THE WOUND DEBRIDER – A NEW MONOFILAMENT FIBRE TECHNOLOGY: Results of a pilot study

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Introduction:

Debridement is a basic necessity to induce the process of tissue repair especially in chronic wounds.

Methods:

In this prospective, blindly assessed pilot study we used a new debrider technology with specific monofilament fibres in a unique texture to evaluate its efficacy, safety and tolerability. In altogether 11 patients exhibiting all kinds of wound-associated debris (biofilms, slough, necrotic crusts, 'hyperkeratotic' plaques, see table 1) the debrider*, wetted with physiological solution, was wiped without specific force over the wound for about 2-4 minutes.

Patient	Gender	Year of Birth	Diagnosis	Comorbidities
1	Female	1922	Mixed ulcer	Methicillin-resistant Staphylococcus aureus colonized
2	Male	1945	Venous ulcer	Cellulitis
3	Male	1940	Mixed ulcer	NYHA III
4	Male	1958	Mixed ulcer	Diabetes, pulmonary hypertension, chronic obstructive pulmonary disease
5	Female	1922	Venous ulcer	Cellulitis
6	Male	1950	Venous ulcer	Dermatitis, Diabetes
7	Female	1924	Arterial ulcer	NYHA III with post-myocardial infarction
8	Female	1931	Venous ulcer	Cellulitis
9	Male	1931	Diabetic ulcer	Diabetes, NYHA II
10	Female	1928	Mixed ulcer	Dermatitis, NYHA III, renal insufficiency
11	Male	1941	Mixed ulcer	None

Table 1. Characteristics of the patients (NYHA=New York Heart Association Class)

Results:

The debrider* removed almost all debris leaving healthy granulation tissue (including even small epithelialised islands of vital tissues) intact. (fig. 1 - 4) The patients didn't feel adverse symptoms, in particular no pain. The healthcare professional's global assessment revealed that the use of the debrider* was easy, fast and very efficient. Scanning electron microscopic analyses identified the majority of the removed debris tightly packed within the monofilament texture (fig. 5 and 6). Finally, a surgeon blindly assessed pictures of wounds (taken before / after the debridement), ranked all debridement results into the best category and one wound formerly classified for a need of surgical debridement as "equal to surgical debridement".

Conclusion:

We have generated the basic proof of concept that the new debrider*-based technology is easy, fast, highly efficient, safe and well-tolerated. Further, since the new debrider* allows its broad use not only by specialised physicians but also by all healthcare professionals, it is anticipated that its use would save substantial costs. Hence, the new debrider* puts the need of other wound bed preparation procedures into question.

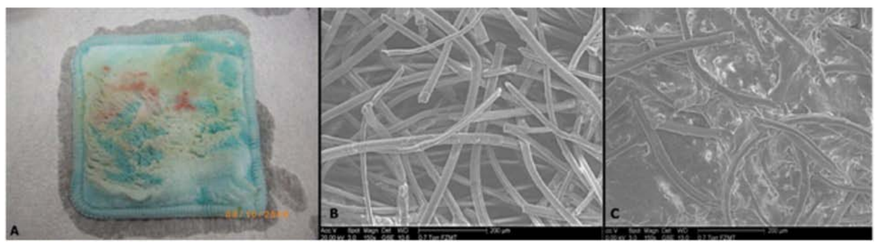

Figure 5. Macroscopic picture of the used debrider and scanning electron microscope analyses of the unused and used debrider.
The debris which has been removed by the debridement of an exudating, seropurulent wound with highly viscous yellow slough is attached to the surface of the debrider (A). The 150x magnification of the unused debrider delineates a woven network of round, artificial fibres in a specific texture and a loose connection (B). The 150x magnification of a used debrider clearly shows the attached debris to the fibres of the debrider (C).

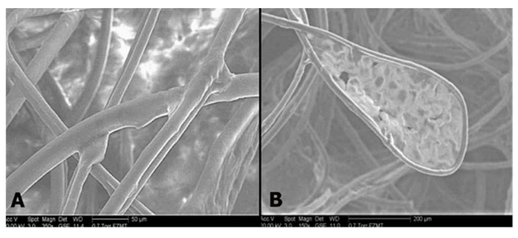

Figure 6. Scanning electron microscopic analyses of the used debrider.
In the used debrider fibres are fixed together by the removed material like adhesive tapes (A and B, x150). Picture B shows such a structure resembling a tennis rack (B).

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Figure 1. Exudating, seropurulent wound with highly viscous yellow slough- clinical effectiveness of the debrider.
Exudating, seropurulent wound with highly viscous yellow slough indicative of local infection and a bacterial biofilm (A). The debrider removes the vast majority of these coatings and leads to vital tissue (B).

Figure 2. Dry wound specifically suffering from serocrusts - clinical effectiveness of the debrider.
Dry wound specifically suffering from serocrusts between the new vital granulation and epithelialisation tissue (A). The debrider selectively removes the crusts without affecting the new healthy tissue.

Figure 3. Small plaque of necrotic material together with hyperkeratotic debris and crusts - clinical effectiveness of the debrider.
Small plaque of necrotic material together with hyperkeratotic debris and crusts of dried exudates over large parts of the lower extremity (A). The debrider not only removes the necrotic layer, but also releases the skin of the lower extremity from all the metabolic waste showing an almost normal epidermis (B).

Fig. 4.1

Fig. 4.2

Figure 4. Similar outcomes in wounds with initially comparable wound bed situations.
In wounds of several patients with initially the same clinical situation, the debrider debridement shows similar clinical outcomes (standardized mode of action).
Results after debridement of initially exudating, seropurulent wounds with highly viscous yellow slough as an indicator for a bacterial biofilm (Fig. 4.1.A and B). Results from the debridement of wounds initially covered with necrotic material together with hyperkeratotic debris and crusts of dried exudates over large parts of the lower extremity by the debrider (Fig. 4.2.A and B).

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