

Clinical Applications of Micro-Skin Grafting For Skin Defect Coverage

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Background: Microskin graft is a technique of skin defect closure using a minimum of STSG donors to cover the large defect. Some considerations were taken, which includes the general status of the patient, donor area morbidity, and patient refusal to act is one of the reasons for the use microskin graft. History STSG failure with previous defect closure and lack of donor area would to benefit from microskin graft.

Methods: Case of boy 12 years old with extensive defects in the forearm due to burns. Consideration of the lack of donor area made us deciding to use microskin graft as main option to close the defect. We did one-week post operative evaluation.

Results: Epithelialization occurs at day 7, while complete epithelialization occurred at 14th day. Three month during follow-up control, the scar are minimal.

Summary: We conclude that microskin graft is one technic that can be used in skin defect closure with minimal donor.

Keywords: *Microskin Graft, Burn Wound Defect, Skin Defect*

Latar Belakang: *Microskin Graft* adalah sebuah teknik penutupan defek kulit dimana digunakan *STSG* donor dengan jumlah minimal untuk menutupi defek luas. Beberapa pertimbangan seperti keadaan pasien secara keseluruhan, kerusakan area donor dan penolakan dari pasien adalah beberapa alasan untuk menggunakan *microskin graft*. Kegagalan *STSG* dengan penutupan defek sebelumnya dan sedikitnya donor kulit dapat mengambil manfaat dari *Micro Skin Graft*.

Metodologi: Kasus anak laki-laki berumur 12 tahun dengan defek luas di daerah lengan ka-rena luka bakar. Dengan pertimbangan sedikitnya donor kulit, kami memutuskan untuk menggunakan *Micro Skin Graft* sebagai pilihan utama untuk menutup defek. Evaluasi satu minggu post-operasi dila-kukan.

Hasil: Epitelisasi terjadi pada hari ke 7, sedangkan epitelisasi komplit terjadi pada hari ke 14. Dalam tiga bulan *Follow-Up* jaringan parut yang didapat minimal.

Kesimpulan: Kami menyimpulkan bahwa *micro skin graft* merupakan teknik yang dapat digunakan untuk menutup defek kulit luas dimana keberadaan donor sulit didapat.

Kata Kunci: *Microskin Graft, Burn Wound Defect, Skin Defect*.

Major burns are life-threatening and several trials have been conducted to determine the best solution for covering the wound, especially when the donor area is limited. The conventional method consists of repeated harvesting from the same limited donor site. Prolonged treatment is anticipated when using this method and a higher probability of complications is expected. Donor areas are limited in large burns, and searching for techniques to cover these areas using small skin grafts has lead to several experimental and human studies. Various techniques of inter-

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mingled skin grafts have been reported to cover large wound areas¹⁻⁵. Keratinocyte culture was started over 20 years ago and their application in burn surgery has lead to controversial results. Some centers reported successful results while others stopped using the method because of the low "take", the 2-3 week waiting period, and the high cost. Nevertheless, it has a strong position in the armamentarium of the burn surgeon.

One of the oldest methods is cutting the skin and dividing it into small pieces (stamps) which

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are distributed over the recipient area. With time, this technique was improved and microskin grafts, which have an expansion ratio of more than 10:1, have been reported. Among the pioneers of microskin grafts and implantation of skin cell suspension was Gabarro⁶. He created small patches of skin graft by laying a sheet of skin over adhesive tape and subsequently cutting that into small pieces. In 1957, Najarian^{7,8} decreased the patch size by using a food processor, thus producing a suspension of skin particles. The work of Zhang^{9,10}, published in 1986, renewed interest in this field. In order to evaluate the healing process of skin grafting in humans, there is a need for a model that simulates human skin grafting. While reviewing the literature, we found that no work has been done using microskin grafts of human origin on animals.

