

AESTHETIC MANAGEMENT OF POST-BURN SCAR*Jitendra Mehta¹, Pawan Laxmanrao Shahane², Manish Zade³, Dhananjay Nakade⁴*

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ABSTRACT**BACKGROUND**

Patient with burn scar of face, extremities, exposed part of abdomen in Indian clothing, seek consultation for aesthetic improvement of scar, even though there is no functional impairment.

MATERIALS AND METHODS

10 patients were studied from January 2007 to June 2016 for post-burn scar with tangential excision and thin split thickness skin grafting. Median time from injury to surgery was 66.2 months and mean follow up of 18 months.

RESULTS

Tangential excision and thin split thickness skin grafting gave a fair aesthetic result with good overall patient satisfaction. The colour match was fairly good with no need for another operation.

CONCLUSION

Tangential excision and thin split skin grafting are good options for aesthetic reconstruction of burn scars.

KEYWORDS

Post-Burn Scar, Tangential Excision, Thin Skin Graft.

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INTRODUCTION: In plastic surgical clinical practice, we come across patients seeking treatment for burn scar involving face, extremities; particularly hands and forearm, neck and exposed abdomen in Indian clothing. Usually, these scars are uneven, pigmented, hypopigmented, hypertrophic, atrophic and wavy without functional impairment. In overburdened general hospital scenario, these patients are given least priority or refused treatment. These patients are suffering from body dysmorphia leading to substantial disruption in social life. These patients are psychologically depressed. Most of them are young and of marriageable age. Although, there have been good literature concerning management of burn contracture and their functional recovery, interest in aesthetic outcome of burn scar is gradually increasing.

Aesthetic treatment of post-burn scar includes pressure therapy, laser, tattoo, excision and split thickness skin graft, dermabrasion and epidermal graft, punch graft and tangential excision and thin skin graft. We find tangential excision and thin skin graft is easier to perform, simple and gives better aesthetic results.

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METHOD: In this study, we have performed tangential excision and thin skin graft for aesthetic improvement of burn scar over face and extremities. Study included 10 patients, 7 females and 3 males. All patients were having pigmentary degeneration, hypertrophy, atrophy, uneven scar or combination of more than one. Study period was from January 2007 to June 2016.

Surgeries were performed either in general anaesthesia or regional block. Burn scar was marked and excised either using electric dermatome or manual skin graft knife up to the depth of capillary bleeding. Donor area was mostly from thigh of the patient. Thin skin graft was harvested with the thickness of 6/1000 or 8/1000 inches with manually or electric dermatome. Donor area was dressed with non-adherent padded dressing. Thin graft was applied to recipient area after achieving homeostasis with epinephrine gauze. Graft was secured with minimal suture or stapler. Non-adherent padded dressing with pressure and splintage given.

Recipient area was dressed after 8 days. Donor area usually healed in 10 to 12 days. Graft usually settled in 15 to 20 days. Patients were instructed about graft care like massage with moisturising lotion, pressure garment and avoidance of sun exposure. Patients were followed up after 15 days, 1 month, 3 months, 6 months, one year and two years.

Patients were assessed for four conditions including pigmentation, vascularity, pliability and height through physical examinations on scar before and after operation



respectively by applying Vancouver Scar Scale (VSS). Level of patients' satisfaction on surgical site was surveyed after at least 12 months using questionnaires selecting one of five responses very satisfied, satisfied, neutral, unsatisfied and very unsatisfied.

RESULTS: The mean time between occurrence of burns and the treatment of tangential excision and thin split thickness skin graft was 60.2 months. After tangential excision and thin split thickness skin graft, 10 patients did not need reoperation and no other complications were observed. The colour of the graft was initially red, but it gradually changed to the colour similar to the surrounding with good texture, which was maintained throughout the follow up. The donor area from where the graft was harvested also healed well with good aesthetic appearance.

VSS indicated improvement of pigmentation in 8 out of 10 patients, vascularity and pliability in all patients, skin thickness in 8 patients. Total score of VSS was 4.5. The period from surgery to study was 18 months on an average, shortest was 3 months and longest was 36 months. Patient satisfaction study shows 6 were very satisfied, 2 were satisfied and 2 were neutral.

