Case Report

International Physiology
Volume 11 Number 3 September - December 2023
DOI: https://dx.doi.org/10.21088/ip.2347.1506.11323.4

Role of Biodegradable Temporising Matrix in Thermal Burns

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How to cite this article:
Aishvarya, Ravi Kumar Chittoria, Jacob. Role of Biodegradable Temporising Matrix in Thermal Burns. Int.Phy.2023;11(3):89–92.

Abstract

Aim of this case report is to assess the role of in management of Biodegradable Temporising Matrix in thermal burns. Clinical examination of the thermal burn injury before and after use Biodegradable Temporising Matrix was done.

Keywords: Biodegradable Temporising Matrix; Thermal burns; Wound; Ulcer, Management.

INTRODUCTION

The function of the Biodegradable Temporising Matrix in Burns The purpose of this case study is to evaluate the Biodegradable Temporising Matrix and its role in the treatment of thermal burns. Clinical assessment of the thermal burn injury both prior to and subsequent to usage Biodegradable Temporising Matrix was done. Keywords: Biodegradable Temporising Matrix, thermal burns, wound, ulcer, treatment. Overview A completely synthetic dermal matrix called the NovoSorb® Biodegradable Temporising Matrix (Poly Novo Biomaterials Pty Ltd., Port Melbourne, VIC, Australia) can be utilised to rebuild complicated wounds.

It is composed of a non-biodegradable sealing membrane placed over a 2-mm thick NovoSorb biodegradable polyurethane open cell foam. The neo-dermis is supported by the open cell matrix, which permits cellular components to permeate.

In addition to providing physiological wound closure, the sealing membrane has tiny fenestrations to stop material buildup beneath it. Application of BTM[1] includes a two step process.[1] Initially, the BTM is placed on a sterile wound bed. During the integration phase, blood vessels and cells move into the BTM, forming a vascularized neo-dermis. It is possible to observe capillary refill as early as two weeks.

Hydrolysis is the process by which the biodegradable polyurethane matrix breaks down.[2]

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Received on: 02.04.2024 **Accepted on:** 15.04.2024

The sealing membrane is taken off and a split skin graft (SSG) is placed to the neo-dermis in the second stage.[1]

The totally synthetic BTM avoids ethical or cultural barriers and removes the risk of interspecies immunological rejection or disease transmission, in contrast to previous artificial dermal templates made of allogenic or xenogenic materials.[4] Early in vitro research verified BTM's biocompatibility.[2,5] In vivo investigations using pig and rat models showed that full thickness wounds could be adequately rebuilt with a high resistance to contracture and no systemic toxic effects.[6,7] Animal model comparisons between BTM and Integra® (Life Sciences Corp., Plainsboro, NJ, USA) demonstrated the BTM's efficacy in delivering a flexible and stable wound reconstruction.[4,8] The polyurethane foam (NovoPoreTM, Polynovo) was tested for the first time in humans for use in negative-pressure wound therapy (NPWT) for pressure ulcers.[9]

This demonstrated that patients did not experience any negative side effects after short term implantation.

After that, the application of a prototype bilayer device in free flap donor wounds that combined Novo Sorb foam with a non-biodegradable sealing matrix yielded encouraging outcomes.[10] Improved outcomes were obtained in further research by modifying the sealing membrane further, including its thickness, bonding layer, and fenestration addition.[11] BTM has been used to treat burns, and its efficacy in treating massive total body surface area burns with outstanding cosmetic and functional outcomes has been proven.[3,12] Because of its effectiveness, it is being used to create flexible wound covering by necrotizing soft tissue infections.[13,14]

MATERIALS AND METHODS

Female aged 70 years, attended JIPMER Hospital, Emergency Services with thermal burn injury (flame) sustaining 15 percent burns to the bilateral gluteal region and posterior thigh (Fig. 1). The patient was admitted to Jipmer burns centre under Plastic Surgery. She underwent tangential excision under general anaesthesia. Regenerative therapy using multiple modalities was done. There was persistent non healing regions. BTM use was planned, and implemented. First stage of reconstruction involved the inset of BTM. After the application of BTM, collagen scaffold was applied over the BTM and either secured with NPWT between 50 and 75 mmHg or dressed with gauze, crepe to provide compression. The external dressing was changed once or twice weekly. The BTM was evaluated weekly for integration by assessing for capillary refill. Excess fluid was expressed through the fenestrations before re-dressing.

The wound bed was not completely ready for the second stage that is the reconstruction of the wound, hence the first stage was planned to be continued till the wound bed is ready.

