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THERAPEUTIC ROLE OF MESENCHYMAL STEM CELLS SEEDED DERMAL MATRIX VERSUS ACELLULAR DERMAL MATRIX IN HEALING OF SKIN DEFECT

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Background & Objectives: One of the major challenges facing the surgeons is replacing a full-thickness skin loss successfully.

Aim: This study aimed at testing the efficacy of de-cellularized dermal matrix seeded with bone marrow-mesenchymal stem cells (BM-MSCs) as a scaffold for the repair of skin defect in rats in comparison to using acellular dermal matrix (ADM) alone.

Materials & Methods: A 2x2 cm² size full thickness skin defect was created on the dorsum of 30 male Wister rats (200- 250g) under xylazine (5mg/kg) and ketamine (50mg/kg) anesthesia. The animals were then randomly divided into three equal groups: group I: the defect was left for spontaneous recovery, group II: the defect was repaired with ADM alone, and group III: the defect was repaired with ADM seeded with labelled BM-MSCs. The healing rate of the defect in all groups was assessed by measuring wound area and healing percentage twice weekly. The specimens from the wound site were obtained from all groups on day 14 and day 28 post-operative for histological analysis.

Results: Treatment of wound defect with BM-MSCs seeded dermal matrix resulted in complete wound recovery on gross examination. Moreover, histological analysis showed proper re-epithelization, proper collagen rearrangement together with minimal inflammatory cells. Well-developed hair follicles and sebaceous glands were noted as well. Statistically, 28 days post-operatively, significant increase in healing rate, healing area percentage and collagen area percentage was detected together with significant decrease in vascular density compared to group I and II.

Conclusion: Stem cells seeded ADM facilitated early and better healing of skin defect in rats than the non-seeded ADM and spontaneous healing.