

Wound Repair/Cosmetic Surgery Healing Enhancement of Skin Graft Donor Sites With Platelet-Rich Plasma

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Introduction:

Split-thickness skin grafts are frequently used in oral and maxillofacial preprosthetic surgeries as well as several types of mucosal neck surface deficiencies, such as may be seen in tumour and trauma wounds. As a variable of size and depths, healing is noted to be slow, associated with discomfort, and eventuates into a scar. Platelet-rich Plasma (PRP) has been documented to accelerate and enhance bone graft healing and maturity. However, no definitive data in humans have yet shown a similar effect on soft tissue healing.

Purpose:

The purpose of this study was to assess the potential of PRP to accelerate the soft tissue wound healing and epithelialization of a split thickness skin graft donor site.

Materials and Methods:

This study consisted of 20 patients who required split-thickness skin grafts in excess of 10x10 cm. Each patient underwent 2 side-by-side split-thickness graft harvests measuring 5x7 cm. One donor area was treated with topical bovine thrombin covered with an occlusive Opsite dressing. The adjacent second donor area was treated with 6 ml of a platelet concentrate containing greater than 1 million platelets per mm³, obtained from the Platelet Concentrate Collection System (3i Corporation) and an occlusive Opsite dressing (see figures below).



Donor site with Thrombin and PRP soaked Gauze for Hemostasis



Skin Graft Harvest Site with "Op-site" dressing applied

Wound assessments were conducted by direct observation, a patient pain evaluation scale, and photographic morphometry at 7 days, 14 days, 20 days, and 30 days. Histopathology specimens were obtained at variable times with special patient consent.

Results:

Direct observation noted a consistent acceleration in the maturity of the wound and PRP added at each assessment time (see pictures below). It was particularly noted that PRP added wound passed quickly through the granulation tissue phase so as to avoid the crusty scar, which was observed on all control sites. The photographic morphometry quantitated the degree of granulation tissue, scar and epithelialization (see Table 1)



Skin Graft Harvest Site 7 days "Post-Op"



Skin Graft Harvest Site 6 months "Post-Op"

Table 1.

	Thrombin (%)	% Epithelium PRP	P
7 days	4	91	.010
14 days	15	95	.010
20 days	58	100	.010
30 days	69	100	.010

Table 2. PATIENT DISCOMFORT SCALE (1-10), MEAN VALUES (N = 20).

	Thrombin (%)	% Epithelium PRP	P
7 days	6	1	.005
14 days	7	1	.010
20 days	4	1	.010
30 days	2	0	.010

Table 1 indicates that granulation tissue and the scar that forms from the granulation tissue indicative of delayed epithelialization were always higher in the controls than the PRP added wound, whereas the surface area of epithelialization was always higher in the PRP added wound. These results correlated to the patients' discomfort scale (Table 2) which indicated a pain level and an "annoyance" level related to the scar to be higher in the control wounds.

The histological specimens confirmed an advanced degree of epithelial migration and thickness in the PRP added wounds.

Conclusion:

Platelet-rich Plasma added topically to a de-epithelialized wound accelerates the early phase of wound healing, presumably by release of platelet-derived-growth-factor (PDGF) and transforming growth factor beta (TGF-β), as well as a fibrin-rich base that provides an early revascularization and a framework for epithelial migration. Clinically, these biologic events gain an earlier epithelialization, and less pain.

References:

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