

Original Research Article

# A comprehensive study on effectiveness of wound healing in vacuum assisted wound dressing

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## Abstract

**Background:** Delayed wound healing is a significant health problem, particularly in older adults. In addition to the pain and suffering, failure of the wound to heal also imposes social and financial burdens. Vacuum-assisted closure (VAC) therapy has been developed as an alternative to the standard forms of wound management, which incorporates the use of negative pressure to optimize conditions for wound healing and requires fewer painful dressing changes.

**Aim:** To assess whether the management of non-healing wounds using VAC therapy will result in improved efficacy and safety outcomes compared with conventional methods.

**Materials and methods:** Present prospective, time bound study was done for 1 year from January 2016 to December 2016 over 50 subjects (25 cases and 25 controls). Details of cases were recorded including history and wound characteristics. Routine investigations were done. Follow up with size of wound, appearance of granulation tissue after day 0, 3, 6, 9, 12 and so on dressings were done.

**Results:** Patients managed with VAC had increased rate of epithelialization and fewer patients required repeat split thickness skin graft to the same site. VAC was more effective at treating various chronic and complex wounds, as there was a significantly greater reduction in wound volume, depth and treatment duration.

**Conclusion:** VAC results in better healing than standard methods, with few serious complications. More rigorous studies with larger sample sizes assessing the use of VAC therapy on different wound types are required.

## Key words

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Vacuum assisted closure, Negative pressure dressing.

## Introduction

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The application of controlled levels of negative pressure has been shown to accelerate debridement and promote healing in many different types of wounds. The optimum level of negative pressure appears to be around 125 mmHg below ambient and there is evidence that this is most effective if applied in a cyclical fashion of five minutes on and two minutes off. It is believed that the negative pressure assists with removal of interstitial fluid, decreasing localized edema and increasing blood flow. This in turn decreases tissue bacterial levels. Additionally, mechanical deformation of cells is thought to result in protein and matrix molecule synthesis, which increases the rate of cell proliferation. Despite the significant costs involved, the technique is said to compare favorably in financial terms with conventional treatments in the management of difficult to heal wounds [1-6].

## Materials and methods

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Present prospective, time bound study was done for 1 year from January 2016 to December 2016 over 50 subjects (25 cases and 25 controls). Details of cases were recorded including history and wound characteristics. Routine investigations were done. Follow up with size of wound, appearance of granulation tissue after day 0, 3, 6, 9, 12 and so on dressings were done.

### Inclusion criteria

- Wounds involving the diabetic foot
- Acute and Traumatic wounds
- Subacute wounds (dehiscid wound)
- Pressure Ulcers
- Chronic open wounds
- Venous stasis ulcers

### Exclusion criteria

- Fistulas or organs or body cavities
- Necrotic Tissue in eschar

- Osteomyelitis (Untreated)
- Malignancy in the wound
- Actively Bleeding wound
- Wounds at the sites other than lower limb
- Ischemic ulcers

## Results and Discussion

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Patients managed with VAC had increased rate of re-epithelialization and fewer patients required repeat split thickness skin graft to the same site. VAC was more effective at treating various chronic and complex wounds, as there was a significantly greater reduction in wound volume, depth and treatment duration. VAC may be more cost-effective than traditional dressings or closed drainage and irrigation, as VAC required a reduced number of dressing changes and number of flaps to close the wound, and a shorter treatment duration and length of hospital stay. This has the potential to reduce health care costs, for both hospital and patient, and enhance patient satisfaction and quality of life. A major complication for patients whose wounds failed to heal with VAC was amputation. This occurred in one patient with a pressure ulcer who developed sepsis and three patients with diabetic foot ulcers who required higher level amputation. Cases of periwound maceration and infection were also reported; however, it is unclear whether these complications were VAC-related. Some patients reported minor discomfort with the application of pressures greater than 100 mmHg.

This prospective study was done in patients admitted in department of general surgery, Stanley medical college from January 2016 to December 2016.

**Table - 1** documents the age distribution of the patients taken for the study. **Table - 2** shows percentage of granulation tissue formed in the wound bed at 0, 3, 6, 9, 12<sup>th</sup> days.

**Table – 1:** Age distribution of the patients.

Age Group (Years)	Cases for VAC	Cases in controls
18-30	7	3
30-40	10	15
40-50	6	4
50-65	2	3

**Table – 2:** Percentage of granulation tissue formed in the wound bed at 0, 3, 6, 9, 12<sup>th</sup> days.

Days	Percentage of granulation tissue formed in VAC dressing (AVERAGE)	Percentage of granulation tissue formed by other conventional mode of dressings (AVERAGE)
0	0 %	0%
3	10 %	4 %
6	25 %	10%
9	40 %	30%
12	70%	40%

### Conclusion

VAC results in better healing than standard methods, with few serious complications. More rigorous studies with larger sample sizes assessing the use of VAC therapy on different wound types are required. With proper training to ensure appropriate and competent use, VAC is simple to use and appears to be promising alternative for the management of various wound types.

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