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Case Report

Use of MatriDerm® (skin substitute) and split skin graft in one stage in wound healing of exposed tibia without periosteum in two patients

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ABSTRACT

Reporting two cases one of two centimetres breadth and the other of four centimetres breadth exposed tibia bone devoid of periosteum due to post debridement involving periosteum elevator to remove infective tissue which was successfully covered by a simple procedure with MatriDerm® and split skin graft in a single stage. Tibia bone was not drilled to sprout granulation tissue from bone marrow to create a granulated vascularised bed for second-stage skin grafting. It avoided local flap or microsurgical free flap surgery for small exposed bone devoid of periosteum. Both cases had a pleasing aesthetic outlook after a few months of follow-up. Difficult to find instances of more than two centimetres of exposed tibia devoid of periosteum covered successfully in a single stage by this procedure.

1. Introduction

Reporting two cases one of 2 cm breadth and the other of four centimetres breadth exposed tibia bone devoid of periosteum due to post debridement involving periosteum elevator to remove infective tissue were successfully covered by a simple procedure to cover with MatriDerm® and split skin graft in a single stage One study claimed to cover two centimetres breadth successfully in two out of six cases by this method.[1] This avoided the use of microsurgical-free flaps or local flaps and was aesthetically pleasing. Drilling of the tibia bone was not done to sprout granulation tissue from bone marrow to create a granulated vascularised bed and thus no need for second-stage skin grafting. It avoided local flap or microsurgical free flap surgery for small exposed bone devoid of periosteum.

2. Case 1

Eighty-seven years old man with irregularly controlled diabetes on oral antidiabetic treatment for the last 10 years had four weeks old infected wound over the left tibia [shin]. It was debrided and the infective wound bed was removed with a periosteal elevator thus bare bone devoid of periosteum was exposed. Two more wounds had also occurred over either side of the left ankle which was later skin grafted at the same time when the exposed bone was dealt. The incident was due to the patient slipping in the bathroom and swelling occurred in the lower half of the left leg and hot fomentation created a scald burn which ultimately got infected with a foul-smelling discharge within a week. Insulin and sensitive antibiotics were administered to this moribund patient. Pseudomonas infection controlled and regular dressing done. VAC at -125 mercury pressure was applied on all three wounds for one week. The exposed bone tibia wound was covered with single stage 37x52 mm MatriDerm® 1 mm thickness and very thin split skin graft. The wound on either side

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of the left ankle region with granulating soft tissue was also covered with a split skin graft of medium size. The dressing was done after seven days and a hundred per cent graft uptake was there. Proper diabetic control and sensitive antibiotics were continued Wound dressings were repeated at 5 days intervals. The wound healed in three weeks' time and the follow-up at three months was aesthetically very pleasing(Figures 1, 2, 3, 4 and 5).

Fig. 1: A Patient wound

Fig. 2: Exposed tibia bone devoid of periosteum.

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3. Case 2

The twenty-four-year-old male had a crush injury to his right lower limb. The external fixator was applied for the fracture of both bones at the lower one-third. Debridement of necrosed tissue and skin glove done. The tibial shaft with two-centimetre breadth and five-centimetre length without periosteum was exposed. The fracture site was covered with a retrograde posterior tibial artery flap. After five days single stage application of MatriDerm® and thin

Fig. 3: MatriDerm® applied

Fig. 4: Also skin graft applied in asingle stage

Fig. 5: 3 months follow-up.

split skin graft over the exposed bone and surrounding portion of the wound. The rest was covered with skin graft only. Later pseudomonas infection was encountered but managed successfully with bacteriophages and antibiotics. The wound healed in three weeks and later further orthopaedic management was done and a follow-up at five months was aesthetically pleasing(Figures 6, 7, 8, 9 and 10).

Fig. 6: Road traffic injury with fracture and exposed bone shaft.

Fig. 7: Fracture covered with flap and exposedshin bone is seen.

Fig. 8: Matriderm applied

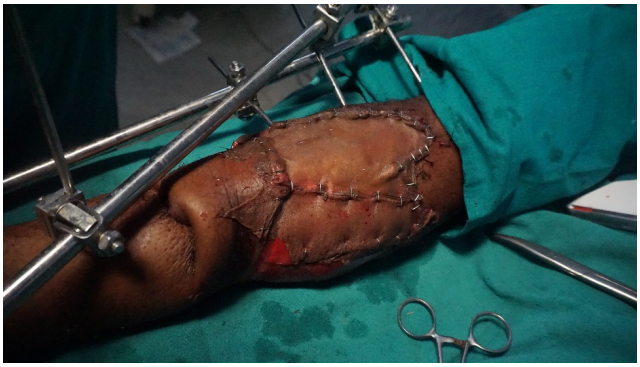

Fig. 9: Also added skin graft in single stage.

Fig. 10: Fig. 10: ingle stage matriderm® + skin graft to cover exposed bone with 2cm breadth devoid of periosteum and soft tissue + pedicled flap to cover fracture site with Five months follow-up.

4. Discussion

Only a few successful cases had been reported on the extensive periosteal devoid tibia to an extent of twelve centimetres in length but breadth not more than two centimetres indicating MatriDerm® was successful in healing by forming a bridge for growth of neovasculature from margins of the wound. Small wound devoid of any vasculature is covered easily by providing a scaffold through a skin substitute which gets vascularised at a faster rate to form a vascularised bed on which skin graft takes up easily. [1,2] In one study two cases out of six were successful. [1] Both cases of two centimetres and four centimetres breadth by us had been successful. Tibia bone exposed and devoid of periosteum to any length but breadth not gone beyond four centimetres defect could be healed by this method. Further study on more cases is required. This simple procedure avoided local flap or microsurgical free flap surgery. No occurrence of donor deformity. The skin substitute Matriderm® had been used to cover successfully extensive

scalp bare bone without pericranium as the outer table was removed and immediately Matriderm® with a skin graft was applied in the single stage or as the second stage after getting good granulation tissue by multiple drilling of the outer cortex of skull bone.[3,4] MatriDerm® is successfully used over the exposed bone of the extremity where periosteum is present or as the second stage after getting granulation tissue by multiple drilling of bone followed by VAC application. It needs vascularised tissue to imbibe neo-vascularization into its scaffold as done for donor site aesthetic purposes in post-radial forearm flap harvesting.[5] It is natural that skin substitutes should go beyond bare bone by one centimetre to cover the vascular area at the edges to get vascularised. The skin substitute behaves as a vascularised bridge to support a thin auto-skin split graft applied over it as a single stage. Both the cases healed through skin substitute as no loss of skin graft occurred and even the four centimetres wound breadth defect healed without much scarring of secondary intention.

5. Conclusion

MatriDerm® vascularised over the small exposed bone devoid of vascular periosteum to the extent of four centimetres breadth irrespective of length. No need for the drilling of bone required to sprout granulation tissue from bone marrow to create a granulation vascularised bed for second-stage skin grafting. It avoided local flap or microsurgical free flap surgery and thus donor deformity. Aesthetically pleasing result in three month time.

6. Conflict of Interest

There are no conflicts of interest in this article.

7. Source of Funding

None.

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