 20-month Mb-/- mice by 12 hr/day * 2d magnet compression of skin, dermal adipose, and muscle. Wounds in 5-month wildtype mice were treated by subcutaneous injection of iron scavenger (deferoxamine 30mg/kg BID) or saline control.

Results / Discussion: Wildtype wounds showed high levels of iron accumulation (Perl's stain for ferric Fe3+) in extracellular granules and iron-loaded phagocytes (siderophages). Immuno-staining showed high oxidative stress (oxidized guanine) and protein nitration (nitrotyrosine). In contrast, Myoglobin-knockout wounds were smaller at all timepoints (>2-fold smaller at 3d), devoid of iron accumulation, 20-fold lower in oxidized guanine, and far lower in protein nitration (p<0.0001). Iron chelation therapy yielded a partial pheno-copy of Myoglobin-knockout.

Conclusion: Myoglobin was a major source of the iron that accumulated in the wound, and created an inhospitable microenvironment. Myoglobin also caused lower tissue viability during wound induction, consistent with prior studies of surgically-induced ischemia-reperfusion injury. We conclude that muscle pressure ulcers can have myoglobin-derived iron toxicity, similar to the hemoglobin-derived pathologies that are recognized in vascular ulcers.

OP15 STEPS TOWARDS BIOPRINTING A PERSONALIZED SKIN MODEL

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Aim: The development of a skin model that closely represents the physiology and response of the human skin is one of the great challenges of tissue engineers. Herein, we aimed to bioprint a skin model that could be tailored according to the specific requirements of different skin cell types and populations.

Method: An extrusion-based printer was used to print bioinks composed of human dermal fibroblasts (HDFB), human microvascular dermal endothelial cells (HDMEC), human adipose-derived mesenchymal stem cells (HASC) or human pre-adipocytes (HpA) encapsulated within different RGD-biofunctionalized gellan gum (GG)-based ink formulations1,2. The printing parameters were optimized and the mechanical properties of the printed constructs evaluated. The behavior of printed cells was evaluated regarding viability (calcein/propidium iodide), morphology (phalloidin), phenotype (CD31/Nile Red) and matrix production (collagen/fibronectin/laminin) up to 21 days.

Results / Discussion: All ink formulations were printable and the printed constructs maintained the shape and mechanical stability post-culture. Cell response was dependent on hydrogels stiffness and cell density, and varied among the different cell populations. Post-printing cell viability barely changed among cell populations but varied among the different cell types, as HDFB showed the highest (85.86±8.66%) and HDMEC the lowest (51.55±14.98%) viability 24h post-printing. One-week post-printing, started to show signs of tissue maturation, as evidenced by HDFB-mediated matrix production, HpAd-lipid formation and HDMEC CD31+ vessel-like structures formation.

Conclusion: A mature skin model was attained using different ink formulations tailored to meet the requirements of different cell types and populations, bringing us one step closer to develop personalized bioprinted skin models.

OP16 BREAKDOWN, IDENTIFICATION AND OBSERVATION OF THE MICRO-ENVIRONMENT IN ACUTE AND CHRONIC WOUNDS (WOUND-BIOME PROJECT) – PROTEOMIC PATTERNS AND SIGNATURE

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Aim: Deciphering and differentiating the biomolecular micro-environment of chronic non-healing and acute wounds is an ongoing necessity. As part of a multicenter, multi-level biomolecular project, this work reports results on proteomic patterns in acute and chronic wounds.

Method: Samples of varying acute and chronic wounds were collected at three university hospitals in Germany via wound swabbing. Comprehensive data on patient and wound demographics, medical history, therapy and healing stage was collected for correlation and matching analyses. Protein profiles were identified and relatively quantified using label-free mass-spectrometry. Ethical approval and informed consent were obtained, and the project was registered with the German clinical trials register (DRKS00017390).

Results / Discussion: 139 samples from 114 patients, including several follow-ups, were collected. Sampled entities include chronic postoperative, diabetic, venous, arterial and mixed ulcer, pyoderma gangrenosum as well as acute wounds for comparison. In all samples combined, over 1800 proteins were identified, including various proteins relevant for wound healing such as dermal, epidermal and extracellular matrix proteins (keratin, collagen, proteoglycans, fibronectin), metalloproteases (MMP-1,-2,-3,-8,-9), S100-family proteins, neutrophil-derived (elastase, cathepsin G, myeloperoxidase) and immunomodulatory proteins. About one quarter were expressed in all samples, whereby the rest represent potentially wound-, patient- or state-dependent proteins or protein-variations allowing a certain extend of differentiation.

Conclusion: These data represent one of the most comprehensive side-by-side analysis of the human wound proteome in chronic wounds. It extends the knowledge on protein expression in varying entities and contributes greatly to the identification of biomarker patterns for diagnostics and progression monitoring in wound management.

OP17 BIOMOLECULAR PROFILES AND BIOMARKERS OF THE MICRO-ENVIRONMENT IN ACUTE AND CHRONIC WOUNDS - A SYSTEMATIC SCOPING REVIEW WITH QUALITATIVE AND QUANTITATIVE EVALUATION

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Aim: Wound exudate can potentially function as a 'diagnostic window', however biomarkers to predict, monitor and guide wound healing are still lacking. This work aimed to provide a comprehensive overview of the current knowledge on biomolecular profiles, patterns and biomarkers in wound healing.
Method: A systematic literature search of databases (MEDLINE, Embase and CENTRAL), reference lists of included studies and reviews/meta-analyses was performed. Studies were included if reporting quantitative or qualitative original data on any biomolecular marker (e.g. cytokines, growth-factors, metalloproteinases) in exudate of acute or chronic wounds, investigating the micro-environment of different wound entities. Subgroup- and meta-analysis was performed, if homogeneous study-groups were found. Non-quantifiable, yet relevant results were reported narratively. The review was preliminarily registered with PROSPERO (CRD 42018095745).

Results / Discussion: 166 studies were included of which 84 reported quantitative results. 50 studies analyzed markers in acute wounds (1051 patients), 52 studies assessed markers in chronic wounds (1398 patients). Over 65 specific biomolecules were identified, including relevant mediators and growth factors such as S100 A8/A9, IL-1ß, IL-6, IL-8, MMPs, TIMPs, VEGF, EGF, FGF and PDGF. While the number of reporting studies was higher than expected, quality of data reporting varied tremendously with heterogenous sampling or analyzing methodologies.

Conclusion: While MMPs, S100 proteins and certain cytokines present promising, study-heterogeneity and sample-size limit their validity. Further insight into the differing micro-environment of acute and chronic wounds is necessary to help identify and establish valid diagnostic tools and monitoring parameters to support and advance specific, efficient and personalized wound management.

Burns and dressings

OP76 PERSISTENT SYSTEMIC INFLAMMATION IN PATIENTS WITH SEVERE BURN INJURY IS ACCOMPANIED BY INFLUX OF IMMATURE NEUTROPHILS AND SHIFTS IN T CELL SUBSETS AND CYTOKINE PROFILES

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Aim: Severe burn injury causes local and systemic immune responses that can persist up to months, and can lead to systemic inflammatory response syndrome, organ damage and long-term sequalae such as hypertrophic scarring. To prevent these pathological conditions, a better understanding of the underlying mechanisms is essential.

Method: In this longitudinal study, we analyzed the temporal peripheral blood immune profile of 20 burn wound patients admitted to the intensive care by flow cytometry and secretome profiling and compared this to data from 20 healthy subjects.

Results / Discussion: The patient cohort showed signs of systemic inflammation and persistently high levels of pro-inflammatory soluble mediators, such as IL-6, IL-8, MCP-1, MIP-1ß, and MIP-3ß, were measured. Using both unsupervised and supervised flow cytometry techniques, we observed a continuous release of neutrophils and monocytes into the blood for at least 39 days. Increased numbers of immature neutrophils were present in peripheral blood in the first three weeks after injury (0.1–2.8 × 106/ml after burn vs. 5 × 103/ml in healthy controls). Total lymphocyte numbers did not increase, but numbers of effector T cells as well as regulatory T cells were increased from the second week onward. Within the CD4+ T cell population, elevated numbers of CCR4+CCR6- and CCR4+CCR6+ cells were found. Conclusion: Altogether, these data reveal that severe burn injury induced a persistent innate inflammatory response, including a release of immature neutrophils, and shifts in the T cell composition toward an overall more pro-inflammatory phenotype, thereby continuing systemic inflammation and increasing the risk of secondary complications.

OP78 CLINICAL SAFETY AND EFFECTIVENESS OF A NOVEL WOUND DRESSING DERIVED FROM EGGSHELL MEMBRANE IN TREATMENT OF VENOUS LEG ULCERS

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Aim: Collagen protein-based dressings are effective in promoting granulation in stalled wounds. This study evaluated the safety and effectiveness of a novel purified eggshell membrane protein (PEP) dressing in a porcine animal model of wound healing and a clinical trial in patients with venous leg ulcers.

Method: Safety and effectiveness were assessed in a full skin thickness porcine model of ulcer healing followed by a multi-centre clinical study (6 sites) of 44 patients with venous leg ulcers. The clinical trial comprised a run-in period of 4 weeks with standard of care, 8 weeks with standard of care and PEP and a further 4 weeks with standard of care alone. Endpoints included wound closure, wound area change, epithelialisation, pain and exudate.

Results / Discussion: The biological responses of PEP in both the pig and humans were similar. There were no serious adverse events reported for PEP dressing in the clinical study. 33 patients were unhealed at the end of the run-in period, 5 healed following PEP dressing treatment (median 9 months, range 2-120 months) with a further 23 progressing with excellent/good epithelialisation. The continuing improvement during the follow up period when PEP treatment had stopped implies that PEP acts to "kick start" the wound healing process.

Conclusion: Use of PEP dressing was not associated with any adverse sequelae. Responses in the animal model and clinical study indicate similar granulation responses to other collagen dressings with potential cost advantages due to the non-bovine source which may facilitate more widespread use.

OP79 EFFICACY OF A NEW ANTIOXIDANT AMORPHOUS HYDROGEL CONTAINING AN EXTRACT OF OLEA EUROPAEA LEAVES VERSUS A STANDARD HYDROGEL IN WOUND HEALING. A RANDOMISED CONTROLLED TRIAL

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Aim: To assess the efficacy of a new antioxidant gel (EHO-85) containing an extract of Olea europaea leaves (OLE) to promote and/or improve wound healing compared with a standard hydrogel (SH).
Method: A prospective, multicentred, randomised, assessor blinded, controlled trial, approved by the Ethical Committee of Cordoba (Spain), was performed. Patients (≥18 years-old) were recruited if they had pressure ulcers (PU) (cat II-III), venous leg ulcers (VLU) or diabetic foot ulcers (DFU), excluding ischaemic conditions, and according to strict inclusion and exclusion criteria. Patients were treated with EHO-85 (n=106) or Varihesive® (ConvaTec) (SH), (n=98); 3 times/week for 8 weeks. Both groups were comparable by main variables. Main endpoint was relative wound area reduction (WAR) measured as ((area to-area tn)/area to) x 100. Analysis were made by intention to treat (ITT) and per protocol (PPP). Descriptive, bivariate and multivariate analysis were performed.

Results: There is a statistically significant superior effect on WAR in favour of EHO-85 vs. SH, both by ITT (-62.7% vs. -34.6%; p<0.001) and by PPP (-72.3% vs. -43.1%; p<0.001). Differences were early observed after only 2 weeks of treatment (p<0.001). Accordingly, absolute WAR (mm2) and healing rate (mm2/day) also favour experimental group (p<0.001). Multivariate analysis (linear mixed model and Kaplan-Meier survival curves) confirms better results for EHO-85 vs SH.

Conclusion: EHO-85 gel containing OLE promotes and accelerates wound healing when compared with a standard hydrogel. Superiority is likely based on its pH down-regulation and antioxidant properties.

OP80 FABRICATION AND CHARACTERIZATION OF PULLULAN-COLLAGEN-P-COUMARIC ACID SCAFFOLD AND ITS EFFICACY ON DERMAL WOUND HEALING IN RATS

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Aim: Collagen, a natural biomaterial, has wide spread application in tissue engineering and regenerative medicine. Collagen scaffolds are useful in wound healing as they mimic the extracellular matrix and provide a template for new tissue growth. In this study, a new scaffold was prepared by cross-linking collagen with oxidized pullulan to increase its stability and incorporated with p-Coumaric acid, to evaluate its wound healing efficacy.

Method: Collagen was crosslinked with different concentrations of oxidized pullulan and characterized to identify effective concentration. In vitro bio-compatibility and wound closure studies were carried out using NIH-3T3 fibroblast cells. Wound healing efficacy of the prepared hybrid scaffolds was evaluated in Wistar rats.

Results / Discussion: The higher the degree of crosslinking, lower was the degradation rate. SEM studies proved the porous nature of scaffolds. The tensile strength was 10 times higher in Col-Pul-Courmaric acid scaffold compared to native collagen scaffold. The swelling capacity of the scaffolds increased with increase in crosslinker concentration and the equilibrium was retained up to 60min. The drug incorporated hybrid scaffold exhibited 75% antioxidant activity, better blood compatibility, erythrocyte adhesion property and also non-toxic to 3T3 fibroblast cell line. A significant increase in percentage of wound

contraction, decreased epithelialization time (14 days when compared to collagen scaffold (20 days) and increased collagen content (3 fold) proved that the hybrid scaffolds are effective wound healing agent.

Conclusion: Thus the fabricated biomaterial showed better biodegradability, biocompatibility, anti-oxidant and wound healing efficacy when compared to native collagen scaffold.

Devices & Intervention

OP81 CLINICAL ANALYSIS OF COMMUNICATING ARTERY BETWEEN THE DORSAL AND PLANTAR FOOT

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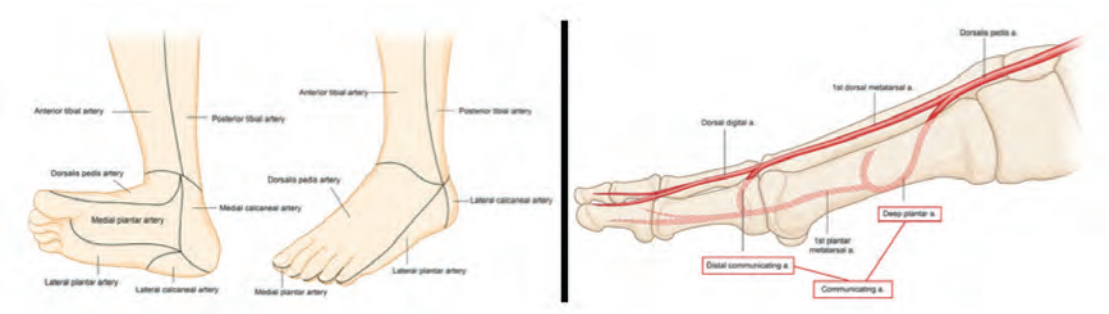
Aim: This study aimed to determine whether wound healing and symptom relief occur depending on whether the communicating artery is patent after percutaneous transluminal angiography (PTA).

Method: One-hundred and twenty patients (120 lower extremities) who underwent PTA. Data concerning 11 risk factors including age, BMI, diabetes, hypertension, tobacco use, hyperlipidemia, cardiac status, carotid status, renal disease, pulmonary status, history of lower limb amputation, were collected. Risk factors were classified according to Rutherford's score to evaluate the effect of each risk factor on communicating arterial occlusion. The effect of communicating artery patency on wound healing was evaluated in the indirect revascularization group.

Results / Discussion: Out of 87 patients who had wounds, 34 had a patent communicating artery and 53 had a non-patent communicating artery. Out of 34 patients who had wounds but a patent communicating artery, 29 were totally healed within 6 months. Among the 53 patients who had wounds and a non-patent communicating artery, 16 were totally healed within 6 months, and 37 were not healed within 6 months. In the indirect revascularization group, 18 of 21 patients with complete wound healing within 6 months in the indirect revascularization group had a patent communicating artery.

Conclusion: It is important to understand the angiosome concept for vessel revascularization and direct revascularization is recommended. However, if only indirect revascularization can be performed, it is important to ensure the patency of communicating vessels linking the pedal and plantar arterial systems to increase wound healing and decrease the likelihood of wound relapse.



OP82 FASTER THAN PROJECTED HEALING IN CHRONIC VENOUS AND DIABETIC FOOT ULCERS WHEN TREATED WITH INTACT FISH SKIN GRAFTS COMPARED TO EXPECTED HEALING TIMES FOR STANDARD OF CARE: AN OUTCOME-BASED MODEL FROM A REGIONAL* HOSPITAL

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Aim: Inaquedete wound response is defined as a reduction in wound area of <40-50% following 4 weeks of standard of care (SOC) and should be treated with a skin substitute. We set out to evaluate a novel outcome-based model focusing on healing of VLUs and DFUs using SOC treatment or intact fish skin grafts (FSGs) in a regional hospital.

Methods: We built an outcome-based model applying surrogate markers and endpoints of wound healing for VLUs and DFUs to determine time to healing trajectory with SOC treatment. After evaluating the wound area reduction after 4 weeks of SOC treatment we could predict if VLUs and DFUs would heal by week 20 and 24, respectively. We recruited 44 patients, 23 VLUs and 21 DFUs. Of those, 18 wounds were unlikely to heal and received treatment with FSGs, and 26 wounds continued SOC for weeks 5-8.

Results / Discussion: When treated with FSGs 12 wounds outperformed the modelled SOC healing predictions. Most healed >50% sooner and as early as <10% of the predicted time. Six of 18 wounds did not achieve criteria required for size reduction between Weeks 4-8 (>25% improvement). The final results show good overall clinical outcomes; even wounds that increased in size during the initial 4 weeks of SOC had a favorable healing trajectory. As this is a predicted outcome model, we recognize that multiple factors can impact individual wound healing.

Conclusion: This pilot study showed that treatment with FSGS results in accelerated healing of wounds resistant to SOC treatment, while SOC treated wounds followed model predictions.

OP83 EFFICACY OF PLATELET RICH PLASMA(PRP) AS A TREATMENT MODALITY FOR WOUND HEALING

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Introduction: Non-healing wounds come with cost and morbidity for patients and the society. Conventional therapies, such as dressings, surgical debridement, and even skin grafting, cannot provide satisfactory healing since such treatments are not able to provide the necessary growth factors to modulate the healing process. Platelet rich plasma is an effective method to directly feed growth factors to the mesenchymal tissue at the edges of the wounds in order to enhance healing. Objectives:
1. To analyze the efficacy of platelet rich plasma in the treatment of wounds.
2. To compare the rate of wound healing in platelet rich plasma arm to conventional treatment.
3. To compare the length of hospital stay and complications between both the groups.

Materials and Methods: A randomized controlled trial(n=60), on patients with wounds having a surface area equal to or less than 10 x10 cm2 with 30 participants each, in the treatment group wherein they will be treated with autologous platelet rich plasma which will be infiltrated into wound edges i.e. into the mesenchymal tissue and the control group would be treated with conventional dressings.
The patients were followed up on days 4, 8, 12, 15 and then 30.

Results: The median surface area of ulcer reduced from baseline measurement of 1710 mm2 to 1583.5 mm2 on Day 15 and 1478 mm2 at the end of one month in control group and from 1421 mm2 to 930 mm2 on the Day 15 and 661 mm2 at the end of one month in treatment group.

Decrease in mean pain score in control group was from 8.4 to 6.3 while in the treatment group it decreased from 7.2 to 4.4 at the end of one month, it is postulated that platelet rich plasma may suppress cytokine release and thus inflammation resulting in decrease in pain.

Study participants belonging to the treatment arm as many as 21 (62.5%) were observed to have healthy granulation tissue as early as Day 4 i.e. after a single infiltration of platelet rich plasma and by Day 15, all 30 study participants were observed to have healthy granulation tissue.

On the other hand, it was observed that in the control group, a single patient had healthy granulation tissue on Day 4 and at the end of one month 24 patients showed healthy granulation tissue.

In our study, we found that in the treatment group, inflammation was present in as many 3 patients (10%) on Day 4 which rapidly declined and there was 100% resolution of inflammation on Day 8.

In contrast, the control group had 18 patients (60%) who had inflammation, and which decreased to 4(13.3%) at the end of one month.

The rate of epithelization observed in the treatment group on Day 4 was 15 mm2/day after which it reached a maximum of 84.43 mm2/day on Day 15 and then began to decline to 19.56 mm2/day at the end one month.

On the other hand, the rate of epithelization in the control group was Day 4 and 12 was 0. On Day 12, it was observed to be 7.75 mm2/day after which it reached a maximum of 37.93 mm2/day and then began to decline to 9.95 mm2/day at the end of one month.

The mean rate of epithelization is 11.12mm2/day in control group, and it is 34.026mm2/day in treatment group.

It was found that time required to reduce the surface area of the wound to half of its original surface area was 15 days for 5 wounds (16.66%) and 4 weeks for 9 wounds (30%) in treatment group whereas no such reduction was seen in the control group.

There was a decrease in duration of hospital stay by 3.5 days. This difference can be attributed to conventional dressings being done daily and thus requiring patients to get admitted whereas the treatment group were subjected to PRP every 4 days.

Conclusion: It is concluded from the study that PRP is a safe and effective treatment modality and can be used as the primary approach to wound management irrespective of the etiology. All patients

showed good compliance, because of decreased hospital stay, analgesic effects of PRP, elimination of surgical interventions, decrease rate of comorbidities such as lower extremity amputations, fastened rate of healing, decreased cost of treatment and no adverse reactions. Researchers using the method of infiltration of platelet rich plasma are few in number, therefore, further research and controlled, randomized prospective clinical trials on larger patient population and of longer durations using this method are necessary to support the results.

Keywords: PRP, Wound healing, Efficacy

OP84 CASE SERIES EVALUATING THIGH ADMINISTERED INTERMITTENT PNEUMATIC COMPRESSION (IPC) AS AN ADJUNCT THERAPY FOR PATIENTS WITH HARD TO HEAL MIXED/VENOUS LEG ULCERS

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Aim: To evaluate the effectiveness and acceptability of thigh administered IPC for the treatment of lower limb, hard to heal wounds of mixed or venous aetiology.

Method: Twenty-seven patients with hard to heal, non-infected, lower limb wounds of mixed or venous aetiology were recruited across six UK evaluation sites. Hard to heal was defined as 'wounds failing to progress over the preceding 8-week period'. Participants continued to receive their standard wound care throughout a 16 week evaluation but also used an IPC device for 2 hours daily. The device consists of a circumferential three-chamber thigh garment and an electronic pneumatic compression pump operating over a repeated 4-minute cycle. Bi-weekly reviews were undertaken during the evaluation period; assessments included wound photographs, measurements, and reported wound-related pain. Results / Discussion: Twenty-one patients completed the 16 week evaluation; of these 95% progressed towards healing, with a mean surface area reduction of -66% (range: -16% to -100%). 33% (n=7) achieved complete re-epithelialisation and reported pain reduced in 80% of patients. Mean duration of wounds prior to inclusion in the evaluations was 45 months. Clinicians and patients reported that the thigh garment was tolerated well.

