

Study of functional status restoration in the resurfaced unit after full thickness skin grafts for facial resurfacing

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Received Date: 29/01/2023

Acceptance Date: 05/03/2023

Abstract

Background: Facial appearance has paramount importance on person's psychology and self-esteem. Facial resurfacing is a facial rejuvenation procedure that uses a laser to improve the skin's appearance or treat minor facial flaws. Present study was aimed to study functional status restoration in the resurfaced unit after full thickness skin grafts for facial resurfacing.

Material and Methods: This was a retrospective study conducted on 15 patients with disfigurement on their face that had undergone reconstruction surgery in the Department of Plastic Surgery of a tertiary care teaching hospital from western India. **Results:** Majority cases were from less than 30 years age group (66.67 %) & female (86.67 %). Common etiology was burns scar (46.67 %), congenital pigmented nevus (20 %) & basal cell carcinoma (13.33 %). Majority cases underwent resurfacing for forehead/chin/cheek/eyelid aesthetic unit area grafting. Common donor site area was from groin, postauricular & thigh region. Total grafts were done at 23 sites. Complications noted among recipients were CPN remnant at the forehead (4.35 %), Lower lid ectropion (4.35 %) & 1 x 0.5 cm marginal graft loss (4.35 %). While in donors were right groin stretching (4.35 %) & stretching (4.35 %). As per patients' evaluation, results at 6 months follow up were, colour match was good (52.17 %) & fair (39.13 %) in majority of cases., texture match was good (52.17 %) & fair (39.13 %) majority of cases. At junctional area, hypopigmentation (60.87 %) & stretching (17.39 %) was noted in majority of cases. **Conclusion:** In this study overall colour and texture match is good. Which is probably due to inclusion of full dermis with the graft.

Keywords: functional restoration, full thickness skin grafts, facial resurfacing, plastic surgery

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Introduction

Facial appearance has paramount importance on person's psychology and self-esteem. It is once first impression which is usually a lasting impression. Any deviation from normalcy will develop a complex in that person. Facial resurfacing is a facial rejuvenation procedure that uses a laser to improve the skin's appearance or treat minor facial flaws. Skin graft is a portion of skin removed from one area of the body and transplanted to another area through surgical procedure. Skin graft is performed when patients lose their skin due to various illness, injuries, burns, etc.¹

Using skin grafts, key parts of the wound are covered significantly faster with keratinocytes, allowing for wound closure and resistance to infection and blood loss.² Full-thickness skin grafts (FTSG) are ideal for exposed areas of the face that cannot be closed by local flaps.

Full-thickness skin grafts are superior to split thickness skin grafts in having more of the characteristics of donor skin; Full thickness grafts also undergo less contraction while healing.³

Factors such as skin thickness, color, and texture, the pattern of sun exposure, and adnexal quality should be considered when selecting the appropriate donor site. Considering these factors, preauricular, posterior auricular, supraclavicular, conchal bowl, nasolabial fold, and upper eyelid skin areas have been mainly used as donor sites for facial FTSG.^{4,5,6} Present study was aimed to study functional status restoration in the resurfaced unit after full thickness skin grafts for facial resurfacing.

Material And Methods

This was a retrospective study conducted on 15 patients with disfigurement on their face that had undergone reconstruction surgery in the Department of Plastic Surgery, Government Medical College & Hospital, Chhatrapati Sambhajinagar, India.

Case records of patients underwent full thickness skin grafts for facial resurfacing at our hospital were analysed. Cases with chemical burns of the eyelids and those who had undergone some surgical intervention for their post-burn contractures at other hospitals were excluded. Study protocol was approved by the institutional ethics committee and written informed consent was obtained from all patients.

Details such as thorough history, socio-demographic profile, type of burn injury, physical examination findings, laboratory investigations & final diagnosis were noted. Structured case record form was used to collect patient's data like socio-demographic profile, disfigurement on their face, area involved, etiology, further treatment if any required.

