

Clinical application of the Society for Vascular Surgery (SVS) Lower Extremity Threatened Limb Classification system: risk stratification based on Wound, Ischaemia, and foot Infection (WIFI)

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ABSTRACT

Peripheral arterial disease and associated critical limb ischaemia is a well-respected predictor of wound morbidity and tissue necrosis. With respect to diabetes, patients who present with a threatened lower extremity may carry a broader spectrum of contributing factors including neuroischaemic and infectious aetiologies. The authors of the Society for Vascular Surgery (SVS) Lower Extremity Threatened Limb Classification have refocused an approach to the patient with a threatened limb and not only address ischaemia, but also have taken into account the key factors of tissue loss and the presence and extent of infection. Case examples are presented for practical application of this system which may aid in characterising and stratifying the clinical state and risk of amputation in patients whose disease burden has given way for a limb-at-risk. With this new classification system and risk assessment tool, meaningful clinical trials may be developed to improve current operative and non-operative treatment options for the threatened limb.

INTRODUCTION

Peripheral arterial disease (PAD) and associated critical limb ischaemia (CLI) is a long-known and well-respected predictor of wound morbidity and tissue necrosis. An earlier publication first described CLI based on certain parameters: pressure <40 mmHg in the presence of rest pain and <60 mmHg in the presence of tissue necrosis¹. Existing CLI classifications such as Rutherford and

Fontaine closely evaluate these clinical parameters. However, they fail to adequately categorise the extent of tissue loss and the severity of infection, if present^{2,3}.

It was intended and noted in Bell's 1982 publication that diabetic patients be excluded or defined in a separate category due to a varied clinical picture of neuropathy, ischaemia and sepsis⁴. However, in modern practice, patients who present with a threatened lower extremity carry a broader spectrum of contributing factors. Ischaemia and PAD is one such factor, but neuropathy and foot deformity associated with uncontrolled diabetes are other compounding factors. It is now known that diabetic foot ulcers carry neuropathic, ischaemic, and neuroischaemic aetiologies⁴. In fact, there has been a rising incidence of PAD in patients with diabetes. Recent revascularisation trials have shown the prevalence of diabetes in patients undergoing revascularisation for limb salvage to be as high as 50% to 80%⁵⁻⁸.

One of the most widely known wound classification systems intended for diabetic feet was published by Wagner⁹. While it has continued to maintain use in wound descriptions including osteomyelitis and location of gangrene, this system does not provide a means to quantify vascular influence over the lower extremity wound. It also fails to address soft tissue infection nor does it differentiate gangrene due to ischaemia or infection. Similarly, the University of Texas (UT) wound classification system, the first validated diabetic foot wound classification system, did describe depth, infection, and ischaemia. However, it only dichotomised infection and ischaemia as "present"

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or “absent”¹⁰. The Infectious Disease Society of America (IDSA) does provide a system for stratifying amputation risk pertaining to pedal infection, but does not address wound extent or ischaemia¹¹. Therefore, the authors of the Society for Vascular Surgery (SVS) Lower Extremity Threatened Limb Classification have refocused an approach to the patient with a threatened limb that not only addresses ischaemia, but also has taken into account the key factors of wound depth and presence and extent of infection¹². The SVS is a not-for-profit organisation consisting of primarily vascular surgeons and other specialists who are dedicated to the prevention and cure of vascular disease. Based in the United States, its stated purpose is to advance excellence and innovation in vascular health through education, advocacy, research, and public awareness.

The purpose of this article is to provide a concise summary and description of the new SVS Wound, Ischaemia, and foot Infection (Wifi) classification for the threatened limb. Case examples are also presented for practical application of this system. It is the expressed purpose of the authors of this article that foot and ankle specialists use this system to aid in characterising and stratifying the clinical state and risk of amputation in patients whose disease burden has given way for a limb-at-risk. With this new classification system and risk assessment tool, meaningful clinical trials may be developed to improve current operative and non-operative treatment options for the threatened limb.

WHAT IS THE WIFI CLASSIFICATION?