Conclusion: Recalcitrant lower limb wounds progressed towards healing following the addition of thigh IPC to standard wound care within these case series evaluations. IPC garments are typically worn over wound sites which may produce discomfort or interfere with treatments; the novel thigh garment utilised in these evaluations addressed this issue and produced encouraging results which support the next step of a multi-centre pivotal study.

OP85 PROSPECTIVE RANDOMISED CONTROLLED TRIAL OF LOW FREQUENCY ULTRASOUND DEBRIDEMENT (LFUD), IN MANAGEMENT OF LOWER LIMB WOUNDS

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This prospective, randomized study assessed the benefit of low-frequency ultrasound debridement (LFUD) as an adjunct in the management of acute and chronic lower limb wounds by comparing time to complete wound healing and relative rate of wound healing at 12, 24, and 52 weeks. Patients (108) with lower-extremity wounds of mixed aetiologies from a vascular surgery service, including inpatient wards, outpatient and wound care nurse clinics, and community district nursing services were enrolled. Patients were randomised to receive LFUD plus standard care (n=53) or standard care (SC) (n=51), and were assessed at week 4, 8, 24 and 52. Participants received treatment twice per week for three weeks and then as required for up to 52 weeks. Assessors were blinded to the treatment group. The time and relative rate to complete wound healing (12, 24 and 52 weeks), length of hospital stay, operative time, and number of treatments were compared between treatment groups. Data for the complete study period was obtained from 77 patients (56% Female, aged 71.1 (42-94) years). In intention to treat analysis, healing occurred in 59% of patients in the LFUD group (n=37) and 64% in SC (n=40). There was no statistically significant difference in the change in the rate of wound healing between treatments (1.43, 95% CI 0.81–2.51, p=.214). Wound size changed significantly over time (p<.001), however this was not significantly different between the treatments (p=.470).

A significant proportion of the patients in per protocol analysis (PP) were excluded because of other confounding factors (progressive ischaemia, infection, other comorbidities). The proportion of excluded patients was highest in the ischaemic cohort (88%) and lowest in the venous group (37%). PP analysis (20 LFUD and 26 SC patients) showed a non-significant trend in faster healing rates in the treatment group, especially in the venous subgroup (30% reduction in wound size in the first 4 weeks in LFUD vs 14 % in standard care, p=.24). We achieved complete healing rates of 75% in both groups.
In conclusion, PP analysis shows a trend in improved healing rates in the treatment group and that a significant proportion of patients with ischemia and neuropathy have underlying conditions which confound the results, requiring exclusion from the final analysis. Moving forward we plan to continue the study with a focus on a venous cohort.

Keywords: Wound debridement, Wound healing, Low frequency ultrasound, Leg ulcers, Wound bed preparation, peripheral arterial disease, Diabetes complications

Diabetic Foot 1

OP01 A TOPICAL NATURAL FORMULATION* EFFICIENTLY PROMOTED HEALING IN DIABETIC FOOT ULCER

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Aim: Near to 15-25 % of diabetic patients experience foot ulcers in their lifetime that impose high costs of treatment on these individuals. Herein, we investigated the safety and efficacy of a topical formulation composed of natural ingredients including arnebia euchroma, olive oil, curcumin, matricaria chamomilla, and honey (AOCMH*) for the treatment of diabetic foot ulcers (DFUs).

Method: Current study was a randomized, controlled, clinical trial performed in DFU clinics of Endocrinology and Metabolism Research Institute of Tehran University of Medical Sciences. 68 patients with at least one DFU (Wagner I or II) were assessed for eligibility and 24 of them were randomized and allocated to Intervention or placebo groups. Consented patients in both groups received standard of care plus AOCMH or placebo for 4 consecutive weeks. Healing assessment was performed at the end of every week using rate of wound size reduction as the primary endpoint, besides scoring checklist (wound color, surrounding tissues and drainage).

Results / Discussion: Mean age of participants was 56±3 years old and mean of diabetes duration was 10 ± 2 yrs. Complete DFU closure was faster with AOCMH (80%) than placebo (18%). Also, wound color and surrounding tissue scores significantly ($p< 0.01$) promoted in AOCMH group compared to placebo at second and third weeks, respectively. In consensus with our previous in vivo study AOCMH was significantly increased the number of fibroblast and collagen deposition.

Conclusion: Our findings signify that the AOCMH formulation can be considered as a good candidate without serious adverse effects for treating DFUs.
** Dermaheal (DaruDarman Salafechegan Co, Tehran, Iran)*

OP02 EFFECT OF TLC-NOSF DRESSINGS IN NEURO-ISCHAEMIC DFUS CONSIDERING THEIR LEVEL OF ISCHAEMIA: POST-HOC ANALYSIS OF THE EXXPLORER RCT

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Aim: The Explorer trial, a double-blind, randomised controlled trial (RCT) [2018], established that introducing a TLC-NOSF dressing into local standard of care (SoC) significantly improves the clinical outcomes (wound closure - 48% vs 30% at Week 20 - and healing time) of neuroischaemic diabetic foot ulcers (NI DFUs). We aimed to evaluate the effect of TLC-NOSF dressing in the subgroups of patients categorised by level of ischemia.

Method: A descriptive post-hoc analysis, based on Explorer ITT population (240 patients) was performed. To be eligible, a patient's Ankle Brachial Pressure Index (ABPI) score had to be ≤ 0.9 and Toe Pressure ≥ 50 mm Hg (or Ankle Pressure ≥ 70 mm Hg if toe pressure could not be measured). In case of ABPI > 0.9, a Toe Brachial Pressure Index (TBPI) score of ≤ 0.7 and toe pressure ≥ 50 mm Hg were mandatory. To answer the issue, treated population was divided between Mild ischaemia (ABPI 0.7-0.9 and TBPI 0.5-0.7. N=159) and Moderate ischemia (ABPI <0.7 or TBPI <0.5. N=81).

Results / Discussion: Amputation and revascularisation history were 61% and 48%, respectively. After 20 weeks, clinical outcomes were always in favour of TLC-NOSF treatment, with very consistent closure rates ranging between 47% and 49% within the TLC-NOSF group and between 27% and 36% within the control group, when respectively considering the mild and moderate ischaemia groups.

Conclusion: This clinical evidence supports that treating DFUs with TLC-NOSF dressings (and good SoC) results in higher wound closure rates whatever level of ischaemia.

OP03 RAPID IMPROVEMENT OF WOUND HEALING AND HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH DFUS TREATED WITH TLC-NOSF POLYABSORBENT DRESSINGS - RESULTS FROM A PROSPECTIVE, MULTICENTRE REAL-LIFE STUDY

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Aim: This clinical evaluation aimed to assess the performances of TLC-NOSF dressings with polyabsorbent fibres in the local management of chronic wounds in an unselected patient population under real-life settings. The results for patients with diabetic foot ulcers (DFUs) are presented here.

Method: A large, prospective, multicentre observational study with three different TLC-NOSF polyabsorbent dressings was conducted in 55 centres across Germany between January 2019 and June 2020. The main endpoints included wound healing rate and progression, health-related quality-of-life (HrQoL) evaluation (Wound-QoL questionnaire), tolerability and acceptability of the dressings.

Results: 217 patients with a DFU were treated with the evaluated dressings for a mean duration of 63±30 days. By the final visit, 57.6% of ulcers healed, 32.3% improved, 4.1% were stabilized, and 4.1% worsened. In DFUs ≤ 1 month duration, wound closure reached 71.3%. A substantial improvement was reported in the majority of the patients on all HRQoL parameters, particularly regarding frustration due to long-healing time, fears of wound deterioration, pain, disturbing discharge, patients' mobility, limitation of leisure activities, and dependency on help from others. The dressings were 'very well' tolerated (88.9%) and 'very well' accepted (83.4%) by the majority of the patients.

Conclusion: These results show the good performance of these dressings in rapidly improving wound healing and HRQoL of patients with DFUs treated in real-life. They are consistent with previous clinical evidence on TLC-NOSF dressings, supporting current guidelines recommending their use for local treatment of DFUs and confirming that optimal outcomes are achieved when used as first-line treatment.

OP04 IMPACT OF AUTOLOGOUS CELL THERAPY ON WOUND HEALING IN DIABETIC PATIENTS WITH CHRONIC LIMB-THREATENING ISCHEMIA. A RANDOMIZED CONTROLLED TRIAL

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Aim: Autologous cell-therapy (ACT) is a new treatment method for patients with diabetes and no-option chronic limb-threatening ischemia (NO-CLTI). We aimed to assess the impact of ACT on wound healing and microcirculation in patients with NO-CLTI in comparison with standard treatment (ST).

Method: Patients with NO-CLTI and diabetic foot were randomized to receive either ACT (n=20) or ST (n=16). After 3 months, those in the ST group were switched to ACT (cell therapy crossover). The effect of ACT on microcirculation and wound healing was assessed by changes in transcutaneous oxygen pressure (TcPO2), number of healed patients and area defect evaluation at 3 months. Pain was evaluated by Visual Analogue Scale (VAS).

Results / Discussion: TcPO2 increased significantly in the ACT group after 1 and 3 months (both $p<0.001$) whereas TcPO2 in the ST group remained unchanged. After cell therapy crossover, patients in the ST group had a significant increase in TcPO2 at 1 and 3 months after the injection of ACT ($p=0.036$ and $p<0.001$, respectively). We observed significantly more healed patients at 3 months in the ACT group compared to the ST group ($p=0.01$). Ulcer area was significantly more reduced in ACT group (12.1 ± 7.3 vs. 0.8 ± 1.6mm2, $p<0.001$). Pain significantly decreased in the ACT group after 3 months compared to baseline ($p<0.001$).

Conclusion: Our randomized controlled trial showed that ACT in patients with no-option CLTI and diabetic foot significantly improved limb ischemia and enhanced wound healing after 3 months when compared to standard conservative therapy. Supported by MH CZ-DRO 00023001.

OP05 A PILOT STUDY- HEALING OF DIABETIC FOOT ULCERS, MICROCIRCULATION STATUS AND THEIR POSSIBLE CORRELATE WITH SMALL ARTERY DISEASE

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Aim: In patients with diabetic foot ulcers (DFU) and peripheral arterial disease (PAD) we occasionally observe an insufficient effect of revascularization procedures. Treatment failure could be associated with small artery disease (SAD) which correlates with medial arterial calcification (MAC). Study's aim is to confirm that more advanced MAC after successful revascularization procedures corresponds with prolonged wound healing, altered microcirculation and higher number of amputations.

Method: We retrospectively reviewed 45 patients with DFU after percutaneous transluminal angioplasty (PTA) performed between 1/2018-12/2020. We evaluated MAC (using a 3- level score based on foot radiographs), state of microcirculation (by transcutaneous oxygen pressure (TcPO2) before and 3-months after PTA), PAD (classified according to Graziani) and outcomes of DFU 3-months after PTA (healed, non-healed DFU, minor/ major amputations, death). Patients were divided into three study groups according to MAC score: group O–no MAC (n=14), group M–moderate MAC (n=17) and group S–severe MAC (n=14).

Results: Due to a small study cohort a trend to lower TcPO2 values before PTA (23.2±13.5 vs. 19.6±13.5 vs. 29.6±13.8 mmHg; p=0.1), more frequent minor/major amputations (61.5 vs. 58.8 vs. 42.9%; p=0.09) and higher mortality (14.3 vs. 11.8 vs. 0%; p= 0.16) were only observed in group S and M in contrast to group O. The TcPO2 increased after successful PTA similarly in all study groups. MAC score significantly correlated with age (r=0.31; p=0.04), other parameters including renal functions didn´t correlate with MAC score.

Conclusion: Our study suggests worse wound healing and increased risk of amputations in patients with moderate or severe MAC/SAD.

OP95 COLD PLASMA – A VALUABLE TREATMENT OPTION IN HARD-TO-HEAL WOUNDS?

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Aim: The aim of this retrospective chart review was to document, whether cold plasma is a valuable treatment option for hard-to-heal wounds in diabetic, PAOD and polyneuropathic patients.
Method: The first 16 consecutive patients treated with cold plasma have been evaluated. Inclusion criteria were: chronic hard-to-heal wound with no healing progress for at least 6 weeks, at least 6 treatment sessions, and at least one co-morbidity of the following three: diabetes mellitus, PAOD, polyneuropathy.

Results / Discussion: 16 charts have been evaluated. Two patients have been excluded, since they did not reach 6 treatment sessions until closure of this study. Mean number of treatments was 19 sessions (range 6-53 per patient and event). 11 patients showed a successful treatment, most with complete closure of the wound, 3 patients showed no effect, one of them will need a below knee amputation, one needed a dermatologic treatment with punch grafts. 9 patients had diabetes mellitus, 13 PAOD, 11 polyneuropathy. There were no adverse reactions documented to this treatment.

Conclusion: Cold plasma is a valuable treatment option for patients suffering of hard-to-heal wounds in the context with diabetes mellitus, PAOD, and polyneuropathy. The treatment showed with a mean of 19 sessions (range 7-53) in 11/14 patients (78.5%) a positive effect, most with complete closure of the wound, after the wounds showed no healing progress for at least 6 weeks.
Further and larger studies are needed to document these findings.

Diabetic Foot 2

OP66 HYPERSPECTRAL IMAGING IN THE HEALING PROGNOSIS OF PATIENTS WITH DIABETIC FOOT ULCERS: A COMPARISON WITH ROUTINE VASCULAR NON-INVASIVE TECHNIQUES

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Aim: to compare the potential healing prognosis of the different routine noninvasive techniques implemented in the International Guidelines with the novel use of hyperspectral imaging (HSI).

Method: twenty-one patients with active diabetic foot ulcers participated in this 1-year prospective study between December 2018 and January 2020. HSI was performed at baseline to quantify tissue oxygenation and presents it on an anatomical map. Systolic toe and ankle pressures, ankle brachial index and toe brachial index values were calculated for the ulcerated limb. Primary outcome measure was wound healing, defined as complete epithelization without any drainage confirmed for at least 10 days after closure was first documented at 24 weeks.

Results / Discussion: TcpO2 optimal cut-off point as determined by a balance of sensitivity and specificity of 28.5 mmHg that yielded a sensitivity of 91% and a specificity of 100%, and area under the curve (AUC) of 0.989 ($p = 0.005$; 95% CI 0.945–1). Followed by the StO2 optimal cut-off point as determined by a balance of sensitivity and specificity of 48.5 mmHg that yielded a sensitivity of 93% and a specificity of 0.71%, and AUC of 0.932 ($p = 0.013$; 95% CI 0.787–1). Logistic regression analyses showed that TcpO2 was the only variable associated with wound healing at 24 weeks ($p < 0.001$, 95% CI 0.046–0.642).

Conclusion: HSI was shown to be effective in the prognosis of diabetic foot ulcer healing compared to other noninvasive test; only TcpO2 values resulted in better diagnosis potential in wound healing.

OP67 EVOLUTION OF THE TCPO 2 VALUES FOLLOWING HYPEROXYGENATED FATTY ACIDS EMULSION APPLICATION IN PATIENTS WITH DIABETIC FOOT DISEASE: RESULTS OF A CLINICAL TRIAL

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Aim: The use of emollients to lubricate dry skin to prevent diabetic foot ulcers (DFUs), especially in neuroischaemic feet, has been recommended. This study analyses the effect of daily topical application of hyperoxygenated fatty acids emulsion on transcutaneous oxygen pressure (TcPO2) in the feet of neuropathic and neuroischaemic patients with diabetes.

Method: Patients with diabetes and no active foot ulcer were included in this longitudinal, prospective, non-comparative clinical trial. The evolution of TcPO2 (mmHg) values after the application of the tested emulsion (Corpitol Emulsion, Laboratoires Urgo Medical, France) was evaluated for a three-month period. Modifications of skin features (skin dryness, skin shedding and skin colour) were also analysed. TcPO2 was performed using a TCM400 device (Radiometer, Denmark).

Results: A total of 50 patients were included in the study. Patients with neuroischaemia showed a significant increase in TcPO2 values (35.69±13.88mmHg) after two months' application of the tested emulsion that remained at month three (day 60: 42.34±10.98mmHg; p=0.006; day 90: 41.62±10.88mmHg; p=0.011). Skin dryness and shedding showed an improvement from baseline to the end of the study in both groups, secondary to the use of the tested emulsion ($p<0.001$ and $p<0.001$, respectively). Skin colour also showed differences from baseline to the final visit in the neuroischaemic patients (p=0.029). Patients with neuropathy did not show any change in skin colour from baseline to the final visit.

Conclusions: Analysis of the use of the tested emulsion showed an increase in TcPO2 and an improvement in skin trophism in patients with neuroischaemic foot.

OP68 A MULTI-CENTER, BLINDED, RANDOMIZED CONTROLLED CLINICAL TRIAL EVALUATING THE EFFECT OF FISH SKIN GRAFT IN THE TREATMENT OF CHRONIC, NON-RESPONSIVE DIABETIC FOOT ULCERS

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Aim: Intact fish skin is a piscine dermal (xenograft) that retains its native dermal structure and a high concentration of Omega3 fatty acids. Preclinical/early clinical work with the intact fish skin grafts has shown to accelerate wound healing through cellular ingrowth and Omega3 bacteriostatic properties in

full thickness wounds, including diabetic foot ulcers (DFU). This prospective multi-center randomized controlled study aims to compare the fish skin grafts to a standard of care (SOC) using collagen alginate dressing.

Methods: Patients with DFUs treated with prior SOC (off-loading, appropriate debridement, and moist wound care) were randomized after a 2-week screening period to either treatment with SOC or fish skin graft applied weekly for up to 12 weeks plus SOC. Primary endpoint was the percentage of wounds healed at 12 weeks between groups.

Results / Discussion: We included 49 patients in the analysis. Median wound size was SOC 2.6(1.83,6) vs fish skin graft 2.13(1,4). At 12 weeks, 67% (16/24) of the patients in the fish skin group was completely healed compared to 32% (8/25) patients in SOC group, significant at p = 0.0152 (N=49). Of healed wounds, the number of applications was not significantly different between treatment groups with avg 6.1 vs 6.3 and median 5.5 vs 6 for SOC and fish skin graft respectively.

Conclusion: The use of fish skin graft in treatment-resistant DFU patients resulted in significantly improved closure rate at 12 weeks compared to SOC alone. The study findings support the use of fish skin grafts for chronic diabetic foot ulcers that fail in comprehensive SOC treatment.

OP69 RISK FACTORS FOR MAJOR AMPUTATION FOR MIDFOOT ULCERS IN HOSPITALIZED DIABETIC PATIENTS

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Aim: The purpose of this study was to investigate the risk factors for major amputation in patients hospitalized with diabetic foot ulcers involving the midfoot.

Method: Between January 2003 and May 2019, a total of 1,931 diabetic patients were admitted to the diabetic wound center for the management of foot ulcers. Among the admitted patients, 169 diabetic patients with midfoot ulcers were included in this study. One hundred and fifty-four patients (91%) healed without major amputation while 15 patients (9%) healed with major amputation. Data related to 88 potential risk factors including demographics, ulcer condition, vascularity, bioburden, neurology, and serology were collected from patients in these two groups for comparison. The univariate and multivariate logistic regression analysis were used to analyze risk factors for major amputation.

Results / Discussion: Among the 88 potential risk factors, 15 showed statistically significant differences between the two groups. In univariate analysis of 88 potential risk factors, eight showed statistically significant differences. In stepwise multiple logistic regression analysis, three of the eight risk factors remained statistically significant. Multivariate-adjusted odds ratios for deep ulcers invading bone, cardiac disorders, and Charcot feet were 26.718, 18.739, and 16.997, respectively.

Conclusion: The risk factors for major amputation in patients hospitalized with diabetic midfoot ulcers included deep ulcers invading the bone, cardiac disorders, and Charcot foot.

OP70 MAGGOT THERAPY FOR WOUND CARE: A RETROSPECTIVE COHORT AND META-ANALYSIS

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Aim: Maggot in wound therapy (MWT) is a real time placement of maggots into a wound. It works as a biological debridement, antibacterial, and healing stimulant. Success rate of MWT has been reported between 67-88% with sparse evidence on the highest level available. We, therefore present our cohort and an update meta-analysis which is the first that analyzes wound-related pain.

Method: A retrospective cohort study was performed in diabetic foot ulcer (DFU) patients who were treated with MWT or conventional wound therapy (CWT). The Kaplan-Meier curve was applied to estimate the healing probability. A meta-analysis was performed to pool our study with four previous cohort studies identified from Medline and Scopus. Updated meta-analysis with clearly defined clinical outcomes according to mechanism of MWT including successful debridement, healing rate, and time to heal were done on angiopathic leg ulcers. Inclusion criteria for eligibility were published comparative studies comparing MT with other types of wound care in leg ulcer and reported at least one outcome of interests. Exclusion criteria were non-English or had insufficient data for pooling.

Results / Discussion: 111 DFU patients (59 MWT and 52 CWT) were included. The median healing time was significant shorter in MWT (9 vs. 28 weeks, $p<0.001$). The hazard ratio (HR) of wound healing was 7.87 times significantly higher in the MWT than the CWT ($p < 0.001$).

Eighty-three and 472 studies were identified from MEDLINE and Scopus, respectively. Sixteen studies were duplicated and were removed, thus resulting in 555 studies for screening. Ten studies met eligibility criteria and were included in the study of which 5, 2, 1, and 1 were RCTs, retrospective cohorts, retrospective case-control, and prospective case-control studies, respectively. Meta-analysis was applied and suggested that the treatment effects were moderately heterogeneous with the pooled risk ratio (RR) of 1.77 [95%CI =1.01,3.11], i.e., the chance of wound healing was 20% significantly higher with MWT than CWT. The MWT had significant higher rate of successful debridement with risk ratio of 2.3 (95%CI=1.7,3.0) with low heterogeneity. Time to heal was about 3.1 weeks (95%CI=1.2-5.0), significantly shorter in MWT but with high heterogeneity. Healing rate and pain were not significantly different between groups with high heterogeneity.

Conclusion: MWT was an effective debridement tool compared with CWT. More studies should be done to confirm other findings because of high heterogeneity.

OP71 HIDDEN DANGERS REVEALED BY MISDIAGNOSED PERIPHERAL NEUROPATHY – A COMPARISON OF CLINICAL TESTS FOR DETECTION

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Aim: Evidence indicates early detection of DPN results in fewer foot ulcers and amputations. The aim of this study was to compare different screening modalities in the detection of DPN in a primary care setting.

