The debridement of chronic wounds: a systematic review

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Authors' objectives
To summarise the evidence for the relative effectiveness and cost-effectiveness of different debriding agents on wound healing and to identify areas for future research.

Searching
The authors searched 19 electronic databases including MEDLINE, EMBASE, CINAHL, BIOSIS Previews, Dissertation Abstracts, DARE and the Cochrane Library (up to October 1997) using a detailed search strategy listed in three appendices to the review. This was supplemented by a handsearch of five specialist wound care journals, twelve conference proceedings and systematic reviews held on DARE. The bibliographies of all retrieved and relevant publications were searched for further studies. Companies with an interest in wound care products were approached for unreported trials. An advisory panel of experts in wound management were also asked to identify any additional trials. No language restrictions were included in the search strategy.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) published or unpublished which used a quantifiable and objective measure of healing rate.

Specific interventions included in the review
Wound debridement agents including: dextranomer polysaccharide beads or paste; cadexomer iodine polysaccharide beads or paste; hydrogels; enzymatic agents; adhesive zinc oxide tape; surgery or sharp debridement; and larval (maggot) therapy. The control intervention was traditional treatment or a control treatment.

Participants included in the review
Patients with chronic non-healing wounds (pressure sores, leg ulcers, sinuses and surgical wounds healing by secondary intention).

Outcomes assessed in the review
Any objective measure of wound healing e.g. percentage area reduction, number of wounds healed in a given time. Full details are given trial by trial in the review.

How were decisions on the relevance of primary studies made?
Studies were assessed by a single reviewer for relevance to the review, and decisions on final inclusion were checked by a second reviewer. Disagreements were resolved through discussion.

Assessment of study quality
The authors checked the quality of included studies against a list of nine categories: inclusion and exclusion criteria stated; total number of wounds (arms); a priori sample size calculation; randomisation procedure stated; appropriate baseline characteristics reported; blinded outcome assessment; appropriate outcome measures; withdrawals; and ITT analysis. The authors do not state how the papers were assessed for quality, or how many of the reviewers performed the quality assessment.

Data extraction
Data from included trials were extracted by a single reviewer into data extraction tables and then checked independently by a second reviewer.
Data were extracted for the categories of study identification and study design, inclusion and exclusion criteria, intervention details, baseline characteristics, results, number and details of withdrawals, and comments.

An odds ratio and/or effect size was calculated for all objective outcomes for all trials with 95% confidence intervals. Where possible, the analysis was performed on an intention-to-treat basis.

**Methods of synthesis**

**How were the studies combined?**
The studies were combined in a narrative synthesis. The studies were grouped as indicated in the previous section. The wound healing effects within each study or group of studies and methodological strengths and weaknesses of the individual studies were discussed.

**How were differences between studies investigated?**
A formal test for heterogeneity is not reported, however the authors did assess differences between studies in order to conclude that statistical pooling was not appropriate.

**Results of the review**

Thirty-five RCTs were included in the review (taken from 47 reports). No RCTs were found that evaluated the effectiveness of surgical debridement, larval therapy, or that compared debridement with no debridement.

Dextranomer polysaccharide beads or paste versus traditional or control treatments (9 trials): 464 participants (229 intervention and 235 control).

Cadexomer iodine polysaccharide beads or paste versus traditional or control treatments (9 trials): 527 participants (254 intervention and 273 control).

Hydrogels (4 trials): 329 participants (147 intervention and 182 control).

Enzymatic agents (5 trials): 161 participants (77 intervention and 84 control).

Adhesive zinc oxide tape (1 trial): number of participants not stated.

Cadexomer iodine polysaccharide versus other debriding agents (2 trials): 164 participants (83 intervention and 81 control).

Dextranomer versus other debriding agents (4 trials): 232 participants (112 intervention and 120 control).

Hydrogel versus hydrogel (1 trial): 62 participants (32 intervention and 30 control).

Enzymatic agent versus enzymatic agent (1 trial): 40 participants (19 intervention and 21 control).

Dextranomer polysaccharide beads or paste versus traditional or control treatment (9 trials): five trials found a statistically significant difference between treatments: three favoured dextranomer polysaccharide and two favoured traditional treatment.

Cadexomer iodine polysaccharide beads or paste (9 trials): three trials had a statistically significant result that favoured cadexomer iodine polysaccharide.

Hydrogels: only one trial out of four that compared a hydrogel with a traditional or control treatment found a statistically significant difference between treatments. The difference suggested a small benefit from treatment with a hydrogel compared with a hydrocolloid dressing.

Enzymatic agents versus traditional or control treatment (5 trials): none of the five trials in this category showed a statistically significant outcome in favour of either treatment for wound closure. One trial showed an increase in wound...
size with both the enzyme collagenase and the control treatment, however, the increase was significantly less in the enzyme-treated group.

Adhesive zinc oxide tape (1 trial): the results showed that adhesive zinc oxide tape was more effective in eradicating or reducing by more than 50% the necrotic area of diabetic foot ulcers than a hydrocolloid dressing.

Cadexomer iodine polysaccharide versus other debriding agents (2 trials): neither trials had statistically significant results.

Dextranomer versus other debriding agents (4 trials): one of two comparisons with a hydrogel showed a statistically significant benefit associated with the hydrogel. Neither comparison with an enzymatic agent found a statistically significant difference.

Hydrogel versus hydrogel (1 trial): there was no statistically significant difference between the two treatments.

Enzymatic agent versus enzymatic agent (1 trial): there was no statistically significant difference between the two treatments.

Cost information
The unit cost for each treatment was stated in some studies, and some studies contained further details on variables such as nursing time or number of dressing changes, however, no study provided sufficient detail from which a reliable cost-effectiveness analysis could be constructed.

Authors’ conclusions
The authors state that there were no studies found that compared debridement with no debridement and without these studies it is unclear whether wound debridement is a beneficial process that expedites healing. There was insufficient evidence to promote the use of one debriding agent over another. There was only a single comparison between two debriding agents that produced a significant result (hydrogel significantly reduced necrotic wound area compared with dextranomer polysaccharide paste).

CRD commentary
The authors have stated their research question and inclusion and exclusion criteria. The literature search appears to be very thorough, with no language restrictions.

Selection of studies and the data extraction were performed independently and in duplicate and there was a formal quality assessment of the included studies. Statistical pooling was correctly determined to be inappropriate because of heterogeneity and so a narrative synthesis of the individual studies was performed using the outcome measure of wound healing. The main source of heterogeneity arose from the wide range of outcome measures used in the individual studies. Although all studies included in the review used some objective measure there was little agreement between studies as to the specific measure. This is discussed in the review. The authors also discuss some of the possible biases which may have influenced the results. The authors’ conclusions appear to follow from the results, which are of limited value due to poor quality study design, particularly inadequate sample sizes and non-standard outcome measures.

Implications of the review for practice and research
Practice: The authors state that pending the availability of improved data on relative effectiveness, other considerations, such as cost-minimisation, may reasonably guide decisions on the use of debriding agents.

Research: The authors state that much of the research is of poor quality, and direct comparisons are few. These issues should be addressed in future trials and the authors list specific recommendations. They also state that the frequent use of surgical debridement and the increasing interest in larval therapy indicate that RCTs in these areas are needed.
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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.