Content available at: https://www.ipinnovative.com/open-access-journals

IP Indian Journal of Anatomy and Surgery of Head, Neck and Brain

Journal homepage: https://www.ijashnb.org/

Case Report

Role of allo-trilaminar dermal regenerative template in management of burns

Neljo Thomas[1], Ravi Kumar Chittoria[1,*], Padmalakshmi Bharathi Mohan[1], Shijina Koliyath[1], Imran Pathan[1], Nishad Kerakkada[1]

[1]*Dept. of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India*

ARTICLE INFO

Article history:
Received 15-08-2021
Accepted 30-09-2021
Available online 22-10-2021

Keywords:
Indigenous
Trilaminar Autologous Dermal regeneration template
amniotic membrane

ABSTRACT

Different methods of treatment options and dressing materials are available in today's era of medical management of wounds. Trilaminar dermal regeneration template (TDRT) has been in use since the 1980s but owing to its high cost, its affordability and availability in third world developing countries is sparse. Here we have described our experience with the use of an indigenously made cost effective dermal regeneration template made from available materials in management of burns

1. Introduction

Present day wound care has become very advanced and sophisticated especially in developed countries. A wide number of expensive adjuncts are being used such as dermal templates, cultured keratinocytes, biological and silver impregnated dressings. In developing countries such as ours, it becomes important that we provide the best possible care to our patients with the available resources. The dermal regeneration templates available in the market are expensive and costs between 20,000 to 30,000 Indian Rupees. Here we describe our experience with a indigenous and innovative, low cost dermal regeneration template.

2. Materials and Methods

This study was conducted in the department of Plastic Surgery at tertiary care center after the departmental ethical committee approval. Informed written consent was taken from the patient. The details of the patient in study are as follows: 31-year-old male with no known co morbidities with h/o accidental burns 2 months back and now presented with raw area about 20% TBSA. Multiple debridement was done and STSG was done over the raw areas in multiple settings. (Figure 1)

A trilaminar autologous dermal regeneration template was made and was applied over the remaining raw area and graft donor site area for preparing the site for a definitive procedure later which was split thickness skin grafting in this case. The trilaminar autologous dermal regeneration template was prepared from silicone sheet amniotic membrane and non culture keratinocyte cells (NCKC) The silicone gel sheet used were of hospital supply, the non culture keratinocyte cells (NCKC) were harvested using dermabrasion, the amniotic membrane was harvested form placenta taken from labour room deliveries. The total cost of the template prepared from these materials was about 2500-3500 Indian Rupees. A silicone sheet of size 10 x 20 cm was usedand amniotic membrane was used of the same size, NCKC was spread on the amniotic membrane (Figure 2) They are sutured over the silicone gel sheet with absorbable sutures like poliglecaprone or polyglycolic acid. This template used can be both meshed and unmeshed. This template was applied over raw areas (Figure 3) and conventional dressing with gauze and cotton pad was done

* *Corresponding author.*
E-mail address: drchittoria@yahoo.com (R. K. Chittoria).

https://doi.org/10.18231/j.ijashnb.2021.023

over it. The dressing was opened every 3^{rd} day and only the outer layer of gauze and cotton pad was replaced. On the 7th postoperative day, the amniotic membrane was completely resorbed and the silicon sheet layer was also removed. Some raw areas were healed and split thickness skin grafting was done over remaining raw area.(Figure 4)

Fig. 1: Wound with multiple raw areas

Fig. 2: Trilaminar dermal regeneration template

Fig. 3: TDRT applied over raw area.

Fig. 4: Post TDRT application

3. Results

The dermal regeneration template use in the raw areas of burns helped in expediting the healing of wound.

