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Research Article

Study to evaluate outcome of autologous fat grafting for facial scar and deformities

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Abstract

Background: Facial scars and deformities pose significant aesthetic and psychosocial challenges, often inadequately addressed by conventional modalities. Autologous fat grafting (AFG) has emerged as a minimally invasive technique offering both volumetric correction and regenerative benefits due to the presence of adipose-derived stem cells.

Objective: To evaluate the clinical outcomes, patient satisfaction, and postoperative morbidity following autologous fat grafting in patients with facial scars and deformities.

Methods: A prospective observational study was conducted involving 16 patients who underwent AFG for facial contour deformities and scarring over an 18-month period. Fat was harvested using manual liposuction, processed via Telfa gauze filtration, and injected after subcision of scar tissue with V dissector. Results were documented 12 months postoperatively with a postoperative questionnaire and photographs.

Results: Patients resumed to normal social activities within a short period, typically between 4 and 15 days, with an average duration of approximately 8.56 days. No major complications occurredin relation to the procedure at donor and recipient sites and only 3 patients (18.75%) required minor revision. Patients expressed satisfaction with mean scores reaching 7.64 (SD - 2.97) on a 0–10 scale.

Conclusion: Autologous fat grafting is a safe and effective technique for the correction of facial scars and deformities, providing favourable aesthetic results, minimal donor-site morbidity, and moderate patient satisfaction. Its regenerative potential further supports its role in facial soft tissue restoration.

Keywords: Autologous fat grafting, facial deformity, scar correction, adipose-derived stem cells, aesthetic reconstruction.

Introduction: Facial scars and deformities resulting from trauma, surgery, burns, or congenital anomalies—often impose significant psychosocial burdens and functional limitations.[1] Conventional treatment such as dermal fillers, laser therapies, and surgical revisions, though commonly utilized, frequently fall short in fully addressing both the aesthetic and structural challenges posed by volumetric tissue loss and compromised skin quality.[2]

In recent years, autologous fat grafting (AFG) has emerged as a promising, biocompatible, and minimally invasive technique. Beyond restoring contour and volume, AFG has demonstrated potential in improving skin texture, elasticity, and overall dermal quality.[3,4.] Initially described more than a century ago,[5] AFG has undergone significant refinement in harvesting, processing, and injection protocols. Parallel advances in our understanding of adipose-derived stem cells (ADSCs) have further underscored its regenerative capabilities.[6,7.] These cells contribute to neovascularization, collagen synthesis, and tissue remodelling features that endow AFG with both mechanical and biological advantages.[8]

This dual functionality positions AFG as a potentially superior modality for the management of facial scars and deformities, especially those unresponsive to conventional therapies.[9] However, despite encouraging clinical and anecdotal outcomes, the literature remains fragmented. Variability in technique, graft retention rates, and outcome assessment metrics hampers the ability to establish standardized protocols and draw definitive conclusions regarding efficacy and long-term results.[10]

Materials and methods: A prospective observational Study done in Department of Plastic and Reconstructive surgery Guwahati Assam after taking the ethical committee clearance, include patient meeting inclusion criteria (Table-1). Procedure performed under tumescent local anaesthesia (500ml Ringer lactate, 25ml of 2% Lidocaine and 0.5mg Epinephrine) in all patients. A 5-mm incision was made within the inferior border of the umbilicus or within the buttock crease to provide access to the donor-site fat. Fat was collected manually by 3mm cannula connected into a 10-ml luer lock syringe. The aspirate was poured from syringe onto large (3 × 8 inch) pieces of Telfa non adherent dressing. The fat was gently rolled and kneaded along the gauze using a sterile scalpel handle for 5 minutes. The fat was then loaded by small spatula into 10-ml syringe and transferred by luer lock adapter into 1-ml syringes for injection. The graft was injected to desired site after breaking scar adhesions with subcision needle and a slight overcorrection is obtained because of the injected volume of the local anaesthetic. The operative incision site was closed with one or two 5-0 non absorbable sutures. Patient follow up done at 2 weeks, 3 months, 12 months and 18 months. A questionnaire was asked to patients whose procedure had taken place at least 1 year previously, asking them to rate their satisfaction levels on a scale from 0 to 10 (10 - highly satisfied). They were also asked to rate on a scale from 0 to 10 the degree of bruising in the grafted area (10 - significant bruising), amount of discomfort in the grafted area and donor site (10 - significant discomfort), donor-site incision visibility (10 - very noticeable), and visibility of a skin contour depression at the donor site (10 - very depressed). The results are measured in terms of mean and standard deviation. photography has been taken for comparison (fig 1).

