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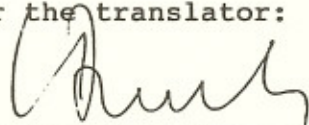
Re: Translation from Portuguese

Article by Hilario et al., "Use of a temporary skin  
substitute in skin losses of out-patients"

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This declaration certifies the accuracy and precision of the translation from  
Portuguese into English of the above material and is an accurate  
reflection of the text as it appeared in Portuguese.

For the translator:



Translator

11/11/94

Date



USE OF A TEMPORARY SKIN SUBSTITUTE\* IN  
SKIN LOSSES OF OUT-PATIENTS

by

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SUMMARY

*The authors report their experience with a temporary skin substitute in outpatients for the treatment of cutaneous lesions either acute or chronic, superficial or deeply situated. Their conclusion is that risk of infection, the local pain and the water and salt loss through the wound were substantially decreased. Also the healing process have been improved.*

KEY WORDS: skin substitutes; biological dressing

When we are working with patients with bloody areas, whether caused by burns, abrasions, avulsions, ulcers, or postnecrotic tissue losses, we are faced with the necessity of instituting suitable treatment until cicatrization of the more superficial lesions and the formation of granulation tissue of the deeper ones occurs. By suitable treatment we understand that which promotes, primarily:

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\**BIOFILL - Productos Biotecnológicos S.A.*

Study conducted in the University Hospital of the Catholic Pontifical University, Porto Alegre-RS [State of Rio Grande do Sul] and presented, as Free Thesis, at the XXVth Brazilian Congress of Plastic Surgery.

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- a) protection against infection;
- b) minimization of pain;
- c) the patient's comfort; and
- d) reduction of recovery time.

The medical class was presented with a temporary skin substitute that consists of a semitransparent, microfibrillar, nontoxic, hypoallergenic and apyrogenic cellulose membrane that is permeable to water vapor and impermeable to microorganisms, obtained through the biosynthesis of bacteria of the genus *Acetobacter*, and which is intended to:

- a) produce temporary covering in the area of the skin loss;
- b) reduce the risk of infection;
- c) reduce loss of electrolytes
- d) reduce pain;
- e) afford comfort to the patient;
- f) reduce cicatrization time; and
- g) obtain a better-quality scar.

#### MATERIAL AND METHODS

Over a period of five months (April to August of 1988), 48 patients with cutaneous lesions of various etiologies were treated (Table 1). The bloody areas were covered with the cellulose membrane, with the greatest adherence to the standards for asepsia, in the Minor Surgery Section and in the Emergency Section of the University Hospital of the Catholic Pontifical University.

##### Application technique

- 1 - The patient is sent to the Minor Surgery or to the the Dressings Room of the Emergency Section.
- 2 - Equipment and conditions required:
  - a) sterile areas;
  - b) aqueous iodophor for antiseptis of the skin;



c) physiological salt solution for use on the injured area;

d) anatomical forceps and scissors;

e) gauzes, gloves; and

f) cellulose membranes.

3 - Debridement of the region should there be devitalized tissues.

4 - Calculate the area to be covered, adding 1 cm for beyond the edges.

5 - Remove the membrane from the envelope. With the aid of dry or moist gauze, put it over the receptor bed. By means of delicate movements, remove any air bubbles so as to obtain perfect adhesion.

6 - Leave the membrane exposed, for the purpose of letting the drying process take place. In the case of a skin graft donor area or in a deep chronic lesion, use, in the first thirty minutes, a gently compressive dressing in order to prevent dislodging of the membrane by bleeding.

7 - It is advisable to employ a heat source (lamp, hair dryer) in the first two hours, in order to accelerate the dehydration of the membrane.

#### **Instructions to the patients**

1 - The patient must be advised to avoid friction on the membrane for the first three days.

2 - After the third day, he is free to take a shower, it being recommended that the membrane be dried afterwards with a hair dryer.

#### **Recording method**

The patients were reviewed and photographed every 24 hours on the first three days; from then on, the evaluations were made twice a week, until complete epithelialization of granulation tissue formation.

A Protocol Form was filled out for each case (Chart 1).

