

## Role of Dermabrasion Assisted Tangential Excision in Deep Partial Thickness Burn Wounds

Geetankshi Gopal Ghabru<sup>1</sup>, Ravi Kumar Chittoria<sup>2</sup>, Amrutha J S<sup>3</sup>

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### Abstract

Early removal of dead necrotic tissue from the burn wound can help improve the healing process by decreasing the time required for removing the necrotic material. Dermabrasion can help reduce post-operative scarring improving the patient outcome, reducing the cost, and improving the quality of life. In this study we consider the effectiveness of dermabrasion assisted tangential excision in management of a deep partial thickness burns in a patient with accidental thermal burns.

**Keywords:** Dermabrasion, Deep Partial Thickness Burn Wounds.

### INTRODUCTION

Dermabrasion a modality primarily used to treat skin diseases. It is a resurfacing technique used to promote reepithelization by removing the epidermis and promoting growth of structural proteins causing reepithelization.<sup>1</sup> However this technique is not frequently used in the management of burn wounds. Management of cases of burn wounds is an ever challenging task involving physical and psychological complications associated with the patient as well as on the clinician to try to improve the patient outcome.

Burn injuries are not only associated with acute complications involving shock, sepsis, ARDS but also have long term complication involving contractures and affecting the cosmetic appearance.

Dead necrotic tissue build up on the large burn wound area seen in partial thickness burn injury affects and delays the wound healing process as greater time is taken for dissolution of the necrotic tissue.<sup>2</sup> In addition is infection spreads through blood sepsis may ensue. Hence it is important to look for measures in removing the necrotic tissue at the earliest.

Debridement of burn wounds include sharp, hydrodynamic, blunt.

Use of sharps to remove the devitalised tissue requires skilled clinician while in hydrodynamic water at high pressure is used to remove the necrotic tissue.

However blunt debridement is relatively safe and does not require precision. It uses rough

Author's Affiliation: <sup>1</sup>Junior Resident, <sup>2</sup>Senior Resident, Department of Plastic Surgery, <sup>3</sup>Professor and Registrar (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, JIPMER, Pondicherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor and Registrar (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, JIPMER, Puducherry 605006, India.

E-mail: drchittoria@yahoo.com

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surface/ materials to remove the devitalised tissue by friction. It is relatively safe and does not cause damage to the healthy tissue. This method is relatively safe to use in areas in sensitive areas as well.<sup>3</sup>

## MATERIALS AND METHODS

This study was conducted in a Tertiary Care Centre in the Department of Plastic Surgery after getting the departmental ethical committee approval. Informed consent was obtained. The subject was a 67-year-old female who suffered an accidental burn injury and developed 35 percent deep partial-thickness burn wounds. She was admitted to the JIPMER Tertiary Burn Centre and was hemodynamically stabilized for the first 4 days. She underwent dermabrasion-assisted tangential excision (Fig. 2, 3) using Manekshaw's dermabrader (Fig. 1) and split skin grafting done after granulation (fig. 4).



Fig. 1: Manekshaw's dermabrader

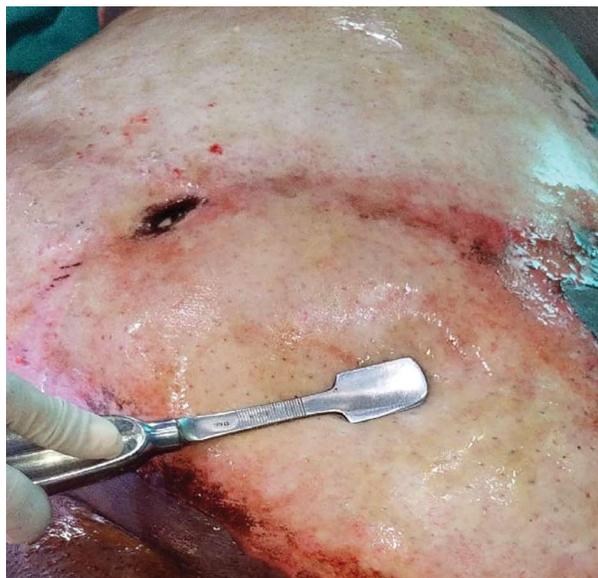


Fig. 2: Partial thickness burn before dermabrasion



Fig. 3: Partial thickness burn after dermabrasion



Fig. 4: Granulated wound before skin grafting

## RESULTS

The wound bed preparation of a large burn wound area was done using blunt dermabrasion. She underwent multiple sessions of regenerative therapy. The wound granulated well and split skin grafting done over it.

## DISCUSSION

Wound healing is a complex phenomenon that is divided conventionally into four phases- hemostasis phase, inflammatory phase, proliferative phase, and phase of maturation. Each phase overlaps with the other. Soon after the injury, the hemostasis phase begins leading to the formation of the platelet

plug. Activation of platelets and the complement system leads to release of several growth factors that activate the inflammatory phase. Recruitment of leucocytes, initially neutrophil followed by lymphocytes and macrophages, is the hallmark of this phase.<sup>4</sup> Macrophages release several growth factors like platelet-derived growth factor (PDGF), transforming growth factor (TGF-beta and TGF-alpha), basic fibroblast growth factor (bFGF) and vascular endothelial growth factor (VEGF)<sup>5</sup> These growth factors are responsible for the proliferation, angiogenesis, deposition of collagen, and extracellular matrix (ECM) and the maturation phase. Non-healing wound is caused by an imbalance of growth factors so that these phases do not occur in a timely fashion or their progression is stopped at a different level.

To accelerate wound healing, dermabrasion was done, which helped in removing the devitalised tissue and promoted growth of structural proteins to promote growth of epidermis for early healing. As the skin is the largest organ of the body with a rich of vessels and adnexa, mechanical alteration like dermabrasion helps in collagen and other structural proteins remodelling and the process of healing is hastened due to ready availability of the blood rich in macro as well as micronutrients. Layer by layer removal of the skin layers in a controlled manner help achieve a desired level for fibroblast activity, resulting in formation of new collagen type I collagen which improves the skin appearance by causing modelling. Considering this concept, dermabrasion can improve the outcome in patient of burns where early removal of devitalised tissue can enhance the remodelling process and improve the outcomes of patient with early healing, less scarring and better patient outcome.

Various mechanisms that are thought to act both at tissue and cellular level include reduction of the edema, improvement of local blood flow, induction of angiogenesis and granulation, wound margin epithelialization, and facilitation of cell migration and proliferation.

Early removal of devitalised tissue help suppress the inflammatory process and accelerating the healing process. Also early care had a positive

on patient outlook and reduced the frequency of changes in dressing.

## CONCLUSION

There are multiple modalities in wound bed preparation that include debridement, Autologous Platelet Rich Plasma, Amniotic membrane grafting, Regulated Oxygen Enriched Negative Pressure Wound Therapy, regenerative grafting and biological scaffolding. Each modality contributes in some way to make the wound fit for grafting and ultimately speeds up wound healing and patient discharge timing.

Also dermabrasion can be taken as a modality to enhance the healing process in patient with burn injury which in turn decrease the in-hospital complication and in-hospital stay of the patient. The reduced dressing frequency also decreases the financial burden. Long effects include decreased scarring as well.

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