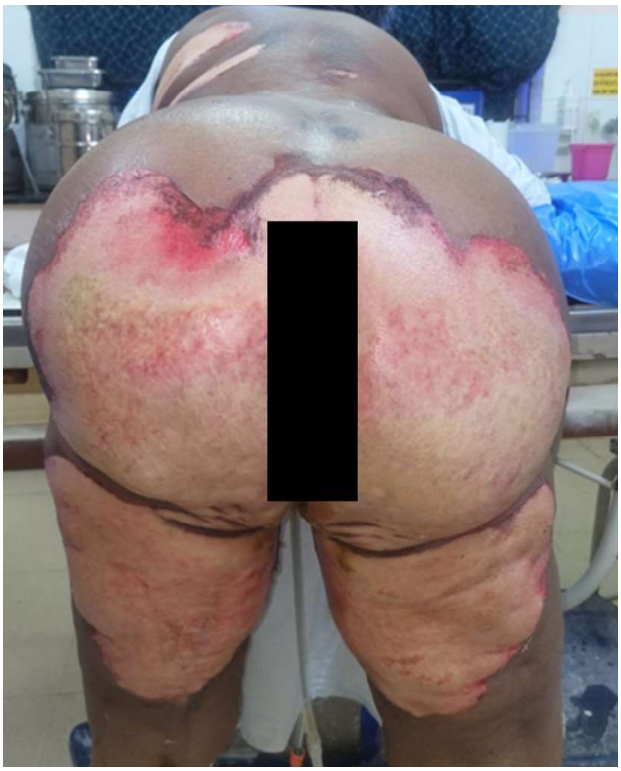

Fig. 1: Thermal burn injury over gluteal and posterior thigh region

RESULTS

Biodegradable Temporising Matrix helped in wound bed preparation of thermal burns wound. (Fig. 2)

DISCUSSION

After reconstruction, the patients' quality of life may be greatly impacted by the sensory

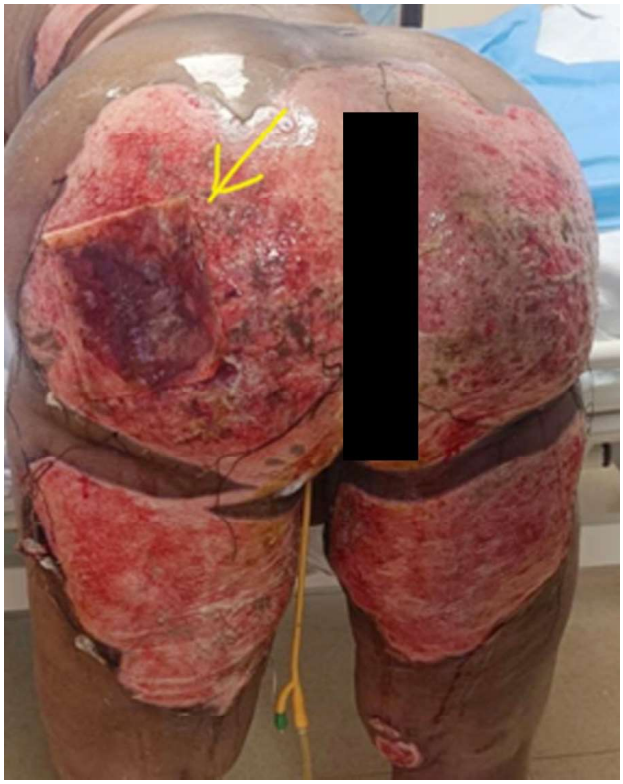

Fig. 2: Improved wound after BTM application

regeneration of the BTM-reconstructed wounds. This is especially crucial if BTM is applied to the lower limb's weight bearing area. A sensible rebuild can help keep the injured area from getting worse while also preserving function. Early outcomes in our cases are encouraging, since most patients have partially regained sensation over most of their wounds. Compared to more intricate reconstructions, this might offer further advantages. It would be helpful to do longer follow-up and more thorough sensory assessments in future research. The overall good aesthetic result with BTM reconstruction is also suggested by the POSAS score.[13,14]

It doesn't require additional revision or debulking because it matches the thickness of the majority of flaws. The phased nature of the reconstruction and the possibility of integration failure, particularly in situations of infection or borderline vascularity, are drawbacks of BTM. All dermal matrices, however, have these limits. There is a significant chance that prior radiation, particularly in the scalp, will interfere with our series integration. Four patients who underwent radiation therapy and outer table burring for scalp malignancies experienced either partial graft failure or, in one instance, total BTM integration failure. This could be the starting point for more research.

CONCLUSION

Biodegradable Temporising Matrix is an effective measure for enhancing the wound bed preparation of thermal burns wound.

Conflicts of interest: This study does not require any institutional approval.

DECLARATIONS

Authors' Contributions: All authors made contributions to the article.

Availability of data and Materials: Not applicable.

Financial support and Sponsorship: None

Consent for Publication: Not applicable

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