All patients underwent surgery under general anaesthesia or local anaesthesia, for full thickness skin grafts for facial resurfacing. Results at 6 months follow up for total 23 sites were collected for Colour Match (G-Good, F-Fair & P-Poor), Texture Match (G-Good, F-Fair & P-Poor), Junctional Area (PA-Hyperpigmentation, P.-Hypopigmentation, HYT-Hypertrophy & S – Stretching). Separate entries were made for Surgeon's evaluation & Patient's evaluation. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

Results

In present study, 14 cases underwent facial resurfacing at our hospital were studied. Majority cases were from less than 30 years age group (66.67 %) & female (86.67 %). Common etiology was burns scar (46.67 %), congenital pigmented nevus (20 %), basal cell carcinoma (13.33 %), xeroderma pigmentosa with multiple basal cell carcinoma (6.67 %), post traumatic (6.67 %) & post infective (6.67 %).

Table 1: General characteristics

| | No. of patients | Percentage |
|-----------------------|-----------------|------------|
| Age groups (in years) | | |
| <20 | 4 | 26.67 % |
| 20-29 | 6 | 40 % |
| 30-39 | 2 | 13.33 % |
| 40-49 | 2 | 13.33 % |
| 50-59 | 1 | 6.67 % |
| Gender | | |
| Male | 2 | 13.33 % |
| Female | 13 | 86.67 % |

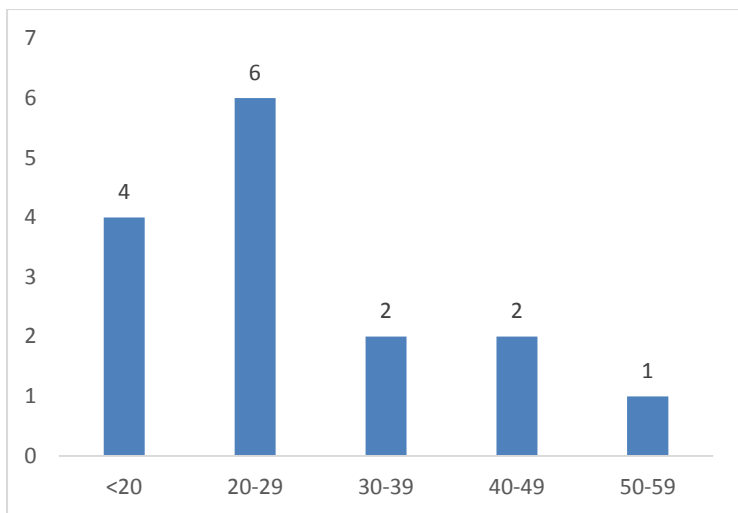


Chart 1: Age-group distribution of patients

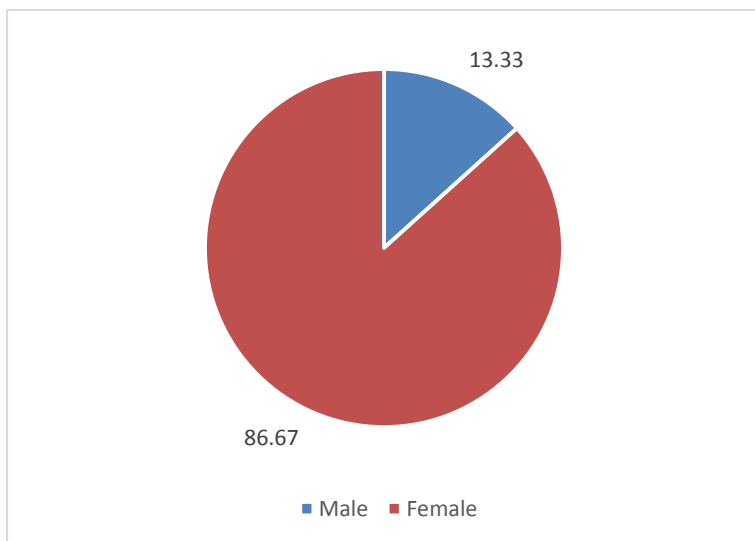


Chart 2: Gender wise distribution of patients

Table 2:Defect etiology

| | | |
|---|---|---------|
| Burns scar | 7 | 46.67 % |
| Congenital pigmented nevus | 3 | 20 % |
| Basal cell carcinoma | 2 | 13.33 % |
| Xeroderma pigmentosa with multiple basal cell carcinoma | 1 | 6.67 % |
| Post traumatic | 1 | 6.67 % |
| Post infective | 1 | 6.67 % |

In present study, majority cases underwent resurfacing for forehead/chin/cheek/eyelid aesthetic unit area grafting. Common donor site area was from groin, postauricular & thigh region. Total grafts were done at 23 sites.

