Efficacy of TNP on lower limb wounds: a meta-analysis

CRD summary
The authors concluded that topical negative pressure significantly reduces healing times and increases the number of healed wounds among patients with lower limb ulcers. In view of the scanty data, poor reporting and methodological limitations of the review, the authors’ conclusions may not be reliable.

Authors' objectives
To assess the efficacy of topical negative pressure (TNP) in the treatment of lower limb wounds with underlying arterial or venous insufficiency.

Searching
PubMed and EMBASE were searched from January 1993 to July 2007; the search terms were reported. Relevant medical journals were handsearched and the reference lists of relevant publications were checked.

Study selection
Randomised controlled trials (RCTs) comparing TNP with conventional treatment were eligible for inclusion. The included studies compared vacuum assisted closure (VAC) therapy (a form of TNP) with conventional wound dressings (saline gauze, where stated). Studies of participants with lower limb wounds with underlying arterial or venous insufficiency, including diabetic foot ulcers, were eligible for inclusion. The studies in the review included patients with arterial and/or venous leg ulcers, uninfected diabetic foot ulcers, or acute and chronic diabetic foot ulcers and surgical wounds following partial foot amputation. To be eligible for inclusion, studies had to evaluate time to healing, rates of wound healing with and without TNP, and infection rates. The outcomes in the included studies were rate of wound healing (defined as complete closure, where stated), number of days to healing and adverse events (including infection).

Two reviewers independently selected studies for inclusion.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Odds ratios (ORs) were calculated for binary data. Median or mean values and associated confidence intervals (CIs), standard deviations or interquartile ranges were reported for continuous data.

The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The binary data were combined to calculate pooled ORs with 95% CIs using the DerSimonian and Laird random-effects model. Continuous outcomes were combined to calculate a pooled effect size with 95% CIs. Statistical heterogeneity was assessed using Cochran's Q test, and potential publication bias was assessed using funnel plots and Egger's test. Clinical heterogeneity between the studies was discussed in the text.

Results of the review
Three RCTs (n=232) were included.

In the intervention group, significantly more wounds healed (OR 1.92, 95% CI: 1.04, 3.55, p=0.03; 2 RCTs, n=222) and time to healing was significantly shorter (pooled effect size -1.042 days, 95% CI: -1.83, -0.24, p=0.01; 3 RCTs, n=232) than in the controls. However, there was statistically significant heterogeneity in the result for time to healing (Cochran's Q test, p=0.005). There was no statistically significant difference between the groups in rates of adverse
events (1 RCT, n=162) or wound infection (2 RCTs, n=222).

There were too few studies to assess potential publication bias.

**Cost information**
The total cost of treating 30 patients was $5,452 with TNP compared with $38,881 in the conventional dressing groups, mainly due to higher staff costs and longer hospitalisation times in the control group (1 RCT, n=30).

**Authors' conclusions**
Compared with conventional treatment, TNP significantly reduces healing times and increases the number of healed wounds among patients with lower limb ulcers.

**CRD commentary**
The review objectives and inclusion criteria were clear and the literature search appeared adequate. Steps were taken to reduce error and bias in the review process by having two reviewers independently select studies. However, it is not clear whether this also applied to the data extraction, or how any discrepancies between reviewers were resolved. No information was provided about study validity, which makes it difficult to determine the reliability of the findings. Few details were provided about the treatment received by the control group or the timeframe for follow-up (e.g. for assessment of wound healing and infection rates). The data on time to healing do not appear appropriate for meta-analysis since the results reported for individual studies indicate that they were not normally distributed. The findings are dominated by a single post-surgical study of diabetic and surgical foot wounds. It is unclear whether the results are generalisable to all lower limb wounds with underlying arterial or venous insufficiency, as the authors noted that diabetic wounds are not invariably associated with underlying blood vessel disease. In view of the scanty data, poor reporting and methodological limitations of the review, the authors’ conclusions may not be reliable.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors concluded that multicentre controlled trials on the use of TNP for patients with lower limb ulcers are required. The outcomes should include quality of life, pain and cost-effectiveness.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
18210955

**DOI**
10.12968/jowc.2008.17.1.28371

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Arterial Occlusive Diseases /complications; Confidence Intervals; Cost-Benefit Analysis; Humans; Leg Ulcer /etiology /pathology /therapy; Odds Ratio; Quality of Life; Randomized Controlled Trials as Topic; Research Design; Skin Care /economics /methods /psychology; Suction /economics /methods /psychology; Time Factors; Treatment Outcome; Venous Insufficiency /complications; Wound Healing; Wound Infection /epidemiology /etiology
AccessionNumber
12008009259

Date bibliographic record published
09/08/2008

Date abstract record published
01/12/2008

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.