



# Restoring facial superficial muscular aponeurotic system defects after permanent fillers removal using fascial and SMAS grafts: a preliminary study

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## Abstract

**Background** Dermal fillers provide an appealing option for facial rejuvenation, but inappropriate filler selection and injection techniques can cause complications requiring surgical correction. This study examined the intraoperative superficial muscular aponeurotic system (SMAS) and tissue abnormalities encountered during facelift after permanent filler removal.

**Methods** This preliminary prospective case series describes reconstructive techniques used in 10 women with SMAS defects following facelift with permanent filler extraction. Defects were repaired using temporalis fascia, and mastoid fascia, or combined platysma-SMAS grafts. Pre- and postoperative photographs were evaluated by two independent surgeons for midface volume analysis.

**Results** Preoperative complaints included facial contour asymmetry (100%), nodules/irregularities (70%), and disfiguring edema (35%). The mean follow-up was 6 months postoperatively. No lipofilling was required in this period. Patient satisfaction at 6 months was: extremely satisfied (70%), very satisfied (20%), satisfied (10%). Facial symmetry was rated as no asymmetry (80%), moderate asymmetry (10%), and mild asymmetry (10%). Standardized photo review found that 80% of surgeons were satisfied with pre- vs. 6-month postoperative results.

**Conclusions** This study shows promising aesthetic outcomes and high patient satisfaction at 6 months after simultaneous facelift and permanent filler removal with volume defect correction using various local tissue grafts. Larger studies with longer follow-ups are warranted to further assess these reconstructive techniques for significant SMAS defects resulting from improper permanent filler placement.

**Level of Evidence:** Level IV, therapeutic study

**Keywords** Dermal filler · Facelift · Mid-face augmentation · Rhytidectomy · Platysma plication · Permanent filler

## Introduction

Achieving a youthful facial appearance is in high demand nowadays as life expectancy rises. Advances in understanding skin aging aim to improve well-being [1, 2]. Facial rejuvenation using dermal fillers to restore proportions is

a popular esthetic treatment. However, proper anatomical knowledge, filler properties, and injection techniques are crucial for optimal, safe outcomes [3]. Injectable fillers are an increasingly favored alternative to incisional procedures for wrinkles, preferred by those unwilling/unable to undergo surgery. Benefits include affordable cost, accessibility, and long-lasting improvements with minimal recovery time [4–6]. Extensive research has examined filler composition, longevity, and risks [7–10].

Currently, non-permanent hyaluronic acid fillers are commonly used for safe, temporary volumization [11, 12]. However, complications from permanent filler injection by non-physicians are rising, including cosmetologists, nurses, physicians' assistants, nurse practitioners, sales representatives, technicians, salon owners, and estheticians

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[13]. Although off-label use is legal, permanent fillers have caused adverse outcomes appearing immediately or years later. These include non-resolving nodules, contour irregularities, and discoloration [14–16].

The facelift is an established procedure to correct age-related laxity with proven safety and efficacy [17]. Yet minimal literature exists on facelift after permanent filler removal [18–21]. Thus, this study evaluated facelifts for restoring deformities following permanent filler injection and removal.

## Patients and methods

This was a preliminary prospective case series examining reconstructive techniques in 10 women who developed superficial musculoaponeurotic system (SMAS) defects during facelift procedures after permanent filler injections were removed. All patients provided written informed consent patients, the duration of study was between October 2020 and December 2022. The study was approved by the Mansoura University Institutional Review Board (R.23.05.2178).

The treatment included filler removal combined with a facelift and neck liposuction. Intraoperatively, a midface deficit was observed after filler extraction in all 10 patients. During preoperative consultations, the surgeons explained



**Fig. 1** Intraoperative picture of 25 cc of permanent filler extracted from the right side of the face

the inability to remove all the permanent fillers or guarantee satisfactory outcomes. They also explained to the patients that reconstructive procedures may be necessary to restore volume deficits after extraction. Patients exhibiting midface indentations from permanent filler removal requiring reconstructive volume restoration were included. Those undergoing facelifts for filler removal without resultant midface depressions were excluded. A comprehensive preoperative assessment involved standard photographs from frontal, basal, and oblique views along with MRI to determine filler volume, location, and depth pre-extraction (Video 1).

