# Dermal substitutes in pediatric burns: our experience

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## Introduction

In the pediatric deep second degree and third degree burns, in which there is the absence of autologous dermis, staged reconstruction with a dermal equivalent or dermal regeneration template is required.
Hyalomatrix PA, Matriderm and Integra dermal regeneration template have been used in our center on pediatric burned patients as a temporary dermal substitute to cover deep partial and full thickness burn wounds after dermabrasion.
This treatment was adopted to remove necrotic tissue (dermabrasion) and to stimulate regeneration in a humid and protected environment.

## Methods

Hyalomatrix is a bilayer of an esterified hyaluronan scaffold beneath a silicone membrane. The scaffold delivers hyaluronan to the wound bed, and the silicone membrane acts as a temporary epidermal barrier.
Matriderm is a dermal substitute consisting of a native (non-cross-linked) collagen matrix supplemented by a elastin hydrolysate. It is available in sheets of 1 mm and 2 mm thickness, and may be covered in a single step procedure with immediate split thickness skin grafting.
Integra dermal regeneration template consists of a dermal substitute of bovine collagen and chondroitin-6-sulfate and an epidermal layer of synthetic polysiloxane polymer (Silastic).
Their mechanism of action is based on revascularization and colonization by fibroblasts of the patient.
On the third to fifth day after admission, dermabrasion was practiced on burned areas, which were covered with Hyalomatrix PA or Matriderm or Integra dermal regeneration template , depending of the burn depth.
A prospective randomized clinical study was performed on 37 pediatric burnt patients to investigate the effectiveness, safety and tolerability of Hyalomatrix and Matriderm.
Hyalomatrix PA was applied on 17 patients aged between 7 months and 13 years old, average age 6,1.
Matriderm was applied on 13 patients aged between 3 years and 16 years old, average age 9,7.
Integra dermal regeneration template was applied on 7 patients aged between 6 years and 17 years old, average age 11,2.

## Results

After 7 days, re-epithelization processes were obtained in deep partial thickness burns in patients where Hyalomatrix PA was applied.
After 29 days, complete closure was achieved in almost all patients.
The silicone membrane may limit wound bed colonization, and the combination of this temporary barrier with hyaluronan delivery and neodermis induction has been termed a barrier-delivery-induction system.
After 1 week all wounds treated using Matriderm were assessed for the percentage of autograft survival. Autograft survival was not altered by simultaneous application of a dermal matrix. Skin elasticity was measured after 3-4 months with the Vancouver Burn Skin Score (VBSS). The VBSS demonstrated a significant increase of elasticity in the group with dermal substitutes.
Within 3 weeks from the application of Integra, the dermal layer regenerated, and a thin epidermal autograft was placed.

## Conclusions

Hyalomatrix PA is used in pediatric patients, in deep partial thickness and full thickness burns, as a temporary coverage before grafting or alone for wound healing. The combination of dermabrasion with a temporary dermal substitute could be a good and feasible approach for treatment of deep partial-thickness burns
The application of Matriderm is safe and provides good results on the skin elasticity.

Skin elasticity was considerably improved by the collagen/elastin dermal substitute Matriderm in combination with sheet autograft.
The use of Integra dermal regeneration template for treatment of deep burns is safe and an intact dermis was achieved as well as definitive closure of a complete epidermal layer with a minimum of scarring.