4. Discussion

Burns raw areas are serious and potentially devastating. They require early recognition and early treatment. In recent years, use of a vacuum assisted closure (VAC) device to prepare the wound bed for grafting has become standard practice for raw area. [1]

Engineered skin substitutes that may provide temporary wound coverage until donor sites are ready to be harvested for autograft, or if they contain autologous cells, may provide permanent wound closure. Relatively few permanent skin substitutes are currently available, but developments in tissue engineering of human skin are expected to soon provide improved models for increased availability and enhanced healing of burn

wounds.[2] INTEGRA® Dermal Regeneration Template is a well-known and widely used acellular dermal matrix. Although it helps to solve many challenging problems in reconstructive surgery, the product cost may make it an expensive alternative compared to other reconstruction procedures.[3] Integra dermal regenerative template has been commercialised since 1980s. Its use was initially described by Burke and colleague in 1981.[4] Its now an important tool for the treatment of burns and scar contracture.[5,6] Dermal regeneration template is a two-layered skin regeneration system. The outer layer of dermal regeneration template is made of thin silicone film act as the epidermis of skin. The outer layer of dermal regeneration template helps in protecting wound from infection and controls in loss of both heat and moisture. The outer collagen Glycosaminoglycan (GAG) thermal layer functions as a biodegradable template that helps in regeneration of dermal tissue neodermis by the body. The inner layer of dermal regeneration template is made of complex matrix of cross-linked fibers. The porous material of the template helps in regeneration of skin. The cross-linked fiber material of dermal regeneration template acts a scaffold for the re-growth of skin layer. Once the dermal skin layer is regenerated the outer layer of template is removed and is replaced with a thin epidermal skin graft. It allows faster healing of wound with minimum scarring. Here we have tried to replicate the same mechanism in our indigenously made dermal regeneration template. One of the main drawbacks is the cost of the template. The indigenous dermal regeneration template prepared from silicone sheet and amniotic membrane and NCKC is cost effective and can be easily prepared and used on wounds. Thus, it can be used in hospital settings in developing countries where the affordability of commercial regeneration template is doubtful.

5. Conclusion

This is a preliminary study to assess the use of indigenous, cost-effective dermal regeneration template in wound management in a limited setting with limited number of cases, but yet it has shown to be effective in the management of burns raw area. A large multicentric, double blinded control study with statistical analysis is required to further substantiate the results.

6. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

7. Source of Funding

None.

References

1. Latifi R, El-Hennawy H, El-Menyar A, Peralta R, Asim M, Consunji R, et al. The therapeutic challenges of degloving soft-tissue injuries. *J Emerg Trauma Shock*. 2014;7(3):228–32. doi:10.4103/0974-2700.136870.
2. Supp MD. Skin substitutes for burn wound healing:Current and future approaches. *Expert Rev Dermatol*. 2011;6(2):217–27.
3. Schiavon M, Francescon M, Drigo D. The use of Integra. Dermal Regeneration Template versus flaps for Reconstruction of Full thickness scalp defect including the calvaria: A cost benefit analysis. *Aesthetic Plast Surg*. 2016;40(6):901–7.
4. Burke JF, Yannas IV, Quinby WC, Bondoc CC, Jung WK. Successful use of a physiologically acceptable artificial skin in the treatment of extensive burn injury. *Ann Surg*. 1981;194(4):413–28.
5. Frame JD, Still J, Lakhel-Lecoadou A, Carstens MH, Lorenz C, Orlet H, et al. Use of dermal regeneration template in contracture release procedures: a multicenter evaluation. *Plast Reconstr Surg*. 2004;113(5):1330–8.
6. Moiemen NS, Staiano JJ, Ojeh NO, Thway Y, Frame JD. Reconstructive surgery with a dermal regeneration template: clinical and histologic study. *Plast Reconstr Surg*. 2001;108(1):93–103.

Author biography

Neljo Thomas, Senior Resident

Ravi Kumar Chittoria, Professor

Padmalakshmi Bharathi Mohan, Senior Resident

Shijina Koliyath, Senior Resident

Imran Pathan, Senior Resident

Nishad Kerakkada, Senior Resident

Cite this article: Thomas N, Chittoria RK, Mohan PB, Koliyath S, Pathan I, Kerakkada N. Role of allo-trilaminar dermal regenerative template in management of burns. *IP Indian J Anat Surg Head, Neck Brain* 2021;7(3):88-90.