Case 1: A female patient aged 36 with a scar caused by flame burn 5 years ago visited our hospital. A hypopigmented burn scar with the size of 13 x 6 cm was observed on the forehead and thus the tangential excision

using a dermatome was performed followed by the thin split-thickness skin graft using the thin skin graft harvested from the right thigh region with a thickness of 6/1000 inches. After two years from surgery, no scar contracture or hypertrophic scar was observed while it could be clearly seen that the surgery site displayed the aesthetic improvement; the pre-surgery VSS of 8 points (hyperpigmentation:1, pink vascularity:1, pliability:3 and height:3) went down to 2 point in the post-surgery VSS, which was a clear improvement; and the response was also "very satisfied" in the patients' satisfaction survey.

Case 2: A female patient aged 18 visited our hospital with hyperpigmentation and hypertrophic scar on hand area caused by flame 10 years ago as the chief complaint. A burn scar with the size of 12 x 5 cm was observed on the dorsum hand first web space area and thus the tangential excision was performed followed by thin split thickness skin graft using the thin skin collected from the right femoral region with a thickness of 7/1,000 inches. It could be seen that the surgery site have similar the colour and outline to those of the surrounding skin at the one and a half years' time point after surgery. The pre-surgery VSS of 5 points (pigmentation:2, vascularity:0, pliability:2 and height:1) was improved to 2 point in post-surgery VSS indicating the improvement in skin colour and pliability and her response in the patients' satisfaction survey was "very satisfied."

No.	Sex/Age	Scar Site	Scar Extent (cm ²)	Skin Type	Period from operation to last follow up (months)	Satisfaction
1	M/24	Face	50	4	20	Very Satisfied
2	M/26	Face	54	3	16	Very Satisfied
3	F/30	Forehead	50	3	18	Very Satisfied
4	M/18	Hand	60	3	18	Very Satisfied
5	F/26	Face and Neck	170	4	12	Very Satisfied
6	F/21	Forearm	72	3	36	Satisfied
7	F/36	Face	80	5	3	Neutral
8	F/21	Forearm	150	5	15	Neutral
9	F/34	Face	66	3	16	Satisfied
10	F/36	Face	78	3	26	Very Satisfied

Table 1: The Data of Patients

Pigmentation
0 = Normal colour
1 = Hypopigmentation
2 = Hyperpigmentation
Vascularity
0 = Normal
1 = Pink (Slight increase in blood supply)
2 = Red (Significant increase in blood supply)
3 = Purple (Excessive local blood supply)
Pliability
0 = Normal
1 = Supple (Flexible with minimal resistance)
2 = Yielding (Giving way to pressure offering moderate resistance)

3 = Firm (Solid/inflexible unit, not easily moved, resistant to manual pressure)
4 = Banding (rope-like tissue that blanches with extension of scar does not limit range of motion)
5 = Contracture (permanent shortening of scar producing deformity or distortion limit range of motion)
Height
1 = Normal
2 <2 mm
3 ≥2 mm and <5 mm
4 ≥5 mm
Table 2: Vancouver Scar Scale