Method: A prospective non-experimental comparative multi-centre cross sectional study was conducted in various Primary Health Centres. One hundred participants living with Type 2 diabetes for at least 10 years were recruited using a convenience sampling method. Both male and females were recruited aged 40 to 80 years and diagnosed with type 2 diabetes mellitus for at least 10 years. Participants were excluded from this study if were living with Type 1 diabetes mellitus, presented with neurological problems other than neuropathy or had a history of neurological conditions such as nerve root compression and cerebral vascular disease. Patients with conditions or history of hypothyroidism and pernicious anemia, alcoholic patients and patients diagnosed with alcoholic liver disease and patients who were using drugs which are known to cause neuropathy were also excluded. The testing modalities and examination methods were carried out by same investigator. The three devices were compared for sensitivity and specificity in the detection of vibration perception. All testing was conducted according to guidelines in the literature. For the purposes of data analysis, each foot was scored separately resulting in 200 limbs for analysis. The Chi Square test was used to assess the association between two categorical variables. The null hypothesis specified that there is no association between the two categorical variables and was accepted if the p-value exceed the 0.05 level of significance.

Results / Discussion: This study showed different results of DPN screening tests, even in the same group of participants. This study has shown that the percentage of participants who did not perceive vibrations was highest when using the device 1* (28.5%). This was followed by the device 3* (21%) and the device 2* (12%) ($p < 0.001$). This study demonstrates that some instruments are more sensitive to vibration perception than others.

Conclusion: Correct diagnosis and treatment of neuropathy in patients with diabetes is crucial. We recommend that different modalities should be used in patients with diabetes and when results do not concur, further neurological evaluation should be performed. This would significantly reduce the proportion of patients with diabetes who would be falsely identified as having no peripheral neuropathy and subsequently denied the benefit of beneficial and effective secondary risk factor control.

Prim Care Diabetes. 2018 Apr;12(2):111-115. doi: 10.1016/j.pcd.2017.09.004. Epub 2017 Oct 10
https://www.sciencedirect.com/science/article/pii/S1751991817301444?via%3Dihub
** Vibratip (Device 1), 128Hz Tuning Fork (device 2) and Neurothesiometer (device 3)*

Diabetic Foot 3

OP91 METABOLIC SURGERY AS THE POSSIBILITY TO REVERSE FOOT PURULENT-NECROTIC LESION IN TYPE II DIABETES PATIENT

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Aim: The course of foot purulent-necrotic lesion in type II diabetes patient was evaluated after metabolic surgery had been done.

Method: As metabolic surgery ileoduodenoplasty, the kind of duodenal switch and ileum transposition, was performed in 21 patients with type II diabetes and foot lesion not subdued by other methods of treatment. There were 12 men and 9 women at the median age 63 years, interquartile range (IQR) 13 years, with median body mass index 32,3 kg/cm2, IQR 8,1 kg/cm2. Median diabetes duration was 10 years with IQR 9 years. On oral antihyperglycemic agents were 6 patients, parenteral insulin injections receive 15.

Results / Discussion: Normoglycemia without medical correction was achieved during three weeks after the ileoduodenoplasty was performed in 19 patients, oral antihyperglycemic medication for 2 months more needed 2.

Wound stabilization and gradual healing in postoperative period occur in all cases. High amputation was performed 3 and 6 months after ileoduodenoplasty in 2 patients with critical ischemia at the time. In other patients' foot arterial blood flow significally improved. In all cases arthropathy and purulent lesion stopped, no high amputation was needed. In term up to 5 years neither hyperglycemia nor diabetic foot destructive lesion relapse.

Conclusion: Ileoduodenoplasty seems to be an effective mean to stop foot destructive lesion in type II diabetes.

OP92 MEDICAL THERMOGRAPHY HAS THE POTENTIAL TO DETECT DIABETIC FOOT DISEASE

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Aim: To determine whether diabetic foot conditions of peripheral arterial disease, peripheral neuropathy and neuroischaemia have different thermal characteristics to healthy feet and diabetic feet with no complications in type 2 diabetes mellitus (DM).

Method: Following a detailed medical examination, participants were categorized into five groups: healthy adults, DM with no complications, DM with peripheral neuropathy, DM with neuroischaemia and DM with peripheral arterial disease (PAD) group. Thermographic imaging of the toes and forefeet was performed in a room at a controlled temperature of 23oC. Regions of interest included the medial, central and lateral forefoot together with the five toes.

Results / Discussion: 43 neuroischaemic feet, 41 neuropathic feet, 58 PAD feet, 21 DM feet without complications and 126 healthy feet were analyzed. The temperatures of the feet and toes were significantly higher in the complications group when compared to the healthy adult and DM healthy. The higher the temperature of the foot in DM, the higher the probability that it is affected by neuropathy, neuroischaemia or PAD. Thus thermography has shown that it has the potential to detect temperature differences between possible categories of complications of DM relative to healthy adults

Conclusion: Significant differences in mean temperatures exist between participants who were healthy and those with DM with no known complications when compared to participants with neuroischaemia,

neuropathy or PAD. As foot temperature rises, so does the probability of the presence of complications of neuropathy, neuroischaemia or peripheral arterial disease.

OP93 CALF MUSCLE ELECTROSTIMULATION EFFECTS VASCULAR PERFUSION AND CLAUDICATION DISTANCE IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE IN DIABETES MELLITUS

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Aim: The aim of the study was to explore the effect of calf muscle electrostimulation on arterial inflow and walking capacity in claudicants with peripheral artery disease and diabetes mellitus.

Method: A prospective, 1-group, pretest-posttest study design was used on 40 high-risk participants who exhibited bilateral limb ischemia (ankle brachial pressure index [ABPI] <0.90), diabetes mellitus, and calf muscle claudication. A program of calf muscle electrical stimulation with varying frequency (1-250 Hz) was prescribed for 1 hour per day for 12 weeks. Spectral waveforms analysis, ABPI, absolute claudication distance (ACD), and thermographic temperature patterns across 4 specified regions of interest (hallux, medial forefoot, lateral forefoot, heel) at rest and after exercise, were recorded at baseline and following intervention to evaluate for therapeutic outcomes.

Results / Discussion: A significant improvement in ACD and ABPI was registered following the intervention ($p<0.001$ and $p=0.001$, respectively). Resting foot temperatures increased significantly ($p<0.001$) while the post exercise temperature drops were halved across all regions at follow-up, with hallux ($p=0.005$) and lateral forefoot ($p=0.038$) reaching statistical significance. Spectral Doppler waveforms were comparable ($p=0.304$) between both serial assessments.

Conclusion: Electrical stimulation of varying frequency for 1 hour per day for 12 consecutive weeks registered statistically significant improvement in outcome measures that assess arterial inflow and walking capacity in claudicants with diabetes mellitus. These results favor the use of electrostimulation as a therapeutic measure in this high-risk population.

OP96 CLINICAL EFFICACY AND COST EFFECTIVENESS OF CERAMIC DRESSINGS OVER SALINE GAUZE DRESSINGS AMONG DIABETIC FOOT ULCERS

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Aim: To compare efficacy and cost-effectiveness of Ceramic wound dressing to standard therapy in healing of diabetic foot ulcers.

Methods: A total of 60 subjects having T2DM with foot ulcer of 2-5cm2 size were recruited. Study protocol was approved by the IEC and informed consent obtained. Subjects were randomly divided into 2 groups - Normal Saline (control) and Microporous ceramic dressing (MCD). Tissue and blood samples were collected on enrolment, after 1 week and at 3rd week and were stored immediately at -200C. Cost incurred was captured. Patients were followed till complete healing.

Results: 60 T2DM patients were enrolled. While 40% of NS group and 50% of MCD group were of 2B grade and others were of 3B grade of Texas classification. Among NS group only 13.3% cases healed. Among MCD group 46.7% cases healed.

Van Gieson sections of MCD group showed increase in collagen formation from pre-application day (day 0) to grade1 on 1st week (day 8) and leading to grade3 collagen formation after 1 month of dressing application (day 30). Similar results were not noticed in NS group.

There was significant reduction in hsCRP levels seen in MCD group compared to NS groups from baseline to 30th day of treatment [p<0.05). Reduction of MMP-2 and MMP-9 were more in MCD group. Total median direct cost incurred in treating DFU by NS was INR78134 and by MCD was INR66463 (p=0.003).

Conclusions: Ceramic dressings led to faster healing of wound and has lower direct cost for treating a diabetic foot ulcer.

Education and e-Health

OP50 LEARNING GOALS AND CONTENT FOR WOUND CARE EDUCATION IN FINNISH NURSING EDUCATION

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Aim: The aim of this study was to create learning goals and content for wound care education in Bachelor's level nursing education and to assess the consensus relating to these learning goals and content among wound care experts.

Method: A Delphi technique was used to assess the consensus between wound care experts comprising registered nurses, authorised wound care nurses, nurse educators and physicians. The learning goals and content for wound care education were based on competence areas identified in previous focus-groups interviews. The data were collected with two online Delphi rounds. The data were analysed using statistical and qualitative analysis.

Results / Discussion: 51 panellists participated in the first round and 36 in the second round. Learning goals and content were divided into four competence areas: 1) Anatomy and physiology, 2) Care of chronic and acute wounds, 3) Wound management and care of a patient with a wound, 4) Values and attitudes. These competence areas comprised 26 learning goals and 29 pieces of content. The consensus between the panellists was >90% in all competence areas. The results of this study can be

used as a framework for planning wound care education and assessing the outcomes of education and competence.

Conclusion: The basis of registered nurses' wound care competence is built during their undergraduate nursing studies. The results of this study can be used to standardise wound care education by implementing consistent learning goals and content in Bachelor's level nursing education.

OP51 GAMIFICATION IN WOUND CARE EDUCATION

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Introduction: Gamification is "the use of game or game formats in a non-gaming context" (Deterding, Khaled, Nacke, & Dixon, 2011). The process of game-thinking strategies and mechanics encourage the students/users to engage and solve problems. (Zichermann, 2011)

The millennial students have grown up with multimedia tools like social media and mobile applications such as games and virtual reality. It seems to be a bit insane to learn about wound physiology and biochemistry by playing games. It has been proven that playing games improve the skills of health care professionals and boost their confidence. (Shawaqfeh, 2015). To meet the need of the millennial students we need to incorporate media skills in the wound care curriculum.

Gamification is a gateway to teach attitudes and implement behavior like working together, creativity, independent learning, and social behavior.

Method: The concept we choose is a mix of game formats al combined in a digital escape room. The escape room calls "the wound care hospital".

To create an escape room we used 'l' Hôpital de la Rose'. Each room has its unique subject e.g. pressure ulcer, …. In each room there are different puzzles to solve, related to the subject. The hints are essential to unlock the room.

To create a digital escape room, technical and graphical skills are important. For the technical side we choose to work with the Google®-platform. For the graphics, we used 'creative commons'.

Conclusion: The escape room we developed, aims to refresh the knowledge about wound management e.g. pressure injuries, …

OP53 USER EXPERIENCE OF A MHEALTH APPLICATION FOR FOOT CARE IN PATIENTS WITH DIABETES MELLITUS

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Aim: Evaluate the user experience and content validity index (CVI) of an application for foot care in patients with diabetes mellitus (D2).

Method: A descriptive study was conducted with specialists in the foot care in patients with Diabetes Mellitus to identify potential obstacles for using the application. A total of 20 health care professionals were interviewed in different primary care units, with more than one year attending patients with this condition, in three different states in Northeast and Southeast regions of Brazil.

Results / Discussion: The scores resulting from the assessment of user experience varied from 3.0 to 3.8. Most scores were close to 4, the maximum expected value, indicating a totally suitable application. Regarding the CVI, we observed that the overall assessment of the application was positive, with CVI $\geq$ 0.80. In assessing acceptability, 90% of experts understood that the D2 application has the potential to promote behavioral change in patients with DM in relation to the management of self-care, as well as the contents presented are adequate to guide and clarify the doubts of the general population about the management of self-care with DM.

Conclusion: The D2 application meets the requirements for user experience for use in the real world and can assist health care professionals and patients with DM in self-care management, preventing complications from foot ulcers. The tests carried out also made it possible to predict its usefulness and applicability in primary care, mainly for use by community health agents in monitoring users with this condition.

OP52 DEVELOPING THE RED LEG RATED TOOL (RAPID ASSESSMENT AND TREATMENT IN THE EMERGENCY DEPARTMENT). A PILOT STUDY

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Background: Approximately 30% of people presenting to the emergency department (ED) with 'red legs' are misdiagnosed as having cellulitis. There is a lack of a validated tool to support clinicians in assessing such presentations.

Aim: A pilot project aimed to (1) develop and evaluate a new Red Leg, Rapid Assessment and treatment in ED (RATED) tool (2) to gain clinician feedback.

Method: A mixed methods study incorporating a retrospective chart review of those presenting with lower limb redness; implementation of a tool; education of clinicians on use of the tool; pilot testing over four-weeks; post-pilot questionnaire among clinicians. The Red Leg RATED tool included descriptive and image criteria for the identification of cellulitis with recommendations for management and follow up.

Results: Fourteen (58%) of those patients presenting with red legs agreed for their data to be included. Of those, 43% (n=6) were female with an overall mean age of 65years. The Red Leg RATED tool identified 50% (n=7) true diagnosis of cellulitis, of those 57% (n=4) required hospital admission, 43% (n=3) were discharged. The remaining 50% (n=7) were non-cellulitis and discharged to expert follow up. Overall, 72% (n=10) patients who presented with suspected cellulitis were discharged. Clinician feedback suggest that all (n=13) users were satisfied with the tool and contents and found it easy to use and helped them make a diagnosis.

Conclusion: The Red Leg RATED tool was user friendly and impacted positively on diagnosis and treatment. Further evaluation of the tool is necessary to determine diagnostic validity in a larger cohort.

OP54 THE WOUND APP (SÅRAPP) – A CITIZEN TOOL

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Aim: The overall aim of the project is to improve the empowerment of the citizen in the progress of having a diabetic foot ulcer and ultimately minimize the delays between contact with healthcare professionals at clinics or at home. During the COVID-19 pandemic there have been an increased demand of home monitoring of various chronic conditions. As citizens with a diabetic foot ulcer are at increased risk of a serious COVID-19 cause, both citizens and the healthcare system have an interest in having a safe and supporting home monitoring device.

Figure 1:
The Wound App.

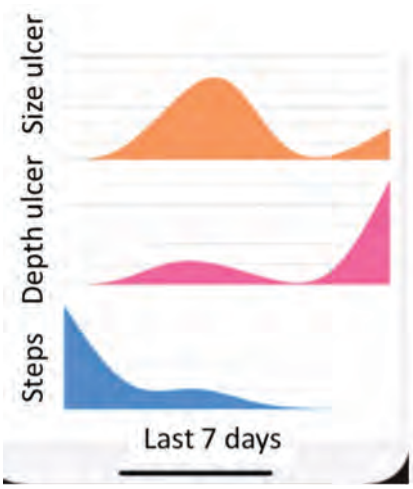

Figure 2: Visualization of ulcer size and number of steps within the Wound App.

Method: The Wound App (SårApp in Danish) has been developed as a part of the Danish HealthD360 project (www.healthd360.dk). The Wound App is for the citizen, co-designed and tested by citizens in collaboration with healthcare professionals, companies and researchers. The citizen can register a wound, take photos and report the wound size, pain, inflammation and wound fluid daily /weekly. The progress of the wound healing is visualized together with self-registered and collected data within the app. A data plugin collects numbers of steps, activity and other data from Apple Health and Google Fit. Data from municipalities and register are included as well in the data analysis of the project. The app (SårApp) is available in Google Play and App Store.

Results / Conclusion: Results already show benefits for citizens when using the Wound App to collect and monitor information in relation to their diabetic foot ulcers on a daily basis.

Infection and antimicrobials

OP19 VALIDATION OF THE TILI (ERAPEUTIC INDEX FOR LOCAL INFECTIONS) SCORE FOR THE DIAGNOSIS OF LOCAL WOUND INFECTIONS: RESULTS OF A RETROSPECTIVE EUROPEAN ANALYSIS

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Objective: Local wound infections are a major challenge for patients and healthcare professionals. To date, no validated score is available for clinical diagnostics. Therefore it was our intention to validate the recently presented TILI (Therapeutic Index for Local Infections) score for early detection of local wound infection in a European study.

Method: The heads of various wound care clinics that had already adopted the TILI score in their clinical practice were asked to send a copy of the questionnaire and a photo of the wound and the wound surrounding for analysis.

Results: Finally 307 patients with leg ulcers from 7 institutions in 5 European countries were included in this retrospective analysis. It was shown that the diagnosis of local wound infection can be objectified very well with 5 of 6 clinical criteria. By summing up these facultative criteria in comparison with any direct parameters that may be present, there would have been an indication for local antimicrobial wound therapy in 22% of the patients examined.

Conclusion: The results of our study show that the results of the TILI score correspond very well with the expert assessment of patients. Thus, a scientific validation of the TILI score, which is easy to perform in daily practice, could be performed.

OP20 INVESTIGATION OF BACTERIAL COLONISATION OF WOUND DRESSINGS AND EFFICACY OF MECHANICAL DEBRIDEMENT: RESULTS OF A PROSPECTIVE STUDY WITH 151 PATIENTS USING FLUORESCENCE IMAGING

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Aim: Bacterial colonisation of wounds can lead to wound healing disorders and complications up to sepsis. Until now, it was not possible to detect bacteria directly in wounds. Fluorescence imaging can now be used to detect these bacteria and thus indicate the need for targeted intervention.

Method: Fluorescence images were taken at each step of dressing removal and before and after mechanical debridement with sterile cotton gauze. Fluorescence is produced by bacteria and indicates areas which are contaminated. Colour analysis of the fluorescent image areas was then used to calculate the areas contaminated.

Results / Discussion: A total of 151 patients with acute (24%) or chronic (76%) wounds were examined. Bacteria could only be detected on the outside of one incorrectly applied wound dressing; bacteria were found on the inside of the dressings in 12.6%. In 41.1% of the patients, fluorescence could be detected as an indication of bacterial contamination. The bacteria were located in the wound in 22%, in the wound margin in 60% and in the area of 1 cm around the wound in 18%. After mechanical debridement a reduction was observed in 53.2% of the wounds.

Conclusion: The results show that correctly applied dressings are effective in preventing bacteria from escaping from wounds. Furthermore, most bacteria are found at the wound edges. Mechanical debridement with cotton gauze leads to detectable bacterial reduction in about half of the patients. This shows that mechanical debridement should be combined with other interventions in bacterially contaminated wounds.

OP18 IMMUNOHISTOCHEMICAL EVALUATION OF THE EXPRESSION OF MMP9, MMP2 AND TIMP2 IN VENOUS LEG ULCERS BEFORE AND AFTER BIOMODULATION WITH FLUORESCENT LIGHT ENERGY

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Background and aim: The aim of the study was to evaluate immunohistochemically the expression of matrix metalloproteinases 2 and 9 (MMP-2, MMP-9) and MMP-inhibitor (TIMP-2) before and after fluorescence biomodulation treatment in patients with venous leg ulcers.

Methods: We enrolled 24 patients (15 females, 9 males), divided in three groups: 5 patients were treated with standard of care, 10 patients with fluorescence biomodulation twice weekly and 9 patients with two consecutive biomodulation treatments once a week.

We performed two punch biopsies from wound edge and wound bed at week 0, 8, 16 and 24 immunostained for MMP-9, MMP-2 and TIMP-2. The intensity and the percentage of positive cells were evaluated.

Results: MMP-2 mean level expression did not show any significant differences among all groups. MMP-9 mean level expression in the biopsies from the wound bed increased from baseline to V8 and V24 in the third group (33%, 35%, 45%).

TIMP-2 expression was higher in the groups treated with fluorescence biomodulation treatment: baseline mean value was 26% in the first group, 26% and 33% in the second and third respectively; at V8 the values were 33%, 40% and 35% respectively; at V24 mean values were 27% in the first group, 37 and 54% in the second and third respectively.

Conclusions: Our results suggest a role of the fluorescence biomodulation treatment in the increase of tissue inhibitor and of MMP-9 that could lead to a matrix remodelling with a positive effect on healing processes.

OP21 IMPACT OF PROBIOTICS ON PATHOGEN SURVIVAL IN AN INNOVATIVE HUMAN PLASMA BIOFILM MODEL (HPBIOM)

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Aim: 60% of chronic wounds are colonized by pathogenic microorganisms. Due to extraordinary survival strategies of the pathogens, biofilms bare a great challenge for wound management. A new in-vivo like human biofilm model was developed to examine the influence of probiotics on the survival of pathogenic bacteria.

Method: Human plasma was used to produce biofilm with pathogenic microorganisms. Scanning electron microscopy was used to analyze the bacterial morphology. Five clinically relevant pathogens P. aeruginosa, S. aureus, S. epidermidis, E. faecium and C. albicans were challenged to the probiotics L. plantarum, B. lactis and S. cerevisiae. The survival was quantified after 4h and 24h of incubation.

Results/Discussion: L. plantarum permanently eliminated P. aeruginosa already after 4h of incubation in the biofilm model. For S. aureus a log10reduction rate of 2.1 and 3.8CFU/ml was detected after 4h and 24h, respectively. B. lactis exerted a pathogen-reducing capacity towards P. aeruginosa as well as towards E. faecium. The application of S. cerevisiae resulted into moderate but significant reduction of the pathogens S. aureus, S. epidermidis and E. faecium but did not affect P. aeruginosa. No relevant antifungal response was detected towards C. albicans.

Conclusion: In the hpBIOM, it was possible to prove the growth reducing activity of L. plantarum towards P. aeruginosa and to visualize the elimination process. As the portfolio of probiotics is wide, further probiotics should be tested and, if appropriate, combined therapies evaluated. This could be beneficial for wounds colonized with bacteria in order to reduce the use of antiseptics.

OP22 CLINICAL EVALUATION OF A POLY-ABSORBENT SILVER DRESSING ON WOUNDS AT RISK OR WITH CLINICAL SIGNS OF LOCAL INFECTION: RESULTS OF AN OBSERVATIONAL, PROSPECTIVE, MULTICENTRE STUDY IN PAEDIATRICS PATIENTS

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Aim: Evaluation of the short-term clinical impact of a TLC-Ag dressing with poly-absorbent fibres* on the healing process of wounds at risk or with clinical signs of local infection in paediatric patients treated under real-life conditions.

Method: A large, German, prospective, multicentre, observational study was conducted on 2270 patients treated with the evaluated dressing. Main outcomes included the reduction of the number of infected wounds, the evolution of the clinical signs of local infection, wound healing rate, relative wound area reduction (RWAR), local tolerability, handling and acceptance of the dressing. The results presented here will focus on the outcomes achieved in paediatric patients.

