

## LOCAL TREATMENT OF BURNS WITH HONEYCOMB EXPANDED POLYURETHANE (LIGASANO)

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**SUMMARY.** The results are presented of the local treatment of burns with honeycomb expanded polyurethane. This method of treatment can be used both for the medication of burns of limited extent but variable depth and as a mattress for patients confined to bed. In the first case, the purpose of the treatment, which makes use of the product's absorbent and debriding capacity, is either to cure the lesion or to pave the way for the surgical operation. In the second case use is made of the product's exudate-draining and anti-pressure sore activity, which prevents the lesion from becoming deeper.

### Introduction

Honeycomb expanded polyurethane (white Ligasano) has two main action mechanisms:

- friction on the lesion-medication interface, causing mechanical debridement of non-viable tissues
- absorption of excess exudates

These features, together with the possibility of replacing it at longer time intervals (every 4-6 days), make honeycomb expanded polyurethane an appropriate method of treatment that is particularly suitable for the treatment of burns of limited extent.

However, when used as a mattress on which the patient is laid, Ligasano can also be applied in cases of extensive burns.

### Materials and method

Sixteen patients with non-extensive burns of varying depth were treated (11 adults, 3 elderly, 2 children). Two adult patients with extensive burns were placed on a Ligasano mattress. Nine patients in the first group were outpatients.



**Fig. 1a** - Necrosis due to electrocution of left hallux.



**Fig. 1b** - Application of 15% salicylate Vaseline.



**Fig. 1c** - Application of white Ligasano.



**Fig. 1d** - Progressive wound debridement.



**Fig. 1e** - Repair with skin graft.



**Fig. 1f** - Three-month check-up

**Table I** - Characteristics of patients healing after local therapy

Age/sex	Cause	Thickness	Site	Management	Healing (days)	Number of out-patient visits	Sequelae
Adult/m	Fire	Partial	Neck	Hospitalization	4	1	–
Adult/m	Water	Partial	Foot	Hospitalization	10	3	–
Elderly/f	Fire	Full	Shoulder	Hospitalization	25	3	–
Elderly/f	Fire	Full	Hands	Hospitalization	21	1	–
Child/m	Water	Partial	Thorax	Hospitalization	30	*	Hypertrophy
Adult/m	Oil	Full	Foot	Hospitalization	20	*	Hypertrophy
Adult/m	Fire	Full	Forearm	Out-patient	44	7	–
Adult/m	Friction	Full	Leg	Out-patient	75	13	–
Child/m	Fire	Partial	Leg	Out-patient	30	7	–
Adult/f	Contact	Partial	Leg	Out-patient	14	4	–
Adult/f	Contact	Partial	Leg	Out-patient	49	7	–
Elderly/f	Oil	Full	Leg	Out-patient	22	5	–
Adult/m	Fire	Full	Leg	Out-patient	14	4	–
Adult/f	Fire	Partial	Breast	Out-patient	30	6	–
Adult/m	Electrocution	Full	Thigh	Out-patient	29	7	–

\* These two patients' scars required protracted treatment.

An assessment is made of the period of healing and out-patient treatment. The follow-up results and the quality of healing are reported.

### Results

Only one patient in the first group healed after surgery (Figs. 1a-f). Table I presents the characteristic of the other 15 patients in the same group, who were healed by topical medical therapy alone. Of the two patients placed on a Ligasano mattress, its intense exudate-draining capacity was used in one and in the other its anti-pressure sore and debridement function (Figs. 2a-e).