This is a new classification system put forth by the SVS that focuses on the “threatened limb”. This system is specifically applicable to patients whose disease burden may place their lower extremities at risk for amputation. These include patients with PAD and diabetes among other co-morbidities. Risk stratification encompasses three factors that place a limb under threat of amputation: (1) Tissue loss or wound extent, including gangrene; (2) Ischaemia; and (3) Infection. These are all key factors that need to be evaluated in predicting amputation risk. The new system aims to create an objective classification of the threatened limb based on the degree of ischaemia, wound extent, gangrene, and infection. This updated SVS Lower Extremity Threatened Limb Classification System is intended to define the disease burden, analogous to the tumour, node, and metastasis (TNM) system for cancer staging¹².

WHY DO CLINICIANS NEED A NEW CLASSIFICATION?

Classification systems published to date have been helpful to an extent, but have been narrowly focused on either the wound, perfusion, or infectious status. For example, existing CLI classification systems fail to adequately categorise the extent of tissue loss or the presence and severity of infection. TASC I, TASC II, the Bollinger system, and the Graziani morphologic categorisation only address arterial anatomy,

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References: 1. Rossington A et al., Clinical performance and positive impact on patient wellbeing of ALLEVYN Life. *Wounds UK* 2013; 9:91-95. 2. Stephen-Haynes et al., An appraisal of the clinical performance and economic benefits of a silicone foam in a large UK primary care organisation. *J Comm Nurs* 2013; 27: 50-59.

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but fail to quantify the index wound or baseline perfusion status¹³⁻¹⁶. Rutherford and Fontaine classifications include the broad categories of rest pain, ischaemic ulceration, and gangrene^{2,3}. However, while adequate for identifying patients at increased risk for major limb amputation and death, they are not sufficiently detailed to stratify the range of risk or determine best therapy across a heterogeneous spectrum of patients¹². It has been suggested that the concept of CLI be reconsidered because of the rising incidence of diabetes, associated foot ulcers, and increased incidence of PAD¹⁷. Also, most diabetic foot ulcer classifications lack adequate assessment of perfusion because ischaemia was dichotomously viewed based on a cutoff ankle brachial index of 0.8 without gradations for severity. CLI haemodynamic criteria were mistakenly applied that were never intended for patients with diabetic foot ulcers¹⁷. Diabetic foot ulcer classifications such as the University of Texas and PEDIS classifications have been validated. Collectively, these systems encompass perfusion, extent or size, depth and tissue loss, infection, and sensation. However, they do not specifically address gangrene. Gangrene increases risk of amputation in comparison to wounds¹⁸. The Wagner classification does include gangrene, but does not differentiate gangrene resulting from infection or gangrene as a result of ischaemia. It also fails to characterise the degree of infection, ischaemia, or wound extent⁹. Furthermore, the Infectious Disease Society of America (IDSA) clinical classification was designed to assess severity of infection¹⁹. Correlation of infectious severity and amputation risk has been validated, but it does not address wound type or perfusion status^{11,12,19}.

Prior to the publication of the new SVS Lower Extremity Threatened Limb Classification system, no system has been sufficiently comprehensive to allow accurate, baseline patient classification and stratification to serve as a foundation for subsequent comparison of outcomes among centres, patient subgroups, and revascularisation procedures¹². This new classification system is not intended or

designed to dictate treatment method. The primary purpose of this classification is to provide a precise description of the disease burden and allow accurate outcome assessments. This will allow comparisons between similar groups of patients and therapeutic measures. In addition, an updated risk factor and co-morbidity index as well as a simpler anatomic classification system will need to be added to aid in selection of the most effective treatment methods for patients. In summary, this new system brings together multiple teams of specialists in a simple risk-stratification approach to identifying a limb-at-risk, while describing the severity of tissue loss, blood flow, and infection.

THE SVS WIFL CLASSIFICATION SYSTEM

In the SVS Lower Extremity Threatened limb (Wifl) classification system, three clinical entities are evaluated and stratified. These include: (1) **W**ound; (2) **I**schaemia; and (3) **f**oot **I**nfection.

Wounds are given a severity grade 0 through 3 based on size, depth, and anticipated difficulty achieving wound healing. A patient with a grade 0 does not have a wound. Grades 1, 2, and 3 are synthesised from previously published diabetic foot ulcer classifications with the inclusion of gangrene. Both of these clinical findings carry a degree and severity of tissue loss and place a limb at risk. This system considers the anticipated complexity of the procedure required to achieve wound healing (Table 1).