Results: A total 77 paediatric patients (2-17 years old) with wounds of various aetiologies were treated in 16 centres for a mean duration of 18±8 days. The wound infections and all the clinical signs of wound

infection substantially reduced since the first visit (after 9±4 days of treatment) and throughout the treatment period. By the last visit, 86% of the wounds healed and 14% greatly improved (median RWAR of 75%). The dressing has been judged very easy to apply and very conformable, it was very well tolerated and accepted by both patients and healthcare professionals.

Conclusions: These results, documented in a cohort of 77 paediatric patients treated in current practice, comfort and complete the clinical evidence on the good healing properties and safety profile of the TLC-Ag dressing in the management of wounds at risk or with clinical signs of local infection.
**UrgoClean Ag, Laboratoires URGO*

OP23 REAL WORLD DATA ON MICROBIAL SITUATION OF CHRONIC WOUNDS - RESULTS FROM 277 CLINICAL FINDINGS

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Aim: The role of microbial bioburden and managing opportunities are under permanent discussion. Typical spectra for microbial communities have been reported in the recent literature and it could be expected that the number of resistant microorganisms is high.

Method: In a recent study, we have analyzed the yielded bacterial spectrum of 277 wounds in 260 patients in a specialized wound care center in Austria. Therefore, quantitative wound swabs were obtained.

Results / Discussion: Results of 260 patients with 277 chronic wounds were eligible for analysis. Staphylococcus aureus was the most common recovered (25.5%) micro-organism, of which 8% were methicillin-resistant S. aureus (MRSA) strains reflecting the current MRSA frequency in Austria. Enterococcus spp. were the second most frequent Gram-positive bacteria (16.3%). Proteus mirabilis (17.7%), Pseudomonas aeruginosa (14.3%), and Escherichia coli (9.5%) were the most frequently isolated Gram-negative rods. 8 % of cultures demonstrating multiple organisms.

Conclusion: In our study, the microbial spectrum in chronic wounds of different origin was reflecting the typical situation. Staphylococcus aureus is the most frequent microbial strain. MRSA was documented according to the national Austrian average and therefore contradicts the opinion that in specialized wound care centers a higher MRSA rate has to be expected.

A considerable limitation of the study is the bacterial sampling technique. While wound swabs taken in the current study following the Levine technique, it is suggested that tissue biopsy could be the gold standard. However, the best sampling technique for bacterial detection has not yet been identified and validated.

OP24 HYPERBARIC OXYGEN THERAPY IN SURGICAL SITE COMPLICATIONS

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Aim: Evaluation of patients who underwent hyperbaric oxygen therapy (HBOT) due to acute or chronic surgical site complications.

Method: The patients were investigated retrospectively from the records between 2016-2019 years.

Results / Discussion: 19 patients who started HBOT because of surgical site complications were reached. 9 of them were not continued their treatments. Therefore 10 patients were included in the study. The female to male ratio was equal. The ages of patients ranged from 3 months to 81 years with a mean age of 48,7. The patients had been operated for diverse reasons: 2 for bone fracture after trauma, 2 for total knee replacement, 2 for firearm injury, 2 for spinal stenosis, 1 for circumcision and 1 for rhinoplasty. After the surgeries, the patients were admitted with wound discharge and inflammatory findings on the surgical site within the period ranging from 4 days to 5 years. 3 of the patients had acute surgical site complications and 1 of them had tissue necrosis while the others had unhealing surgical site wounds. HBOT sessions were ranged from 6 to 55 with a mean of 20. In literature, there are various studies about that HBOT is used for several conditions such as non-healing wounds including surgical and traumatic wounds, deep tissue infections, osteomyelitis, gas gangrene, acute traumatic ischemia. In this study, HBOT was applied in addition to surgical interventions, antimicrobic treatment and wound care. After the treatments, all patients were improved and discharged.

Conclusion: HBOT should be included in addition to the main treatment modalities for surgical site complications.

OP25 A COMPARATIVE STUDY OF THE MICROENVIRONMENT AND TRANSCRIPTOME OF AN IN VITRO CHRONIC WOUND MODEL AND AN EX VIVO PORCINE MODEL - AN EVALUATION EMPLOYING HUMAN CHRONIC WOUND DATA

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Aim: Chronic wounds are often found infected with aggregated bacteria growing in an extracellular matrix providing protection against the host immune response and antibiotics. Eradication of biofilm, as a part of wound healing treatments, is challenging and several laboratory models have been established to study biofilm growth and for testing eradication strategies including in vitro, ex vivo, and in vivo models. However, it is unknown to which extend these models mimic the conditions of chronic wounds. The aim

of this study was to explore whether two dual-species models reflect the conditions in human chronic wounds concerning growth conditions of the infecting microorganisms.

Method: A novel in vitro model and an ex vivo porcine model employing Staphylococcus aureus and Pseudomonas aeruginosa were investigated by means of growth at different temperatures, and measurements of pH and oxygen micro profiles. Parameters were evaluated against published data and through statistical analyses.

Results/Discussion: Stable co-existence of P. aeruginosa and S. aureus was confirmed for both the in vitro models and the ex vivo model using cell count methods and statistical analyses showed that the effect of temperature is species dependent. Confocal laser scanning microscopy confirmed the presence of bacterial aggregates of various sizes in the in vitro models corresponding to in vivo findings. In vivo tendencies were demonstrated for both the in vitro and ex vivo models with oxygen and pH microprofiles, demonstrating steep oxygen gradients reaching anoxic conditions and slightly alkaline environments, respectively.

Leg Ulcers

OP40 COVID IMPACT ON LEG ULCER MANAGEMENT

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Objective: The Covid pandemic has had a negative impact in all sectors, including in wound care. A survey was conducted in 4 European countries to measure how Covid-19 has impacted leg ulcer (LU) care in terms of diagnosis, treatment initiation, and overall contact with the patient.

Method: Quantitative online 20-minute survey among specialist physicians, specialist nurses, community nurses and general practitioners in France (94 respondents), Germany (90 respondents), Spain (90 respondents) and UK (92 respondents).

Results: Clinicians perceived that Covid has had a negative impact on their Leg Ulcer Patients (LUP), because of lack of access to patients resulting in more patients having to self-manage (17% to 19% of patients) and less monitoring by clinicians.

1) Less patients were seen overall (-28%) and less often (-33%) especially in Spain and UK.
2) LU diagnosis was seen as negatively impacted by Covid by 85% of clinicians, especially in Spain
3) Treatment initiation was seen as negatively impacted by Covid by 48%
4) Ultimately, according to physicians, Covid negatively impacted wound trajectory for 73% of LUP.

According to clinicians, patients were very concerned of being contaminated by Covid AND by the lack of medical support (due to self-management of their wounds).

Conclusion: Covid restricted access between clinicians and their LUP, leading to patients having self-management and less wound monitoring. The direct consequences were a delay in LU diagnosis, treatment initiation and overall dialogue with the patient. This ultimately led to a perception of wound deterioration.

OP41 STATIC STIFFNESS INDEX OF NEW BANDAGE COMPRESSION SYSTEM: RESULTS OF A RANDOMIZED CONTROLLED TRIAL ON HEALTHY CVOLUNTEERS

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Aim: The FUSION study was a mono-centre randomised, controlled clinical trial, carried out on healthy volunteers to evaluate performances of a new compression system*. This study compares the Static Stiffness Index (SSI) of Short Stretch Bandage (SSB) or multicomponent bandage and the new system over the time.

Methods: In this randomised controlled trial, both legs of 75 healthy volunteers were randomly, in 3 series of 25 healthy volunteers, bandaged with either a new generation of compression system* or established system (one SSB unique bandage or multicomponent system), as a control. All systems were worn day and night. Working and resting interfaces pressures were measured, and SSI calculated, after application and 4h, 24h, 48h and 72h later.

Results: After 48h, the tested system has a better performance than SSB on SSI ≥ 10mmHg and reached with 60% and 20% of the tested and control systems respectively, validating the superiority on its stiffness (p=0.004). In comparison with a multicomponent system, it has a similar performance regarding SSI≥ 10mmHg and reached with 88% and 77% of the tested and control systems respectively, validating the non-inferior stiffness of the tested system (p=0.016). It presented good holding properties, good tolerance, was perceived as significantly more comfortable and preferred to the control systems by most of the volunteers.

Conclusions: The tested system achieved better stiffness performance than a SSB and similar performance than a multicomponent bandage. These promising results need to be confirmed in a clinical study on leg ulcers patients.

OP43 CLINICAL EVALUATION OF A MULTICOMPONENT COMPRESSION SYSTEM: RESULTS OF A PROSPECTIVE, OBSERVATIONAL, MULTICENTRE STUDY ON 702 PATIENTS

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Aim: Compression therapy is the most conservative therapeutic measure for patients with chronic venous

insufficiency (CVI). This study assesses the efficacy and safety profile of a multicomponent compression system in an unselected cohort of patients with CVI symptoms under real-life conditions.

Method: This observational, prospective, multicentre study was conducted in 103 centres in Gemany with a multicomponent two-bandage compression system (UrgoK2, Laboratoires Urgo). Wound healing rate and progression, oedema resolution, ankle mobility, local tolerability and acceptance of the compression system were assessed.

Results: A total of 702 patients with venous leg ulcers (VLUs) and/or oedema due to CVI were treated with the evaluated system (mean duration of 27 ±17 days). By the final visit, 31.9% of wounds healed and 60.6% improved.

In 67.1% of the patients, the oedema was resolved and in 42.5%, the ankle mobility was improved. The skin condition was improved in 73.9% of the patients. A substantial pain reduction was achieved, both in proportion of patients reporting pain and in pain intensity. The evaluated system was 'very well'/'well' tolerated and accepted by more than 95% of the patients. The general physician's opinion on the evaluated bandages was judged 'very useful'/'useful' for more than 96.6% of patients. Similar results were reported regardless of the treated condition, VLUs and/or oedema.

Conclusion: This real-life study confirms the performance, acceptability and safety profile of the evaluated compression system, regardless of the wounds or patients' characteristics at baseline. These data support this compression system as a good alternative in CVI symptoms management.

OP44 SUCROSE OCTASULFATE DRESSING AND TWO-LAYER COMPRESSION SYSTEM IN THE LOCAL MANAGEMENT OF VENOUS ULCERS TREATED BY PUNCH GRAFTING: RESULTS OF A SPANISH CLINICAL TRIAL

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Aim: Punch grafting is a traditional technique that we use in our daily practice, as it may accelerate epithelialisation of venous leg ulcers (VLUs). Considering positive clinical outcomes we observed in our clinic when treating these VLUs with sucrose octasulfate dressing* and the two-layer bandage compression system** we designed an open clinical trial, to evaluate the effect of this procedure on the healing process of these chronic wounds when combined with punch grafting.

Method: Fifty-one VLUs in 42 patients were treated with a procedure including punch grafting, a sucrose octasulfate dressing*.and a high compression therapy, whatever the wound bed clinical status (sloughy/granulation tissue). Complete immobilization was recommended at least during 5 days after the procedure. Clinical assessment and photographs were registered every 2 weeks during a follow-up period of 12 weeks maximum or until complete epithelialisation. Dressing and bandage removals were performed on a weekly basis.

Results: Forty-two patients presenting 51 VLUs were included. Median surface area and duration of the

wounds were 5 cm2 (range: 1-135 cm2) and 29 weeks (range: 4- 676 weeks) respectively, receiving 12 punches (mean number). 47 of the 51 VLUs of the VLUs healed within a mean time of 26 days with a mean change frequency of 1.43 per week. High safety profile very and good acceptability by patients and caregivers were reported.

Conclusion: The combined use of punch-grafting with the tested procedure (sucrose octasulfate dressing* and two-layer compression system) accelerates healing of VLUs that me manage in our daily practice.
**UrgoStart*
*** UrgoKTwo*

OP45 TREATING VENOUS LEG ULCERS WITH SUCROSE OCTASULFATE LIPIDOCOLLOID DRESSING: CLINICAL OUTCOMES FROM TWO RANDOMIZED CLINICAL TRIALS

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Introduction: The last decade, procedures have been developed in order to improve the healing prognosis of venous leg ulcers; among them, a sucrose octasulfate dressing* which presents metallo-proteases inhibiting properties and stimulates angiogenesis, has been developed and assessed in two large controlled randomized trials, to establish its benefits in these chronic wounds.

Method: Two European prospective, multicentre, controlled randomised clinical trials were carried out in VLUs; the first one was open label versus oxidised regenerated cellulose (ORC matrix) and a second one, conducted under a double blind design. Patients were randomly assigned and treated during 12 and 8 weeks respectively, with a biweekly investigator's assessment (clinical, planimetric and photographic records). The primary outcome in both trials was the relative Wound Area Reduction (WAR, in %) at the end of the treatment period.

Results: 117 and 187 patients were randomly allocated to treatment groups. Baseline patients' and wounds' characteristics were well balanced between the two groups, in both trials, with a high level of compression therapy compliance. In both studies, the median WAR was significantly higher in the TLC-NOSF group; 54.4% vs 12.9% (p=0.0286) and 58.3% vs 31.6% (p=0.002). All secondary outcomes were significantly in favor of the tested dressing, in both trials with a good safety profile for the tested dressing.

Conclusion: These two RCTs have documented positive and concordant outcomes for the dressing*, suggesting a strong promotion of the healing process in VLUs, as recently reported by the NICE Guidance recently published on this dressing.
** TLC-NOSF*

OP46 WHY VENOUS LEG ULCER PATIENTS SELF-TREAT THEIR ULCERS?

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Aim: Venous leg ulcers (VLUs), the most common type of leg ulcerations, have long healing times and high recurrence rates; reimbursement rules and a general shortage of nursing staff have put self-treatment into focus. The study aimed to investigate why and how patients with VLUs self-treat their ulcers.

Method: Patients with VLUs (N = 32) were selected by criterion sampling for a multicentric qualitative study using semi-structured interviews. The interviews were analyzed via inductive qualitative content analysis.

Results / Discussion: More than two-thirds of participants sometimes self-treated VLU and one quarter changed their prescribed treatment. Experiences were expressed through four themes as follows: a) current local VLU therapy; b) VLU self-treatment; c) patient education; and d) psychosocial issues. The main reasons for self-treatment were a lack of healthcare resources, reimbursement restrictions, and dissatisfaction with conventional treatment together with insufficient knowledge about the wound-healing process and possible side effects. No educational materials were provided for patients or caregivers. Many patients adopted homemade remedies.

Conclusion: Patients with VLUs practice self-care due to limited healthcare availability, a low awareness of the causes of their condition, and the effects of therapy on VLU healing. Future educational intervention is needed to enhance self-treatment.

OP47 THE ROLE OF MEDICAL CHESTNUT HONEY FOR INFECTION, INFLAMATION, GRANULATION AND EPITHELISATION PHASES

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Introduction: The medical chestnut honey(MCH)is not act only as an antiseptic, it also significantly cleanses and debride the wound in the inflammation phase(saturated sugar solution generates osmotic pressure in the wound, stimulating autolytic debridement; glucose oxidase enzyme help activate protease debridement and promotes antimicrobial and anti-inflammatory activity; kynurenic acid destabilises and inhibits biofilm formation),promotes granulation and stimulates epithelialization(high levels of calcium manganese, zinc, potassium, and proline stimulate granulation and epithelization; high levels of polyphenols and flavonoids have antioxidative activity).

Methods: Study1:To evaluate effects on healing and pain in 19 C2-3 VLUs (venous leg ulcer) treating with MCHalginate verssus16 C3 VLUs treating with PHMBfoam. In the first week of the study, we proved that alginate dressing with MCH cleansed the wound bed faster than polyhexanides, which showed its high efficiency in treating infected VLU. Study2: We usually use foams to treat wounds once wound bed is clean, that is, for the granulation phase. In our case study, at 7 VLUs, we used MCH on ulcers whose wound beds were classified as C3. Within 14days, the wound beds of all wounds became B3.

MCHfoams have also been shown to be suitable for debridement and promoting granulation. Study3: In case study we treated the patient with VLU on all circumferences of the lower two thirds of the left shin, where wound bed was A2.After 14days of applied alginate dressing with MCH on the half of VLU and hydrofiber dressing with silver to the other half of VLU, the erosions epithelized and healed faster on the side where we used MCH.

Results: MCHalginate is an appropriate choice for infected wounds, for fibrin debridement in the inflammatory phase and MCHfoam accelerates granulation and epithelialization of ulcers.

OP48 DIAGNOSIS OF MARTORELL HYPERTENSIVE ISCHEMIC ULCERS (HYTILU): A RETROSPECTIVE OBSERVATIONALDESCRIPTIVE STUDY

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Aim: To describe the fundamental criteria for the correct diagnosis of Martorell hypertensive ischemic ulcers (HYTILU) and to find the histological differences with other similar pathologies.

Method: A retrospective observational descriptive study of clinical cases diagnosed with Martorell HYTILU was performed at the Dermatology Service and Ulcer Unit of the General University Hospital of Valencia Consortium (CHGUV) from September 2018 to September 2019. The main study variables were the comorbidities, pain, clinical characteristics of the lesion and histological results of the samples.

Results / Discussion: 18 patients were diagnosed with Martorell HYTILU, of which 100% had arterial hypertension, 61.11% diabetes mellitus and 55.56% dyslipidemia. Progressive livedo in the perilesional area and irregular borders was present in 100% of the lesions, highlighting that 83.33% had necrotized areas. In the wound bed 72.22% of the patients showed necrotic observation plates and 50% denatured fibrin. In 38.9% of the cases it was necessary to perform biopsies to confirm the diagnosis. Moreover, in 100% of the histological samples arteriosclerotic arterioles were detected in the subcutis with narrowing of the lumen, arteriolitis and a thickened vessel cut accompanied by thrombosis thereof.

Conclusion: The differential diagnosis of HYTILU is based, fundamentally, on the presence of a history of arterial hypertension, pain, perilesional livedo, location on either the dorsolateral surface of the leg or over the Achilles tendon and histology. If other pathologies are suspected with a similar clinical presentation, the biopsy can confirm the definitive diagnosis.

OP49 PHOTODYNAMIC PLASMATHERAPY OF WOUNDS

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Aim: Plasma has shown substantial potential to defeat wound germs in acute and chronic wounds. However, stringent biofilms and overwhelming colonization by nosocomial pathogens still resist in part also to repeated plasma treatment. Therefore photodynamic plasmatherapy (PPT) was investigated in order to create almost stronger in vivo germ reduction in clinical settings facing important nosocomial germ transmission.

Method: Cold plasma devices were coupled with secondary photoactivation via conventional photosensitizers (5-ALA, toluidine blue TBO, methylene blue MB) during irradiation and exposed to a set of most important wound pathogens including nosocomial multiresistant strains in vitro. Irradiation with plasma ranged from 1 to 3 x 60 sec, surviving bacteria were counted and compared with controls applying Plasma alone. Antimicrobial power was calculated as logstep reduction (lg10) and compared as reduction factor (RF).

Results / Discussion: Plasma irradiation (> 10sec) applied as photodynamic therapy (PTT) was followed by significant surplus of RF (>3RF) against S.aureus, MRSA, E.coli, P.aeruginosa, K.pneumoniae sp. pneumoniae, S.epidermidis when TBO was used. Reduction amplification was less pronounced using 5-ALA and MB.

Conclusion: PTT showed significant benefit surplus compared with conventional plasma treatment in vitro. This reduction power seems suited for better biofilm activity and is going to be translated for in vivo application.

Negative Pressure Wound Therapy

OP06 CLOSED INCISION NEGATIVE PRESSURE WOUND THERAPY REDUCES SURGICAL SITE INFECTION FOLLOWING EMERGENCY LAPAROTOMY

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Aim: This study aims to compare rates of surgical site infection (SSI) between patients receiving closed incision negative pressure wound therapy (CINPWT) and standard surgical dressing following emergency laparotomy through a propensity matched analysis.

Method: A registry-based, prospective cohort study was undertaken using data from National Emergency Laparotomy Audit (NELA) database at our centre. The primary outcome measure was SSI as defined by the Centers for Disease Control (CDC) criteria. Secondary outcomes included 30-day post-operative morbidity and grade, length of stay, 30 day mortality and readmission rates. A propensity- score matching (PSM) was performed in a 1:1 ratio to mitigate for selection bias

Results / Discussion: A total of 1484 patients were identified from the NELA dataset, PSM resulted in two equally matched cohorts with 237 patients in each arm. The rate of SSI was significantly lower in the CINWPT cohort (16.9% vs 33.8%, p<0.001). There were no overall differences in 30-day morbidity, CD grade, CCI severity, length of hospital stay, re-operation rates and 30 day mortality between the two groups.

Conclusion: Prophylactic CINPWT in emergency laparotomy patients is associated with a reduction in SSI rates.

OP07 RESOURCE USE FOR NEGATIVE PRESSURE WOUND THERAPY COMPARED TO CONVENTIONAL WOUND TREATMENT: RESULTS OF THE MULTICENTER SAWHI RANDOMIZED CONTROLLED TRIAL

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Aim: To compare resource utilization of negative pressure wound therapy (NPWT) and conventional wound treatment (CWT) for subcutaneous abdominal wound healing impairment (SAWHI) after surgery.

Method: Within 34 surgical departments in Germany, the Netherlands and Belgium, 539 adult patients (NPWT 273; CWT 266) with SAWHI without fascial dehiscence were 1:1 randomly assigned to NPWT or CWT. Neither treatment nor resource outcome assessment were blinded. Recruitment was completed. The resource use analysis was primarily based on the per protocol (PP) population (NPWT 157; CWT 174). Time, personnel, and material required for inpatient and outpatient wound treatment within 42 days or until complete, sustained and verified wound closure were evaluated. Results are presented with mean (standard deviation).

Results / Discussion: Although treatment length (days) was significantly shorter with NPWT (NPWT N=157, 22.8 [13.4], CWT N=174, 30.6 [13.3]; p<0.001 U-test), length of hospital-stay (days) was shorter with CWT (CWT N=158, 11.8 [10.8], NPWT N=144, 13.9 [11.1]; p=0.047 U-test). More study participants were outpatient with CWT (N=167 [96.0%]) than with NPWT (N=140 [89.2%]). Time required for dressing changes per study participant (minutes) (NPWT N=133, 196 [221], CWT N=152, 278 [208]; p<0.001 U-test) and time for associated wound-related procedures (minutes) (NPWT N=157, 167 [195], CWT N=174, 266 [313]; <0.001 U-test) were significantly lower with NPWT.

The additionally analyzed median (SE) time (days) to any wound closure within 132 days was significantly shorter with NPWT (35 [3.0]) than with CWT (57 [5.3], p<0.001).