Table-1

Inclusion criteria	Exclusion criteria
• Any etiologic factor (burn, postsurgical, traumatic). • Any scar >6 months. • Age 18–65 years. • Negative pregnancy test.	• Active psychiatric illness (excluding depression without suicidal ideation). • Diagnosis of cancer <5 years (excluding basal and squamous cell carcinoma). • Diagnosis of bleeding diathesis and/or INR >2.2. • Differential site treatment (eg, steroid injections, pressure garment, or silicone sheeting).

Results: A total of 16 patients have undergone autologous fat grafting for facial scar and deformities over a period of 18 months minimum duration of follow up 12 months (Average – 13.5 months). The facial regions in this study include the malar area, buccal area, forehead, nasolabial folds, and mental area. There has been no procedure related complications at the fat harvest sites or recipient graft regions. Only three patients (18.5 percent) have required a minor revision of the grafted site.

The postoperative outcomes demonstrated favourable results (Table 2). On average, patient swelling and bruise was present for approximately 8.56 days (SD -3.54) with a range from 4 to 15 days. The bruising and discomfort at recipient site with mean 2.94 (SD - 2.17) and 2.12 (SD - 1.15) respectively. Patient satisfaction was relatively high, with a mean score of 3.50 (SD - 2.25) out of 10, suggesting a moderately positive experience overall. Localized discomfort at the site of intervention was minimal (mean - 0.81, SD - 1.60). Noticeable incisions and skin contour depressions were negligible by patients with mean 0.12 (SD - 0.34), reflecting infrequent incidence. These findings suggest that the procedure yields manageable postoperative symptoms with a low rate of visible or long-term complications.

Table: 2

Variables	Mean	Standard Deviation	Range
Visible swelling/ bruising (days)	8.56	3.54	4 – 15
Bruising	2.94	2.17	1 – 10
Discomfort	2.12	1.15	1 – 5
Patient satisfaction	3.50	2.25	1 – 10
Local discomfort	0.81	1.60	0 – 6
Noticeable incision	0.12	0.34	0 – 1
Skin contour depression	0.12	0.34	0 – 1

Figure 1. A-frontal view. B-lateral view Preoperative picture of patient with left infra orbital depressed scar following chronic Dacryocystitis. C and D are postoperative follow up 6 months following procedure.
E is the preoperative post traumatic right cheek scar, F on 8 month of following autologous fat grafting.
G and H are preoperative picture of right cheek depressed scar following trauma. I is the post operative picture following 9 months of autologous fat grafting.

Discussion: Autologous fat grafting (AFG) has become a widely adopted method in facial reconstructive and aesthetic procedures due to its ability to restore soft tissue volume while offering regenerative properties. In our prospective study, AFG showed promising results in patients with facial scars and deformities, demonstrating low rates of complications and moderate levels of patient satisfaction.

The average duration of postoperative swelling was 8.56 ± 3.54 days, which aligns with data from other studies indicating that facial swelling usually subsides within one to two weeks, depending on graft size and location.[3,11.] Bruising was generally mild to moderate, with a mean score of 2.94 ± 2.17. This is consistent with the higher tendency for bruising in vascular regions like the periorbital and malar areas.[12]

Pain and discomfort were minimal at both donor and recipient sites. The recipient area reported a mean discomfort score of 2.12 ± 1.15, while the donor area averaged 0.81 ± 1.60. These outcomes reinforce the minimally invasive nature of the technique and reflect other reports that describe the procedure as being well tolerated without requiring strong analgesics.[13,14.]

The average patient satisfaction score was 3.5 ± 2.25 out of 10. Although this score may appear modest, it likely reflects the variability in patient expectations and the complexity of cases treated. Studies have shown that satisfaction often improves with multiple sessions and over longer follow-up periods, especially as skin quality and scar pliability gradually improve.[15,16.]

Very few patients noted any visible scars or contour irregularities at the donor site, with both parameters averaging 0.12 ± 0.34. These outcomes suggest that careful technique in fat harvesting and placement can reduce aesthetic complications. Previous evidence supports this by emphasizing the importance of gentle handling and precise injection to preserve graft viability and minimize surface deformities.[17,18.]

Only 3 out of 16 patients (18.75%) required a minor revision, which is comparatively low when seen against other studies that report touch-up rates as high as 30%.[19] The use of slight overcorrection during the initial procedure may have contributed to a more durable outcome by accounting for the early phase of fat resorption.

Apart from volume enhancement, the regenerative capabilities of fat grafts are attributed to adipose-derived stem cells (ADSCs). These multipotent cells are known to enhance tissue vascularization, stimulate collagen production, and improve dermal architecture—benefits particularly useful in previously scarred or irradiated tissues with poor vascularity.[20-22.]

While our findings are encouraging, limitations such as the small sample size and absence of objective imaging or quantitative volume assessment must be acknowledged. Nonetheless, the study supports AFG as a safe, autologous, and cost-effective method for addressing soft tissue deficits and improving facial contour in patients with scars or deformities.

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