In regard to ischaemia, patients are graded based on their ABI level. Patients with an ABI >0.8 are classified as ischaemia grade 0. Ischaemia grade 1 are patients with ABIs between 0.6 and 0.79. Ischaemia grade 2 patients are those with ABIs between 0.4 and 0.59. Patients with ABIs ≤0.39 are classified as ischaemia grade 3. Patients in this grade are likely to require revascularisation to achieve wound healing and limb salvage. Patients with ischaemia grades 1

SVS Wifl classification tables (adapted from the *Journal of Vascular Surgery*, Mills et al., 2013)

Table 1:

Wound		
Grade	Ulcer	Gangrene
0	No ulcer	No gangrene
	Clinical description: ischaemic rest pain (requires typical symptoms + ischaemia grade 3); no wound	
1	Small, shallow ulcer(s) on distal leg or foot; no exposed bone, unless limited to distal phalanx	No gangrene
	Clinical description: minor tissue loss. Salvageable with multiple (≥3) digital amputations or standard TMA ± skin coverage	
2	Deeper ulcer with exposed bone, joint or tendon; generally not involving the heel; shallow heel ulcer, without calcaneal involvement	Gangrenous changes limited to digits
	Clinical description: major tissue loss salvageable with multiple (≥3) digital amputations or standard TMA ± skin coverage.	
3	Extensive, deep ulcer involving forefoot and/or midfoot; deep, full thickness heel ulcer ± calcaneal involvement	Extensive gangrene involving forefoot and/or midfoot; full thickness heel necrosis ± calcaneal involvement
	Clinical description: extensive tissue loss salvageable only with complex foot reconstruction or nontraditional TMA (Chopart or Lisfranc); flap coverage or complex wound management for large soft tissue defect	

Table 2:

Ischaemia			
Grade	ABI	Ankle Systolic Pressure	TP, TcPO ₂
0	≥0.80	>100 mmHg	≥60 mmHg
1	0.6–0.79	70–100 mmHg	40–59 mmHg
2	0.4–0.59	50–70 mmHg	30–39 mmHg
3	≤0.39	<50 mmHg	<30 mmHg

ABI, Ankle brachial index; PVR, pulse volume recording; SPP, skin perfusion pressure; TP, toe pressure; TCPO₂, transcutaneous oximetry

Patients with diabetes should have TP measurements.

If arterial calcification precludes reliable ABI or TP measurements or if ABI is incompressible (>1.3), ischaemia should be documented by TCPO₂, SPP, or PVR.

If TP and ABI measurements result in different grades, TP will be the primary determinant of ischaemia grade.

Flat or minimally pulsatile forefoot PVR = grade 3.

Table 3:

foot Infection		
Grade	Clinical manifestation of infection	IDSA/PEDIS infection severity
0	No symptoms or signs of infection	Uninfected
1	<p>Infection present, as defined by the presence of at least two of the following items:</p> <ul style="list-style-type: none"> • Local swelling or induration • Erythema >0.5 to ≤2 cm around the ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous secretion) <p>Local infection involving only the skin and the subcutaneous tissue (without systemic signs).</p> <p>Exclude other causes of an inflammatory response of the skin (e.g., trauma, gout, acute Charcot Neuro-osteoarthropathy, fracture, thrombosis, venous stasis)</p>	Mild
2	<p>Local infection (as described above) with erythema >2 cm, or involving structures deeper than skin and subcutaneous tissues (e.g., abscess, osteomyelitis, septic arthritis, fasciitis)</p> <p>No systemic inflammatory response signs (as described below)</p>	Moderate
3	<p>Local infection (as described above) with the signs of SIRS as manifested by two or more of the following:</p> <ul style="list-style-type: none"> • Temperature >38° or <36°C • Heart rate >90 beats/min • Respiratory rate >20 breaths/min or PaCO₂ <32 mmHg • White blood cell count >12,000 or <4000 cu/mm or 10% immature (band) forms 	Severe ^a