Conclusion: NPWT reduces resource use for SAWHI after surgery.

OP09 EFFECT OF HIGH NEGATIVE PRESSURE WOUND THERAPY ON HEALING IN DIABETIC FOOT ULCERS

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Aim: To assess the effect of high negative pressure wound therapy (-160mmHg) versus standard negative pressure wound therapy (-120mmHg) on the duration of wound healing.

Method: This is a prospective randomized study performed at one institution during the 6-months period from 1/7/2018 to 31/12/2018. Patients with diabetic foot ulcers for whom NPWT was prescribed were randomized into two groups: Group A received NPWT at standard pressure -120mmHg, and group B received NPWT at high pressure -160mmHg. Patients received wound care according to standard local protocols. Patients were followed up for a maximum of 12 months.

Results / Discussion: A total of 175 patients were randomized into 2 groups: Group A: 87 patients, and Group B: 88 patients. There was no significant difference between the two groups in the mean age, distribution of gender, risk factors, ulcer duration, ischemia on presentation, WIFI classification, and duration of vacuum. The mean follow-up was 207 days for group A & 203 days for group B. Complete wound healing was achieved in 51 vs 79 in group A & B respectively (P=0.000002). The mean time to complete ulcer healing was significantly different in group A & B: 216 (SD 110) vs 163 (SD 94) days respectively (P=0.003). Major amputation was more frequent in Group A than Group B: 16 versus 4 respectively (P=0.003).

Conclusion: We conclude that higher negative pressure wound therapy accelerated healing, in this group of patients with diabetic foot ulcers.

OP11 NEGATIVE PRESSURE WOUND THERAPY FOR POST-STERNOTOMY MEDIASTINITIS REDUCES MORTALITY RATE AND STERNAL RE-INFECTION RATE COMPARED TO CONVENTIONAL TREATMENT

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Aim: To compare the mortality rate, the sternal re-infection rate and the length of hospital stay in patients with post-sternotomy mediastinitis after NPWT and conventional treatment.

Method: We reviewed data on 107 consecutive patients who were treated from 2010 through 2019 for post-sternotomy mediastinitis after cardiac surgery. Of these patients, 59 had undergone extensive wound debridement followed by negative-pressure wound therapy, and 48 had undergone conventional treatment, including primary wound reopening, debridement, closed-chest irrigation without rewiring, topical application of granulated sugar for recurrent cases, and final plastic reconstruction with pectoral muscle flap in most cases.

Results / Discussion: The 2 study groups were homogeneous in terms of preoperative data and operative variables (the primary cardiac surgery was predominantly coronary artery bypass grafting). Negative- pressure wound therapy was associated with lower early mortality rates (1.1% vs 2.8%; P=0.35) and significantly lower reinfection rates (1.2% vs 15.3%; P=0 .0 01). Significantly shorter hospital stays were also observed with negative pressure in comparison with conventional treatment (mean durations, 23.3 ± 8 vs 32.5 ± 5; P=0.02), consequent to the accelerated process of wound healing with negative-pressure therapy.

Conclusion: Lower mortality and reinfection rates and shorter hospital stays can result from using negative pressure rather than conventional treatment. Therefore, negative-pressure wound therapy is advisable as first-choice therapy for deep sternal wound infection after cardiac surgery.

OP12 CLINICAL EXPERIENCE WITH THE USE OF NEGATIVE PRESSURE WOUND THERAPY COMBINED WITH MANUKA HONEY VISCOSE DRESSING IN MIXED WOUNDS: A RETROSPECTIVE STUDY OF 60 CASES

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Background: Using honey to treat wounds is an ancient global remedy that has been handed down through the ages. Medical honey promotes autolytic debridement, provide a moist wound environment, reduces interstitial edema, anti-inflammatory and broad-spectrum antimicrobial activity.
The use of Manuka honey dressing with negative pursuer wound treatment (NPWT) is not so common practice with limited literature to support.

Aim: To examine the effectiveness of non-adherent viscose Manuka honey dressing, in reducing inflammation markers, duration and cost of therapy in contaminated wounds using NPWT.
Methods: Retrospective study of 60 acute and chronic wounds. 30 patients with Manuka honey dressing combined NPWT compared to 30 patients with standard NPWT controls that used dressings without honey, over one-year period. Demographic data, medical history and wound characterization are the same across both categories. Inflammation markers [plasma C-reactive protein (CRP), white blood cell counts (WBC)] before and during the treatment, duration of NPWT, healing time and cost of therapy were recorded.

Results: After 2 weeks of therapy, plasma CRP levels and WBC counts were significantly lower in the Manuka honey group (p=0.001). Duration and cost of the treatment were also significantly lower in the Manuka honey group (24.9 vs 62.4 days and, 1700 USD vs 4330 USD – respectively) (p<0.001). Healing parameters of wounds were significantly better (p<0.001).

Conclusion: This study demonstrates that the addition of Actilite, non-adherent viscose Manuka honey dressing to NPWT effectively reduces inflammation marker levels, healing time and cost of treatment.

Nutrition, pain, quality of life and pressure ulcers

OP63 SIGNIFICANT IMPROVEMENT OF HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH CHRONIC WOUNDS TREATED WITH TLC-NOSF DRESSINGS IN REAL LIFE SETTINGS

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Aim: Chronic wounds can deeply affect the health-related quality of life (HRQoL) of patients. This evaluation aimed to assess the performances of TLC-NOSF dressings with polyabsorbent fibres in the local management of chronic wounds in an unselected patient population under real-life settings. This work will focus on the HRQoL outcomes.

Methods: A prospective, multicentre observational study was conducted in 49 centres across Germany between January 2019 and June 2020. The main endpoints included HRQoL, assessed with a validated HRQoL questionnaire (WoundQoL), both at baseline and final visits, after a maximum of 12 weeks of treatment with TLC-NOSF polyabsorbent dressings or four documented visits.

Results: The HRQoL questionnaires were completed at both the initial and final visits by 337 patients with chronic wounds of various aetiology (132 leg ulcers, 69 diabetic foot ulcers, 28 pressure ulcers and 108 wounds of various other types). While the included patients presented wounds of relatively short duration at baseline, their HRQoL was already deeply affected in all three dimensions of the WoundQoL. At the final visit, after a mean duration of 64±35 days, significant improvements of the global score and of the sub-scores were achieved in the global cohort as in each wound aetiology subgroup.

Conclusion: These results confirm that chronic wounds strongly affect the patient's HRQoL but rapid improvement is achievable when patients are appropriately managed. This new real-life evidence supports the use of TLC-NOSF dressings, as first-line treatment, in the management of chronic wounds.

OP34 PRESSURE ULCER MANAGEMENT IN FRANCE: AN UNDERSTANDING STUDY

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Aim: To assess General Practitioner's (GPs) and nurse's attitude, knowledge and management of Pressure Ulcer (PU) in France.

Methods: A two-part online questionnaire was conducted among GPs and nurses in the country: first part entailed a survey on knowledge, the second part collected data on healed PU cases recently managed.

Results: 60 nurses and 60 GPs were interviewed. 120 questionnaires were collected for first part, and second part included management of 302 PU cases of their 4 last patients with PU stage II or III. There were on average 38 PU patients currently managed by GPs and 23 by nurse, about 50% of PU stage II or III. 8/10 patients are more than 71 years old and about 4/10 patients with PU have recurring PU. The vast majority of patients have 2 PUs at the same time on average. Appropriate size and design first drive the choice for GPs, while wound optimization is top driver for nurses, with 8/10 stating a significant importance when choosing a dressing for PU. About 2/3 of patients had medium, high or very high level of exudates. More than 88% of Health care professionals would like to improve current treatment of PU. Main suggestions are trainings, either practical or specific on PU Care.

Conclusions: The analysis of patient's cases is really powerful due to the large number of PU reported. The communication proposed will detail the keys points on each stage of PU management and compare care of PU stage II and III.

OP64 STANDARDIZED LOCAL MANAGEMENT OF MALIGNANT FUNGATING WOUNDS: THE PEBO APPROACH

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Background / aim: Malignant fungating wounds (MFWs) represent a major problem for public health. The most common symptoms associated with MFWs are pain, exudate, bleeding and odor. The aim of the study was to optimize the local management and dressing of MFWs.

Methods: We developed a standardized approach to MFWs by measuring pain, exudate, bleeding and odor in a case series of 24 patients: we call this the PEBO approach. Wound assessment was performed by using Toronto Symptom Assessment System (TSAS-W), Numerical Rating Scale and quality of life by EuroQoL (EQ-5D) twice a week for 4 weeks.

Results: At baseline TSAS-W showed malodor (n=17), itch (n=9), bleeding (n=22), moderate exudate (n=7), and severe exudate (n=16), the NRS pain score was 7 (n=11), 4 (n=9), and four patients reported no pain also at baseline the EQ-5D score was 30(n=12), 40 (n=10) and 60 (n=5). After 4 weeks no bleeding, no severe exudate were found, and only three wounds had malodor and three others had moderate exudate, and only 10 patients had the NRS pain score 6. The EQ-5D score at the end of our study was 70 (n=21) and 40 (n=3).

Conclusion: PEBO simplified the complex aspects of this type of ulcer, and could help physicians, nurses, and caregivers including the patients themselves and their family, in the multidisciplinary palliative care of MFWs.

OP61 ZINC DERIVATIVES INHIBIT BACTERIAL GROWTH AND PROMOTE WOUND HEALING IN A SIMULATED CHRONIC WOUND ENVIRONMENT IN VITRO

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Aim: Zinc as therapeutic agent in skin and wound treatment has been around for centuries. However, especially in chronic wound management, its role is controversial and broad-spectrum investigations in such nutrient-deficient or chronic wound environments are lacking.

Method: Human fibroblasts (CRL2522) and keratinocytes (HaCaT) were treated with a broad concentration range (10 – 0.0001 µg/mL) of zinc sulfate (ZnSO4), zinc gluconate (ZnGluc) and zinc histidine (ZnHis) for 1 to 6 days. Cell proliferation was investigated by XTT assay. Targeted analyses in proliferation- (E2F1, PCNA) and apoptosis- (TP53) associated genes were performed via qRT-PCR and apoptosis was determined via FACS (Annexin V/7-AAD staining). Antimicrobial efficacy was investigated using a quantitative suspension method against S. aureus, P. aeruginosa, E. coli and C. albicans.

Results / Discussion: Especially 0.1 to 0.001µg/mL Zn increased cell proliferation in both cell lines. Fibroblasts were more susceptible. Significant proliferation peaks occurred on days 2 & 6 and days 1 & 4 for keratinocytes. No relevant changes in gene expression were detected for E2F1 and PCNA levels nor for TP53 expression. Annexin V/7-AAD staining of fibroblasts revealed a small reduction of apoptosis induction for ZnGluc and ZnSO4. 0.1µg/mL ZnGluc and ZnSO4 achieved high microbial reductions (4-5 log10 reductions) against tested pathogens.

Conclusion: Zinc gluconate and zinc sulfate showed noticeable pro-proliferative, anti-apoptotic and antimicrobial features in a simulated nutrient-deficient microenvironment in-vitro. In contrast to keratinocytes, the extracellular matrix-forming fibroblasts showed a more profound susceptibility to zinc supplementation. These results indicate a potential benefit of local zinc supplementation in chronic wound management.

OP65 METHODOLOGIES USED FOR ASSESSING HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH LYMPHEDEMA OF THE LOWER LIMB: A SYSTEMATIC REVIEW

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Aim: Lymphedema of the lower limb (LLL) is a chronic condition adversely effecting quality of life and management aims to prevent complications and improve health-related quality of life (HRQoL). The aim of this systematic review was to explore the existing literature and identify the most common methodologies used in assessing HRQoL in patients with LLL.

Method: Following the guidance of PRISMA, the databases CINAHL, PubMed, Scopus, Google Scholar, EMBASE and the Cochrane Library database were searched. Data were extracted using a predesigned data extraction tool, study quality was assessed using the EBL checklist and data analysis consisted of a narrative synthesis.

Results / Discussion: We identified 18 studies (total sample= 2240), 7 reported HRQoL as a global score; 12 reported only the individual dimensions of HRQoL; 6 reported both the overall global score and dimensional scores and 1 reported dimensional scores and summary scores on physical and mental QoL. Thirteen different questionnaires used; of these the disease-specific questionnaire Lymphedema Quality of Life Questionnaire and the SF-36 were the most common tools employed.

Conclusion: There was significant heterogeneity among the studies in terms of research design, methodological quality, and HRQoL questionnaires and dimensions of HRQoL assessed, with some studies including disease symptoms as the measure of total HRQoL. Consistency in the methods and measures are important for matching and comparing the patient-reported treatment outcomes in patients with LLL.

OP62 A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY TO DETERMINE THE ANALGESIC EFFICACY, SAFETY AND TOLERABILITY OF VPX638 ADMINISTERED TOPICALLY ON A SINGLE STUDY OCCASION, TO PATIENTS WITH PAINFUL WOUNDS

Jonathan Golledge[1], Heather Giles[2], Pat Aldons[3], Geoffrey Cox[4], Rebecca Iseli[5], Casper Pretorius[6], Omar Shum[7], Erwin Sunjoto[8], Paul Yates[9], Cécile Bascoul[2], Dannette Doolittle[2], Sergio Parra[2], Ajay Rege[2], Vaidehi Thanawala[2], Michael Woodward[9]

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Aim: To conduct the first randomized, double-blind, placebo-controlled, multi-centre study to evaluate the analgesic efficacy, safety and tolerability of a non-opioid, lidocaine-free novel class of topical analgesic, VPX638 (sevoflurane), in painful non-healing wounds.

Method: 78 participants were recruited from 8 sites in Australia. 5mls of VPX638 or matching placebo (saline) was administered topically into the wound following dressing removal, and immediately following wound cleaning, on a single study occasion. Pain (0-10 NRS scale) and use of analgesia was recorded for 24hrs. Multiple measures were implemented to minimize the placebo effect. Safety assessments included evaluation of the wound, blood chemistry, and sedation assessment to assess systemic exposure.

Results / Discussion: Participants allocated VPX638 had a rapid, large and clinically meaningful analgesic effect (3.8, 95%CI:2.4-5.2 NRS decrease), within 15mins. At all time points (except 18 hours) VPX638 treatment demonstrated greater analgesic effect than placebo. Post-hoc analyses showed a statistically significant difference in SPID (Summed Pain Intensity Difference) over 8, 12 and 24hrs (p=0.016, 0.009, 0.0495 respectively). The median duration of analgesia was 24.3hrs for VPX638 and 7.1hrs for placebo, Hazard ratio 0.415, p= 0.0065. VPX638 treatment also resulted in a 50% decrease

in opioid use compared with placebo during 24hrs after drug administration. VPX638 was well tolerated with no evidence of systemic effects, no local effects on the wound, and no other safety signals. Conclusion: With a rapid onset of action, sustained analgesia and opioid-sparing properties, VPX638 has the potential to become the standard of care in treatment of wound pain.

Pressure Ulcers

OP30 PREVENTION OF PRESSURE INJURIES RESULTING FROM SURGICAL POSITIONING: HEELS OPERATING ROOM PRESSURE INJURY TRIAL (HORPIT)

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Aim: To evaluate the efficacy of multi-layered silicone foam (intervention) compared to transparent polyurethane film (control) in preventing heel PI caused by surgical positioning of individuals undergoing elective surgery.

Method: An intra-patient, open, parallel, randomized controlled clinical trial was conducted in a university hospital in southern Brazil, from March 2019 to February 2020, with patients undergoing elective surgery in the cardiac and gastrointestinal specialties. The patients who met the selection criteria constituted, simultaneously, a single group to receive the intervention and the active control, through a paired analysis of the cutaneous sites (right heel and left heel). The outcome was the occurrence of PI within the 72-hour follow-up period. PI incidences in each group were compared using the Chi-square test. The study was approved by the Ethics Committee with Certificate of Presentation for Ethical Assessment 77103617.6.0000.5346 and by the Brazilian Registry of Clinical Trials under identifier RBR-5GKNG5.

Results / Discussion: Data from 136 patients (271 calcaneus) were analyzed. Most participants were male (n=88; 64.7%). The mean age of participants was 59.5 years. 92 (67.6%) individuals underwent cardiac surgery; 44 (32.4%) underwent gastrointestinal surgery. Among the 271 cutaneous sites analyzed, 100 developed PI, resulting in an overall incidence of 36.9%. The PI incidence was significantly lower in the intervention group (26.7%), compared to the control group (46.7%), p=0.001; relative risk of 0.57.

Conclusion: Multi-layered silicone foam is more efficacious than transparent polyurethane film in preventing PI due to surgical positioning on the heels of individuals undergoing elective surgery.

OP31 FAILED PHAGOCYTOSIS DURING THE IMPAIRED HEALING OF PRESSURE ULCERS

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[1]Duke-NUS Medical School, Singapore, Singapore; [2]Massachusetts Institute of Technology, Cambridge, United States; [3]CREATE Tower NUS, CAMP IRG, Singapore, Singapore

Aim: We developed an animal model of chronic wound healing in mice, without relying on diabetes or infection. Using pressure ulcers of muscle, we aimed to characterize physiological differences between acute and chronic wounds.

Method: In a specific-pathogen-free facility, mice received a chronic wound (magnet pressure injury of skin, adipose, and muscle), or an acute wound (cardiotoxin injection into muscle). Newly regenerated tissue was distinguished from pre-existing regions via inducible heritable labelling.

Results / Discussion: The acute injuries showed normal wound healing phases. At 3 days, dead tissue had been cleared; at 10 days, immature muscle fibers filled the wound bed; at 16 days, mature muscle showed near-native morphology.

In contrast, pressure ulcers showed a failure of phagocytosis to clear necrosis after 3 days, with histology indicating that immune infiltrate failed to penetrate the compressed regions. However, immune cell remnants were detected by immunostaining extracellular traps, which are toxic anti-microbial structures produced by expulsion of nuclear DNA from dying neutrophils/macrophages. (In vitro, macrophages incubated with myoglobin exhibited decreased viability.) At 10 days after injury, dead tissue was extruded to slough, and viable immune cells filled the wound bed. At 40 days, immature myofibers occupied the margins, but morphology was deranged (wavy, branched fibers). At 90 days, unfilled holes remained.

Conclusion: We conclude that the immune response to pressure injury was overzealous in producing anti-microbial toxicity, but inadequate at engulfing debris (which was later cleared by slough). Human pressure ulcers are characterized by slough, suggesting a similar mechanism of impairment.

OP32 PRESSURE ULCERS PROLONG THE HOSPITAL STAY – DO WE HAVE EVIDENCE IN DATA?

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Aim: To evaluate the influence of the reported pressure ulcers (dg. L89.0) on length of stay in hospital at different type of units and in relation to the main hospitalization diagnose.

Method: Analyses of the National Registry of Hospitalised Patients in the period of 10 years.

Results / Discussion: The patients with PUs are hospitalised at the standard, intensive care, and follow-up care units. The number of hospitalised patients with L89* increases constantly in the last 10 years (Fig. 1). The annual number of treatment days (TD) in patients hospitalized with PUs (on the main or secondary diagnosis) has reached a stable value of around 620,000 TD / year in recent years. Of this volume, 59% are TD in follow-up inpatient care, 32% TD in standard acute inpatient care and 9% TD in intensive acute inpatient care (data for 2019). The average treatment days are constantly decreasing (Fig. 2). Diseases of the circulatory system are the group of diseases most often reported with dg. L89* (main and secondary diagnosis). If a hospitalized patient has a PUs reported, the length of hospital stay is extended regardless of the main diagnosis.

Figure 1: Number of hospitalised patients with Pressure ulcers (dg. L89*)

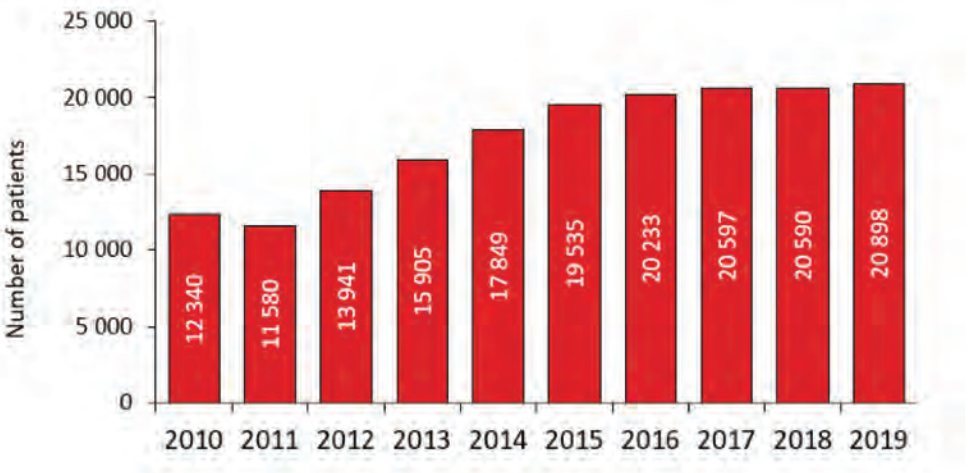

Figure 2: Average treatment days of patients with Pus - types of unit

Type of inpatient care unit	Average treatment days in 2010	Average treatment days in 2019
All the types of units	48	38
Standard acute inpatient care units	20	16
Intensive care units	15	12
Folow-up inpatient care units	67	65

Conclusion: We have proven from the available national registries that in the patients with PUs the hospitalisation is prolonged and differ based on the type of unit (standard, intensive.

Acknowledgement: This work was supported by the Ministry of Health of the Czech Republic under grant no. NU20-09-00094 “Cost analysis of pressure ulcers treatment - determinant of care”.

OP33 PREVENTION OF PRESSURE INJURIES RESULTING FROM SURGICAL POSITIONING: HEELS OPERATING ROOM PRESSURE INJURY TRIAL (HORPIT)

Thaís Eberhardt[1], Suzinara Lima[2], Lidiana Silveira[2], Bruna Pozzebon[2], Karla Santos[2], Camila Mendonça[3], Rhea Soares[4], Paulo Alves[5]

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Aim: To evaluate the efficacy of multi-layered silicone foam (intervention) compared to transparent polyurethane film (control) in preventing heel PI caused by surgical positioning of individuals undergoing elective surgery.

Method: An intra-patient, open, parallel, randomized controlled clinical trial was conducted in a university hospital in southern Brazil, from March 2019 to February 2020, with patients undergoing elective surgery in the cardiac and gastrointestinal specialties. The patients who met the selection criteria constituted, simultaneously, a single group to receive the intervention and the active control, through a paired analysis of the cutaneous sites (right heel and left heel). The outcome was the occurrence of PI within the 72-hour follow-up period. PI incidences in each group were compared using the Chi-square test. The study was approved by the Ethics Committee with Certificate of Presentation for Ethical Assessment 77103617.6.0000.5346 and by the Brazilian Registry of Clinical Trials under identifier RBR-5GKNG5.

