

## Innovative Preservation of Skin Graft on the Donor Site

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### ABSTRACT

Skin grafting is a most common procedure done in plastic surgery department. The most common complication associated with skin grafting is graft loss. Graft loss is expected usually from day 7 - day 10. The excess skin graft harvested during the initial skin grafting will be preserved for the future graft loss. Various preservative methods are available for storage of excess skin grafts. In this article, we assess the preservation of skin grafts in the donor site of the same patient.

**Keywords:** Innovative; Donor Site; Preservation; Storage; Skin Graft.

### INTRODUCTION

Most of the Skin grafts harvested from the patients has epidermal and upper dermal layer. Human Skin has five layers of epidermis and upper part of papillary dermis. The Skin has low immunogenic potential, anti-inflammatory nature, antioxidant properties, and also angiogenic properties.<sup>1</sup> Preserved skin grafts can either be used in staged reconstructive procedures as autografts. Although several nutrient media and techniques have been developed for storage, the conventional method of preservation is wrapping the graft in a normal saline soaked sterile gauze and refrigerating this

material in a sterile container at +4°C. As normal saline contains only certain electrolytes and nothing more, it is far from physiological. For that reason, saline stored skin grafts lose some of their viability in a short period of time and become edematous. In our study, we assess the role of preservation of skin graft at donor site.

### Materials and Methods

This study was conducted in the department of Plastic Surgery at tertiary care center after getting the departmental ethical committee approval. Informed written consent was taken from the patient. This is the prospective observational study about a 73-year-old male came with non-healing post traumatic degloved wound with no known co morbidities. He met with RTA (road traffic accident) 5 months back with degloving injury of the left lower limb for which serial debridement was done by primary center before referring to our center. At admission patient presented to plastic surgery department with extensive raw area over the left lower limb extending from just below knee to dorsum of foot.

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After wound bed preparation (fig. 1), skin graft was harvested from right thigh and grafted in left lower limb raw area. (Fig. 2) The excess skin graft obtained during the procedure was preserved by applying the skin graft back to the donor site. (Fig.

3) The recipient skin graft site showed minimal graft loss after 14 days. (Fig. 4) The excess skin graft preserved at donor site was then peeled off used at areas of graft loss. (Fig. 5)



**Fig. 1:** Wound bed after preparation



**Fig. 2:** Wound bed after autologous skin grafting



**Fig. 3:** skin graft stored in the donor site



**Fig. 4:** Minimal graft loss after 14 days of primary skin grafting



**Fig. 5:** Peeling of excess skin graft preserved at donor site



**Fig. 6:** Final appearance after regrafting using preserved graft

## Results

Skin grafting of the recipient site done with the graft taken from the right thigh. The extra skin graft which are available needs to be stored in physiological medium for the survival of the cells. The storage of skin grafts on donor site helps the cells by good nourishment from the wound bed and ensure the survival of the skin graft. In our case, after 14 days we used the stored skin graft from the right thigh for regrafting of the graft loss on the recipient area. Regrafted skin take was good on day 7 (fig. 6). No complication noted with this procedure.

## Discussion

There are various methods to preserve the skin like direct storage, cryopreservation, glycerol, preservative medium, culture medium. The ideal way of preservation is one that is easy to carry out, safe to tissue, and does not cause any alteration in the biological properties of skin.<sup>3</sup> Cryopreservation is one of the commonly used methods for the preservation of skin. It is then stored in a storage medium at a very low temperature. Different cryomedia and storage temperatures ranges have been mentioned in the literature. The most common technique of cryopreservation involves the use of glycerol as a cryoprotectant medium along with antimicrobial agents and storage at a temperature of  $-80^{\circ}\text{C}$ .<sup>4</sup> There is not an ideal or universally acknowledged medium for the preservation of skin grafts. In previous studies, Roswell Park Memorial Institute 1640 solution (RPMI) was reported superior to other media including Eagle's minimal essential medium, Euro-Collins preservation fluid, University of Wisconsin solution, Histidine tryptophan ketoglutarate solution, and saline.<sup>5,6</sup> Basaran et al. explained this superiority with the rich amino acid content of RPMI, which helps to improve cell preservation. It is suggested that Roswell Park Memorial Institute 1640 solution (RPMI) seemed to be the most efficient short term solution. On the other hand, storage at  $4-8^{\circ}\text{C}$  after wrapping the graft in physiological saline soaked gauze is still a widely used method by most clinicians because of practicality and inexpensiveness.<sup>7</sup> However, this solution is known to be inferior to others.

Storage of skin grafts with saline moistened gauze and using it later as a homograft or autograft is a widespread practice in plastic surgery. Recent

studies have reported an increase in the quality and viability of skin grafts using different methods and, as saline lacks the nutrients necessary for cellular metabolism, this practice should be reviewed. Percentage graft take can be used to test the effects of different storage media on skin graft viability, but this may be affected by many factors other than viability such as infection, immobilization of the graft and hematoma, and so cannot be used as a primary measurement.<sup>8</sup> The use of autograft skin for the cover of burn wounds and other non-healing ulcers has since been the subject of numerous research that have been published. The autograft reduces the risk of wound infection and stops protein, fluid, and electrolyte loss from the wound, which saves the patient's energy. Additionally, it lessens discomfort while also enhancing the patient's overall wellbeing and psychological condition and preserving autografts. According to Snyder et al., autografts have been used to treat diabetic, venous, arterial, post-traumatic, post-scleroderma, and other ulcers.<sup>8</sup> He lists a number of advantages, such as a significant decline in wound infection, desiccation, and patient sensations like discomfort.

Autografts made of human skin effectively lower wound protein, water, and electrolyte losses while also lowering the body's energy needs.<sup>10</sup> We employed autograft in our case for the same reason. Compared to collagen dressing, autograft more successfully reduces pain and manages infection. The sick donor's torso, hips, thighs, and upper calves can be harvested for skin autograft. In the present study, we assess the skin graft preservation at donor site. We assess the viability of skin grafts preserved at donor sites. The results of this study showed that donor site maintained a better environment for skin grafts by increasing the quality and survival time of skin grafts. A complication of preserving the skin grafts at donor site may be bleeding during graft removal. Another disadvantage of the procedure is that the graft may be difficult to peeled off after 21 days as it will get taken up at the donor site.

## Conclusion

In conclusion, donor site preservation can be a very good method for preservation of skin grafts in resource poor settings where there is no facility of refrigeration. This is an economical means of storage compared to other preservative media which require storage in cooler temperatures. But further studies with larger sample size and better histological markers

are needed.

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