PACO₂, Partial pressure of arterial carbon dioxide; SIRS, systemic inflammatory response syndrome

^aIschaemia may complicate and increase the severity of any infection. Systemic infection may sometimes manifest with other clinical findings, such as hypotension, confusion, vomiting, or evidence of metabolic disturbances, such as acidosis, severe hyperglycaemia, new-onset azotaemia.

or 2 may benefit or even require vascular intervention to achieve wound healing. If the ABI is elevated due to incompressible vessels, toe pressures or transcutaneous oximetry measurements must be performed to stratify the degree of ischaemia. These modalities along with other non-invasive vascular studies such as pulse volume recordings, skin perfusion pressures, and quantitative indocyanine green angiography are preferred in patients with medial calcinosis leading with falsely elevated ABIs, or with previous toe or forefoot amputations (Table 2).

The risk of amputation correlates directly with increasing infection severity. The SVS Wifi classification system incorporates the IDSA clinical staging system with the PEDIS system to account for both soft tissue and bone infectious severity. The four grades are based on clinical evaluation of the affected limb with respect to systemic and metabolic observations (Table 3).

IS THERE A PROGNOSTIC VALUE OF THE SVS WIFI CLASSIFICATION?

This new classification system can provide an estimated risk of amputation and possibly aid in determining whether a patient would benefit from revascularisation. A Delphi consensus process was carried out by members of the SVS. This consisted of a 12-member group of recognised experts in the field of chronic limb ischaemia. This group defined the Wifi system's potential clinical applicability. Two questions were addressed: (1) what is the perceived

risk of amputation for each possible combination?; and (2) what is the perceived benefit from revascularisation for each possible combination? The 64 theoretically possible clinical combinations were each assigned a limb threat clinical stage as outlined below:

- Very low = VL = clinical stage 1
- Low = L = clinical stage 2
- Moderate = M = clinical stage 3
- High = H = clinical stage 4
- Clinical stage 5 would signify an unsalvageable foot

The consensus group followed these basic premises of assigning a clinical stage to each of the 64 respective clinical scenarios: (1) increase in wound class increases risk of amputation; (2) PAD and infection are synergistic — an infected wound with PAD increases likelihood revascularisation will be needed for wound healing; and (3) infection with systemic and metabolic instability (grade 3) carries a high risk of amputation regardless of other factors. Table 4 shows results of the Delphi Consensus process. These results represent the one-year risk of amputation with medical therapy alone for each of the 64 possible presentations. The purpose of this consensus exercise was to define stages of disease that may prove useful for clinical decision-making and design of prospective studies.

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Table 4: a and b Risk/benefit: Clinical stages by expert consensus

a. Estimate risk of amputation at one year for each clinical combination

	Ischaemia – 0				Ischaemia – 1				Ischaemia – 2				Ischaemia – 3			
	W-0	VL	VL	L	M	VL	L	M	H	L	L	M	H	L	M	M
W-1	VL	VL	L	M	VL	L	M	H	L	M	H	H	M	M	H	H
W-2	L	L	M	H	M	M	H	H	M	H	H	H	H	H	H	H
W-3	M	M	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3

b. Estimate likelihood of benefit of or requirement for revascularisation

	Ischaemia – 0				Ischaemia – 1				Ischaemia – 2				Ischaemia – 3			
	W-0	VL	VL	VL	VL	VL	L	L	M	L	L	M	M	M	H	H
W-1	VL	VL	VL	VL	L	M	M	M	M	H	H	H	H	H	H	H
W-2	VL	VL	VL	VL	M	M	H	H	H	H	H	H	H	H	H	H
W-3	VL	VL	VL	VL	M	M	M	H	H	H	H	H	H	H	H	H
	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3	fi-0	fi-1	fi-2	fi-3

fi, foot Infection; I, Ischaemia; W, Wound

Four classes: for each box, group combination into one of these four classes

Very Low = VL = clinical stage 1
Low = L = clinical stage 2
Moderate = M = clinical stage 3
High = H = clinical stage 4
Clinical stage 5 signifies an unsalvageable foot

APPLICATION OF WIFL STRATIFICATION AND CASE EXAMPLES

The following cases are examples of various inpatient scenarios where the SVS Wifl classification system was applied.

