A systematic review of topical negative pressure therapy for acute and chronic wounds


CRD summary
This generally well-conducted review assessed the effectiveness of topical negative pressure (TNP) for wound healing. The authors concluded that there was little evidence to support the use of TNP. This conclusion was an accurate reflection of the evidence and was likely to be reliable.

Authors' objectives
To review the evidence for the effectiveness of topical negative pressure (TNP) on wound healing in acute and chronic settings.

Searching
MEDLINE, EMBASE, CINAHL and the Cochrane Controlled Trials Register were searched to June 2007 without language restriction. Search terms were reported. The manufacturer of the VAC device was contacted for details of unpublished and ongoing studies.

Study selection
Randomised controlled trials (RCTs) that evaluated TNP in patients aged over 18 years with any type of wound in any setting were eligible for inclusion if they assessed wound healing as a primary outcome. Acceptable measures of wound healing were time to complete healing, change in wound surface area, proportion of wounds healed, survival of split-thickness skin grafts and wound condition ready for surgery or skin grafting. Secondary outcomes were infection, pain, quality of life, oedema, microcirculation, bacterial load, adverse events and duration of hospital stay.

Included studies examined mixed chronic and acute wounds, diabetic wounds, pressure ulcers, skin grafts and acute wounds. Where reported, negative pressure ranged from 100 to 150 mm Hg with most studies using 125 mm Hg. A variety of dressings, gels and other agents were employed as control interventions.

Two reviewers independently assessed the papers for inclusion at each stage, with disagreements resolved through discussion.

Assessment of study quality
At least two reviewers independently assessed the studies for validity using criteria based on those of the Dutch Cochrane Collaboration checklist. These included items related to randomisation and allocation concealment, blinding and use of intention-to-treat analysis and comparability of treatment. Disagreements were resolved through discussion.

Data extraction
Data were extracted by one reviewer and checked by a second. Authors were contacted for missing data or clarification of measurement precision where necessary. Risk differences with 95% confidence intervals (CIs) and numbers needed to treat or harm (NNT or NNH) were calculated where appropriate.

Methods of synthesis
Although a meta-analysis was planned, the studies were presented in a narrative in which the studies were grouped by wound type. Differences between the studies were apparent from this narrative and from the accompanying evidence table.

Results of the review
Thirteen RCTs (n = 554, number of wounds = 573) were included in the review. Sample sizes ranged from 10 to 162. Trial quality was considered to be moderate overall. Only four trials reported use of blinded outcome assessment. Duration of follow-up ranged from 11 to 365 days.

Acute and chronic wounds (four studies): one of two studies reported a significant increase in the median time to
complete healing with VAC. One of two studies appeared to report a significant reduction in wound surface area. Two studies assessing wound preparation time prior to surgery reported a statistically significant reduction in time with TNP of 10 days and a non-significant reduction of one day respectively.

Diabetic wounds (three studies): one study reported no significant difference between TNP and control in mean healing time. Two studies assessing measures of wound area reported reductions in TNP groups, one was statistically significant. One study reported a significant reduction of four days in the wound preparation time prior to surgery.

Diabetic foot amputation (one study): the study reported a significant increase in the percentage of patients with wound healing in the TNP group (17%, 95% CI: 0.02, 0.32 NNT: 6). There was an increase in adverse events of 11 per cent (95% CI:0.01, 0.21) with an NNH of nine.

Trials in skin grafts and pressure ulcers showed inconclusive and conflicting evidence as to the efficacy of TNP.

**Cost information**
Cost information was reported by three RCTs. Two studies found a non significant mean cost difference of 330 Euros and 80 Euros for TNP. The third study found a significantly greater cost for TNP of 259 versus 94 Euros (P = 0.0001).

**Authors' conclusions**
There was little evidence to support the use of TNP in the treatment of wounds.

**CRD commentary**
The review question and inclusion criteria were clear if broad. The authors searched several relevant databases, but did not report searching for unpublished studies, which may have increased the risk of publication bias and the exclusion of some relevant studies. The authors used rigorous review methodology throughout and conducted an appropriate validity assessment. The decision not to use meta-analysis was probably appropriate given the clinical heterogeneity between the studies. This was a generally well-conducted review and the authors’ conclusions were likely to be reliable.

**Implications of the review for practice and research**
Practice: the authors stated that the use of TNP should neither become routine nor be reimbursed for local wound care until further randomised trials were conducted.

Research: the authors stated that more rigorous evaluation of TNP by RCTs is required.

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**Other publications of related interest**

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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.