## Operative procedure

All procedures were performed under general anesthesia with the patient supine and head slightly elevated. After marking incisions, tissues were infiltrated with 100 mL of 0.9% saline, 20 mL of 2% lidocaine, 10 mL of 0.5% bupivacaine, and 1:1000000 adrenaline per side. Neck liposuction was first done through a small incision. The classic facelift incision was then made starting at the temporal hairline curving behind the ear into the retroauricular sulcus and inferiorly along the occipital hairline. To remove superficial fillers above the SMAS, a subcutaneous flap was undermined from the incision to the nasolabial fold using facelift scissors, Anderson claw bear 5-pronged retractor, and fiberoptic facelift retractor. In the postauricular area, a skin flap was elevated above the sternocleidomastoid fascia into the mid-neck. The SMAS was then incised laterally allowing sub-SMAS dissection towards the nasolabial fold.

Meticulous dissection under magnification with a nerve stimulator (STIMPOD NMS410) located filler cysts and bands which were then excised. This careful approach aimed to prevent facial nerve injury and expose deeper facial planes. In most patients, granulomatous cysts from permanent filler had infiltrated facial layers above and below the SMAS, anchored by fibrous bands to facial nerve branches while eroding native retaining ligaments with sub-clinical infection (Fig. 1). Following the extraction of fillers, the tissues underwent irrigation using betadine, diluted hydrogen peroxide (5%), and antibiotic-infused saline (500 mL of saline with 2 g of ceftriaxone). This procedure aimed to eliminate any debris or non-viable remnants, while also delivering localized antibiotic treatment to the tissue.

To allow for proper skin redraping and mobilization of the medial SMAS, the subcutaneous undermining was extended to fully release the mandibular, zygomatic, and masseteric retaining ligaments. Additionally, lateral subplatysmal dissection anterior to the sternocleidomastoid border was performed to identify and protect the marginal mandibular branch of the facial nerve and great auricular nerve. This meticulous layered dissection ensured

complete mobilization of the SMAS and overlying skin flaps while safeguarding the key nerves supplying facial animation and sensation. Once dissection was completed, the SMAS layer defect was assessed by direct visualization, and the skin was re-draped to assess external depressions. All depressions and defects were marked and evaluated (**Video 2**).

We addressed the aforementioned mid-face volume deficit (Fig. 2) with two options. First, the jowl area SMAS was spared from fillers in all our patients; upward plication of the SMAS was performed and fixed with PDS 2/0 to reduce the SMAS defect. Second, the tissue graft from either the mastoid fascia with its overlying fats (Fig. 3 and Video 3) or another alternative was the temporalis fascia (Fig. 4). The lower part of the SMAS was combined with a part of the platysma primarily as it was the least area affected by permanent fillers with more preserved anatomy than the mid-face. Available grafts were taken according to the defect site and secured in position by Monocryl 4/0 sutures, and the external appearance was then evaluated. If there was any residual volume deficit, additional grafts were added. Finally, the skin flaps were re-draped to be tension-free on the skin closure, and suction drains were placed in all patients. Facelift garments were placed after the surgery and for the first postoperative month.

### Postoperative care and follow-up

All the drains were removed on day 3 post-surgery while compressive garments were worn continuously for 2 weeks, then 12 h per day thereafter. Dressings were changed every other day. If fluid collection was noted, patients were instructed to sleep with head elevation for 2 weeks and take prophylactic antibiotics and anti-edematous medications for 10 days. Patients were seen every other day for 2 weeks, weekly for 1 month, then monthly. Followed by standardized postoperative photos were taken at 6 months and evaluated independently. Patients completed satisfaction questionnaires at follow-up visits. The key aspects of postoperative management included extended compression garment use, frequent dress changes, and medications to prevent complications like infection or fluid build-up. Close follow-up especially in the first month allowed prompt intervention for any issues. Patient satisfaction and photographic analysis at 6 months helped assess surgical outcomes. Pre-and postoperative photographs were analyzed by two independent surgeons to report asymmetry, a simplified form of asymmetry scores ranged from one to three (one none, two slight, and three obvious asymmetries) [21]. Patient satisfaction scores were also recorded from one to four from not satisfied, satisfied, very Satisfied, and extremely satisfied.