PROTOCOL FORM No. \_\_\_\_\_

DATE: \_\_\_\_\_

I - Identification

NAME: \_\_\_\_\_ RACE: \_\_\_\_\_ AGE: \_\_\_\_\_ SEX: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_

II - Causes of the injury:

1 - BURNS: Degree: \_\_\_\_\_ Etiology: \_\_\_\_\_ % Area \_\_\_\_\_  
Body regions: \_\_\_\_\_

2 - DERMAL ABRASION: Etiology: \_\_\_\_\_ Extent \_\_\_\_\_ cm<sup>2</sup>

3 - GRAFT-DONOR AREA: Site: \_\_\_\_\_ Extent \_\_\_\_\_ cm<sup>2</sup>

4 - CUTANEOUS ULCERS: Etiology: \_\_\_\_\_ Extent \_\_\_\_\_ cm<sup>2</sup>

5 - DECUBITUS ULCERS: Site: \_\_\_\_\_ Extent \_\_\_\_\_ cm<sup>2</sup>

6 - OTHER SKIN LESIONS (ETIOLOGY, LOCALIZATION & EXTENT) \_\_\_\_\_

7 - REMARKS: \_\_\_\_\_  
\_\_\_\_\_

III - Pathologic Antecedents and Current Treatments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

IV - Course after Application of the Membrane:

1 - Observation in the first 24 hr: \_\_\_\_\_  
\_\_\_\_\_

2 - In 48 hr: \_\_\_\_\_

3 - In 72 hr: \_\_\_\_\_

4 - In the following week: \_\_\_\_\_

5 - In the second week: \_\_\_\_\_

6 - Scab-formation time: \_\_\_\_\_ hr. or \_\_\_\_\_ days

7 - Scab persistence time: \_\_\_\_\_ hr. or \_\_\_\_\_ days

8 - Total epithelialization time: \_\_\_\_\_ days

9 - Granulation tissue-formation time: \_\_\_\_\_ days

V - Complications and other observations (date each one): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Chart I



### Clinical application

The trial was carried out in 48 patients, as specified in Table 1.

We have selected three cases, with different lesions of different etiologies, for exemplification of the study.

Table I

Cause of lesion	No. of cases
Second degree burns	19
Second and third degree burns	6
Skin-donor areas	10
Chronic ulcers	8
Mechanical dermal abrasion	3
Infectious epidermolysis	2
Total	48

#### Case No. 1

Patient 18 months of age, female, white. She suffered a superficial second degree chemical burn in the interomedial and posterior regions of the forearm (Fig. 1a).

Debridement and application of the cellulose membrane were performed 12 hours after the accident. We extended and fixed over the membrane, with micropore at its ends, an open gauze with the object of preventing nocturnal dislodgment. The patient was sent home (Fig. 1b).

At the reinspection, carried out 24 hours afterward, we verified perfect adhesion of the membrane to the bed, without the formation of secretion. The patient's mother reports normal behavior of the child (Fig. 1c).

At reinspection on the third day, we noted the already formed scab. Absence of painful complaints (Fig. 1d).

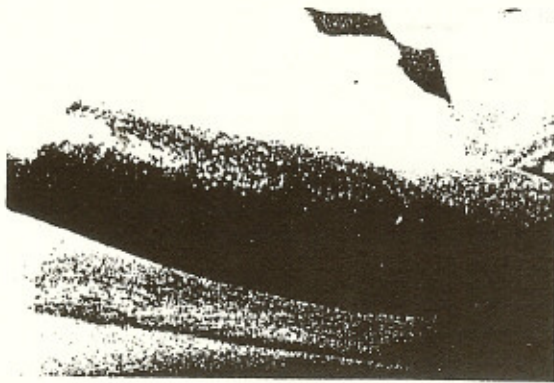


Fig. 1a



Fig. 1b

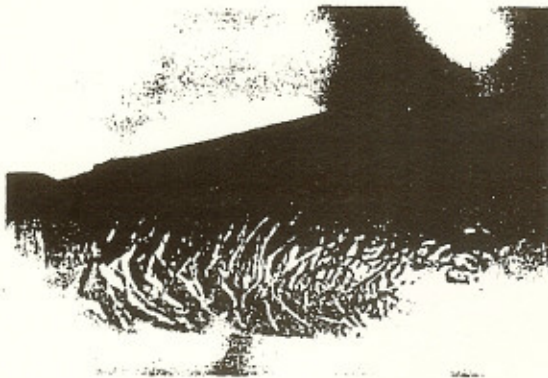


Fig. 1c

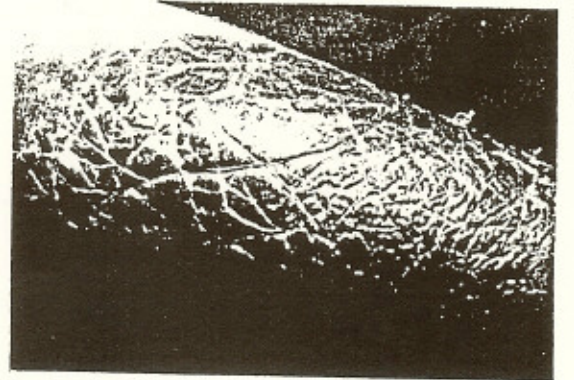


Fig. 1d



Fig. 1e

Figs. 1a-e - Second degree chemical burn on the left forearm: a - after debridement; b - immediately after the application of the membrane; c - 24 hr after application of the membrane; d - 48 hr after application, scab formed and completely integrated; e - complete epithelialization on the 10th day.



