

Journal watch

Miller C

Malone M, Bjarnsholt T, McBain A, James G, Stoodley P, Leaper D, Tachi M, Schultz G, Swanson T & Wolcott R. The prevalence of biofilms in chronic wounds: a systematic review and meta-analysis of published data. *Journal of Wound Care* 2017;26(1):20–25.

The impetus for this systematic review of biofilm prevalence in-vivo human research was the presence of extensive data emerging from in-vivo-animal and in-vitro research, and a smaller evidence base with typically small sample sizes in human studies that would benefit from meta-analysis. Articles pertaining to biofilms and chronic non-healing wounds of varied aetiology were sourced and data limited to studies with human samples. Other study eligibility criteria pertaining to specific methods used to establish the presence of a biofilm and methods of sampling tissue were also applied to limit article selection and enhance the scientific merit and homogeneity of the research. Although 452 unique studies were identified, the majority failed to meet the study eligibility criteria ($n=443$ or 98%), leaving nine papers meeting the eligibility criteria. As one study was a case report, only eight were incorporated in the meta-analysis. The meta-analysis identified the prevalence of biofilms in chronic wounds as 78.2% with a confidence interval of 61.6–89.0%. Across the studies no fewer than 60% of chronic wounds were identified as having a biofilm, with many reporting a 100% positive identification of a biofilm. Given the exclusion of so many papers, additional clarification as to the reason for ineligibility would be of interest to the reader. The study reaffirms the pertinence of extending scientific and clinical research programs in the identification and biofilm-based wound care to facilitate optimal wound management and healing.

Yang Q, Larose C, Della Porta AC, Schultz GS & Gibson DJ. A surfactant-based wound dressing can reduce bacterial biofilms in a porcine skin explant model. *International Wound Journal* 2017;14(2):408–413. DOI: 10.1111/iwj.12619

The paper by Yang and colleagues (2017) also addresses the topic of biofilms and wound healing. The resilience of bacteria when it has organised itself into a biofilm presents innumerable challenges for wound healing. At present debridement of the biofilm from the wound bed is best practice to facilitate wound progress; however, not all wound care settings are resourced to support safe and regular debridement, especially sharp wound debridement. Yang and colleagues explored the effectiveness of autolytic debridement on established biofilms by applying a non-ionic surfactant topically to the wound bed. It was theorised

that a non-ionic surfactant, which has been observed to assist with the solubilisation and disaggregation of proteins, could be effective against the aggregation of bacteria in the extracellular matrix.

Porcine skin explant models were used to test the ability of two non-ionic poloxamer surfactant gels, one which also contained silver sulfadiazine, in the sensitisation of viable bacterial biofilms. Daily cleansing of the explant using phosphate-buffered saline moistened gauze and reapplication of the gel was attended for a three-day period; this procedure was suggested by the authors as reflecting usual care in the cleansing of the wound surface. During wound cleansing, samples from the four explants per condition were obtained using a punch biopsy and were cultured. Results were compared to a control which received only daily wiping with moist gauze. All study groups had reduced count of biofilm-protected bacteria after the initial cleansing of the wound. No biofilms were detected after the first day in either gel intervention groups although maintenance of the reduced count of biofilm-protected bacteria following the first cleansing in the control group resulted in a lack of statistically significant differences between conditions at this time point. Both gel conditions maintained the absence of a biofilm over days two and three, while the presence of biofilm-protected bacteria increased in the control group over this time. The authors concluded that daily treatment with a surfactant gel with daily cleansing was effective at eliminating a wound biofilm compared to cleansing in isolation. These study findings would benefit from translation to human subjects and comparison to sharp wound debridement as well as the use of a frequency of wound cleansing that aligns more readily with clinical practice.

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