Results / Discussion: Data from 136 patients (271 calcanea) were analyzed. Most participants were male (n=88; 64.7%). The mean age of participants was 59.5 years. 92 (67.6%) individuals underwent cardiac surgery; 44 (32.4%) underwent gastrointestinal surgery. Among the 271 cutaneous sites analyzed, 100 developed PI, resulting in an overall incidence of 36.9%. The PI incidence was significantly lower in the intervention group (26.7%), compared to the control group (46.7%), p=0.001; relative risk of 0.57.

Conclusion: Multi-layered silicone foam is more efficacious than transparent polyurethane film in preventing PI due to surgical positioning on the heels of individuals undergoing elective surgery.

OP35 DO WE STILL NEED TO ASSESS NURSES' ATTITUDES TOWARDS PRESSURE ULCERS PREVENTION? A SYSTEMATIC REVIEW

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Aim: To critically appraise and synthesize the existing research literature pertaining to nurses' attitudes towards pressure ulcer prevention.

Method: Using systematic review methodology, we considered included published quantitative studies focusing on nurses' attitudes towards pressure ulcer prevention measuring by psychometric tests. The search was conducted in May 2019, using PubMed, CINAHL, Scopus, Cochrane, and EMBASE databases, and returned 442 records, of which 21 met the inclusion criteria. Data were extracted using a pre-designed extraction tool and all included studies were quality appraised using the checklist.

Results / Discussion: Of the included studies, 20 employed a cross-sectional design and one author employed a validation study. Two distinct measurement instruments were used for measuring nurses' attitudes toward prevention pressure ulcers: The Moore & Price Attitude Scale and the Attitude towards Pressure Ulcer Prevention Instrument. The mean attitude score within the studies was 73% (SD= 9.2%). The lowest attitude score was 51%, whilst the highest score was 89%. The results obtained from the studies indicated that 86% (n= 18) yielded positive attitude results.

Conclusion: The findings suggest that, overall, nurses are positively disposed towards pressure ulcer prevention. However, it is important to highlight that the nurses have difficulties reflecting this positive attitude into actual preventative strategies.

OP37 REPOSITIONING FOR PREVENTING PRESSURE ULCERS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: To assess the effects of different repositioning regimens on pressure ulcer (PU) incidence, in at-risk adult individuals.

Method: This systematic search was conducted in January 2019, using PubMed, CINAHL, SCOPUS, Cochrane, and EMBASE databases and grey literature was also interrogated for pertinent, studies which 15 met the inclusion criteria for this review. We considered published and unpublished randomized controlled trials (RCTs), including cluster-RCTs, non-RCTs prospective, pre-post, and interrupted-time-series studies.

Results / Discussion: PU incidence was 8%(n=221/2834), for more frequent repositioning, versus 13% (n=398/3050) for usual care. The Odds Ratio (OR)=0.75(95% Confidence Interval (CI):0.61-0.90, p=0.03), suggesting that there is a 25% reduction in the odds of PU development in favor of more frequent repositioning. Three studies explored use of a repositioning system. PU incidence was 2%,17/865, for the repositioning system, versus 5.5%, 51/926 for standard of care. The OR=0.26(95% CI:0.05-1.29, p=0.10), suggesting that there is a 74% reduction in the odds of PU development when a repositioning system is used, with the true population parameter being 95% reduction to a 29% increase in PU development. Two studies explored use of a turning team. PU incidence was 11%(n=22/200), for use of a turn team versus 20% (n=40/200) for usual care. The OR=0.49(95% CI:0.27-0.86, p=0.01) suggesting that there is a 51% reduction in the odds of PU development in favor of use of a turn team. Using GRADE appraisal, the certainty of the evidence has been assessed as low.

Conclusion: More frequent repositioning and se of a turn team reduce PU incidence.

OP39 NATURAL HISTORY OF PRESSURE INJURY AMONG ETHNICALLY, RACIALLY DIVERSE NURSING HOME RESIDENTS

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Aim: Provide descriptive primary data on pressure injury (PrI) natural history in ethnically/racially diverse nursing home (NH) residents.

Method: We assessed 142 participants with all stage PrIs from 19 facilities over 16 weeks in a descriptive cohort study. Assessments included medical records, Braden Scale, and weekly Bates-Jensen Wound Assessment Tool (BWAT). Analysis of variance and chi-square were used to compare resident characteristics and trunk/heel PrIs across groups (Asians, Blacks, Hispanics, Whites). History was sum-

marized using Q Sort of visual assessments of each location for each participant with four patterns: PrI all weeks, 3-15 weeks, <3 weeks, and resolved.

Results / Discussion: Participants were 62% female and differed by ethnicity for age (Blacks younger (70 +/- 16.9 years), Asians older (86 +/- 5.8 years), p<0.001) and peripheral vascular disease history (Blacks 29% and Asians 26%, p=0.04). Blacks more often exhibited persistent trunk PrIs (24%, p=0.02) and stage 4 PrI (29%; p=0.09). Asians and Blacks showed PrI induration (18%, 26%, respectively, p=0.03). Blacks (43%) and Hispanics (55%) presented with normal skin color surrounding PrI (p=0.002). Asians had PrIs with no granulation (21%, p=0.01), surrounded by purple/red discolored skin (42%, p=0.002). Blacks' heel PrIs were more often unstageable (21%, p=0.13), showed no granulation (31%, p=0.05), 100% necrotic (26%, p=0.04) and, with Hispanics, deep tissue injury (58%, 40%, respectively, p=0.13). No differences by NHs or prevention, though room for improvement exists.

Conclusion: Disparities found in primary data validates that in administrative database research. Differences in PrI characteristics should be examined among ethnically/racially diverse individuals.

Wound Assessment

OP55 THE ASSESSMENT OF CHRONIC WOUNDS : A REVIEW OF PSYCHOMETRIC PROPERTIES OF INSTRUMENTS AND A STUDY OF THE COGNITIVE PROCESS OF DECISION MAKING.

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Aim: A wound assessment instrument can help clinicians assess wounds and track wound progression or deterioration. The goal of this project was to identify assessment instruments for chronic wounds, investigate their measurement properties, and summarize the data per assessment instrument. A current follow-up project relates these findings to the process of decision making and problem solving in the assessment and management of chronic wounds by community nurses and general practitioners. The results of both projects will be merged and specific proposals for optimizing wound surveillance and clinical decision support will be developed.

Method: A systematic review of studies reporting on the development and/or assessment of the measurement properties of chronic wound assessment instruments, followed by a scenario-based think-aloud study. The final project will include focus interviews with wound care experts.

Results / Discussion: Twenty-seven studies describing the measurement properties of fourteen chronic wound assessment instruments were included in the systematic review. Reported measurement properties included: structural validity, reliability, hypothesis testing for construct validity, and responsiveness. Twenty-six different wound parameters were extracted from the assessment instruments. Preliminary results from the think-aloud interviews are presented.

Conclusion: Fourteen assessment instruments for chronic wounds were identified. The construct validity and responsiveness of the Pressure Ulcer Scale for Healing Version 3.0 were supported by sufficient ratings based on moderate to high quality evidence. The reliability of the (Revised) Photographic Wound

Assessment instrument was rated as adequate based on moderate quality evidence. How these results can be translated into clinical practice requires further investigation.

OP56 COMPARISON OF THE DETECTION OF SEVEN COMMON WOUND PATHOGENS FROM A RANGE OF WOUNDS AND FROM THE CONTRALATERAL LIMB.

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Aim: Previous studies of wound colonisation have not included a control sample to compare to the patients' natural microflora. This study uses qPCR to identify patterns in bacterial colonisation by seven wound pathogens

Method: Swabs were taken from the wound site and the contralateral limb. Primers were designed to detect seven wound pathogens. Swabs were sonicated and genetic material was collected. qPCR was used to detect seven bacterial species. Anonymised data relating to the size of the wound and duration of the wound was also collected and analysed in combination with the bacterial identification qPCR data.

Results / Discussion: Half of the patients sampled were reported as having venous wounds, which were more likely to be greater than 3 years in duration. Bacterial species were detected at comparable levels in venous and non-venous wounds.

Younger patients had the greatest difference in number of species detected in the wound compared to the control, with more species present in the wound sample. Staphylococcus aureus and Pseudomonas aeruginosa were the most commonly identified species, detected in around 60% of wounds.

Conclusion: The data collected gives an overview of the natural microflora of patient's skin compared to that of their wound. The age of the patient impacted the number of species detected, with the highest number of bacterial species detected in wounds of patients under the age of 60. As a result, wound treatments in patients of this age group may need to target a broader range of species.

OP57 THE EFFECT OF INFLAMMATION MANAGEMENT ON PH, TEMPERATURE AND BACTERIAL BURDEN

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Aim: The aim of this study was to investigate the impact of inflammation management on pH, temperature and bacterial burden, using the principles of TIME and Wound Bed Preparation.

Method: A descriptive, observational approach was employed to follow 26 patients with locally infected or non-healing wounds of varying aetiologies, over a two-week period. Wound pH was measured using pH indicator strips and the FLIR E6 infrared camera was used to measure wound temperature. The presence of bacteria in the wounds was measured using MolecuLightTM i:X. The study adopted the principles of TIME and Wound Bed Preparation.

Results / Discussion: The mean pH reduced by 0.76 units from 8.57 to 7.81 and wound size reduced by 39% over the two weeks. The Temperature of the study participants' wounds varied, ranging from 26.20^{0}C to 35.70^{0}C (mean: 32.86^{0}C; SD: 1.78^{0}C) at baseline and 28.30 to 36.70 (mean: 32.66^{0}C; SD: 1.78^{0}C) at week two. The results demonstrated that as pH and temperature decreased, wound size also decreased. At baseline, 78% (n=21) of the wounds had harmful levels of bacteria present in their wounds. This figure reduced to 26% (n=7) following two weeks of inflammation management. Wound size reduced by 39% over the two weeks.

Conclusion: The study illustrates that objective assessment incorporating the principles of TIME, including cleansing, frequent sharp debriding and treatment with an antimicrobial agent, improves wound outcomes. There was notable difference when this approach was adopted as evidenced by the reductions in pH, temperature, bacterial burden and wound size.

OP58 A RELIABILITY STUDY OF FOUR VALIDATED DIABETIC FOOT ULCER CLASSIFICATION SYSTEMS

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Aim: One of the many complications of diabetes mellitus is foot ulceration. Diabetic foot ulceration may have different presentations depending on the pathogenic contributing factor and this may lead to various outcomes. The need to classify, score and describe these lesions is needed for various reasons, including clinical documentation and reporting. The aim of the study was to determine the inter-rater reliability between four validated classification systems in the grading/scoring of diabetic foot ulceration.

Method: A prospective non-experimental comparative study was held at the diabetes foot clinic. Patients with diabetes presenting with a new ulcer or long-standing ulcer were recruited. Each ulcer was graded/scored by three experienced clinicians using four-classification systems; namely the University of Texas staging system, the SINBAD system, the Meggitt-Wagner system and the PEDIS scoring system. Data was tested for normal distribution to determine normality of data. IBM SPSS (the Statistical Package for the Social Sciences) was used to evaluate analyzed data. The non-parametric Kendall Tau coefficient was used to assess the inter-rater reliability since the evaluations had an ordinal and ranked scale.

Results / Discussion: A total of 40 participants were included in the study and assessed by 3 clinicians.

The mean age of the study sample was 58.28. The mean duration of diabetes was 16.28 years, the mean duration of the ulceration was 24.08 weeks. 68.29% of the study population were males whilst 31.71% were females. Twenty per cent [n=8participants] of the study cohort presented with a new ulceration whilst 80% [n=32 participants] had a re-ulceration. 92.5%of ulcers did not reach a depth down to bone, 72.5% of ulcerations were not infected and 90% did not present with biofilm. Osteomyelitis was not present in the study cohort. Most of the ulcerations were present in the forefoot [87.5%], 2.5% were present in the midfoot and 10% were present in the rear foot. Neuropathy was present in 92.5% of the sample. Neuropathic ulcerations accounted for 65% followed by neuroischaemic ulcerations 30% and ischaemic ulcerations 5%. All four classification systems had a satisfactory inter-rater agreement ($p<0.05$) when evaluated by three raters of various clinical experience, however, the strength of the agreement varied between classifications. The Meggitt-Wagner system had an almost perfect agreement, the SINBAD and UT systems had a strong inter-rater agreement whilst the PEDIS had a moderate inter-rater agreement.

Conclusion: The more complex the classification, the weaker the inter-rater agreement. Until a gold standard is reached, these classifications should not be used a single tool to predict ulcer outcome or determine treatment options. Such classifications should only be used in combination with other routine clinical assessments, to acquire an overall prognosis and manage appropriately to achieve the best possible outcome.

OP59 EFFECTIVENESS OF FAST-TRACK PATHWAY FOR DIABETIC FOOT ULCERATIONS: PRELIMINARY DATA FROM ITALY

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Aim: International Diabetic Foot Care Group and D-FOOT international developed a fast-track pathway (FTP) for diabetic foot ulcerations (DFUs) to allow a clear identification of DFU's severity, specific management and related timing of referral1. After 1 year of implementation, the effectiveness of FTP in Italy (metropolitan area of Rome) was evaluated.

Method: The study group was composed of consecutive patients who referred to specialized DF centres for DFUs. All patients were managed through a limb salvage protocol base on Guidance2. Patients were divided in two groups: early referral (ER) and late referral (LR) patients. According to FTP, ER were considered patients who referred after 2 weeks in the case of uncomplicated non-healing ulcers (super-

ficial, not infected, not ischemic), within 4 days in the case of complicated ulcers (ischemic, deep, mild infection) and within 24 hours in the case of severely complicated ulcers (abscess, wet gangrene, fever, sepsis). Limb salvage, healing, healing time, amputation at 6 months were evaluated.

Results: One-hundred sixteen subjects were included with a mean age of 70.4±14.5 years, 83.7% type 2 diabetes and diabetes duration of 21.5±13.8 years. 92/116 (79,3%) were ER, 24/116 (20.7) LR. The rate of limb salvage, healing, healing time, and amputation for ER and LR were respectively: (97.3vs50%,p<0.0001), (95.6vs33.3%,p<0.0001), (9±6vs16±7weeks,p=0.005), (1.1vs50%,p<0.0001). ER was an independent predictor of limb salvage [OR95% 3.8(2.3-5.7),p<0.0001] and healing [OR95% 3.7(2.5-5.2),p<0.0001].

Conclusion: Lower rate of LR were recorded in comparison to ER. ER based on the FTP timing of referral resulted an independent predictor of favourable outcomes.

OP60 HYPERSPECTRAL IMAGING (HSI) DELINEATES MAGGOT EFFICACY SUPPORTING WOUND HEALING BY ENHANCED HEMODYNAMICS

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Aim: Maggot therapy applied as debridement is well known to support wound healing by complex effects apart from pure bacteria killing. However despite a huge lot of work focusing mainly biochemical networking, stringent evidence of the nature of action at the source remains unclear. Therefore we applied a new tool using noninvasive hyperspectral technology to visualize potential microcirculatory effects by the maggots for better understanding clinical efficacy.

Method: We used a new commercially hyperspectral imaging system HSI (TIVITA Tissue, Germany) working in visible (VIS) and near infrared (NIR) region with high spectral and spatial resolution to investigate 6 patients under maggot debridement with recalcitrant chronic ulcer wounds. From hyperspectral data hemoglobin oxygenation (StO2), relative concentration of hemoglobin [tissue hemoglobin index (THI)] and NIR-perfusion index can be measured and given as false color image.

Results / Discussion: HSI visualization gave strong evidence for significant augmentation of nutritive microcirculation in all 6 wounds during debridement with homogenous spatial oxygen distribution in superficial and deeperdeeper tissue (St02 and NIR).

Conclusion: For the first time a direct clinical impact on a gearstick for better wound healing exerted by maggots during debridement could be demonstrated in vivo delineating a significant shift in spatial oxygen supply. Using HSI wound therapy by maggots can be monitored and optimized in future for optimized wound management.

Health Economics & Outcome and Acute Wounds

OP26 COMMUNITY-BASED WOUNDCARE IN THE NETHERLANDS:IMPLEMENTING A REGIONALNETWORK FOR WOUND CARE

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Aim: Share the results of a successful initiative to establish a regional community-based wound care network for a primary care in the Zwolle region of the Netherlands.

Method: A descriptive analysis of several outcome parameters was performed on prospectively retrieved data. In the period 2018–2019, a weekly consultation hour was started after installing a local team in six primary care practices. The team included a nurse practitioner specialised in wound care, general practitioner assistants and a general practitioner. An experienced surgeon from the regional hospital could be consulted via telemedicine and visited the practices regularly.

Results / Discussion: In total, 869 patients were seen; among them, 695 patients had 814 wounds. Most of these wounds (73%) were located on a lower extremity. The program treated mainly older patients with moderate or severe co-morbidities; 91% were served in a primary care practice. An access time of up to six weeks was reported for 80% of patients. A healing rate of 91% was achieved in 417 wound patients treated by the nurse practitioner. In the end, 9% of the cases were referred to the regional hospital.

Conclusion: Almost all patients with wound-related problems can be served by a local nurse practitioner-led team. It seems that the Zwolle regional wound care network has adopted the national policy goals, such as short access times and more preventative measures, with high rates of wound healing and a minimum number of referrals.

OP77 OP77 RESULTS OF A MULTICENTRE, PROSPECTIVE, OBSERVATIONAL STUDY ON THE PERFORMANCES OF TLC-NOSF POLYABSORBENT DRESSINGS* ON CHRONIC WOUNDS

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Aim: This evaluation aimed to assess the efficacy and safety of TLC-NOSF dressings with polyabsorbent fibres in the local management of chronic wounds in an unselected patient population under real-life settings.

Methods: A large, prospective, multicentre observational study with three TLC-NOSF polyabsorbent dressings* was conducted in 105 centres across Germany between January 2019 and June 2020. The main endpoints included wound healing rate and progression, health-related quality-of-life (HRQoL, Wound QoL), and dressing tolerability and acceptability.

Results: Altogether 961 patients with chronic wounds (390 leg ulcers, 217 diabetic foot ulcers, 92 pressure ulcers and 262 wounds of various other types) were treated with the evaluated dressings for a mean duration of 61.5±36.5 days. By the final visit, 50.9% of the wounds healed, 41.1% improved, 3.3% were stabilized, and 2.7% worsened. At baseline, the patients were primarily affected by fears of wound deterioration and frustration due to long-healing time. At the final visit, a substantial improvement was reported in all the dimensions of HRQoL and 74.6% of the patients documented that their current situation was much better than previously. The dressings were very well tolerated and accepted in the large majority of the cases (84.7% and 79.7%). Similar outcomes were reported whatever the aetiology of the wounds.

Conclusions: These results show the effective healing properties and good safety profile of these dressings, which are consistent with the previous clinical evidence on TLC-NOSF dressings, and support their use, as first-line treatment, in the management of chronic wounds.

OP72 OP72 HYPOCHLOROUS ACID IN ACETIC ACID INCREASES EARLY REEPTHELIALZATION OF SUPERFICIAL ACUTE WOUNDS – A RANDOMIZED CONTROLLED TRIAL

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Aim: Decontamination of acute wounds is often desirable to prevent infections. The aim was to evaluate the effect of a novel wound irrigation solution, composed of hypochlorous acid and acetic acid on the healing of acute subepidermal wounds. The primary outcome was to show noninferiority on reepithelialization of the experimental solution versus control (0.9% NaCl) on Day 10. Secondary outcomes included bacterial growth before and after treatment, and reepithelialization Day 4.

Method: A randomized controlled trial, evaluator-blinded, involving 20 healthy volunteers. One suction blister was raised and reroofed on each underarm, and experimental/control solutions were assigned to either wound by randomization. On Days 0, 2 and 4, wounds were irrigated for 5 seconds and subsequently treated with gauze saturated with experimental/control solutions for 15 minutes. Reepithelialization was assessed blindly by image analysis from close-up photographs, and microbial growth was assessed by counting colony-forming units (CFU) from swabs.

Results/Discussion: Bacterial growth was lower with the experimental compared with control solution before (4.2 ± 4.7 (log10) versus 4.7 ± 5.0 CFU/mL, P= .0129) and after treatment (3.6 ± 4.1 versus 4.2 ± 4.5 CFU/mL, P= .0009) Day 4. The experimental solution increased reepithelialization compared with control Day 4 (57 ± 17% versus 43 ± 17%, P= .0006) and was not inferior to control Day 10 (P< .0001). The transient pain/discomfort during irrigation with the experimental solution typically disappeared within seconds.

Conclusion: The study demonstrates a beneficial effect of the experimental solution on reepithelialization of acute wounds, possibly via its antimicrobial action.

OP27 OP27 OBSERVED IMPACT OF SKIN SUBSTITUTES IN LOWER EXTREMITY DIABETIC ULCERS: A RETROSPECTIVE ANALYSIS OF A MEDICARE LIMITED DATABASE (2015–2018)

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Aim: The aim of this analysis was to assess the outcomes in patients receiving advanced treatment (AT) with skin substitutes for lower extremity diabetic foot ulcers (LEDUs) versus no AT (NAT).

Method: Medicare patients receiving care (10/01/2015-10/02/2018) for a LEDU treated with AT or NAT (propensity- matched Group 1) were retrospectively analyzed. AT was defined as high-cost skin substitute products reported under CPT codes 15271-15278 and the applicable Healthcare Common Procedure Coding System (HCPCS) Q-code. The analysis included major and minor amputations, emergency department (ED) visits and hospital readmissions. In addition, AT following parameters for use (FPFU)* was compared with AT not FPFU (propensity-matched Group 2). A paired t-test was used for comparisons of the two groups. A Bonferroni correction was performed when multiple comparisons were calculated. *FPFU = initiating AT within 30-45 days from the first visit of the episode of care and applying AT within the range of every 7-14 days.

Results / Discussion: There were 9,738,760 patients with a diagnosis of diabetes, of whom 909,813 had a LEDU. In propensity-matched Group 1 (12,676 episodes per cohort), AT patients had statistically fewer minor amputations ($p=0.0367$), major amputations ($p<0.0001$), ED visits ($p<0.0001$), and readmissions ($p<0.0001$) compared with NAT patients. In propensity-matched Group 2 (1131 episodes per cohort), AT FPFU patients had fewer minor amputations ($p=0.002$) than those in the AT not FPFU group.

Conclusion: AT for the management of LEDUs was associated with significant reductions in major and minor amputation, ED use, and hospital readmission compared with LEDUs managed with NAT.