On the 10th day, there was already complete elimination of the scab. Cicatrization of good quality was obtained (Fig. 1a).

#### Case No. 2

Eight-year-old patient, female, white. She had suffered superficial and deep second degree burns in the anterior region of the left thigh, anteroposterior region of the right thigh, genitalia, and suprapubic region, caused by boiling water (Fig. 2a).

On the 3rd day after the accident, we started treatment with the cellulose membrane on both thighs. The pubic region was treated with zinc oxide, in an expositive way, in order to facilitate genital hygiene (Fig. 2b).

At reinspection 48 hours after the application, we observed scab formation on the right thigh. On the left thigh, the site of a deeper burn, we detected the presence of a yellowish secretion. This was drained and the integrity of the membrane was restored without the necessity of replacement or supplementation. The culture analysis of the secretion turned out to be negative (Fig. 2c). The patient reported burning pain, which yielded to the analgesic treatment recommended (acetominophen).

On the 5th day, she was already walking about without complaining of pain or of a feeling of tightness. The scabs appeared to be adhering well and were thick.

On the 10th day, we noted fragmentation of the scabs, with almost complete elimination on the right thigh. The use of a hydrating cream was prescribed. The patient resumed her school activities.

On the 15th day after the application, there was already complete epithelialization of the right thigh. On the left thigh, remains of the scab still persisted, in the shedding phase (Fig. 2d-e).



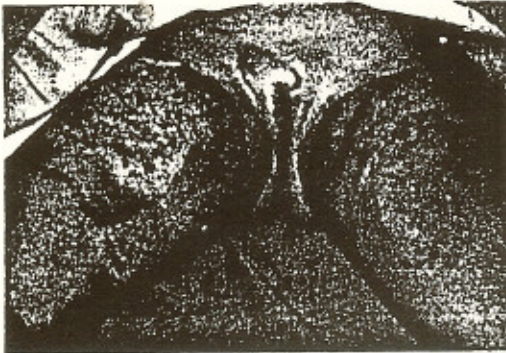


Fig. 2a



Fig. 2b



Fig. 2c



Fig. 2d



Fig. 2e

Figs. 2a-e - Burns with a scalding liquid, 2nd degree, thighs;  
a - after debridement; b - immediately after application of the cellulose membrane;  
c - 48 hr after application of the membrane;  
d - 15 days, cicatrization of right thigh, scabs still being shed on left thigh.



Case No. 3

Patient 67 years of age, female, white. Suffering from basal cell carcinoma of the suprasternal region. She was subjected to surgery, which required partial thickness skin grafting, skin taken from the anterior region of the right thigh (Fig. 3a).