Case example 1: neuropathic ulceration with systemic infection

A 32-year-old female with a past medical history of diabetes mellitus, peripheral neuropathy and left hallux ulceration presented with two days of increased redness, swelling, and drainage. She also reported worsening fever and chills. Upon admission, she was found to be febrile, tachycardic, hypotensive with increased respirations. Laboratory investigation revealed the presence of leukocytosis, and increased markers of inflammation including elevated c-reactive protein and erythrocyte sedimentation rate. Evaluation of the plantar hallux ulceration revealed exposure of a subcutaneous abscess and purulence, tracking to the first inner space flexor and extensor hallucis tendon (Figures 1 and 2). Plain radiography did not reveal finding suggestive of soft tissue emphysema or osteomyelitis. Non-invasive vascular studies revealed and ABI of 1.06.

Given these clinical findings, this patient is given a Wifl assessment of Wound 2, Ischaemia 0, foot Infection 3 or Wifl 2,0,3. The consensus clinical stage is 4 (high risk of amputation) with respect to the risk of major limb amputation at one year. The anticipated benefit of revascularisation is low.

The patient underwent incision and drainage with aggressive debridement of infected and necrotic tissue. Appropriate antibiotic therapy followed based on intraoperative tissue cultures. The resultant soft tissue deficit was managed with negative pressure wound therapy (NPWT) until adequate granulation was present for a split-thickness skin graft (Figure 3).

Figures 1 and 2: A 32-year-old female with a diabetic foot infection, fever, leukocytosis and systemic sepsis. She had ABI of 1.06. She would be classified as Wifl 2,0,3





Figure 3: Four weeks post-debridement, the patient underwent application of a split-thickness skin graft

Case example 2: PAD and neuroischaemic ulceration

A 67-year-old male with a past medical history of PAD, diabetes mellitus, peripheral neuropathy presented with rest pain, a gangrenous fourth digit, and a chronic left lateral penetrating mid-foot ulceration which appeared neuroischaemic in aetiology (Figure 4). His past surgical history included superficial femoral artery (SFA) angioplasty and partial fifth ray resection. Despite intervention and local wound care, his wounds have not improved over three months. Non-invasive vascular studies were repeated and revealed an ankle brachial index of 0. The toe pressure was also 0 mmHg with flat waveforms. Duplex ultrasound revealed an occluded SFA artery and stent, along with popliteal and trifurcation occlusion. These findings were consistent with critical limb ischaemia and recurrent arterial occlusive disease. He presented without any concerns for acute infection.

This patient is given a classification of Wound 3, Ischaemia 3, and foot Infection 0 or Wifl 3,3,0. Given these new clinical findings and prior history of revascularisation and fifth digit amputation, his prognosis



Figure 4: A 67-year-old male with PAD and diabetes presented with non-healing neuroischaemic lesions to his left foot. ABI was 0 and toe pressure of 0 mmHg. Wifl classification was 3,3,0 for this patient



Figure 5: Patient underwent a non-traditional transmetatarsal amputation with a rotation flap one week after revascularisation

Figure 5a: Immediate postoperative image depicting primary closure and drain placement



Figure 5b: Three days postoperatively, the soft tissue flaps remained viable and bypass grafts were patent

and risk for amputation is a SVS consensus clinical stage 4 (high risk of amputation). There is also anticipated benefit of revascularisation.

The next steps in this patient's plan of care included left profunda posterior tibial bypass with three segment spliced vein grafting. Post-bypass arterial duplex studies revealed potential for healing a mid-foot amputation. Thus, he underwent a non-traditional transmetatarsal amputation with rotational flap one week later (Figure 5). Although this patient received an amputation despite aggressive revascularisation and intervention, his risk of undergoing a below-knee amputation was decreased and had successful limb salvage. The patient went on to heal his incision by two weeks postoperatively (Figure 6).