**Fig. 2** Intraoperative picture of a mid-face defect after removal of permanent filler extracted from the right side of the face



**Fig. 3** Harvesting of platysma mixed SMAS graft area (1) and mastoid graft area (2) to restore more volume

### Results

This case series included 10 patients undergoing face-lifts after permanent filler removal. The mean age was  $39.5 \pm 6.79$  years, and the mean BMI was  $26.84 \pm 6.05$  kg/m<sup>2</sup>. The main preoperative complaints were contour asymmetry (100% of patients), nodules/irregularities (70%), and





**Fig. 4** Inset and fixation of a temporal fascia graft to mid-face defect

disfiguring facial edema (35%). Although MRI was done for all patients, it was not possible to differentiate the filler types. Mean extracted filler volumes were  $12.11 \pm 12.44$  mL on the right and  $11.47 \pm 9.28$  mL on the left. The average operative time was  $310 \pm 25.06$  min (Table 1). Patients were followed for 6 months postoperatively. All were primary facelifts. One patient developed a hematoma requiring drainage and compression. Another had temporary buccal nerve weakness recovering by 3 months with physiotherapy. No additional fat transfer was needed initially. Patient satisfaction at 6 months was extremely satisfied (70%), very satisfied (20%), and satisfied (10%). Facial symmetry was rated as none (80%), moderate asymmetry (10%), and mild asymmetry (10%) (Table 2). Standardized photo review by independent surgeons found that 80% were satisfied with pre- versus 6-month postoperative results.

### Representative cases

**Case 1** A case of combined platysmal mixed SMAS and mastoid fascia to restore the mid-face defect after the removal of permanent fillers preoperatively in multiple views (anterior, lateral, and oblique (A, C, and E) and postoperatively (B, D, and F) (Fig. 5).

**Case 2** A case of temporalis facial graft to restore mid-face defect after the removal of permanent fillers preoperatively

in multiple views (anterior, left, right) (A, C, and E) and postoperatively (B, D, and F) (Fig. 6).

### Discussion

With the rise of nonsurgical facial rejuvenation, many patients now opt for minimally invasive procedures over surgery and desire quick outpatient treatments. In this study, patients had an average age of 40 years and received cheek injections almost more than 10 years prior. Injectables are often used prophylactically by younger individuals to prevent aging changes. Notably, permanent fillers were commonly administered in the Gulf region over the past decade. Patients now present with complaints of asymmetry, nodules, and numbness from ill-advised permanent filler use. The flawed properties and complications of permanent fillers are well-established [18, 19]. Patients suffering from myriad issues increasingly seek solutions, driving growth in corrective techniques [18–21]. Restoring facial contours is critical for those with irregularities and deformities. Options to replace midface volume include fat injection, buccal fat pad transfers, dermal grafts, midface lifts, and implants [22–25].

In this study, the key challenge was significant midface filler burden and residual volume loss after extraction. To address this unexpected intraoperative hollowness, a straightforward repair technique was devised. Previously, Alaslwi et al. addressed that the removal of permanent fillers requires adequate subcutaneous dissection to remove and perform SMAS plications to fill in the areas thinned by granuloma and filler removal [21].

In this study, we reviewed 10 patients who suffered from deep permanent fillers beyond the SMAS layer (Video 1). Those cases showed an obnoxious mid-face volume deficit after redraping the SMAS flap and skin flap during the final step of the facelift. Xie et al. used fat transfer as a complementary procedure [26]. None of our patients requested additional volume restoration using fat injection during the 6-month follow-up period, and none complained of any facial irregularities. We think that fat injection may not be suitable for such a large volume loss, as the extensive fibrosis, atrophic skin flaps, and SMAS scarring (stigmata) may not provide a healthy environment for successful fat cell survival.