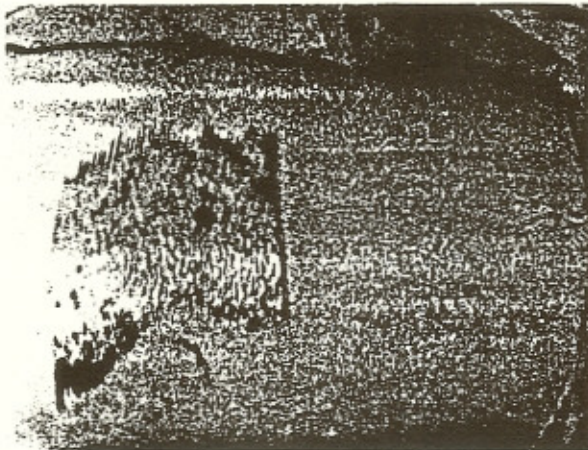


Fig. 3a



Fig. 3b

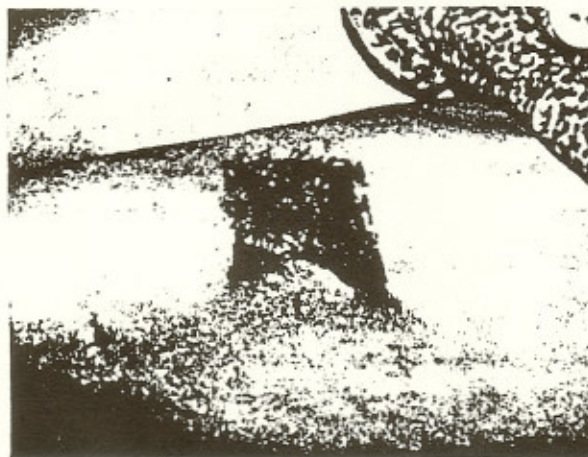


Fig. 3c

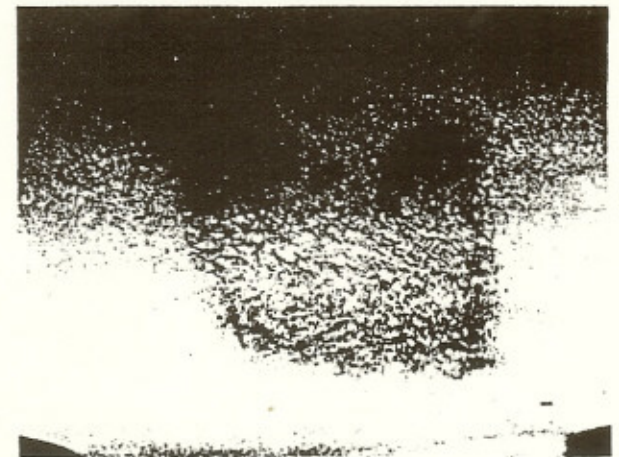


Fig. 3d

Figs. 3a-d - Appearance of skin grafting donor area, partial thickness on the right thigh; a - after removal of the graft; b - application of the cellulose membrane; c - 10 days after application, scab adhering with retraction of the edges; d - 15 days, complete epithelialization.



The donor area, measuring 10 x 8 cm in extent, was covered by a layer of cellulose membrane (Fig. 3b). In the immediate postoperative period, we placed a compressive dressing over the membrane until complete awakening of the patient. After the removal of the dressing we used a heat lamp for two hours, in order to accelerate the process of dehydration of the membrane. The patient went back home.

At the 24-hour reinspection, the minimal presence of yellowish, undrained secretion was noted. The patient reported burning-type pain, which was bearable, as she had not made use of the analgesic prescribed.

On the 3rd day, she had complete adherence of the membrane. Absence of pain, walking normal.

On the 10th day, we observed a thick scab, adhering well and with retraction of the edges of the donor area (Fig.3c).

At the 15-day reinspection, we verified that complete shedding of the scab had occurred; complete re-epithelialization of the donor area was seen (Fig. 3d).

## RESULTS

The use of the cellulose membrane in the cases we studied showed, as the result, effective protection in terms both of loss of skin substance, which was reflected in its insulation from the external milieu, with consequent reduction of losses of water and electrolytes and of the possibility of an infectious process setting in.

On very few occasions was there the necessity for partial or complete replacement of the membrane. On the contrary, we noted a pronounced reduction in the handling of the patient's lesion, if we compare it with the dressings routine of conventional treatments.

Its relative transparency enabled us to achieve, through periodic inspections, an effective follow-up of the progression of the cicatrization.

We observed, further, that the cicatrization or the granulation of the bloody areas was obtained in a shorter time or, at least, within the same period of time as that achieved when other treatment methods are employed.

We are conducting, at the same time, studies with the use of the membrane in patients the gravity of whose lesions led to hospitalization. We can state in advance that no significant differences have been noted up to the present time in the results as between these patients and those treated here on an out-patient basis.

#### DISCUSSION

Guidance on the part of the physician and the resultant participation of the patient are essential to the success of the treatment primarily when it is a question of children. We did not record any conspicuous problems of this sort, in spite of the care the membrane requires and must deserve during the first few days. We believe that the attenuation of the painful symptoms and of the discomfort, together with his desire for healing, lead the patient to cooperate with the team.

We are in agreement with Rebello,<sup>1</sup> when he makes observations regarding the lack of elasticity of the membrane. We also believe that if it had this property, the occasional ruptures stemming from its not accompanying the tension and relaxation movements of the skin would cease to occur.

#### CONCLUSION

From the results obtained at the end of the study carried out in 48 out-patients suffering from skin losses, the majority of them caused by burns, we conclude in favor of the value of the use of the cellulose membrane functioning as a temporary skin substitute.



## REFERENCES

1. Rebello, Claudio. BioFill, Um Novo Substituto de Pele: Nossa Experiência, Separata da Rev bras Cir, 1987, 77(6).