



FACIAL FAT GRAFTING- OUR EXPERIENCE AT A TERTIARY CARE CENTRE IN INDIAN SCENARIO

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ABSTRACT **INTRODUCTION:** Facial scars cause aesthetic impairment and functional limitation for the patient. Till date there is no gold standard treatment for facial scar tissue. Autologous fat grafting has shown promising results for depressed scar tissue and soft tissue volume deficiency seen in certain congenital syndromes.

METHODS AND MATERIAL: 14 patients (11 female and 3 male) with depressed scars and syndromic facial volume deficiencies were treated with autologous fat grafting. A visual 4-grade scale was used for the evaluation of the results.

RESULTS: All patients showed improvement. 12 patients required single operation whereas 2 patients required another operation. The patients were followed up till 18 months.

CONCLUSION : Autologous fat grafting is a great method to address the problems of volume deficiency and depressed scars on the face. Its use as a natural soft tissue filler are long lasting.

KEYWORDS : Fat Grafting, Depressed Scar, Fat Injection

INTRODUCTION

Having a scar is an unpleasant experience because it reminds the person of the initial insult to the body every time they see it. A spot over the face is even worse, as it cannot be hidden. Patients with facial scars form a significant portion of patients visiting a plastic surgeon.

Depressed facial scars and specific craniofacial syndromes like Parry-Romberg Syndrome hemifacial microsomia are associated with loss of volume of the affected side. Alloplastic implants and injectable fillers have tried to fill up for volume depletion, but they have disadvantages. Fat grafting has evolved as one of the most commonly done procedures for such conditions. It is also known as lipofilling. Since it is derived from the individual's body, it is just reallocating one's body fat from excess to a deficient site.

Fat grafting has become one of the most popular tools in the armamentarium of plastic surgeons to correct the congenital or acquired contour deformities of the face.¹

The importance of volume augmentation to the face and its results has been well described in the literature. Fat grafting is now being used for both cosmetic and reconstructive surgical procedures.

This study presents our experience using autologous fat grafting and evaluates the outcomes of using fat grafting in patients with a facial deformity.

METHODS AND MATERIALS:

The study included 14 patients who presented to us with complaints of facial deformities caused by depressed scars and specific craniofacial syndromes which cause facial volume loss.

Patients with hypertrophic scars and immature scars were excluded from the study.

TECHNIQUE:

The fat was generally harvested from the abdomen and the patient's thighs, depending on the patient's fat deposit and preference.

A tumescent solution consisting of 500 mL of Ringer's lactate, 15 mL of 2% lidocaine, and 0.5 mL of 1:200,000 adrenaline was infiltrated in the donor areas in a 1:1 ratio. The fat was harvested using a blunt-tipped Coleman's cannula size ranging from 2 to 3 mm. The cannula was connected to a 20 mL Luer-lock syringe, thus creating a slight negative pressure. With gentle to-and-fro motion, the fat was harvested under low pressure.

The aspirated fat in each 10-mL syringe was then subjected to centrifugation at 3,000 rpm for 3 minutes.

The target sites were marked before the procedure and then infiltrated with adrenaline, which caused vasoconstriction at the recipient area,

causing decreased bleeding and hematoma formation. Stab incisions were placed using a number 11 surgical blade to introduce the cannula. Fat was injected using blunt tip 18 or 17 gauge Coleman cannula.

The stab incisions were sutured with interrupted nylon 6-0 sutures. Postoperatively, small strips of adhesive tapes (Dynaplast 3M) dressing are applied over the fat-grafted areas to reduce pain and swelling.

14 patients who presented with depressed scars and volume loss due to congenital syndromes (11 women and 3 men), the mean age of being 30 years, were part of this study (Table 1). The clinical profile of the patients included Parry-Romberg syndrome (n = 7), post-traumatic scar (n = 6), and Hemifacial Microsomia (n=1). All patients received treatment by fat grafting in their scars using the Coleman technique.

Donor sites were the abdomen in 11 patients and thighs in the remaining 3.

To evaluate the results, we used a visual 4-grade scale, which is given below:

Score 1: poor
Score 2: acceptable
Score 3: good
Score 4: outstanding

Two specialists assessed the result; in case of any discrepancy between the two specialists, the lower score was recorded.

