Use of polylactic acid dressing as a temporary interface in advanced burn management. A case report

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Background
Despite advances in medicine, the treatment of burns remains a challenge because they cause sequelae that lead to disability in patients. New dressings such as Suprathel® represent a recent and effective method for the management of burns. Some of the main indications for the use of Suprathel® are superficial and deep second-degree burns, skin donor sites, toxic epidermal necrolysis, large abrasions, and scar corrections, among others. We present the case of a 37-year-old male patient with superficial and deep second-degree burns on 36% of the body surface. Suprathel® dressings were applied. The use of this dressing as a skin substitute is reliable and presents significant advantages in terms of reduced healing time and epithelialization of superficial and deep second-degree burn wounds, as well as pain reduction and ease of postoperative care. The objective of the article is to provide information about the use of Suprathel® in the management of burn injuries, obtaining good aesthetic and functional results in the short term.

Keywords: suprathel, polylactic acid dressing, burns.

Case Report

Plastic Surgery

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In 2004, the Suprathel® dressing (PolyMedics Innovations GmbH, Filderstadt, Germany) was launched. This dressing is a thin, microporous synthetic membrane based on polylactic acid copolymer, which adheres on contact and conforms to the skin surface, making it highly permeable to oxygen and water vapor, thus providing a favorable environment for wound healing. The results have been satisfactory in regard to scar formation, skin quality, and pain management in patients with second-degree burns. Among the advantages of this dressing demonstrated in prospective randomized studies are that it is effective, safe (in terms of allergic reactions and infection rate), easy to use, has a lower rate of pain, and has a lower rate of exudate, which translates into less need for refills. It also reduces the healing time of donor areas with epithelialization without scarring by approximately 8 to 14 days. It is also cost-effective since it does not need daily refills like other dressings, which reduces anxiety and pain for both the patient and caregivers, in addition to a shorter hospital stay and a faster return to activities [1-5]. These last three characteristics make it an ideal dressing for burn patients compared to other products. Since its proven effectiveness, this dressing has become the standard for burn care in Europe, the United States, and Latin America. The utilization of this dressing in burn care has proven to be a significant advantage in the management of burns in Europe, the United States, and Latin America [7,8].

It is used for superficial and deep second-degree burns, skin donor sites, toxic epidermal necrolysis, large abrasions, and scar corrections, among others [1-8].

Despite the great advances in medicine made so far with the development of draping materials, as well as the extensive experience and expertise that exist in the area of wound management, the treatment of burns remains a challenge [1]. In England, 184 million GBPs were spent on products for skin injuries (mainly burns) in 2012. In the United States of America, it costs about $20 billion a year to treat burn sequelae. Wound and burn dressings are prepared from biopolymers, synthetic polymers, and biomaterials. Biopolymers such as chitosan, alginate, fucoidan, and hyaluronic acid, among others, are nontoxic, readily available, biodegradable, biocompatible, and nonimmunogenic. Biopolymers such as chitosan, alginate, fucoidan, hyaluronic acid, and others are

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Sex and age	37 year old male patient
Date and time of event	24/02/2023 09:00 hours
Accident site	Repair of clandestine PEMEX* pipeline tap in Tula, Hidalgo
Burn type	Thermal/ Flame/ Direct fire
Place, date and time of service	SCHSH** PEMEX*, 24/02/2023 17:00 hours
TBSA%***	36%
Evolution time of burn patient protocol onset	8 hours
Initial treatment	1st mechanical washing time + Suprathel® dressing placement
Secondary treatments	2nd time: mechanical lavage + graft taking and application + VAC system placement 3rd time: removal of VAC system + revision of grafts integration

*PEMEX: Petroleos Mexicanos
**SCHSH: South Central High Specialty Hospital
***TBSA: Total Body Surface Area

Table 1. Characteristics of the burn patient treated in the burn unit of the South Central High Specialty Hospital PEMEX

nontoxic, readily available, biodegradable, biocompatible, and nonimmunogenic [1-9].

Case report

A 37-year-old male patient who came to the emergency department referred from another unit because of direct fire burn injuries in the pelvic and thoracic limbs. Initially, the patient was treated according to the protocol for admission and initial management of the burn patient.

Physical examination revealed superficial and deep second-degree burns on the upper and lower extremities, involving approximately 36% of the total body surface area burned. There were no lesions on the face, and there was no involvement of the airway.
After the accident, care was initiated 8 hours after the accident, where, in a first surgical time, mechanical lavage was performed with the placement of Suprathel® dressings. Following this, in a second surgical stage, mechanical lavage was performed with the taking and application of grafts as well as the placement of a Vacuum-assisted closure system (VAC). During the third and final surgical procedure, the VAC system is removed, followed by the revision of grafts (Figure 1 and Table 1).

The patient is stable with clinical improvement at 5 months of follow-up, continues to improve general conditions, and performs rehabilitation therapy on an outpatient basis.

Discussion

According to the literature, the majority of burns occur mainly at home (55.3%), followed by burns occurring during recreational activities (23.7%), and those related to work (15.6%) were proportionally less frequent, 5.4% other causes. The most frequently occurring etiologies in our environment are correlated with the professional pursuits of the patients at Petróleos Mexicanos. In the formulation of burn dressings, important factors should be taken into account, including their capacity to reduce infections, stop bleeding, absorb exudates, enhance wound healing and debridement, ease of use, biodegradability, ease of sterilization, non-toxicity, and good permeability to water vapor and gas. It is possible to classify burn dressings into artificial, traditional, and biomaterial-based ones. We should emphasize a variety of biomedical applications due to their beneficial properties, such as biocompatibility and non-toxicity [1-9].

