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**Case Report**

# Traumatic wound difficult to heal: use of negative pressure therapy: case report

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## ABSTRACT

The skin is one of the largest organs of the anatomy. It is the barrier between the exterior and the first line of defense against aggression. A wound is a loss of continuity of the soft parts of the organism generating an interruption in the structure of the tissue, as a consequence of this loss of continuity, there is a loss of sterility existing inside and infection can occur. Another consequence of discontinuity are possible lesions in adjacent tissues or organs. Trauma results in complex wounds that are difficult to manage due to large skin loss or avulsion of large areas of tissue. Among the factors that can prevent proper healing can be systemic (malnutrition, chemotherapy, steroids) or local (infection, prosthetic material, bone exposure). Among the therapeutic options for complex wounds is negative pressure therapy which generates wound contraction, stabilization of the environment, reduction of edema, removal of exudate and micro-deformations of the surface, increase of angiogenesis, granulation tissue formation and decreased bacterial count. We described a clinical case of traumatic injury at the level of the right pelvic limb in a 70-years-old woman with diabetes and hypertension, in which surgical washing was performed, debridement and use of negative pressure therapy with adequate evolution in a second level public hospital.

**Keywords:** Contused wound, Negative pressure therapy, Wound infection, Degloving

## INTRODUCTION

Negative pressure below atmospheric; it was developed in 1989 by Louis Argenta and Michael Morykwas at Wake Forest University Medical School in North Carolina USA, uses a semi-occlusive cover of polyurethane with limited permeability to gases and steam and impermeability to proteins and microorganisms, the tissue is exposed to a suction of 125 mmHg creating contraction of the wound.[1,2]

Evacuate the fluid with its electrolytes and proteins, the pressure of the fluids within the interstitial space is greater than the local capillary pressure with a decrease in microvascular perfusion, subatmospheric pressure improves blood flow by increasing the pressure gradient between the interstitial space and the capillary system, decreasing tissue edema.[3-5] Subatmospheric pressure therapy removes proinflammatory mediators from the wound such as cytokines, chemokines, proteolytic enzymes, collagegenolytic enzymes are removed, including metalloproteinases.[6,7]

## CASE REPORT

We presented the case of a 70-years-old woman with a history of diabetes mellitus 2 from 15 years of diagnosis, systemic hypertension of 15 years of evolution, obesity grade I; with an evolution of 48 hrs after falling on its own plane of support on laminated object, generating wound of contuse type on right pelvic limb (Figure 1-4), so it goes to hospital unit, it is valued by the general surgery service is decided to perform surgical washing empirical antibiotic debridement and use of negative pressure system; surgical washes and dressing change every 4 days, 7 replacements of negative pressure system were performed, modality was

continuous, the type of sponge used was silver, the negative pressure was 125 mmHg when removing the system uniform granulation tissue was observed, no discharge and a decrease in the initial wound diameter, wound bed cultures were taken on 2 occasions both without bacterial development, noticeable improvement was observed on day 30 (Figure 5 and 6).

So, it was decided to leave the service with sending to the clinic of wounds and reference to plastic surgery for evaluation of possible graft, there were no complications such as bleeding, bone tissue exposure, loss of pressure, or the need to change dressings early during the course of treatment.

**Figure 1: Wound contuse type on right pelvic limb.**

**Figure 2: Wound with avulsion of large extensions of skin and tissues.**

**Figure 3: Wound with avulsion of large extensions of skin and tissues.**

**Figure 4: Wound with avulsion of large extensions of skin and tissues.**

**Figure 5: Negative pressure therapy which generates wound contraction and stabilization of the environment.**

**Figure 6: Final results after withdrawal of negative pressure therapy.**

## DISCUSSION

With negative pressure therapy, there is a control of the infection by increasing blood flow to the wound through negative pressures and the removal of edema and cellular waste decreases the potential for infection with a bacterial count of less than 100,000 bacteria.[8,9] When the sponge is compressed there is resulting deformation mechanical stress has been shown to have a direct effect on mitotic cell activity, deformation of cells creates changes in molecular stimulation, increase tissue growth factors including TGF B1 and vascular endothelial growth factor expresión.[1,2,10,11]

Among the contraindications for negative pressure therapy there are: undeveloped necrotic tissue, heavy bleeding, osteomyelitis, malignancy in the wound and fistulization to some organ or body cavity. The most frequent complications are bleeding at the time of sponge change, allergic reactions, necrosis of the wound margins, infection, pain.[2,12]

## CONCLUSION

The negative pressure system was developed in the 1990s, based on a subatmospheric pressure in the wound bed, a polyurethane foam or polyvinyl alcohol is cut and placed on the surface of the wound. The foam is sealed above with a transparent tape to provide a closed system. The negative pressure therapy is useful in patients with degloving understood as wound with avulsion of large extensions of skin and tissues is an alternative to flaps, decreasing the time needed for treatment, favoring granulation and an environment for healing as shown in the present case; however it is necessary to bear in mind the cost generated by the materials, there is not always more availability of the same in the public health system so it is necessary to have therapeutic alternatives in the absence of such a resource; however, the negative pressure therapy decreases the treatment times, generates granulation tissue, achieving to be an ideal therapeutic for extensive wounds.

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