OP28 OP28 SECONDARY DATA ANALYSIS OF STATUTORY HEALTH INSURANCE DATA TO DETERMINE THE PREVALENCE OF CHRONIC WOUNDS

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Aim: Due to varying prevalence data on chronic wounds in Germany the aim of this secondary data analysis was to survey the prevalence with the routine data of the AOK Rhineland/Hamburg as point prevalence for the first of January 2019 and as period prevalence for the years 2015 to 2018.

Method: To check the plausibility of the routine data used, internal diagnostic validations were performed using three case definitions (1st: Diagnoses leg ulcer and pressure ulcers; 2nd related wound-relevant prescriptions and/or services; 3rd: other chronic wounds).

Results / Discussion: Over two million data sets of insured members were evaluated The key-date prevalence rate of chronic wounds for first of January 2019 varied between 0.33% and 0.80%. In 2015, the period prevalence rate ranged between 0.57% and 1.16%, in 2016 between 0.60% and 1.26%, in 2017 between 0.62% and 1.25% and in 2018 between 0.68% and 1.28%. The 95% confidence intervals deviated from the point estimator by a maximum of ±0.02%. Only 22-46% of the wounds identified through the 1st case definition have received wound-related prescriptions or services. Overall, the evaluation of the routine data showed an increase in the prevalence of chronic wounds over the last years. Due to the limited transferability, up-to-date data from other health insurance companies are necessary to determine a comprehensive prevalence of chronic wounds.

Conclusion: The current prevalence as well as statements about the development of chronic wounds must be available for planning future care offers oriented to the needs and requirements of those affected.

OP74 OP74 SPLIT SKIN GRAFTS AS A WORK HORSE FOR SURGEONS IN LOW RESOURCES SETTINGS

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Aim: Split skin grafting (SSG) forms an early step in the reconstructive ladder. Aim of the study is to demonstrate that SSG when combined with negative pressure wound therapy (NPWT) and platelet rich fibrin (PRF) is sufficient in managing complex wounds which may otherwise require advanced reconstructive procedures.

Method: Seventy patients with tissue loss were included in the study and subclassified into post

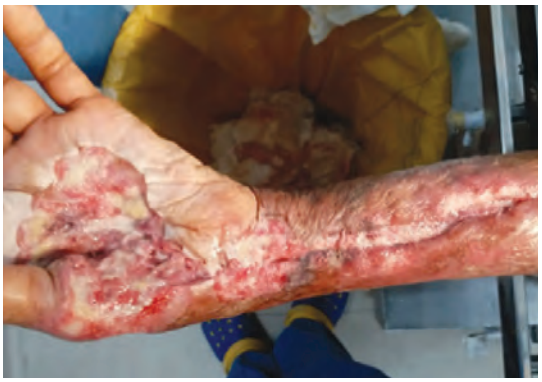

Fig 1: NSTI Left Forearm with Palmar Space Extension

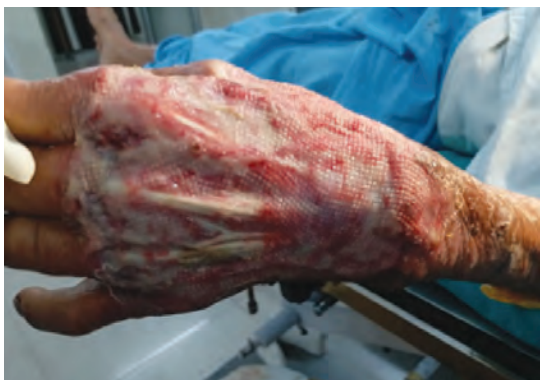

Fig 2 : Dorsal Aspect involvement

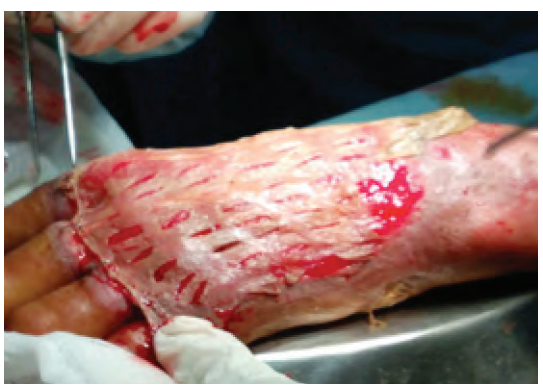

Fig 3 – SSG following sequential Deridement & improvised NPWT

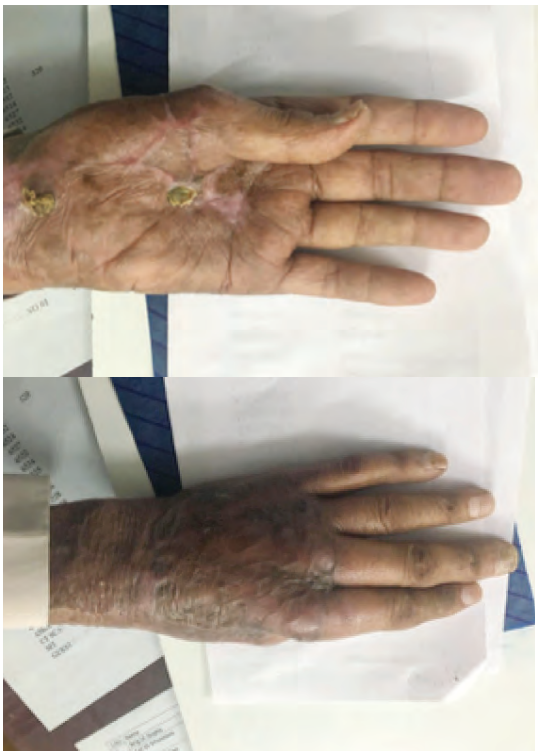

Fig 4 & 5 : Functional Hand following SSG

traumatic, post infective & those with vascular Insufficiency. After noting initial size of the defect they were treated with NPWT and PRF followed by SSG. Quality of graft uptake was assessed at the end of treatment.

Results / Discussion: Mean age of the patients was 40 years with male: female ratio of 2:1. Trauma and necrotising soft tissue infections were common etiologies, diabetes being the commonest comorbidity. PRF was helpful in creating a better wound bed in non healing ulcers in 25 patients. Improvised NPWT was used for larger wounds in 55 patients. Some wounds required a combination of therapies (50) and all were followed by a SSG. Average uptake of the graft was 90%. Two patients had graft failure & had to undergo regrafting.

Conclusion: With correct use of adjuncts, complex wounds & non healing ulcers can be managed only with SSG which proves to be a much simpler procedure with high success rates, thereby avoiding the need for complicated surgical procedures like flaps. This finding holds great significance for surgeons working in austere environments with limited access to advanced reconstructive surgical facilities.

Paper posters

PP18 THE DIFFICULT CASE: NPWT FOR EXTENSIVE SOFT TISSUE DEFECTS OF THE LOWER EXTREMITY

Rainer Stanek[1], Eva Pointner[1], Katja Canigiani de Cerchi[1], Gerhard Pomberger[1], Thomas Hölzenbein[2], Mehdi Mousavi[3]

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Aim: We report on the case of a 14-year-old girl with extensive soft tissue defects on the right lower extremity up to the right hip following a traffic accident. The patient suffered a subtotal amputation of the right lower extremity with a rupture of the external iliac artery and the iliac vein.

Method: After CTA, the pulseless, ischemic leg was treated with autologous arterial und venous vascular graft. Perfusion resumed 4 hours post-accident. Osteosynthesis was carried out using an external fixator. Despite fasciotomy, extensive soft tissue necrosis occurred on the right lower extremity. Due to preterminal multiple organ failure caused by SIRS, a large-area necrosectomy was performed and NPWT started. The occlusive dressing was applied to the entire right lower extremity including the anogenital area up to the iliac crest using a tubular bandage*.

Results / Discussion: This method allowed for sufficient negative pressure on the entire hip area and the entire right lower extremity. Septic condition improved immediately. After stimulating wound granulation, the secondary, serial split skin coverage of the defects was possible.

Conclusion: In the case of extensive soft tissue defects on the lower extremity with deep substance defects in the area of the hip and simultaneous external fixation on the pelvic ring as well as cystofix and colostoma creation, the establishment of an NPWT system typically is difficult and time-consuming. With the tubular bandage it was possible to use a reliable, reproducible, time-saving occlusive and elastic system for the NPWT.
**Suprasorb® CNP EasyDress Fixateur Externe – L&R*

PP05 LOCAL MANAGEMENT OF PYODERMA GANGRENOSUM: OUR EXPIERENCE

Pierluigi Gallo[1], Federica Maiello[1], Consiglia Staiano[1], Luigi Cacace[1], Giuseppina Oliviero[1], Bruno Iaccarino[1], Teresa Piccolo[1], Diana Barone[1], Agnese Turco[1], sERENA striano[1]

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Aim: Pyoderma gangrenosum (PG) is a rare neutrophilic dermatosis that presents with rapidly developing, painful skin ulcers hallmarked by undermined borders and peripheral erythema, with an incidence of a few cases per million person-years. PG is often associated with a variety of other immune-mediated diseases. PG is generally considered an autoinflammatory disorder.1 Our experience in PG follows a specifical wound flow chart, with a valid recognizing of the clinical sign.

Method: Between 2018 and August 2021, we followed five patients with a confirmed histological PG.

Every patient suffered of a remittent fever, elevated neutrophil count, painful erythematous cutaneous lesions. Three on five patients, suffered of rheumatoid arthritis, two on five, of small bowel disease and in two patient there was a previous cancer diagnosis. In a multidisciplinary accord, we afford everyone with systemic corticosteroids, colchicine and cyclosporines. Locally, following TIMERS and clinical sign changes, we worked in one a day enzymatic detersion, after using of a surgical debridement one a week and covering in impregnated gauze dressings and secondaries fresh cotton gauzes. Finally, in the last phase, we used hydrofiber dresses.

Results / Discussion: We had a complete resolution in about 6-12 months. No one suffered of any kind of problem linked with medications. Locally infection was contained with a good cleanser using, and specific antibiotics after a confirmed culture.

Conclusion: A correct and early diagnosis of PG permits a good systemic and local treatment. Locally following TIMERS and sign changes, we can obtain a progressive resolution, solving eventually over infections.

PP16 LEVELS OF ANGIOGENIC REGULATORS AND MMP-2, -9 ACTIVITIES IN MARTORELL ULCER: A CASE REPORT

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Aim: Martorell hypertensive ischemic leg ulcers (HYTILU) represent a unique form of lower extremity non-healing ulcers that develop in association with poorly controlled high blood pressure.
Method: The present study was performed in order to assess levels of protein regulators of angiogenesis (vascular endothelial growth factor, or VEGF, and angiostatins) and to evaluate activities of matrix metalloproteinases (MMPs) (gelatinases MMP-2 and -9) in wound cutaneous tissue in the case of patient with 2-years HYTILU history.

Results / Discussion: VEGF and angiostatin levels were analyzed by Western blot, MMP activities were evaluated by gelatin zymography. We report here for the first time that wound tissue in HYTILU is characterized with increased levels of VEGF (by 75 folds vs. histologically normal tissue, $P < 0.01$) and dramatic overproduction of angiostatin levels, which are undetectable in healthy cutaneous tissue. Approximately 10-fold elevation in MMP-2 and -9 activities is observed in wound tissue as compared with uninjured cutaneous tissue. Obtained results indicate that increased production of angiogenic inhibitors, angiostatins, may counteract VEGF-induced pro-angiogenic signaling, and together with MMP overactivation, contributes to failed healing of ischemic ulcer.

Conclusion: Further extended studies are needed to clarify how changes of angiogenic profile and imbalance of proteolytic activities in non-healing Martorell ulcers can be considered during their management procedures to improve efficacy of surgery debridement and/or skin grafting.

PP19 NEGATIVE PRESSURE WOUND THERAPY AFTER C. MAMMA SURGERY

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Aim: We explore the use of negative pressure wound therapy (NPWT) after c. mamma surgery, focusing on indication of NPWT and effect on the numbers of seroma draining postoperatively (SDP).

Method: 249 underwent surgery between January 2020 and Marts 2021 at Viborg Hospital, Denmark. Data were collected retrospectively from patient records. Patients were stratified by type of operation (mastectomy and +/- sentinel node, axillary clearance (AC) or re-axillary) and according NPWT-use postoperatively. Data on BMI, age, smoking, diabetes, postoperative infection, cicatrice deficit (CD) and neoadjuvant chemotherapy (NC) were also included.

Results: 57(23%) were in the +NPWT-group. The mean numbers of SDP were 4.6(95%CI 4.1-5.2) +NPWT vs 3.8(95%CI 3.0-4.6) -NPWT (p=0.13). The highest mean of SDP were seen among patients with infection 7.6(95%CI 6.3-9.0), CD 6.1(95%CI 4.5-7.7) and BMI>30 5.9(95%CI 4.9-7.0), independent of NPWT-use. No significant effect of NPWT on numbers of SDP were seen according to infection, CD, NC or diabetes. A significant reduction of mean SDP was in the +NPWT-group after stratifying for smokers (+NPWT 2.5 vs –NPWT 4.9(p=0.01)) and for mastectomy with AC (+NPWT 5.7 vs. -NPWT 7.8(p=0.02)).

Conclusion: A no-significant difference in numbers of SDP were seen between the +/-NPWT-groups. Furthermore, patients with infection, CD, and BMI>30 had the highest mean of SDP independent of NPWT. By subdividing the +NPWT-group, we found a significant reduction in SDP among smokers and mastectomy+AC. An individualized approach to NPWT use after c. mamma surgery are needed. Additionally, a randomized controlled study focusing on smokers, BMI>30, and/or patients with mastectomy and AC are required.

PP04 BACTERIAL BINDING IN VITRO IS RELATED TO THE BACTERIAL LOAD AND COMPOSITION OF THE SURROUNDING MEDIA

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Aim: To investigate the impact of bacterial load in surrounding media on the bacterial binding of two hydrophobic wound dressings in vitro.

Method: Two hydrophobic wound dressings, coated with dialkylcarbamoylchloride (DACC) or silicone, were evaluated for bacterial binding in vitro. Dressing pieces were placed on top of suspensions containing approximate 103, 105 or 107 colony forming units (CFU) of Pseudomonas aeruginosa in either Phosphate Buffered Saline (PBS) or Simulated Wound Fluid (SWF, containing 50% serum), incubated

for 1 hour. CFUs were determined on dressings and in the suspensions. Suspensions without dressing pieces served as controls.

Results / Discussion: Higher bacterial load in suspensions resulted in higher bacterial binding, and the binding was reduced with the more complex surrounding of SWF. Proteins, which are present in the SWF and in wounds, binds to the dressings and leads to a change in bacterial binding.

Bacterial load in PBS suspensions was significantly lower for DACC than silicone ($P<0.01$), with 0.5 log reductions at most. A 3 log reduction is a general accepted standard for bactericidal activity of a substance or device, which could not be achieved by bacterial binding in this test set up. No significant reduction was observed in SWF for any of the dressing which correlates with less bacterial binding of the dressings in this environment.

Conclusion: Bacterial binding was related to the composition of the test medium and bacterial load. Bacterial load in surrounding suspension was reduced by at most 0.5 log units.

PP09 MULTINATIONAL OBSERVATIONAL STUDY ON THE PERFORMANCE, HANDLING AND SAFETY OF A NEW ALGINATE WOUND DRESSING

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Aim: Alginate dressings play an important role in modern wound care. Areas of application include exudate management, autolytic debridement and hemostasis. Users of the alginate dressings have high demands on performance, handling and safety. In order to meet these requirements, a new alginate wound dressing* was developed from a mixture of 80% alginate and 20% viscose. In the study presented, the wound dressing was tested for the properties described.

Method: An observational study was carried out in clinical as well as outpatient settings at study centers in Germany, Austria and Poland. The users were asked to treat up to 8 patients with the new alginate according to the instructions for use. All patients were adults and suffered from highly exuding wounds which were either pressure injuries, arterial/venous ulcers, diabetic ulcers or postoperative wounds.

Results / Discussion: The performance, measured in the parameters of time required for application and adaptation to the wound bed in dry and gelled conditions, was rated on average by users as good or very good/excellent on a 6-point Likert scale. More than 90% of the users stated that they could achieve their treatment goals, in particular exudate management, autolytic debridement and hemostasis. All handling parameters were also rated as good or very good on average. The alginate caused almost no maceration of the wound edge and was usually removed very easily in one piece.

Conclusion: The alginate dressing met the performance, handling and safety requirements and was very positively received by users.
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PP06 HBOT AND ADVANCED WOUNDCARE IN A 38 YEAR OLD WOMAN WITH COMPLEX WOUNDS AND MIXED CONNECTIVE TISSUE DISEASE

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[1]Da Vinci Clinic Foundation, Geldrop, Netherlands

Aim: Mixed connective tissue disease (MCTD) is a chronic inflammatory systemic autoimmune disease, signified by complex interactions including inflammation, dyslipidemia, thrombotic events, and humoral autoimmune processes. One of the possible clinical manifestations is chronic ulceration. The use of hyperbaric oxygen therapy (HBOT) has not yet been described in MCTD.

Materials and methods: A patient with two complex wounds at the right leg because of MCTD was treated using advanced wound care before and after HBOT. Disease progress was monitored prospectively using wound measurements and with the RAND36 questionnaire score.

Results: The 38 years old woman had before treatment respectively 6 and 3 months complex wounds of the right medial malleolus and right tibia. Before the first treatment with HBO in September the patient was treated for a period of 7 months with negative pressure therapy, compressive therapy, maggot therapy and later topical application of hydrocortisone and antibiotics. The patient was treated with 40 daily sessions HBOT (80 minutes of 100% oxygen at 2,5 ATA). The wound surfaces before the start of HBO were 1,4 cm2 and 6 cm2. The smaller wound was closed after HBOT, and the wound surface of the remaining wound was 4,16 cm2. After HBOT, wound care included epidermal grafting and negative pressure therapy. Six weeks later the second wound was also closed and the RAND36 improved.

Conclusion: After advanced wound care and HBOT two chronic MCTD ulcers were closed, with improvement in quality of life. HBOT should be considered in the multidisciplinary approach of MCTD ulcers.

PP21 KERATIN BASED GEL USE ON PRESSURE RELATED ULCERS IN LONG TERM CARE

Comprehensive Wound Johnson[1]

[1]Washington, Surgery, WASHINGTON, United States

Purpose: This research project is designed to support improvement in the quality of life for patients living with pressure ulcers in long-term care facilities. Currently, wound care products for pressure related wound care ulcers are limited in use due to cost and limited research.

Approach: Pressure ulcer care is essential medical care to prevent patient systemic decline in Long-term Care facilities. Our study consists of a retrospective look at 13 patients with stage II and stage III buttock or sacrum wounds. Keragel based product was applied 1mm thick from wound edge to wound edge, photos taken during each wound assessment.

Result / Data: Progressive wound healing was noted in ~70% (9/13), with (2/13) unchanged, and (2/13) declined. The same wound care provider assessed all wounds for 30 days weekly with photographic and standard of care management. Debridement and the standard of care were applied to all patient wound sites. 7 wounds were sacrum in location and 6 wound located on the buttocks sites, 4 on the

right 2 on the left. The same wound care nurse applied 1 mm thick Keragel based product to the pressure ulcer wound sites edge to edge.

Conclusion: Extensive wound decline in long term care settlings can affect patient's clinical progress. Using a keratin enriched gel category dressing utilizing keratin technology to create and maintain a moist wound environment improving wound healing is imperative. Required for progressive wound healing in the Long-term care.

PP22 AN INNOVATIVE BIOLOGICAL MATRIX: FIRST CLINICAL STUDY IN THE TREATMENT OF VENOUS LEG ULCERS

Henri-Pierre Suso[1], Jevgenija Purane[1], Ralf Schmidt[1], Luc Téot[2], Jean-Charles Kérihuel[3], Enda Kenny[1], Peter Vowden[4], Kevin Mercer[5]

[1]Biovotec, Valbonne, France; [2]Chu Montpellier, Montpellier, France; [3]Vertical, Paris, France; [4]University of Bradford, United Kingdom; [5]Bradford Teaching Hospitals NHS Foundation Trust, United Kingdom

Aim: The first clinical study has been completed to evaluate the safety and effectiveness of Purified Eggshell membrane Protein (PEP) matrix in patients with venous leg ulcers (VLU). The study population presented with difficult and hard to heal wounds.

Method: PEP matrix consists of a network of collagen and other structural protein. It aims to optimize the granulation and modulate MMP activity. The clinical assessment was done by a multi-center clinical study of 44 patients: run-in period of 4 weeks with standard of care, 8 weeks with standard of care and PEP matrix and a further 4 weeks with standard of care alone. Only patients who had failed to show >40% improvement during the Run-In Phase were treated with PEP matrix. Endpoints: wound closure, wound area change, epithelialization, pain and exudate.

Results / Discussion: The results of the clinical study are consistent with the preclinical data. There were no serious adverse events reported for PEP matrix in the clinical study. The study reports that 18% of wounds healed during PEP matrix treatment and approximately 50% of wounds decreased in size by a median of 37.9% or more. The data suggest that the treatment may be beneficial whilst wounds are continuing to heal and treatment should be continued as long as the wound shows signs of improved epithelialization and continues towards full healing.

Conclusion: PEP matrix was not associated with any unexpected adverse events. It can make a significant contribution to wound healing due to its innovative mechanism of action and affordable price.

PP01 PROTEAS-MODULATING POLYACRYLATE BASED HYDROGEL IN THE TREATMENT OF HEMATONA WHEN NPWT FAILED

Guy Duboccage[1], Hadewijch Pecceu[1]

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This case involves a 75 year old woman with diabetes and overweight causes fall with bicycle.

There was a large hematoma on the top left buttock with suddenly necrotic tissue after several days. NPWT was not done in this case because hospitalization was denied and the costs were too high, so we looked for another treatment.

We used a wounddressing consisting of super-absorbant granules of poly-acrylate (SAP) impregnated with a Ringer and PHMB solution. The combination of these two components provides an easing out of necrotic tissue and a good absorption of the wound-exsudate. The function of the different components is multiple: The SAP's are responsible for reducing the activity of MMP's in the wound. The solution passes from the dressing to the wound, the exsudate from the wound is held in the poly-acrylate granules and the bacterial load decreases due to the action of the PHMB solution.

An integrated layer of the dressing is designed to avoid exsudate from leaking out. We performed different chirurgicals debridement at home before starting an proteas-modulating polyacrylate Hydrogel. The dressing can stay in the wound for up to 3 days or 72 hours.

