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# Role of Cyclic Negative Pressure Wound Therapy in the Management of Adult Scald Burn

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**Abstract**

A common treatment for both acute and chronic wounds is negative pressure wound therapy. NPWT is recommended for a range of difficult wounds, and certain research support its usage in specific burn care procedures. Even though more study is required to fully understand the advantages for burns, NPWT has shown promise as a dressing that supports skin grafts, encourages the integration of bilaminate dermal substitutes, encourages the re-epithelialization of skin graft donor sites, and may even lessen the zone of stasis. Based on indication/ application, this article analyses the literature on NPWT in burns and discusses our experience with modified NPWT for major burns.

**Keywords:** Scald burns; Cyclical negative pressure wound therapy; Wound healing.

## INTRODUCTION

Applying negative pressure wound therapy together with the proper debridement and antibiotic treatment as judged clinically necessary can help manage infected wounds. NPWT encourages perfusion surrounding the wounds in addition to removing fluid and reducing oedema. Additionally, when used as a bolster, NPWT may result in improved graft fixation, particularly in patients who are less cooperative or who have poor graft fixation as a result of employing conventional procedures. In patients who are young, active, and less obedient, NPWT is an excellent option to support skin grafts. In order to better control postoperative infection, we suggest an improved segmental compartment covered approach that includes NPWT as an additional first line wound care. Additionally, NPWT encourages the development of granulation tissue to prepare the wound bed for a subsequent skin graft and can be utilized. Dehydration, inhalation injury, infection control and nutritional support are urgent needs for burn victims. Additionally, escharotomy, followed by skin grafting, is the most crucial procedure to boost the survival probability. Burn patients remain immunosuppressed, hypermetabolic, and

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painfully sensitive throughout this period. The difficulties in treating individuals with severe burns are controlling early wound exudate and providing postoperative care following skin graft. A dressing should ideally be able to shield the area from external pollutants, avoid traumatising or damaging the wound, and lessen patient discomfort brought on by dressing changes.[1,2] Negative pressure wound therapy (NPWT) may be used to treat various issues, such as wound infection brought on by the early stage's large exudate.[3,4,5] According to earlier studies, NPWT increases the circulation around the wound while also removing exudate and infectious materials.[3,4] Additionally, it has been noted that NPWT, when used as a support, can aid in promoting graft take and may lower the chance of needing additional skin grafts. Finally, adopting NPWT for burn patients' wounds may shorten the time spent providing nursing care. In this study our aim assesses the role of NPWT in scald burns.

## MATERIALS AND METHODS

This study was carried out in a tertiary care hospital's plastic surgery department. The patient whowas the subject of the study provided informed consent. The approval of the departmental scientific committee was gained. It is a non-randomized, non-controlled trial that only has one centre. The 33 years old female patient and had no other known comorbidities. After thorough examination, it was discovered that the patient had second degree superficial burns to her lower limbs, abdomen (Fig. 1).

**Fig. 1:** Scald burns with mixed superficial and deep burns.

According to the TIME concept described in therecommendations, the wound bed was prepared, and the ulcer was serially examined and document the Bates-Jensen wound evaluation method (Fig. 2).

**Fig. 2:** After Tangential Exision

The management of non-viable necrotic tissueinvolved numerous sessions of surgical and hydro debridement. Local antibiotics and antimicrobials were used to treat the infection, according. The ulcer was serially evaluated and documented in accordance with the bates-Jensen wound assessment tool, a notion described in the guidelines. The management of non-viable necrotic tissue involved numerous sessions of surgical and hydro debridement. Depending on the sensitivity of theculture, local antimicrobials and antibiotics were used to treat the infection. Cyclical negative pressure wound therapy was used to regulate moisture because the wound was naturally moist with pressure of 25 to 125 mmhg Two sessions ofcyclic negative wound pressure treatment were used (Fig. 3 and 4).