### Discussion

Honeycomb expanded polyurethane (Ligasano) is used in the local treatment of burns of limited extent, prior to surgical repair, or to facilitate healing. The following indications have to apply in this second case:

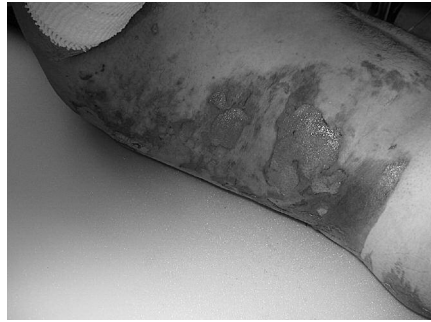
- dermal burns in critical areas<sup>1</sup>
- full-thickness burns in non-operable patients
- burns following a skin graft operation
- burns in out-patients<sup>1</sup>

Analysis of individual cases also enabled us to make the following considerations:

- Ligasano can be used in the local treatment of burns of varying aetiology (electrical, thermal, friction) and of different depth (partial- and full-thickness)
- it can also be used to treat paediatric burns
- it often happens that burns treated at length with other methods (especially collagenase) are finally cured thanks to the use of Ligasano treatment; Ligasano can also be used in association with colla-

genase or salicylate Vaseline (also with biotics) when it is desired to achieve a more rapid debridement or necrosectomy<sup>2,3</sup> or with rifamycin for local use if it is desired to exploit the latter's anti-inflammation and anti-oedema effect<sup>4</sup>

- in out-patients it makes it possible to apply dressings at some distance of time (every 4-6 days), thus reducing handling manoeuvres and making treatment more comfortable; the speed with which burns heal, as also the action mechanism, also depends on the site because burns in particular mobile areas (neck, hands) heal more rapidly than others
- in many cases there is an evident development of scabs during the process towards clinical healing, probably because of the greater local absorbing-dehydrating effect; in these cases a brief hydrating treatment of the scar is sufficient
- when there is a tendency towards scar hypertrophy this is countered by using the routine treatment protocol (hydration, masso/presso therapy, silicone). The long-term results are usually good
- when Ligasano is used in mattress form, mainly for the purpose of draining the exudates, the objective assessment of its degree of imbibition (done by squeezing by hand), associated with the patients' subjective sensation that they are "floating on water", is the main indication for changing it. When the purpose is to exploit its anti-pressure sore action (it prevents further deepening of the lesions) and that of debridement and re-epithelialization (it reduces the quantity and time of infusion and bladder catheterization), a feeling of "lying on emery paper" replaces the much more painful sensation caused by dressing changes.



**Fig. 2a** - Deep dermal burn in trunk and buttocks. **Fig. 2b** - Decubitus on white Ligasano mattress. **Fig. 2c** - Initial stage of lesion debridement.



**Fig. 2d** - Advanced stage of lesion debridement (day 12). **Fig. 2e** - Clinical healing (day 20).

### Conclusions

The local treatment of burns has the following purposes:

- to favour removal of necrotic tissue, which is the main source of bacterial multiplication

- to produce, thanks to absorption and control of exudates, an environment for the lesion that promotes a rapid infection-free recovery.<sup>5,6</sup>

Honeycomb expanded polyurethane's characteristics make it possible to achieve both these purposes.

The anti-infectious action of mechanical debridement can be increased with the association of enzymatic treatment (collagenase) or chemical treatment (salicylate Vaseline) while the anti-infectious action due to absorption of the exudates can be increased by the association of antiseptics and antibiotics for local use.<sup>7</sup>

The debridement of nonviable tissue, the absorption of the exudates, and the anti-infectious action lead to re-epithelialization or the formation of a suitable area for surgical repair using a free skin graft.<sup>6</sup>

**RÉSUMÉ.** Les Auteurs décrivent leur expérience avec le traitement local des brûlures moyennant le polyuréthane expansé en nid d'abeille. Cette méthode peut être utilisée soit pour les médications des brûlures d'étendue limitée mais de profondeur variable soit en forme de matelas, pour le décubitus des patients. Dans le premier cas le but du traitement, qui exploite l'action absorbante ou de débridement du produit, peut être ou la guérison de la lésion ou la préparation à l'intervention chirurgicale. Dans le deuxième cas on exploite l'action de drainage de l'exsudat et l'action contre les escarres de décubitus, qui empêche l'approfondissement des lésions.

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