As extra bonus: the hydrofobe silicone cover of the dressing avoids it from sticking to the woundbed. This makes the replacement of the dressing non-traumatic and much less painful for the patient.
The conclusion must be that these dressings are specially designed for the use in chronic, non-healing or slow-healing wounds

PP10 EVALUATION OF A SUPERCORE DRESSING ON EXUDING CHRONIC WOUNDS

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Introduction: Wound exudate has significant role in the process of wound healing. It is well known that the composition and amount of exudate in chronic wounds have a negative impact on wound healing. SuperCore absorbent dressings are binder and adhesive free and have a non-sagging superabsorbent core that contain a mix of natural fibres and sodium polyacrylate making them a potentially more effective choice than foam dressings.

Aim: Investigate if improved exudate management by using SuperCore dressings can lead to faster healing, prevent exudate related complications, and minimise cost of treatment.

Method: 11 highly exuding wounds that had been open for more than six weeks and previously treated with silicon foams were included. A thorough assessment of the patient's history and a detailed wound assessment based on the T.I.M.E principle was performed. Dressing changes according to exudate level. Results: All patients reported a reduction in exudate (average 73%), odor and pain during the first week of their treatment. Patients became calmer when not experiencing odor and leakage. All wounds gradually reduced in size taking between 1,5-3 months to completely close. The dressing showed to be amazingly effective at debriding and didn't 'sag'. The frequency of changes reduced from 3x week to 1x week. We saw a 71.1% reduction of cost compared to previous treatment.

Conclusion / Discussion: Our evaluation showed that SuperCore dressings promoted wound healing

in patients where previous therapy with silicon foams had failed, increased patient satisfaction, while being very cost-effective.

PP11 RETENTION OF BACTERIAL PROTEASES BY DRESSINGS: AN IN VITRO EVALUATION

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Aim: Wound maceration and breakdown of the wound bed are commonly associated with high proteolytic activities. Endogenous matrix metalloproteinases (MMPs) are believed to play a crucial role in extracellular matrix (ECM) remodelling and breakdown. However, clinical studies have shown that bacteria-derived proteases also contribute to ECM destruction in non-healing chronic wounds[1]. The sources of these bacterial proteases are the wound bioburden and the dressings in situ on the wounds. We have developed an in vitro method for quantitatively assessing the leakage of bacterial proteases originating from dressing bioburden.

Method: Different wound dressings inoculated with Pseudomonas aeruginosa were incubated for 24hrs on Bromocresol-stained casein agar plates that detect proteolytic activity through coloration changes. Intensity of color change is proportional to amount of proteolytic activity leaking from the dressing onto the plates. Images of plates were processed and visualized by ImageJ software and relative quantification of proteolytic activity was done by mathematical assessment of pixel histograms.

Results: Significant differences in bacterial protease leakage between different dressings were observed. The results show that dressings have different ability to retain bacterial proteases and, thus, may contribute differently to the overall proteolytic activity in wounds.

Conclusion: By employing a “volume under the surface” approach based on pixel intensity, the method compensates for differences in wound dressing size. The method is a robust and reproducible way to assess bacterial protease leakage from wound dressings.

[1]Trøstrup, H., Holstein, P., Karlsmark, T., Moser, C., Ågren, MS. Uncontrolled gelatin degradation in non-healing chronic wounds. J Wound Care 2018;27(11):724-734

PP12 WOUNDS IN ONCOLOGY: HOW MANAGE A RISK OF INFECTION, INCLUDING BIOFILM SUSPICION?

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Aim: Management of biofilm and local infection is important in oncologic patients, who are vulnerable, frequently immuno-depressed and/or present other specifics delay healing factors. Cancer treatment cannot be delayed, so it’s necessary to act promptly. In frame of the Infection Continuum concepts, the choice between anti-biofilm and antimicrobial solution can be difficult.

Objective: discuss clinical strategy and when oncologic patients present biofilm or local signs of infection on post-surgical wounds.

Material / method: retrospective study of clinical cases. 2 groups polyhexanide–betaine product for biofilm (n=10) or ionic silver alginate paste for infection (n=10). Observed parameters: wound type and aspect including local signs of infection, protocol duration and outcomes.

Results: Group polyhexanide–betaine: age mean: 63 years. Criteria: chronic surgical wound (superficial, low exudate, slimy), Modalities: dynamic cleaning with surgical compresses and polyhexanide–betaine gel + Vaseline tulle, once/ day +. Protocol duration: mean 23 days Results: complete healing: 6/10; Good evolution: 3/10; 1/10: healing process start again, bur relay with hydrofiber during radiotherapy.

Group silver alginate: age mean: 60 years. Criteria: chronic surgical wound (superficial or cavity, low to moderate exudate) or infection signs /increased infection risk Modalities: silver alginate paste + compresses, once/ day. Protocol duration: mean 19 days. Results: improvement 8/10, failure or inappropriate 2/10

Conclusion: Biofilm and bacterial colonization/ infection are part of the Infection Continuum and should be addressed in due time. The choice between an antimicrobial and an anti-biofilm product is important to address different indications, with same aim manage infection prevent delayed healing.

PP13 SILICONE DRESSINGS AND RE-EPITHELIALISATION - A POSSIBLE LINK TO SUPERIOR WOUND HEALING

Ausra Peciulyte[1], Fredrik Osla[1], Kristina Blom[2], Eric Wellner[1]

[1]Mölnlycke Health Care AB, Research & Development, Gothenburg, Sweden; [2]Mölnlycke Health Care AB, Medical and Economic Affairs, Gothenburg, Sweden

Aim: Clinical studies have shown that soft silicone-coated dressings (SCD) are associated with faster healing of acute wounds than non-silicone dressings1, including lipidocolloid-impregnated dressings (LID)2. This study was undertaken to elucidate the effect of SCD and LID on human keratinocytes and skin to capture re-epithelialisation in vitro and ex vivo.

Method: Human keratinocytes were seeded and exposed to decreasing concentrations of SCD and LID cell media extracts (cells quantified after 72 hours' incubation). In addition, keratinocytes were grown to near confluency, scratched and exposed to dressing extracts. Closure of scratch gap was measured after 24 hours. Closure of gap was also investigated using the ORIS system, monitoring cells over time with holographic microscopy. Re-epithelialisation was studied with a human ex vivo wound model. Cell media was added, keeping the epidermis air-exposed before applying dressings. Healing progress was studied using fluorescein diacetate3.

Results / Discussion: Keratinocyte numbers after incubation with the extracts were significantly higher with SCD than with LID (dose-dependent response). Significant difference was found in gap closure; LID extracts led to a delay (due to reduced proliferation and migration). Slower re-epithelialisation was seen with LID than SCD in the ex vivo model.

Conclusion: The difference seen on keratinocytes proliferation / migration and re-epithelialisation between SCD and LID could explain the superior number of healed wounds for SCD in the previously undertaken clinical trial.2

1. *Gotschall, C.S., et al. J Burn Care Rehabil 1998 ;18(4) :279-83*
2. *David, F et al. Int Wound J 2018 ;15(1) :158-169*
3. *Lu, H., et al. Wound Repair Regen. 2004;(12):575–87*

PP02 IGG-IMMUNE COMPLEXES ACCELERATE WOUND HEALING BY RECRUITING NEUTROPHILS VIA FCr RECEPTOR IIA AND LFA-1

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Aim: Wound healing is a complicated process including, haemostasis, immune cell infiltration and proliferation, tissue remodeling. Chronic would lingers on the stage of cell infiltration due to severe tissue destruction and infection. Antibodies to wounded tissue and bacteria are reported to accelerate wound healing. We showed deposited antibodies to wounded tissue and bacteria improved wound healing by inducing neutrophil recruitment from the microcirculation via interaction with Fcr receptor IIA.

Method: To demonstrate the role of IgG-immune complex in recruiting neutrophils, we used an in vitro perfusion flow chamber assay. An in vivo splenectomy mouse model was used to address the role of antibodies in wound healing.

Results / Discussion: We found that Fcr receptor IIA was required for IC-induced neutrophil recruitment. A monoclonal blocking antibody to LFA-1 abrogated the IC-mediated neutrophil capture, illustrating that the arrest of neutrophil induced by the binding of ICs with Fcr receptor IIA demanded the presence of LFA-1. Furthermore, an in vivo splenectomy mouse model showed that splenectomy delayed wound healing accompanied by less IgG deposition and neutrophil infiltration. Correlation analysis further proved that deposition of IgG had a significant positive relationship with the recruitment of neutrophils. Besides, Adoptive transfer of antibodies into splenectomized mice rescue the delayed wound healing by attracting more neutrophils. Interestingly, local application of Fcr receptor IIA blocking antibodies to the wound sites exactly in the first day after injury abolished neutrophil recruitment and restrained wound healing.

Conclusion: Thus, our results prove that IC deposition to the wounded site benefit wound healing by recruiting neutrophils via Fcr receptor IIA and further supported by LFA-1, implying a novel role of antibodies to immunomodulate wound healing.

PP20 A COMPACT TRADITIONAL NPWT. REDUCTION IN SIZE BUT NOT IN PERFORMANCE

Kathleen Leak[1], Susan Johnson[1]

[1]Independent wound care, Doncaster, United Kingdom

Aim: An evaluation of a new compact NPWT system incorporating a pump and cannister for exuding wounds was undertaken in four different clinical settings to assess the performance of the unit to determine its positioning within today's healthcare environment.

The new compact pump can be used on a variety of settings both continuous and variable with either foam or guaze.

Method: Four different clinical settings were used:
- community,
- outpatients,
- burns and plastics
- diabetic and general foot clinic.

All clinicians involved in the trial were experienced in NPWT.
Data collection included:
- co-morbidities,
- medications,
- wound aetiology and previous dressing regimes
- type of interface dressing used (clinician choice)
- the setting of the unit (- 40mmHg to – 125mmHg), continuous or variable pressure
- duration of therapy
- Wound assessment pre and post therapy with photographs
- Clinician questionnaire re ease of use, application and any problems encountered.

All pumps, cannisters and dressings were supplied by the company.

Results: Performance of compact unit are equitable with other traditional units are wear time, exudate management.
Range of settings in compact pump increases versatility of use in the wider healthcare Setting.
Portability of Compact pump facilitates earlier discharge and mobility.
Battery life equitable or better than traditional units.

Conclusion: Multiple therapy options increases versatility of therapy.
Cannister sizes enables the compact unit to replace all heavier units.
Clinician choice of dressing interface (green foam or gauze) enables clinicians to maintain their current practice but with a more compact unit.
When used on low exuding wounds the pump will run for 40 hours on one charge.

PP15 EXOGENOUS NITRIC OXIDE IN THE TREATMENT OF INFECTED WOUNDS

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Aim: improve the treatment results of patients with infected wounds of the extremities by using nitric oxide (NO).

Method: The results of treatment of infected limb wounds in 24 patients with NO therapy were analyzed, and 32 used traditional treatment methods. The effectiveness of treatment was monitored by cytological examination of wound prints during exposure to a cooled air-plasma stream enriched with molecules of exogenous nitric oxide before treatment, on the 1st, 7th, 15th and 20th day. The dynamics of changes in the clinical picture of the wound process was determined by reducing the area of wounds.

Results / Discussion: After a 15-day course of NO therapy, up to 20 days from the start of treatment, 18 patients (75.0%) achieved complete healing of wound defects, and 6 (25.0%) showed a marked reduction in wound size with stimulation of active epithelization. As a result of the use of NO-therapy in patients with infected wounds, the time of wound cleansing and healing in the main group was significantly less (by 10.1 ± 2.0 days) than in the comparison group. Cytologically occurring changes in the clinical picture towards healing correspond to an earlier, on average, 6.2 ± 1.1 days, change of degenerative-inflammatory processes in the wound to regenerative ones.

Conclusion: 1. The use of NO-therapy can reduce the treatment time for patients with infected wounds of the extremities by 10.1 ± 2.0 days. 2. Treatment with exogenous nitric oxide using the Plazon apparatus is regarded as effective in 100% of patients.

PP08 COLD PLASMA IS A NOVEL METHOD TO TREAT DIABETIC FOOT ULCER INFECTION

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Background: Cold atmospheric plasma (CAP) is shown to decrease bacterial load in chronic wounds. It is also presented as a novel approach in healing the wounds in both in vitro and in vivo experiments.

Objective: We aimed to implement the first randomized clinical trial in use of CAP in diabetic foot ulcers.

Methods: Patients with diabetic wound (n=44) were randomized to receive standard care (SC, n=22) without or with CAP applied three times a week for three consecutive weeks (SC+CAP, n=22). CAP was generated from ionized helium gas in ambient air and driven by high voltage (10 kV) and high frequency (6 kHz) power supply. The primary outcomes were wound size, number of cases reached wound size of <50%, and bacterial load over three weeks of treatment.

Results: Treatment with CAP was effective in reducing the fraction of wound size (p=0.02). After 3 weeks, the number of wounds that reached the fraction of wound size of ≤ 50% was significantly more in SC+CAP group (77.3%) compared with the SC group (36.4%) (p = 0.006). The mean of fraction of bacterial load counts in each session 'after CAP exposure' was significantly less than 'before exposure' measures.

Conclusion: CAP could be an effective method for accelerating wound healing in diabetic foot ulcers. It also exerts immediate antiseptic effects, which seems not to last for a long time.

Key words: Cold Plasma; Diabetic Foot Ulcer; Infection

PP03 THE USE OF A LIGHT VISCOSE NET DRESSING* IN PATIENTS WITH LARGE POSTOPERATIVE WOUNDS COMPLICATED WITH MULTIPLE FISTULAS

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Aim: Describe the various considerations needed for choosing the correct treatment of a complicated case, taking into account both the wound and the patient's conditions.

Methods: Case report describes a 52 YO female with 3 children of Arab origin presented with complex postoperative wounds complicated by multiple high output and abdominal sepsis. A broad spectrum antibiotic was started after wound debridement. The surgical wound on the abdomen was big, surrounded by multiple fistulas secreting intestine fluid. The fistulas couldn't be joined into one unit and a negative pressure dressing was impossible. The attending staff couldn't cover the wound. The patient was in pain every time she was touched for dressing replacement. The light viscose net dressing* is an antibacterial material serving as a protection of the wound and an enhancer for granulation. It was placed on the wound bed and covered with saline gauze and secured with a film dressing. While the light viscose net dressing* remained on the wound for 3 days, the saline saturated gauze was replaced several times a day.

Results: Considerable improvement in general condition and wound healing was noted within 2 weeks. The surgical wound was approximately 90% clean and granulating, the volume of excreted contents decreased, local pain and discomfort for the patient reduced.

Once the general condition of the patient was considered satisfactory, she underwent surgery aimed at restoration of the digestive tract continuity.

Conclusion: The light viscose net honey dressing* serves as a good solution for oncologic wounds involving major pain, bad odor and extensive pain and second degree burns.
**Actilite*

PP23 APPLICATION OF THE HPBIOM IN A HUMAN WOUND MODEL FOR THE ANALYSIS OF WOUND HEALING AFTER BACTERIAL INFECTIONS

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Aim: Biofilms represent a major challenge in the therapy of chronic wounds. There is a lack of suitable models to simulate biofilm infections in wounds. For this purpose, a new model, the human plasma biofilm model (hpBIOM) was used to mimic the infection of a wound in a human ex-vivo wound model. Method: Human plasma was inoculated with Pseudomonas aeruginosa or MRSA and, subsequently, induced to polymerize by thrombocyte aggregation. The wound model was obtained from human fat apron resectates, which were punctured with a biopsy punch, creating wounds with 8 mm diameter.

The hpBIOM disc was inserted on top of the wound. The biofilm wound models were placed on an air-lift system. The wound/bacteria interaction was monitored by means of hematoxylin/eosin staining. Results / Discussion: Both bacteria strains interfere with wound healing. The non-motile MRSA mainly infected the wound bed, while the motile P. aeruginosa infiltrated the tissue residing in the damaged Stratum corneum. This behavior reflects the reported clinical situation.

Conclusion: MRSA and P. aeruginosa require different wound therapies. The treatment of the wound bed is sufficient for MRSA infections. P. aeruginosa infections additionally require increased attention to the visually unaffected wound environment. The combination of the human ex-vivo wound model and the hpBIOM reflects a suitable model for the investigation of biofilm infections, their effects on wound healing and enables the identification of new targets for the management of chronic wounds.

PP24 THE NOVEL RAT EXCISIONAL WOUND MODEL METHOD

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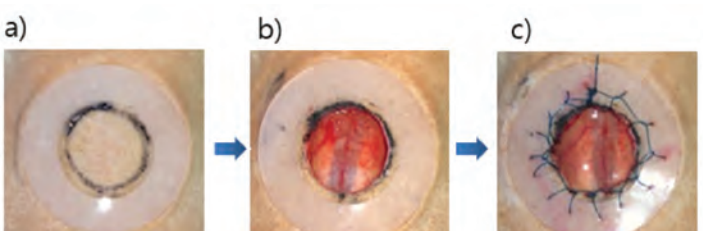

Fig. 1. The novel rat excisional wound model method.

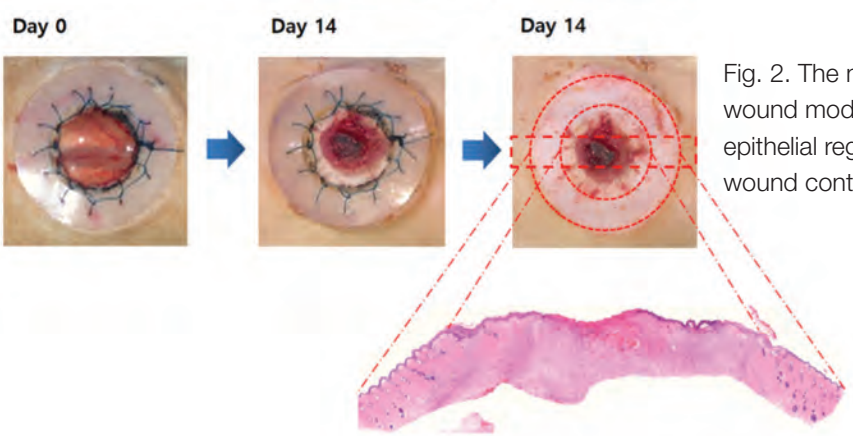

Fig. 2. The novel rat excisional wound model method showed epithelial regeneration without wound contraction by day 14.

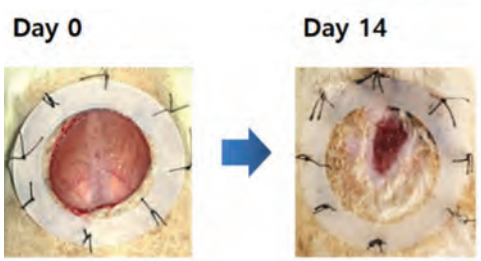

Fig. 3. The conventional rat excisional wound model.

Aim: A good animal wound healing model is essential for researchers to study the basic mechanism of tissue repair. Among those, rat wound healing models are popular for wound healing models. However, the major limitation of using rat to evaluate wound repair is that wound contraction originates outside of tissue, whereas in humans, re-epithelization and granulation tissue formation occurs within the wound space.

Method: We present a new skin defect wound model by fixating silicone ring by skin bond prior to creating a full thickness skin defect wound. An 15mm sized diameter, full-thickness skin was created. Then, the silicone ring was fixed once more by continuous locking sutures (5-0 nylon) to prevent contracture.

Results / Discussion: The novel technique described in this study resolves the problems that were encountered with conventional technique. By fixing the silicone ring by adhesive bond first and then creating the excisional skin and fixing once more by continuous locking suture, the sutures did not detach from the skin and the skin remained properly fixed without contracture. The wound healing process was not affected by the silicone ring, as the skin and subcutaneous tissue healed very well by day 14.

Conclusion: The new technique can effectively reduce wound contraction and allow the wound healing mainly through re-epithelization and granulation tissue formation.

PP17 WHAT IS THE EFFECT OF A PLANNED MULTIDISCIPLINARY TEAM APPROACH ON THE PREVENTION OF LOWER LIMB AMPUTATION, IN PATIENTS SUFFERING FROM PERIPHERAL VASCULAR DISEASE? A SYSTEMATIC REVIEW

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Aim: Lower limb amputation is a serious, costly procedure and has many complications associated with it, including an increased risk of mortality. The aim of this systematic review was to explore the existing literature and identify the effect of a multidisciplinary team approach (MTA) on rates of amputation in patients affected by vascular disease (VD) in the lower limbs (LL).

Methods: Following the guidance of PRISMA, the databases CINAHL, PubMed, Scopus, Google Scholar, EMBASE and the Cochrane Library database were searched. Data were extracted using a predesigned data extraction tool, study quality was assessed using the EBL checklist and data analysis consisted of a narrative synthesis.

Results: We identified 7 cohort studies (N= 3915). There were variances in each of the studies methods, with the only 3 of the seven studies offering a control population in which to compare their results. Despite this, 6 of the studies had statically significant results demonstrating a positive decrease in the rate of amputations after MDT implementation.

Conclusion: MTA implementation in acute or outpatients' services may have a positive effect on reducing the incidence of large LL amputation. However, with a lack of RCTs, the level of evidence is low. At present, there is no standardisation of care/multidisciplinary team for patients with VD. This identified

variance may be leading to discrepancies in amputation rates internationally. The healthcare team should provide holistic and multidisciplinary care with close observation and staging of a patient's limb status to halt the progression VD, prior to the need for major invasive life-threatening surgical procedure.

PP14 FUNGATIVE WOUND: PSYCHOLOGICAL AND EMOTIONAL DISTRESS

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Introduction: Fungating wounds one of the common problems in advanced stage cancer patients. This is also both physical and emotional challenges to the patient, informal carer, and to health care professionals. An understanding of palliative care goals in the care of patients is essential in developing an individualised care and treatment plan to enhance the quality of life of both the patient and their family.

Method: Initially a plan was generated regarding management of fungative wounds in cancer patient in a nodal centre at District Head Quarter. Subsequently every week trained social worker attached to nodal centre will follow up and give necessary advice and emotional support to the patients and their families. Patient's family were also encouraged to communicate with the team in case of fresh complain and urgency in between.

Result: Since last one year, 600 cancer patients were contacted with us. It is estimated that 60 (10%) patients with cancer develop fungative stage in rural areas of India and highest number of sites is breast (70%) and after that head neck (20%). Apart from psycho-social and emotional problem, pain, exudates, drainage, odour, itching, bleeding are the main symptoms affecting these patients. However regular homecare visits by a group of social workers were of immense help in the last few months of life.

Conclusion: Study has shown that the families are often the ones who support the patients, and they themselves are likely to experience extreme physical and psychological distress. Families report that it is hard for them to manage the wound-related symptoms and a shift in their role from being a partner to being a supportive carer. They have to acquire the tasks of palliative wound care to manage their loved one's wound.


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