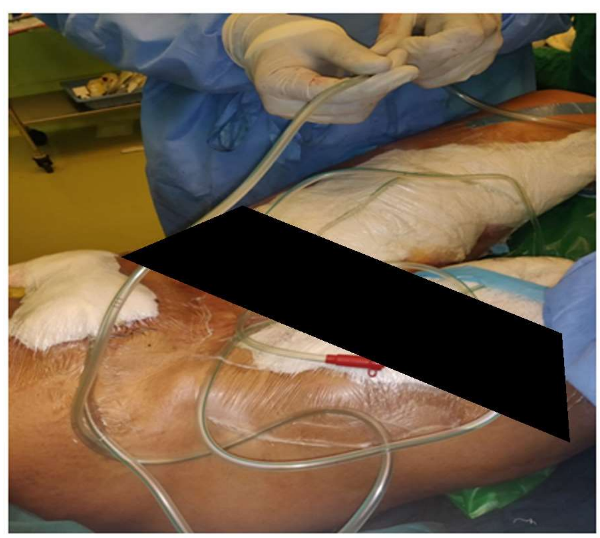

**Fig. 3:** Negative pressure wound therapy both limb

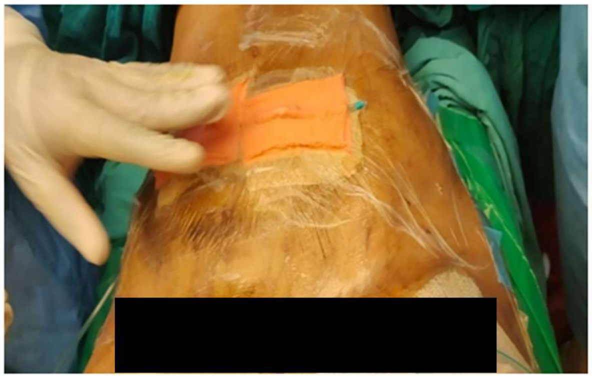

**Fig. 4:** Negative pressure wound therapy for abdomen

Skin graft was done. Additionally, it has been noted that NPWT, when used as a support, can aid in promoting graft take and may lower the chance of needing additional skin grafts. (Fig. 5)

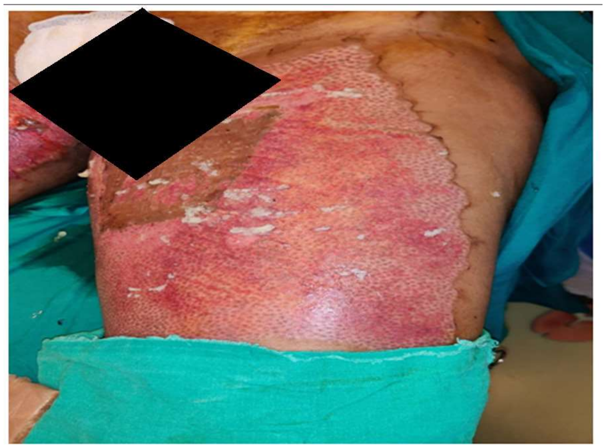

**Fig. 5:** Superificial degree healed and deep treated with SSG.

## RESULTS

Cyclical NPWT improves pain tolerance. Superificial burns healed, deep burns treated with SSG.

## DISCUSSION

The cyclic mode cycles through the defined negative pressures to operate its negative pressure in a manner similar to the sine wave. Regardless of time, the pressure system turns off once it reaches the upper target pressure of 125 mmHg, and the pressure gradually decreases until it reaches the lower target pressure. The drop velocity of the pressure is closely correlated with the defect volume in the cyclic mode as the change in intra lesional pressure is recorded. In other words, the length of time needed to complete a system cycle decreases as the volume of defects increases.[1-3]

Increased collagen I production in wound healing has previously been demonstrated by improved tensile strength in in vivo study. This increase may be caused by higher levels of vascular endothelial growth factor and fibroblast growth factor, which have a pro-angiogenic effect. Both growth factors have an impact on wound healing since they are engaged in the stages of haemostasis, proliferation, and repair during the healing process. During angiogenesis, VEGF also regulates cell migration, differentiation, and proliferation. This promotes the growth of new capillaries, improving blood flow to the area of the wound and facilitating the supply of vital nutrients and oxygen. VEGF is induced (MCP-1) by the increased expression of certain mediators, including IL-1 and monocyte chemoattractant protein-13.[4,5]

Studies on humans and animals have revealed that VAC therapy increases the formation of granulation tissue, increases blood flow, reduces the size of the wound, and controls the inflammatory response. VAC results in cell micro deformation, wound contraction, stabilisation of the wound environment, reduction of edema with evacuation of wound exudates, and all of these things. Due to the increased blood flow, decreased bacterial load, and enhanced wound bed preparation for subsequent coverage, these factors enable VAC to hasten wound healing. Negative pressure tissue compression results in tissue hypoxia because of decreased perfusion beneath the foam, which increases angio-neogenesis and produces local vasodilation due to nitric oxide release.[6]

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