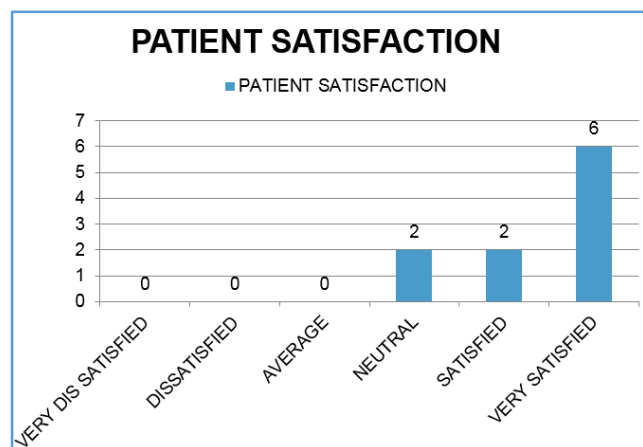


Fig. 1

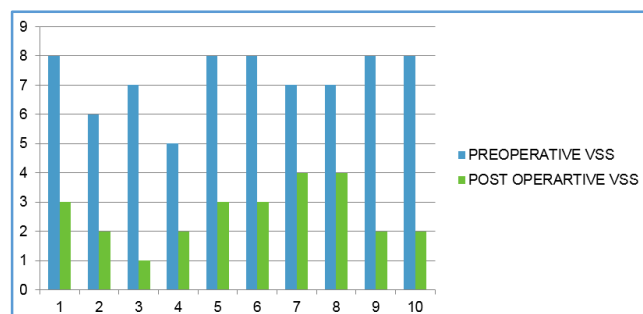


Fig. 2: Result of Vancouver Scale



Fig. 3: Forehead Female 36



Fig. 4: Hand Dorsum Female 18

DISCUSSION: As face and extremities are exposed body parts, aesthetic outcome of post-burn scars in these areas is equally important as the functional outcome.^[1] There are various aesthetic treatments for post-burn scar-like tattoo, punch grafting, dermal over graft after dermabrasion, pressure garment, laser and tangential excision and thin split thickness skin graft. Tattoo has limitation in recovering natural skin colour. Thick split thickness skin graft may leave scar around boundary of graft and maybe hyperpigmented and may result in hypertrophic scar on donor site.^[2,3] The dermal over graft has been described by Webster in 1954. In this method, primary graft is denuded or derma abraded and secondary split thickness graft is applied. In our method, we have applied thin split thickness graft after tangential excision.^[4] Our procedure is performed only once because of thin graft donor site morbidity is minimal. Limitation of our procedure is that it cannot be used when there is element of contracture.

Our aim of treatment was aesthetic correction of post-burn scar. Procedure was performed only after maturation of initial burn scar. Thin split thickness graft was applied after denuding scar with dermatome to the level of capillary bleeding. This can be used in all type of scar including hypertrophic scar. Method is easy and reduces surgery time. Accuracy of dermatome is less vis-a-vis in dermabrader removing the boundary of scar. The tangential excision using a dermatome can preserve the panniculus by peeling the

burn scars thinly several times iteratively and remove the base epidermal layer containing melanin in dyspigmented site (skin:6/1,000 inches). Moreover, it offers shorter surgical time. Also, it can be carried out several times repetitively. It reduces recovery time with prompt engraftment and minimal damage on the donor site.^[5]

Present study, patients did not complain of significant donor site pain. Donor area healed in 8 to 12 days' time with minimal scar and very good colour match with surrounding skin. The recipient site after grafting had excellent pliability. Dyspigmented and hypertrophic scar was removed by tangential excision and subsequently grafted with thin split thickness skin graft. Erol and Ataby have reported that ratio of abnormal hyperpigmentation was 5% after thin split thickness skin graft of 0.2-0.3 mm and suggested that it was caused by excessive sun exposure of skin graft recipient site.^[3] Accordingly in this study, we could prevent pigmentation by advising patient to refrain from direct sun exposure. Postoperatively, we advised pressure garment and silicone gel application over grafted area to prevent hypertrophy. While Walton et al have reported that inclusion cysts maybe generated from residue of the follicles after thin split thickness skin graft; in this study, we have not come across any. It is considered that since inclusion cyst disappear within 6 months spontaneously,^[3,6] it would not greatly affect outcome.

We have assessed outcome of our study by two methods:

- 1) VSS score.
- 2) Patients satisfactory survey.^[7]

The VSS was first devised by Sullivan et al^[8] in 1990, which assess four elements including 1) Pigmentation, 2) Vascularity, 3) Pliability and 4) Height. In 2005, Truong et al suggested that the VSS was useful also in the assessment of breast cancer surgery scar indicating its generality. As such, this has been accepted as valid scale of post-surgery scars as well as burn scar. Accordingly, we employed it and assessed the outcomes of the surgical method in this study. The average VSS decreased to 2.8 points from 7.1 points after thin split thickness skin graft following tangential excision, which confirmed that aesthetic outcome were excellent. On follow up, we performed survey that required patients to respond on a scale of very satisfactory, satisfactory, neutral, unsatisfied and very unsatisfied. Out of 10 patients, 6 patients were very satisfied, 2 were satisfied and 2 were neutral with surgical outcome of tangential excision and thin split thickness skin graft. All of the patients were of Fitzpatrick skin type 3 to 5 and those two having less satisfaction were happened to be of type 5. Type 5 skins

being more reactive to sunlight and more tendencies to get hypertrophy, may lead to less satisfaction of the patient.

Other methods like pressure garment will not address pigmentation and pliability. It will require long time and patient's compliance. Laser will have long down time and repeated sittings and will be impractical on big scars.

CONCLUSIONS: Patients seek treatment for aesthetic improvement of post-burn scar over exposed body area like face, neck, extremities and abdomen, even though, there is no functional impairment. Various modalities of treatment have limitations such as differences in skin colour, collapse of skin graft site, donor site morbidities and pigmentary degeneration. We have carried out tangential excision with thin split thickness skin graft. Procedure was easy to carry out with substantial improvement in VSS score and subjective improvement in patient satisfaction. In conclusion, we find this procedure easy, reproducible with consistent improvement in aesthetics, patient satisfaction and VSS score.

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