The injections were performed in uncertified facilities rather than regulated medical cosmetic clinics. Patients stated that non-physician personnel in beauty centers administered unapproved, off-label fillers of unclear composition. Those patients were presented with asymmetry, laxity, and numbness. A facelift with filler removal was appropriate to

**Table 1** Patients' demographics

No.	Age	BMI	smoking	No. of permanent filler injection	Date of injections	site	Volume in cc of filler removed. RT, LT.	Drug allergy	Previous intervention	Previous inflammation	Associated comorbidity	Type of graft used Right Left	Operative time in min.	
1	37	21.5	No	once	2013	Mainly zygomatic, malar and tear trough	5.6 3.5	None	None	None	no	mastoid fascia	mastoid fascia	315
2	44	27.3	no	once	2013	Malar, zygomatic, tear trough, premassetric and rt side lateral check over the parotid	7.5 6	no	no	no	No	-	Superficial temporal fascia	350
3	34	31.6	Yes	once	2011	All facial spaces	25 19	NSAID	2015 under GA aspiration	2020 infected treated conservatively	Gastritis on omeprazole	SMAS graft	SMAS graft	285
4	38	17	No	once	2012	Tear trough, buccal and premassetric	15 14	None	Abscess drainage 2020 and 2021	Twice 2020 and 2021	no	SMAS graft and mastoid fascia	mastoid fascia	330
5	50	25.4	No	once	2008	Tear trough and buccal	4 3.2	no	no	no	No	Superficial temporal fascia	Superficial temporal fascia	290
6	39	28.5	Yes	Twice	2012,2015	All facial spaces	42 31	no	2018 infected open abscess	Once 2018	no	SMAS graft	SMAS graft	310
7	30	25.2	No	once	2012	Buccal, masseteric, and over parotid	6 17	no	no	9-2021 10-2022 all treated with antibiotics	No	-	mastoid fascia	270
8	44	28.4	No	once	2007	Buccal and masseteric	4 5	No	2012 abscess LT side then drained. 2018 under GA aspiration	2012 LT side 2022 infected after doing cup suctioning	no	Superficial temporal fascia	Superficial temporal fascia	310
9	49	39.6	yes	once	2010	Nasolabial and buccal	9 14	Sea food	no	no	no	SMAS graft	SMAS graft	300
10	30	23.9	No	once	2013	Buccal, malar, and masseteric	3 2	no	12-2021 LT side aspiration by needle 4-2022 abscess drainage LT side	4-2022 abscess LT side	no	Mastoid graft	Mastoid graft	340

**Table 2** The degree of the participants' satisfaction

Variable	Study patients ( <i>n</i> = 10)
Degree of satisfaction (Patient view)	0
Not satisfied	1
Somewhat satisfied	2
Very satisfied	7
extremely satisfied	
Assessment of asymmetry (Patient view)	8
No	1
Mild	1
Moderate	0
Severe	

restore symmetry. For significant SMAS defects, local tissue grafting was preferred over mobile fat injection. The platysma-SMAS layer, spared from fillers, provided graft material to malar, submalar, and buccal areas. Mastoid fascia and fatty tissue over facia used to reconstruct focal medial malar depressions. Grafts were secured to improve intake.

We believe that the most suitable reconstructive option in such cases is the use of local tissue grafts that can be fixed to the defect and reconstruct the SMAS layer. In most cases, the combined lower SMAS and platysma graft was taken for

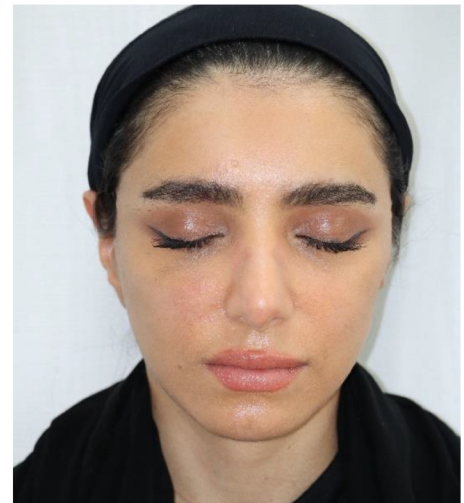
**Fig. 5** A case of combined platysmal mixed SMAS and mastoid fascia to restore mid-face defect after removal of permanent filler preoperatively in multiple views anterior, lateral, and oblique (A-C-E) and postoperatively (B-D-F)