The unique properties of Suprathel® make it a potential tool that can overcome the problems of current dressings by improving the absorption of exudates, minimizing bacterial infections, reducing adverse allergic effects, and improving wound healing due to its biocompatibility. It has been successfully used in superficial, mixed, and deep partial thickness burns in adult patients, achieving the same results compared to the literature. In 2020, Rahimi conducted a systematic review of 14 publications, wherein he reported the concerns regarding the safety, efficacy, and cost-effectiveness of the utilization of biosynthetic wound dressing, as exemplified in the figure 2 [10].

Conclusion

Suprathel® represents a robust and reliable skin substitute with great impact on wound healing, patient comfort, and ease of care, making it the ideal dressing in the context of patients with superficial, mixed, and deep partial thickness burns. Its main advantages include a significant reduction in pain, excellent wound fixation, and a clear increase in patient comfort. During the course of healing, the membrane becomes transparent, allowing good wound control, and automatically separates from the wound surfaces to aid in the process of re-epithelialization and painless material removal. In addition, there is a significant reduction in overall treatment costs.

In the design of burn dressings, the important factors to consider are their ability to reduce infection, stop bleeding, absorb exudates, improve wound

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healing and debridement, be easy to handle, and have adequate permeability to water vapor and gas. Due to the satisfactory course of our patient's wounds, we can conclude that the use of this dressing based on polylactic acid copolymer meets these characteristics and offers excellent results.

Conflicts of interests

The authors have no conflicts of interest to disclose.

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Figure 1. Satisfactory evolution with early, functional and esthetic discharge.

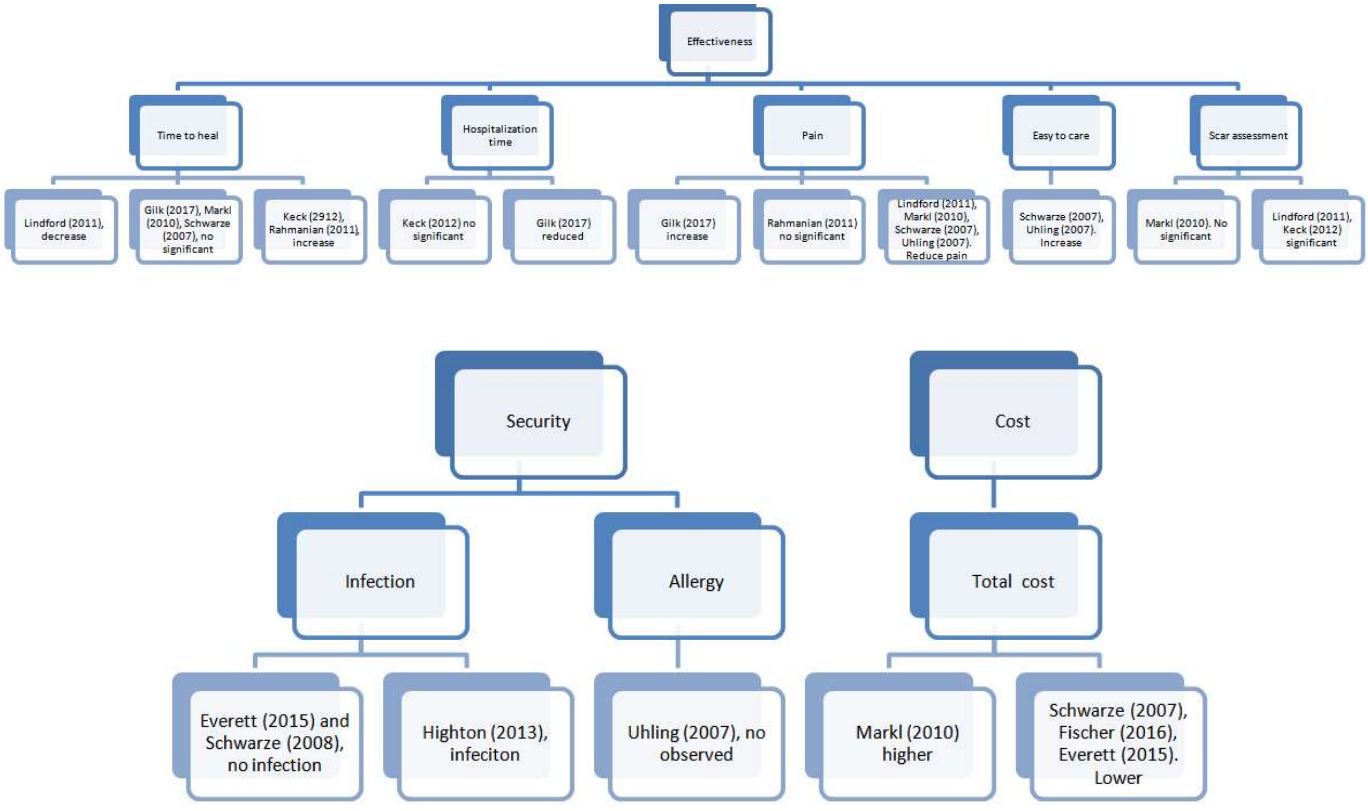

Figure 2. Showing different publications and their position on the effectiveness, safety and cost of the use of Suprathel®

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