General anaesthesia was used in 8 patients; and intravenous sedation plus local anaesthesia was used in the remaining six patients.

(Table 1)

Cas e	Sex	Age (yrs)	Etiology	Donor Area	Anaesthesia	Sess ions	Score
1	Female	24	Parry-Romberg Syndrome	Abdomen	General	1	4
2	Female	20	Hemifacial Microsomia	Abdomen	General	1	4
3	Male	23	Post Traumatic Scar	Thigh	Local + Sedation	2	3
4	Female	45	Post Traumatic Scar	Abdomen	Local + Sedation	1	4
5	Female	48	Parry-Romberg Syndrome	Thigh	General	1	3
6	Female	33	Post Traumatic Scar	Abdomen	Local + Sedation	1	3
7	Female	29	Parry-Romberg Syndrome	Abdomen	General	1	3

8	Male	25	Post Traumatic Scar	Abdomen	Local + Sedation	1	4
9	Female	42	Post Traumatic Scar	Abdomen	Local + Sedation	1	4
10	Female	22	Parry-Romberg Syndrome	Abdomen	General	2	4
11	Female	36	Parry-Romberg Syndrome	Abdomen	General	1	4
12	Female	22	Parry-Romberg Syndrome	Abdomen	General	1	3
13	Female	30	Parry-Romberg Syndrome	Abdomen	Local + Sedation	1	3
14	Male	20	Post Traumatic Scar	Thigh	General	1	4

RESULTS

We found an improvement in all the patients. (Figure 1-4)

Eight cases obtained a score of 4, and 6 points a score of 3.

The patients were followed upto 18 months. 12 patients required only one surgery, and two patients needed two surgeries. There were no complications in any of the cases.



Figure 1: Case of Parry Romberg syndrome (a) Preoperative picture (b) Postoperative picture



Figure 2: Case of Facial Post Traumatic Scar (a) Preoperative picture (b) Immediate Postoperative picture (c) Late Follow up at 18 months



Figure 3: Case of Hemi Facial microsomia (a) Preoperative picture (b) Immediate Postoperative picture (c) Late Follow up at 15 months



Figure 4: Case of Post Traumatic Scar Nose (a) Preoperative Picture (b) Lateral Postoperative Picture with derma-abrasion of the nasal dorsum (c) Frontal Postoperative Picture with derma-abrasion of the nasal dorsum (d) Lateral late Postoperative Picture

DISCUSSION:

The face is one of the essential structures of the human body. Any trauma to the front and its consequences have a long-lasting effect on the individual, either psychological or mental stress. In a country like India, which is still a conservative society, facial scars lead to decreased social interactions as the affected person is not comfortable going out and meeting people. This also leads to reduced self-esteem. Most of the patients that presented to us were females and were looking for marriage prospects. People with these complaints have a greater tendency to get into subclinical or clinical depression.

The management of facial scars has always been a challenging problem. As plastic surgeons, we must be well versed with all the treatment options we can provide to such patients when they present to us seeking help.

The fat grafting technique has evolved a lot since it was first introduced in 1893 by the German surgeon Gustav Neuber. In the succeeding years, various stalwarts in the field of plastic surgery, like Hollander (1912), Neuhof (1923), Josef (1931) and S.R. Coleman (1994), have given their contribution, which has further refined the procedure. Fat grafting has now become one of the essential tools in the armamentarium of a facial plastic surgeon.

Autologous fat grafts have diverse applications. When used as a filling material, adipose tissue has many of the advantages that an ideal material may have because it is bio-compatible, versatile, stable, not immunogenic, long-lasting, not migratory, not carcinogenic, and not teratogenic; it replaces lost tissue correctly with very natural results, and its harvest has a low cost and low morbidity for the patient.

The use of autologous fat grafting in the face has shown promising results. Since it is from the person's own body, it is a very cheap alternative to the commercially available fillers.

Techniques to harvest, process, and deliver adipose tissue vary greatly. Although liposuction may take less time, it was generally thought that syringe aspiration produced minor trauma to the fatty tissue and improved cell survival⁵; more recently, however, investigators have discovered that low-pressure controlled liposuction units can remove large volumes of fatty tissue with the delicacy of a handheld syringe. Whether low- or high-volume aspiration is performed with handheld or automated harvest equipment, the principle remains the same: extract fat from the patient with the least amount of cellular trauma.

