

# Factors Influencing Healing Time after Enzymatic Debridement

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## Aims of the study:

The investigation was intended to **evaluate the influence of demographics and treatment modalities on healing time after Enzymatic Debridement (ED)**.

## Introduction:

Enzymatic debridement (ED) was developed and tested since the second world war. Critical points of treatment with ED are a fast and complete removal of necrosis.

As a non-invasive method it is widely used after several studies.

Papers on components of trauma and treatment modalities influencing the healing time after ED are rarely found in literature.

This presentation tries to evaluate components influencing healing time.

## Material and Methods

In a retrospective evaluation of patients admitted to UKB between 2014 and 2016 we found 52 patients with 56 wounds treated with ED. Most patients were treated either by a silicone or by a polylactide dressing. As a healing time of 30 days seemed to be critical for healing without hypertrophic scarring, we compared the group of patients who healed within 30 days to patients healed after 30 days.

**Parameters tested** were

**demographical ones** like age, sex, etiology of burn, location in or outside a closed space,

**parameters regarding pre-hospital therapy** like cold water application, pre-hospital intubation, pre-hospital fluid administration and

**evaluation and treatment parameters** like TBSA, percentage of partial thickness and full thickness burns, patients taken to the ICU, timing of and completeness of ED, pseudoeschar to be operated on, ABSI and modified BAUX index (MBI).

Based on the results of this comparison and to evaluate the influence of a possible bias based on the general situation of the patients, two groups were formed based on the average MBI.

A logistic regression formula was calculated regarding Polylactide membranes (PLM) and Silicone dressings.

## Demographics:

Of the total of 52 patients, 22 received PLM, and 19 received Silicone after ED. Age was  $43.8 \pm 14.8$  years in the PLM group and  $45.6 \pm 13.8$  years in the Silicone group. Both groups were well balanced regarding sex but not regarding percent TBSA burned (8.1% vs. 22.8%,  $p < 0.001$ ).

The predominant mechanism of injury in both groups was flame burn (68% for PLM group vs. 84.5% in the Silicone group), followed by scald injury (22.7% vs. 10.5%) and electrical injury (4.6% vs. 0%).

ED was started on average  $2,2 \pm 1,9$  days after injury. Application was done for four hours. Post Soaking time was on average 3,7 hours. After a temporary dressing the definitive dressing was applied on average after 3 days. When a healing time of >3 weeks was to be expected, grafting was considered and done in 24 patients of the PLM and Silicone group.

Healing time was registered when a 95% closure of the wound was clinically confirmed.

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## Results:

### Healing time < 30 days versus > 30 days:

Statistically significant differences were found in the rate of preclinical intubations, inhalation injuries, the application of fluids before admission, the type of dressing used, and the BAUX index.

**Statistical significance comparison healing time all patients < 30 days vs. >30 days**

Age : P=0,047

Sex P=0,34

Etiology P=0,44

Localisation P=0,33

Cold water P=0,03

Intubation P=0,0055

TBSA P=0,07

Deep partial P=0,03

Full P= 0,07

Thickness

ICU P=0,02

Fluids P=0,03

prehosp.

Inhalation P=0,02

verified

ABSI P=0,01

mBAUX P=0,02

Residual P=0,06

Necrosis

Eschar to be P=0,03

operated

Dressing P=0,02

Healing P=0,001

time



### Modified Baux > 67,5 versus < 67,5

As in the comparison of healing times a **highly significant difference was found in modified BAUX index (MBI)** groups with a separator of the mean MBI of 67,5 were formed.

Comparing groups with a **higher than average MBI** of 67,5 the PLM and the silicone group had a **comparable MBI (p=0,337)**, but the PLM group had a **five days shorter healing time of 43 days (p=0,2768)**.

The amount of areas treated with ED did not show statistical differences, as well as the amount of ED material used.

### Regression analysis:

The Regression analysis was based on dressing, modified BAUX index, incomplete debridement and eschar to be operated on and was performed on all patients treated with PLM membranes or Silicone.

Regression Formula (n=37)

Group = all patients treated with PLM or Silicone and available data

Days for healing = 1,53266

+ 8,89374 \* type of dressing ( 1 PLM or 2 Silicone)

+ 0,34955 \* Modified BAUX

- 5,1583 \* Residual necrosis ( 1= Yes, 0= No)

+7,59858 \* Pseudoeschar to be operated on

R= 0,5544

(p=0,0166 eins.) SE = 20,2366

## Lessons learned:

- Dressings are an influencable setting in burns treatment, which might have impact on healing time
- Results should be validated in a prospective and randomized study

## Limitations:

Due to the retrospective approach of the study a bias cannot be excluded; The small sample numbers limit statistical validity.