

## Home Care Based Negative Pressure Wound Therapy - an Economical and Effective Therapeutic Alternative

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### Abstract

*Background:* Chronic non healing ulcers are challenging problems faced by reconstructive surgeons. And treating these problems are huge economical burden and consuming more manpower to take care them in hospital setting. The aim of this paper is to share our experience of an economical and effective technique of wound care. *Materials and Methods:* This is a retrospective hospital based study of chronic non healing ulcers treated in JIPMER hospital from 2012 to 2014. The study consists of 11 patients of all age groups and both genders. Wounds were treated with periodic wound debridement done in hospital followed by home based negative pressure therapy for all cases. SSG was also done in few patients after wound bed preparation. Follow up done for 6 months. *Results:* 11 patients were taken for the study consisted of 7 males and 4 females. Ulcers involving upper and lower limbs are treated. End results were analysed by healing of the wound and maintaining the stable scar. Wound healing achieved by secondary intention in 9 patients and SSG was done in 2 patients. Number of hospital visits averaged 7. Average duration of treatment is 43 days. 3 patients are admitted only after skin grafting. *Conclusion:* Economical and effective wound care can be achieved by home care based negative pressure wound therapy with using simple appliances and proper education of patients and relatives.

**Keywords:** NPWT; Non-Healing Ulcer; Ulcers-Home Care.

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### Introduction

Negative pressure wound therapy (NPWT) or vacuum-assisted closure (VAC) - negative pressure applied to the wound will promote an improved environment for wound healing. NPWT now used for chronic open wounds, diabetic ulcers, stasis ulcers, acute and traumatic wounds, and dehisced wounds. In this method continuous or intermittent negative pressure varying between 50 to 125 mmhg [1] applied over the wound and its margin. Applied mechanical forces deform tissues, which results in deformation of cells which is followed by stimulation of growth factor pathways, resulting in increased mitosis and production of new tissue that results in accelerated wound healing [2]. The system consists of a non adherent, porous wound dressing (such as polyurethane foam), a draining tube placed in the dressing (or adjacent to it), a transparent air tight film to seal the wound and drainage tube that is connected to a vacuum source for negative pressure. The system is usually applied to an open wound for period of 48 - 72 hours.

### Materials and Methods

The study was conducted in Plastic Surgery Department, JIPMER hospital. It is the retrospective study conducted between 2012 to 2014 in patients having non healing ulcers in upper and lower limbs. Details of 11 patients including 7 males and 4 females who were treated for non healing ulcers were analysed. Patients who were treated for ulcers less than 4 weeks were excluded from the study. All 11 patients were treated with periodic wound debridement and application of negative pressure using self retaining suction canisters. And all patients

were taught about the method of application and detachment of suction canister. And all patients were instructed to report immediately.

#### *Inclusion Criteria*

- Age group 20-75 years.
- Ulcer area > 30 cms<sup>2</sup>
- Ulcers > 4 weeks duration

#### *Exclusion Criteria*

- Age < 20 years or > 75 years.
- An obvious septicaemia.
- Osteomyelitis.
- Malignant disease in a wound
- Other serious pre-existing systemic diseases that require hospitalisation.

#### **Result**

Of 11 patients 7 patients were male and 4 patients were female. Age range is between 28 years to 57 years. Average age is 42 years. Wound surface area ranging between 16 sq cms to 96 sq cms. Average duration for complete healing is 43 days. Average number of visits are 7.3 patients were required skin grafting. All patients achieved complete wound healing. As portable negative pressure device was applied patients were ambulatory and able to care for themselves in their home. And cost associated with staying in the hospital was significantly lower. Images of the patients who required grafting are shown below (Figure 1-6) & (Figure 7-10).



Fig. 1: Chronic, infected diabetic ulcer



Fig. 2: Wound after surgical debridement



Fig. 3: Portable negative pressure applied



Fig. 4: Wound after 3 week follow up



Fig. 5: Wound covered with Graft



Fig. 6: Showing fully taken graft



Fig. 7: Post traumatic raw area



Fig. 8: Portable negative pressure applied



Fig. 9: After 2 week follow up, showing



Fig. 10: Wound covered with graft contracted and granulate wound

## Discussion

In the past few years, the use of NPWT has increased substantially. This is due to the favourable results following NPWT and increased awareness among medical faculties, easy availability of the materials and they are cost effective, moreover NPWT is both patient and surgeon friendly method.

NPWT delivers intermittent or continuous vacuum pressure 50-125 mmHg. The therapy is based on the principle of turning an open wound into a controlled, closed wound in the mean time removing the exudates from the wound bed. So that the blood circulation to the wound is improved. This therapy is not the replacement of surgical wound debridement. There must be no significant infection or gangrene in the wound, when NPWT is initiated. Caution is also warranted if there is a risk of bleeding from the wound.

In our cases we used suction canisters that used for suction drain which would produce the negative pressure of about 60-80mmhg. Periodic wound debridement/ inspection (once in 3-4 days) was done and continuous negative pressure applied through the suction canister. Patients were educated to reapply the suction. During each visit wound is assessed with Bates- Jensen wound assessment tool [4] and surface area measured with Digital planimeter. All the patients were treated in OPD basis. There was significant decrease in the wound size in each visit. Out of 11 patients 9 patients achieved complete wound healing and 2 patients required grafting.

## Conclusion

In our experience home care based negative pressure wound therapy using easily available cost

effective suction canister has produced good results that are comparable to hospital (inpatient) based NPWT which is more costly.

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