Table 3: Area grafted

| | Area grafted | Percentage of area of unit | Donor site |
|----|--|----------------------------|--|
| 1 | Forehead aesthetic Unit | 100 % | Thigh |
| | Right Cheek | 70 % | |
| | Nose | 100 % | |
| 2 | Left forehead, | 10 % | Postauricular |
| | Temporal & upper eyelid | 100 % | |
| 3 | Forehead aesthetic unit | 100 % | Bilateral groin |
| | Chin aesthetic unit | 100 % | |
| 4 | Left 1/2 lower eyelid, temporal & infra-orbital region | 80 % | Medical arm superficial temporal fascia & palatal mucosa |
| 5 | Left infraorbital | 2 % | Bilateral Postauricular |
| | Preauricular | 2 % | |
| | Right cheek | 2 % | |
| 6 | Chin aesthetic unit | 100 % | Groin |
| 7 | Chin aesthetic unit | 100 % | Groin |
| 8 | Left Temporal | 100 % | Postauricular |
| 9 | Right upper eyelid | 100 % | Groin |
| 10 | Dorsum of nose | 100 % | Postauricular |
| 11 | Right cheek aesthetic unit | 100 % | Groin |
| | Dorsum of nose | 90 % | |
| 12 | Right cheek aesthetic unit | 100 % | Groin |
| 13 | Left cheek aesthetic unit | 60 % | Groin |
| 14 | Bilateral lower eyelid | 100 % | Bilateral Postauricular |
| 15 | Chin aesthetic unit | 100 % | Groin |



Figure 1

Complications noted among recipients were CPN remnant at the forehead (4.35 %), Lower lid ectropion (4.35 %) & 1 x 0.5 cm marginal graft loss (4.35 %). While in donors were right groin stretching (4.35 %) & stretching (4.35 %)

Table 3: Complications

| Complication | No. of patients | Percentage |
|--------------------------------|-----------------|------------|
| Recipient | | |
| CPN remnant at the forehead | 1 | 4.35 % |
| Lower lid ectropion | 1 | 4.35 % |
| 1 x 0.5 cm marginal graft loss | 1 | 4.35 % |
| Donor | | |
| Right Groin Stretching | 1 | 4.35 % |
| Stretching | 1 | 4.35 % |

Results at 6 months follow up, were evaluated by surgeons. As per surgeon's evaluation, colour match was good (43.48 %) & fair (39.13 %) in majority of cases, texture match was good (60.87 %) & Fair (30.43 %) in majority of cases. At junctional area, hypopigmentation (60.87 %) & stretching (17.39 %) was noted in majority of cases.

Table 4: Surgeon's evaluation at 6 months follow up (23 sites)

| Results | No. of patients | Percentage |
|-------------------|-----------------|------------|
| Colour Match | | |
| Good | 10 | 43.48 % |
| Fair | 9 | 39.13 % |
| Poor | 4 | 17.39 % |
| Texture Match | | |
| Good | 14 | 60.87 % |
| Fair | 7 | 30.43 % |
| Poor | 2 | 8.7 % |
| Junctional Area | | |
| Hyperpigmentation | 3 | 13.04 % |
| Hypopigmentation | 14 | 60.87 % |
| Hypertrophy | 2 | 8.7 % |
| Stretching | 4 | 17.39 % |

Results at 6 months follow up, were evaluated by patient themselves. As per patient's evaluation, colour match was good (52.17 %) & fair (39.13 %) in majority of cases., texture match was good (52.17 %) & fair (39.13 %) majority of cases. At junctional area, hypopigmentation (60.87 %) & stretching (17.39 %) was noted in majority of cases.