The role of Centrifugation of the aspirated fat is paramount. Centrifugation is done at 3,000 rpm for 3 minutes. Values more than 3,000 rpm should be avoided as they can cause cell damage⁶.

Centrifugation separates the viable and nonviable contents; the lowermost layer was the tumescent fluid and serum. The middle layer was the pure fat-containing adipocytes, and the top layer was formed by oil and nonviable cells. The bottom layer was usually drained by uncapping the syringes gently, and the top layer is decanted/soaked by gel foam.

The cannula used to inject fat in the recipient area is blunt-tipped, so it

tends to follow the natural planes and does not cut into new planes. To prevent the clumping of deposited at one place, the fat was injected only after the cannula had been fully inserted. The fat was placed in multiple planes starting from deeper to a superficial plane.

During the fat grafting injection, it is vital to release the adhesions of the scar in all its planes, so we break the hard, fibrous tissue with the cannula, intra operatively. At the beginning of the infiltration, the spot offers a critical resistance to pass the cannula, but when the procedure progresses, the fibrosis relaxes, and the fat injection becomes easier.

Lipofilling has numerous advantages and few disadvantages in treating the scars of the face.^{7,8,9,10,11} The use of autologous fat grafting helps the skin become softer, more flexible, and extensible, and the colour seems similar to the surrounding undamaged skin. It improves the mobility of the body district treated, in particular joints, eyelids, nasal valve, and mouth. Lipofilling can also restore volume deficits. From a histologic point of view, autologous fat graft has shown the ability to regenerate the dermis and subcutaneous tissue (angiogenesis and new collagen deposition).

All cases in our study presented favourable results, with scores 3 (good outcome) or 4 (outstanding result) according to our evaluation score. Eight patients obtained a score of 4, and 6 cases a score of 3.

The key to successful structural fat grafting to the face is understanding how to place fat in different levels and use the graded densities in fat to accomplish maximal predictability. The placement of similar densities of fat into bilateral areas helps avoid potential uneven fullness or changes in the overlying skin.

In the face, the use of smaller-bore cannulas for placement gives surgeons greater control, which allows them to be more precise. The cannulas used in the perioral, periorbital, and nasal areas are 17 gauge or smaller in diameter.

A single session can often be enough, but a complete correction cannot always be achieved. In these cases, the objective of the first session is to release the fibrosis and increase the subcutaneous fat volume to have more graftable tissue for the second session.

We do not consider that any donor area is better. Although some studies suggest the trunk as a better donor area to obtain a significant quantity of adipocyte precursor cells¹², in our experience in fat grafting injection in different body places, we have not found any difference in the results, despite having harvested the graft from different body zones. It is noteworthy that Rohrich et al. have also studied the differences in the adipocyte viability depending on the donor area, concluding that there are no significant differences in adipocyte viability among abdomen, thighs, flanks, or knees.¹³

Some of the most remarkable results of fat grafting have been realized in treating patients with hemifacial atrophy.¹⁴ This condition is associated explicitly with the localized loss of fat to the face and requires significant soft tissue restoration. Previous reconstructive attempts have included vascularized free flaps, dermal fat grafts, and the use of alloplastic materials. These procedures are associated with significant short- and long-term morbidity. Our study found that cosmetic results with fat grafting were instant and gratifying to the patient.

Fat grafting improves the texture, appearance, and compliance of burned skin by changing the collagen content and enhancing vascularity.¹⁵ Surprisingly, the improvement in skin quality affects the treated area and the penumbra of surrounding tissue. In the case of acne-related scars, fat injection improves the contour from scar depression.¹⁶

CONCLUSION:

Fat grafting has had a significant impact on our cosmetic and reconstructive practice. Despite variable results, facial fat grafting is well accepted by most patients and has low morbidity. Recent improvements in harvesting, purifying, and injecting autologous fat have made the process of facial fat grafting significantly more reliable. When utilized in the appropriate areas, facial fat grafting can provide a long-lasting and aesthetically superior replacement for the soft tissues lost through ageing or disease. In conclusion, we believe that volume restoration plays a critical component in depressed facial scar

management, and advances in the area of fat transplantation will lead to significant improvements in our aesthetic results.

DECLARATIONS:

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Ethical approval: The study conducted was in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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