

CLINICAL AND EXPERIMENTAL FINDINGS BEYOND OCCLUSION WHEN USING A GLYCERINE HYDROGEL

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INTRODUCTION

In this poster a clinical evaluation of an absorbent hydrogel on burn wounds will be discussed.

Next to the clinical evaluation in humans, scientific discoveries concerning the hydrogel will be discussed.

A controlled animal study was conducted by the Dutch Burn Research Institute. The animal study was a comparison of hydrogels with and without glycerine: Elasto-Gel* versus ClearSite**.

The preliminary macroscopic and microscopic pre-clinical results will be discussed.

CLINICAL EVALUATION OF THE GLYCERINE BASED HYDROGEL.

I. Burns

Since we are a regional hospital we only treat burns smaller than 10% body surface burned. In most cases we have children with scalds and adults burned by flames.

We have about 20 patients a year with serious burns. About 65% is a deep 2° degree and only 10% have serious overall 3 Th. degree burns. The rest is a mixture of all degrees. The standard treatment of burns is Silversulfadiazine cream (SSD) but since we know that the Silver particles in the creme are irritating we have chosen for an **other** standard treatment in our hospital. SSD has the potential to preserve viable dermal tissue but the epidermal regeneration is rather slow and irritated, while the formation of granulation tissue is pronounced, with an abundance of myofibroblasts. This abundance of myofibroblast is a possible case of hypertrophy scars. (i. Hoekstra et al.)

We use SSD the first day for killing the germs on the burned skin, but then we cover the wound with large pieces of Elasto-Gel. In the first days this hydrogel sheets can be left for at least 3 days. As wound exudate diminishes the hydrogel sheet can be left for one week or longer. Wound healing is enhanced and patient comfort is seriously improved. We had no signs of infection during the treatment with Elasto-Gel.



Picture 1.

Second degree burns on a mans buttock.

A 53 year old Caucasian male burned himself severely because his nylon night dress started to burn .The man was at least 10% burned body surface with 2 end degree burns and 4 to 5% body surface 3 degree burns. Both buttocks (picture 1-3), were severely burned. After three days the man was operated. The buttocks were not grafted and Elasto-Gel was applied. Due to the pressure relieve properties of Elasto-gel the patient was able to sit in a wheelchair. We applied two Elasto-gel sheets (30 cm x 30 cm) and wrapped the whole upper leg in the hydrogel dressing.



Picture 2.

Both burn wounds covered with Elasto-Gel and fixated with OpSite. Dressing could be left for 3 days.

It was necessary to fixate the dressings one to another at the overlay and on the outer sites we used large polyurethane films to secure the dressing further. This extra fixation with polyurethane films is necessary because the hydrogel absorbs 3 to 4 times it own weight with exudate and when getting heavy it starts to glide.



Picture 3.

Treatment results with Elasto-Gel. From the 5th day post burn till the 25th day PB complete epithelialization.

In another case we had a 1 year old boy who was burned by hot water. The first day the wound was treated with SSD and the second day all the death tissue was removed and a piece of Elasto-Gel was applied. (Pic. 4) This dressing remained for 7 days on the wound. The baby was able to play and could eat and play normally. After 7 days we found a healing, less irritated wound. (Pic. 5) Again a piece of Elasto-Gel was applied for 7 days. After this the wound was healed, just a soft bandage for protection was needed.(Pic 6.) Three months later no hypertrophic scarring was found.



Picture 4

Hot water burn in 1 year old baby on day 2.

Reference.

i. M.J. HOEKSTRA, e.a., A comparative burn wound model in the New Yorkshire pig for the histopathological evaluation of local therapeutic regimens: silver sulfadiazine cream as a syandard., *British Journal of plastic Surgery*, (1993), 46, p. 585-589.



Picture 5.

The wound was dressed with Elasto-Gel.



Picture 6.

Wound after 7 days treatment with Elasto-Gel. (PB day 8)

II. Scientific discoveries

A. Thin layer of fibrin and glycerin covering the wound.

When we used Elasto-Gel on the burn wounds or even on grafted wounds we found a transparent film layer on the wound surface. After anatomopathological



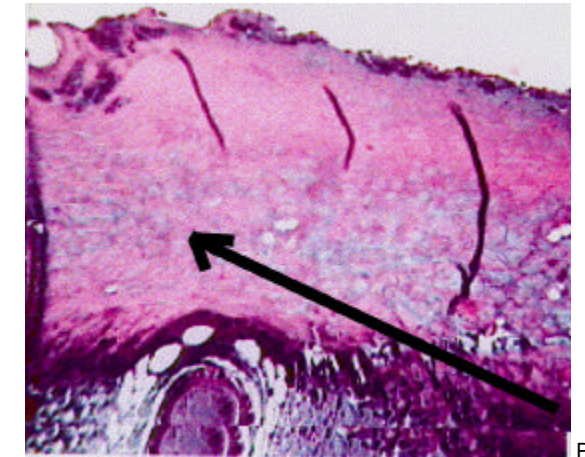
Pic. 7

Wound after 14 days Elasto-Gel treatment. PB day 22.

examination we found that the film consisted of fibrin and glycerin. The film forms because the hydrogel sheet is absorbing the exudate quit fast and a thickening of the wound fluid takes place. We also found that the local growth hormones were concentrated on the wound surface which explains partially the better wound healing results.

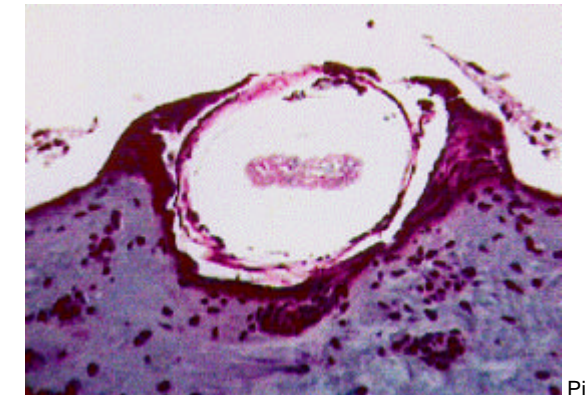
B. Bacteriostatic action of the 65% glycerine

In the animal study conducted by the Dutch Burn Research Institute we found a striking difference in the bacterial counts in the wounds treated with Elasto-Gel and those which were treated with ClearSite. The wounds treated with ClearSite were smelling badly and histological evaluation revealed a multitude of bacterial micro abscesses in wound crust. (Pic. 8) In the wounds treated with Elasto-Gel no such bacterial abscesses were found after histological evaluation. This shows that 65% glycerine works severe bacteriostatic on a wound. (pic. 9) This result proves our clinical findings since we had now sings of Infection during the treatment with Elasto-gel.



Pic. 8

Section of wound treated with ClearSite. Notice bacterial colonies staining dark blue in superficial crust layer.



Pic. 9

Wound treated with Elasto-Gel. Superficial hair follicle. Notice absence of bacterial colonies.

III. Conclusion

Elasto-gel proved to be an excellent choice for the primary wound dressing as we have experienced in the treatment of several burn wounds. Specifically, Elasto-gel:

- was compatible with other dressings, medications and wound packing materials in complex wound care, which resulted in reduced cost of nursing labor.
- was able to absorb part of the exudate and contain the remaining exudate with minimal leakage.
- was easy to handle, apply and mildly adhesive.
- conformed to body contours and the elastic backing enables stretching with body movements (reduces friction and nerve irritation, resulting in less pain).
- is bacteriostatic and fungistatic and highly odor "absorbing". did not dry out and adhere to the wound or surrounding tissue.