Case example 3: extensive osteomyelitis, Charcot, and systemic infection

A 33-year-old male with past medical history of uncontrolled insulin-dependent diabetes mellitus, hypertension, left foot Charcot neuroarthropathy, and previous pedal complications necessitating hallux amputation and other resections due to osteomyelitis presented with acute left foot infection. He reported increased redness, swelling, and purulent drainage (Figure 7). Vitals revealed tachycardia, fever and increased respiratory rate. Laboratory analysis was notable for leukocytosis, elevated liver enzymes, c-reactive

Figure 6: Patient progressed well at three weeks postoperatively and healed uneventfully



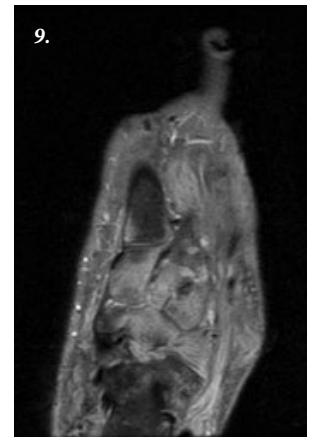
Figure 7: A 33-year-old diabetic male with previous pedal complications presented with acute chronic osteomyelitis



Figure 8: Medial oblique radiograph projection reveals significant degenerative joint disease involving multiple joints of the mid-foot including all metatarsals and lesser tarsals. There is cortical erosion and irregularity along second to fifth metatarsals. These findings are suggestive of osteomyelitis superimposed with Charcot neuroarthropathy



Figure 9: Magnetic resonance imaging, T2 axial cut reveals increased signal intensity suggestive of osteomyelitis involving multiple lesser tarsals including the cuboid and navicular



protein, and erythrocyte sedimentation rate. Radiographic evaluation with computed tomography, plain radiography, and MRI was highly suggestive of osteomyelitis with superimposed Charcot neuroarthropathy of the entire forefoot and mid-foot extending to the calcaneal-cuboid and talo-navicular joints (Figures 8 and 9). Non-invasive vascular studies revealed non-compressible arteries with biphasic waveforms and highly pulsatile second digit waveform.

Given these clinical and radiographic findings, this patient is given a Wiffl assessment of Wound 3, Ischaemia 0–1 foot Infection 3 or Wiffl

3,0–1,3. The consensus clinical stage is 4 (high risk of amputation) with respect to the risk of major limb amputation at one year. The anticipated benefit of revascularisation is low.



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The patient underwent urgent incision and drainage and initiation of intravenous antibiotic therapy. He had persistent leukocytosis and unrelenting systemic and local signs of infection that ensued for a few days postoperatively. Thus, he was taken back to the operating room for a Chopart's amputation. Patient was medically stabilised and healed uneventfully (Figure 10). This case reiterates the validation of grade 3 infections to carry an increased risk of amputation. Despite undergoing aggressive amputation, this was performed in favour of limb salvage and medical stabilisation. The biomechanical deficiencies to the affected limb were addressed with appropriate bracing, prosthetic fitting, and physical therapy.



Figure 10: The status of a 33-year-old male with diabetes, post Chopart's amputation due to extensive osteomyelitis involving the Lisfranc and midtarsal joints. Prior to amputation, he was given a WIfI classification of 3,0-1,3 due to systemic infection at the time of hospital admission

Case example 4: severe and complicated PAD with neuroischaemic ulcerations

A 71-year-old male with a past medical history of diabetes, PAD and hypertension presented with rest pain and an ischaemic ulceration to his left heel (Figure 11). He was status post left iliofemoral bypass several years prior. Non-invasive vascular studies revealed apparent occlusion of the bypass graft.



Figure 11: An ischaemic left heel ulceration in a 71-year-old male with PAD. Non-invasive vascular studies revealed occlusion of a previous iliofemoral bypass procedure

Figure 12: Worsening appearance with dorsal foot ischaemia



Figure 13: Status post-transmetatarsal amputation and application of split-thickness skin graft. There is superficial necrosis of split-thickness skin graft site four weeks postoperatively

Given these clinical and radiographic findings, this patient is given a WIfI assessment of Wound 2, Ischaemia 3, and foot Infection 0 or WIfI 2,3,0. The consensus clinical stage is 4 (high risk of amputation) with respect to the risk of major limb amputation at one year. The anticipated benefit of revascularisation is high.