**Fig. 6** A case of the temporalis facial graft to restore mid-face defect after removal of permanent filler preoperatively in multiple views anterior, left, and oblique (A-C-E) and postoperatively (B-D-F)



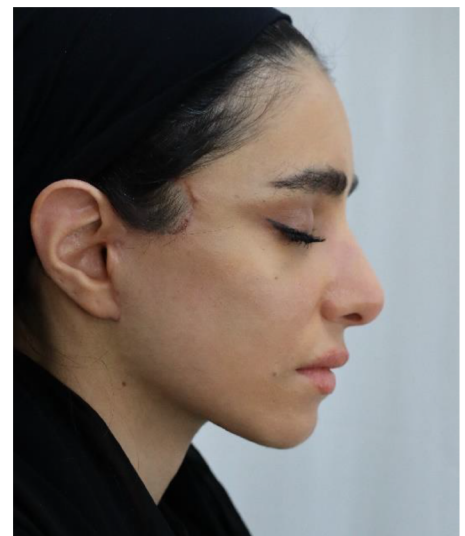
(A)



(B)



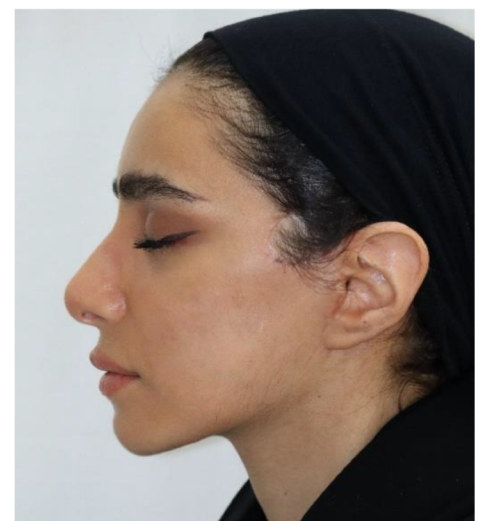
(C)



(D)



(E)



(F)



the reconstruction of the malar, submalar, and buccal areas. Six cases showed depression in the most medial part of the malar region, and this was reconstructed using the mastoid fascia and overlying fat graft. Grafts were secured in position to address the defect area and increase survival intake. Although it was difficult to objectively measure the effect of the described maneuver and predict the potential vascularity and survival of the grafts used, the patients reported high satisfaction scores (87.5% were satisfied or very satisfied). Most of our patients experienced varying degrees of satisfaction 6 months after the procedure because the main complaint was multiple lumps causing disturbed facial contour. The removal of the permanent filler material resulted in a remarkable improvement in their facial contours, eliminating the facial asymmetry caused by the permanent filler. There were no defects postoperatively. In huge defects, redirection of the SMAS plus graft was sufficient to prevent irregularity and provide stability of the SMAS, but it was not enough to provide facial volume. Therefore, we followed the patient for 6 months and evaluated their facial volume.

Midface projection is key for youthfulness but is often inadequately restored by lateral lift approaches [27]. Buccal fat pad transposition and implants have been described for volume enhancement [28, 29]. Intraoperative findings dictate optimal augmentation strategies. Study limitations include the small sample, lack of controls or randomization, and short follow-up. Additionally, precise injected materials were unknown. Nevertheless, this study demonstrates effective midface reconstruction after permanent filler removal to improve contour and support. Larger controlled studies with longer follow-ups should further assess these techniques.

## Conclusions

This study shows promising aesthetic outcomes and high patient satisfaction at 6 months after simultaneous facelift and permanent filler removal with volume defect correction using various local tissue grafts. Larger studies with longer follow-ups are warranted to further assess these reconstructive techniques for significant SMAS defects resulting from improper permanent filler placement.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s00238-024-02193-2>.

**Author contributions** All authors contributed to the study conception and design. Material preparation, data collection and analysis. All authors read and approved the final manuscript.

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## Declarations

**Ethical approval** The research followed the Helsinki principles, and the study was approved by the Mansoura University Institutional Review Board under NO. R.23.05.2178.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

**Consent to publish** The authors affirm that human research participants provided informed consent for publication of the photos.

**Conflict of interest** None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript. The authors have no relevant financial or non-financial interests to disclose.

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