Other method was introduced in another country, they cut the skin with scissors during the first few years. More recently they invented a special mincing machine and used the flotation method to reduce the number of upside down patches compared with the sedimentation method of Nystrom. These methods of skin mincing are all time consuming, taking hours to do. The main problem is that the special machine is not usually available in hospitals. We developed a new method of skin mincing using the Zimmer Meshgraft II Manual Dermatome (Tanner-Vandeput) which is usually available in most plastic surgery clinics. The procedure is very simple and can be carried out in a few minutes only instead of hours. The Zimmer derma carrier was cut into three equal pieces having a shorter length so that it can pass the mesher transversely. The shaved donor scalp, about one-tenth the skin defect area, is marked with pen and is harvested with the Brown dermatome set at 0.015 inches (0.38 mm). The skin sheet is laid evenly with the dermal side down on the back of the derma carrier. The first cut makes the skin into strips instead of a mesh because the back of the derma carrier has no ditches. The carrier is then turned 90 degrees so that the second cut is transversely. The skin strips are cut into equal micro patches, 1.2mm x 1.2mm in size, in a uniform square. They are brushed carefully into a small

bowl. These microskin pieces are grafted on the well-prepared defect after floating. A Bio brane dressing covers the wound. Compression with dressings and splinting area applied and the wound is left untouched for a week. The dressing is then changed and Flamazine is used as a topical agent until the epithelial migration is complete. A pressure garment is used routinely thereafter for 6 months.

Microskin grafting can economize on autografts, the procedure is simple, there is less scar formation on the healed wound. It is therefore a new approach to solving the problem of covering extensive full thickness burns with small amounts of autogenous skin. The procedures for microskin grafting. A piece of split thickness autograft (0.15-0.30 mm in thickness) was taken from the patient and minced with scissors into tiny pieces smaller than 1 mm³, the smaller the better (1 cm² of skin can be minced into 200-230 pieces), and then immersed in normal saline. The minced skin gradually floated with the epithelial side upwards. The floating particles of skin were removed from the saline and evenly spread on a piece of silk cloth with a spoon keeping the epithelial side upwards. A large sheet of homograft was placed over the micro skin grafts on the silk cloth, the dermal side of the homograft making contact with the epithelial side of the micro grafts. The homograft and the silk cloth were turned over together and the cloth was removed carefully, leaving the micro grafts in contact with the homograft. At this time the microskin grafts had also turned over with dermal side up (the same as homograft). There were usually a few pieces of minced skin which would not float up, most of them were dermal side up, these were also spread directly on the homograft keeping their dermal side up. The prepared homograft-autograft was transplanted on the burn wound following eschar excision. The procedures are shown in. The grafting operation must be performed gently and carefully, avoiding excessive movement of the homograft on the wound. Other steps of the grafting procedure are similar to conventional eschar excision and homografting. Some holes should be cut in the homograft for drainage. The recipient site was examined 5-7 days postoperatively and sections



were taken for histological examination^{11,12,13}.

PATIENT AND METHODS

Case of boy 12 years with extensive defects in the forearm due to burns. Having previously performed defect closure with STSG two times but unfortunately STSG undergoes lysis, the defect is covered with basic wound granulation tissue (Figure 1).



Figure 1. The Skin Defects In Antebrachii Region.

We take the thin donor skin graft from the lateral thigh with a size of 8x5 cm, and then minced the skin using scissors into tiny pieces (Figures 2).



Figure 2. Minced skin donor, performed With Scissors.

The already minced skin then inserted into 1 cc syringe with out a needle (Figures 3).



Figure 3. Minced Skin Donor Inserted To 1 cc Syringe.

Soon after it was incorporated into the granulation tissue with a distance of 1 cm each (Figures 4). Dressing were performed with



Figure 4. Minced skin injected to granulation tissue

MEBO dressing, gauze and elastic bandage. We do one-week post operative evaluation to asses the time of epithelialization occurred and scar formation.

RESULT

The evaluation of this technique was performed at day 7. We can see that the skin epithel grown in the granulation tissue. Complete epithelialization occurred at the second week. After three months, less obvious scar were profound (Figures 5-6).



Figure 5. Follow-up after 3 months



Figure 6. Follow-up after 3 months

SUMMARY

The application of microskin grafting could be useful in dealing with vast skin defect, with minimal donor reserves. Our case reports has shown that the microskin graft application combined with MEBO dressing, gauze and elastic bandage in skin defect would results in granulation tissue formation as long as 7 day and less obvious scar formation.

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