The patient was subsequently admitted and underwent urgent iliofemoral bypass graft thrombectomy, and left femoral endarterectomy with intragraft stenting. He presented two months later with worsening appearance of his foot including dorsal foot ischaemia, progressive heel necrosis and great toe gangrene (Figure 12). There were no signs of infection. Non-invasive vascular studies revealed 0 mmHg at pedal vessels with an ABI of 0 and flat waveforms. The patient was admitted again where several more revascularisation procedures were performed including right to left femoral to femoral bypass with cephalic vein, left femoral to popliteal artery bypass, and right external iliac angioplasty. One week later, he underwent a transmetatarsal amputation and application of a split-thickness skin graft. Over the next several weeks, only 60% of the graft incorporated and eventually superficial necrosis ensued requiring debridement (Figure 13).

Non-invasive studies were repeated which revealed patency of the grafts. The WIfI was re-characterised as 3,3,1. He underwent a thorough debridement and NPWT for an additional two weeks until the wounds appeared more granular and infectious free (Figures 14a and 14b).

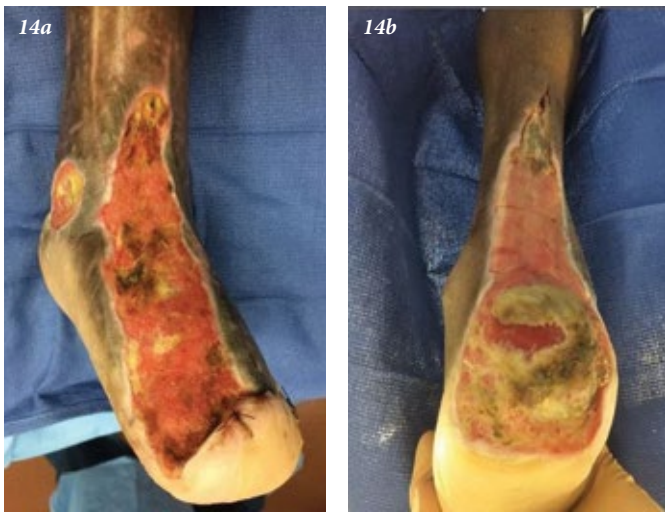


Figure 14: At two weeks status post-debridement and NPWT, the wounds were prepared for split-thickness skin graft application

Figure 14a: Dorsal foot wound is >90% granular following debridement and two weeks of NPWT

Figure 14b: Posterior leg and heel wound appears healthy at two weeks following debridement and NPWT

The patient was then taken back to the operating room for a final split-thickness skin graft and partial calcaneotomy (Figure 15). At three weeks postoperatively, his new skin grafts continued to incorporate well (Figure 16). The patient eventually returned to full weight bearing and ambulated in a special ankle-foot-orthotic.

CONCLUSION

The SVS Wifi classification system is a step towards refocusing the evaluation and treatment of patients with a threatened limb. A limitation of this new classification is that it has yet to be



Figure 15: Intraoperative application of split-thickness skin graft

Figure 15a: The skin graft was harvested from the ipsilateral thigh and secured to the dorsum of the lower extremity with skin staples and absorbable suture



Figure 15b: A partial calcaneotomy was performed prior to application of the skin graft

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validated. The system also does not offer suggested treatment algorithms based on the risk assessments. However, this system integrates three critical aspects of a clinical work-up that contribute to lower extremity amputation risk and morbidity because of the disease burden associated with diabetic peripheral neuropathy and PAD. This system aims to provide a risk stratification assessment tool analogous to the TNM cancer staging. For any specialist or surgeon involved in the work of limb salvage, this system may assist practitioners in adequately characterising and stratifying the clinical state and condition of a threatened limb. Furthermore, with this new classification system, there is potential application for improved clinical trials. Using the proposed risk stratification by clinical stage, an effective platform for testing new therapies could be established and allow for more meaningful analysis of outcomes in this challenging and heterogeneous population. The disease burden of diabetes and PAD mandates a team approach to patient care and engage foot and ankle specialists, vascular surgeons, medicine, and infectious disease colleagues in the management of these patients at risk for lower extremity amputation.

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Figure 16a and Figure 16b: At three weeks following the operation, the patient's skin grafts showed near complete incorporation at both wounds