Table 5: Patient's Evaluation at 6 month follow up

| Results | No. of patients | Percentage |
|---------------|-----------------|------------|
| Colour Match | | |
| Good | 12 | 52.17 % |
| Fair | 9 | 39.13 % |
| Poor | 2 | 8.7 % |
| Texture Match | | |
| Good | 12 | 52.17 % |
| Fair | 9 | 39.13 % |
| Poor | 2 | 8.7 % |

| | | |
|-------------------|----|---------|
| Junctional Area | | |
| Hyperpigmentation | 3 | 13.04 % |
| Hypopigmentation | 14 | 60.87 % |
| Hypertrophy | 2 | 8.7 % |
| Stretching | 4 | 17.39 % |

Discussion

In present study, cases operated with full thickness skin graft for Facial defects of various etiologies, the resurfacing of the defect with a full thickness skin graft approximates more closely to normal skin in colour, texture and resilience. The method is relatively simple, reliable and safe needing minimal post-operative care and with minimal or no complications and sequelae.

The principles of reconstruction of parts of the body deformed as a result of trauma, burns or congenital disease are the same, but the demands made on the plastic surgeon when resurfacing the face and neck, are much exacting because a good result depends on many factors, i.e. restoration of function, skin quality, good colour, and texture match of the reconstructed part with the rest of the face, aesthetic units of the face, long term results and durability of the skin cover provided, patients compliance and dedication and post operative care.

Traditionally skin grafting techniques are divided into full thickness skin grafts and split thickness skin grafts. Full thickness skin grafts which consist of grafts containing the epidermis and the entire dermis. Split thickness skin grafts which consist of grafts containing the epidermis and part of the dermis. Full thickness skin grafting is commonly used when cosmesis is an important consideration, to prevent wound contraction in areas such as on the face.^{7,8}

In the treatment of large skin defects not amenable to secondary healing, primary closure, or local tissue rearrangement, split and full-thickness autologous skin grafts remain the gold standard of care.⁹ It is an accepted fact that adjacent skin gives the best colour and texture match. However, when facial disfigurement, whether due to burns, trauma or malignancy involves a large area of the face, the adjacent skin is usually not sufficient for resurfacing the defect.

Different modalities of treatment have been used in the management of such burn's scars and contractures like excision and reconstruction, skin grafting split thickness or full thickness etc. Controversy still exists regarding which method of reconstruction should be used and how long they should be continued.^{10,11}

In study by Allam AM et al.,¹² full-thickness skin graft for facial resurfacing after post-burn sequelae excision was used in 12 young patients. Females made up the majority of the patients (75%) and the ages ranged between 8 and 18 yr. The operating time was 3-3.5 hours, in two sessions. Post-operatively, we recorded partial graft necrosis in two cases (16.7%) and infection in one (8.3%), and some minor donor-site related complications were reported, such as hematoma in one patient (8.3%), wound infection in one patient (8.3%), and wide scarring in two patients (16.7%). At follow-up, eight of the patients (66.7%) were satisfied with their new facial look as the mask effect of facial scarring had been overcome. With monoblock expanded full-thickness graft we were able to resurface the face in nine cases (75%). A second complementary procedure to reconstruct the eyebrows or reshape the nose was required in two cases (16.7%).

The long-term results have shown that flaps perform better than full-thickness skin grafts in providing a safe and effective method to resurface post-burn scar contractures in the face with better aesthetic results. However, most problematic late outcomes that Philip et al.¹³

identified after facial burns included gaps between grafts and hairline, eyelid ectropion, nose asymmetry, and marked hypertrophic scarring around the lip.

With ablative and nonablative laser resurfacing rising in popularity and becoming more accessible, surgeons have considered whether it is appropriate to use this augmenting technique pre, post, or perioperatively to achieve the greatest benefit with the highest safety profile. Although such nonsurgical therapies offer a multitude of benefits for patients, there are limits to their application, and ultimately some patients will require facial plastic surgery to achieve their goals.^{14,15}

Conclusion

In this study overall colour and texture match is good. Which is probably due to inclusion of full dermis with the graft. It is still desirable to have longer follow up for the junctional areas which are expected to improve only with time. Junctional areas may stay problematic warranting secondary procedures unless they are placed in shadow lines.

Conflict of Interest: None to declare

Source of funding: Nil

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