Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

Technical tips to enhance micrografting results in burn surgery

Si Jack Chong, Abby Choke, Bien-Keem Tan*

Department of Plastic, Reconstructive and Aesthetic Surgery, Singapore General Hospital, Outram Road, 169608, Singapore

ARTICLE INFO

Article history:
Accepted 23 January 2017

Keywords:
Micrografting
Technical tips
Meek
Major burn

ABSTRACT

The lack of autograft donor site is one of the greatest limiting factors for the treatment of extensive burn. Micrografting is an important revolution in burn surgery where autografts are cut into small pieces for wide and rapid coverage of burn wound. Our early experiences with the current standard micrografting technique were fraught with poor graft take as well being time and labor intensive. We have improvised our technique, where we combined the use of allograft to serve as a carrier for the micrograft. The objective of this paper is to share our experience in micrografting and several technical tips which had enhanced our micrografting results.

The improvisation in our technique includes: (1) Single-stage 'micrograft-allograft sandwich method' where allograft served as a direct carrier for the micrografts. Micrografts were laid uniformly 1cm apart onto allograft sheets, creating a 1:9 expansion ratio. This technique replaced the original two stage method. (2) The use of the Meek device (Humeca, Netherlands) to prepare micrograft. The Meek device can rapidly produce 3mm micrografts for easy transfer with a fine forceps. (3) The use of slow-acting fibrin sealant to promote graft take and hemostasis. (4) A two-team approach for micrograft preparation where one team processes micrograft and another prepares the allograft sheets. This reduces the lag time between micrograft preparation and grafting, and reduces the overall surgery time.

Micrografting remains an important treatment for major burn surgery. The aim of micro-allograft combination is to allow autografts re-epithelization under a reliable temporary skin coverage in a single stage procedure. A prospective study is warranted to measure the objective outcome of this renewed technique.

1. Introduction

One of the greatest limiting factor for treatment of extensive burn is the lack of autograft donor site. An important revolution in burn surgery was the introduction of micrograft by Meek in 1958, where a skin expansion device can rapidly produce skin grafts as small as 3 mm × 3 mm for coverage of large surface area burns [1]. In 1993, a new technique introduced by Kreis, known as the 'Modified Meek Micrograft' technique, combined the original technique with a second-stage delayed allograft coverage [2]. This two-stage technique is the current standard technique for Meek micrografting and was also used in our institution.

Micrografting was integrated into our newly implemented burns protocol in 2014. In the same year, a prospective cohort

* *Corresponding author.*
E-mail address: abbyc29@gmail.com (A. Choke).
http://dx.doi.org/10.1016/j.burns.2017.01.030

Fig. 1 – Autograft were harvested and laid onto cork bases.

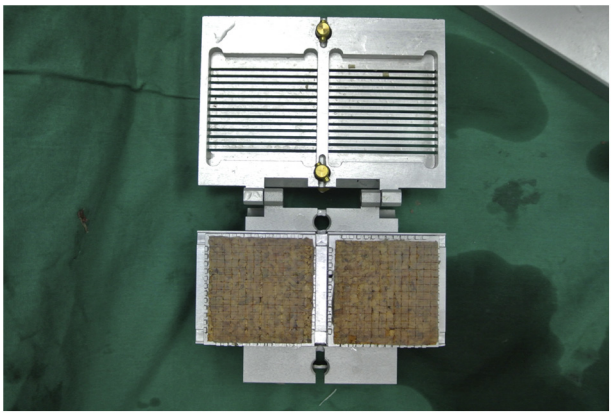

Fig. 3 – Uniform cut pieces of 3 mm × 3 mm micrografts were kept moist.

study was carried out in our institution to compare the economic outcome of micrograft and conventional split skin grafting. This study compared two techniques on 8 severely burnt patients (>45% TBSA burns), and the results demonstrated a significant positive outcome with the use of micrografts, i.e. overall cost reduction of 50%, shorter hospital stay, and lesser number of surgery sessions [3]. However, we found that the Modified Meek technique required a longer treatment duration with the delayed laying of allograft, and it was also fraught with poor micrograft 'take'. This has prompted several modifications in our technique, where we combined the original technique into a single stage method by direct laying of micrografts onto the allograft, with the allograft serving both as a carrier as well as a temporary skin coverage [4]. The objective of this paper is to share our experience in micrografting and several technical tips which had enhanced our micrografting results.

2. Modified meek technique

The two-stage 'Modified Meek Technique' was used when micrografting was firstly introduced in our institution. Firstly, skin grafts were laid onto small cork bases and cut into micrografts of 3 mm × 3 mm size using the Meek device *(Humeca, Netherlands)*. Next, the grafts were transferred onto a special expandable gauze with the aid of a special adhesive spray. The gauzes were laid open and manually expanded to the ratio of 1:3, 1:6, or 1:9 for wide distribution of the micrografts. These gauzes were then transferred onto the recipient wound bed for grafting, followed by dressing in layers. After 5 days, the gauzes were carefully removed, preserving the micrograft islands. Allograft sheets were then laid on for secondary coverage of the wound bed. This process is repeated until sufficient epithelisation takes place.

2.1. *Our technique*

In our improvised technique, we omitted the use of the special expandable gauzes and adhesive spray. Micrografts were prepared directly onto hand-fenestrated allograft in a single stage procedure. We termed this the 'micrograft-allograft sandwich method'.

Our technique is described as below:

1. Autografts are harvested using a skin dermatome and laid evenly onto the cork bases. It is important to ensure that skin does not exceed the edges of the cork bases (Fig. 1).

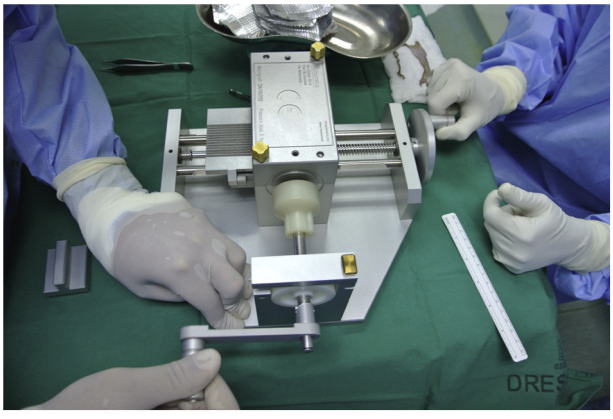

Fig. 2 – The Meek micrograft device cuts through the autografts in 2 planes.

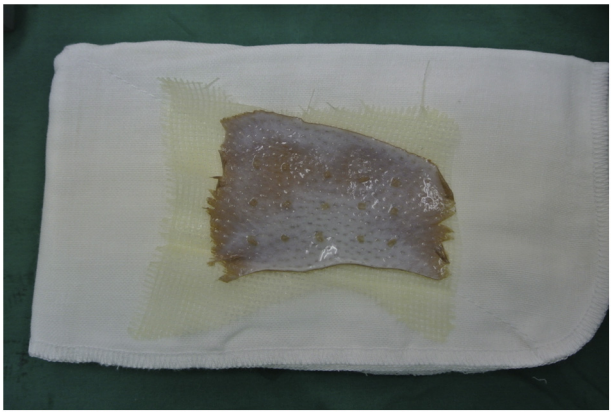

Fig. 4 – Individual micrograft pieces were laid onto allograft sheets using a fine forceps to create the dual layer 'micrograft-allograft sandwich'.