

# The use of resected SMAS as autologous graft for the correction of nasolabial folds during rejuvenating procedures

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**Abstract.** *Background and aim:* Despite several techniques are proposed, treatment of nasolabial folds is often challenging. During rejuvenation procedures, the SMAS could be redraped or partially resected during the procedure. The aim of this study is to investigate the use of obtained SMAS strip as autologous graft, because of its solid but pliable consistence and fatty composition, to correct nasolabial folds during procedures with SMAS resection. *Methods* Between 2015 and 2018, 23 patients underwent SMAS graft for nasolabial fold correction. All procedures were performed under local anesthesia and no other cosmetic treatments, including HA fillers, have been done in the past 12 months. *Results:* 22 patients were declared eligible for the study. 20 patients were female, accounting for 90,91%. Mean age was 53 years old. Ancillary procedures were performed in 17 patients, including upper blepharoplasty (3, 13,63%), upper and lower blepharoplasty (5, 22,73%) and submental neck lift with platysma plication (15, 68,18%). Mean follow-up was 9 months. No major complications have been recorded: only 1 case of minimal hematoma in the retroauricular region have been recorded and 1 patient required laser treatment for pathological scars. At follow-up, graft is completely integrated into the mid-fat compartment. As evinced from the FACE-Q analysis, the overall satisfaction rate is extremely high. These are very convincing data regarding the effectiveness of the technique and, despite a little bit longer downtime, is not invasive and led to natural long-lasting results event during motion. *Conclusions:* The use of SMAS graft during face-lift as nasolabial fold filler results in a satisfactory but natural filling of the folds, reducing the need for lateral tension and therefore assuring more natural results. Since its nature, SMAS, reduced in width to properly fit into the nasolabial fold, can be considered as an optimal autologous graft for replenish loss volumes of the face with aging. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** SMAS, autologous graft, facial rejuvenation

## Introduction

Despite several techniques are proposed, including the use of filler or fat grafting, treatment of nasolabial folds during aging process is difficult, even during facial rejuvenation surgeries. During rhytidectomy, the superficial musculoaponeurotic system could be redraped or partially resected during the procedure and, because of its soft but pliable consistence, SMAS could be grafted to correct nasolabial folds. The aim of this study is to investigate the use of obtained SMAS strip as autologous

graft to correct nasolabial fold in patients underwent rhytidectomy, evaluating satisfaction with the results obtained with an “old-school” technique.

## Surgical Technique

A standard rhytidectomy with lateral SMASectomy is performed by authors under local anesthesia with mild IV sedation. Ideal candidates for this surgery are patients in their 40s or 50s, with skin laxity and good

skin elasticity. The goal of the procedure is to rejuvenate the aging appearance of the face. Preoperative photos were taken under the same light conditions. Patients were marked in upright position for surgical planning. Local anesthesia was performed right after IV sedation (100 mL sodium chloride 0.9%, 20 mL Lidocaine 2%, 10 mL Ropivacaine at 10 mg/mL and 1: 100000 epinephrine). Preauricular incision extended to the retroauricular region were performed. Skin and subcutaneous tissues were undermined over the parotid fascia with facelift scissor, under direct vision to avoid damage to important structures, for the area previously marked. A strip of SMAS (mean length: 4.2 cms, from 3.6 to 5.1 cms) is excised and placed in cold saline solution till the end of the rhytidectomy. SMAS is closed with 3/0 Lactomer suture and skin repositioned with excision of excess tissues. With the use of a 11-blade, two incisions, according to “Langer” lines are performed for each side in the nasolabial fold: the upper one surrounding the lateral border of the base of the ala nasali and the lower one at the most distant part of the nasolabial fold where usually a small triangular concave area can be identified. With a 15 cm long and 2 mm cannula, with a cutting flat edge, a subcutaneous tunnel is performed, with simultaneous release of any fibrous attachment to the overlying tissue. SMAS graft is thinned and rolled according to the entity of the defect. Therefore, it is anchored to a Casagrande needle and passed into the tissue. No internal suturing of the graft is required, but minimal movements are mandatory to avoid displacement and ensure a higher percentage of graft survival. No compressive medications are applied to the region and cutaneous access are closed with non-reabsorbable sutures and removed at the first postoperative control (5th POD).

## Material and Methods

Between 2015 and 2018, 23 patients underwent SMAS graft for nasolabial fold correction. All procedures were performed under local anesthesia and no other cosmetic treatments, including HA fillers, have been done in the past 12 months. All patients signed a written consent.

Including criteria: age > 18 years old, underwent facial rejuvenation surgical procedure with SMAS

strip graft for nasolabial fold, no previously facelift procedures, responding to the provided FACE-Q questionnaire.

Excluding criteria: patients underwent simultaneous fat graft in the nasolabial fold or laser ablative treatment during the same procedure and patients not responding to the questionnaire have been excluded from the study.

All patients underwent SMAS graft bilaterally with the previously mentioned technique. Preoperative and postoperative pictures have been collected under the same light conditions with the same camera with a minimum follow-up of three months. At the third months, FACE-Q questionnaire is administered (1,2).

Several questionnaires are taken into consideration to obtain a global satisfaction rate, divided into two major categories:

- A. FACE-Q appearance, including
  - A1. Appraisal of Lines-Nasolabial folds (5 items)
  - A2. Satisfaction with Facial Appearance Overall (10 items)
- B. FACE-Q quality of life (QOL), including
  - B1. Aging Appraisal (7 items)
  - B2. Appearance-related psychosocial distress (8 items)
  - B3. Early life impact of treatment (12 items)
  - B4. Psychological function (10 items)
  - B5. Satisfaction with decision (6 items)
  - B6. Satisfaction with outcome (6 items)

Patients are required to reply to 64 questions. All questionnaires are completely anonymous and independently analyzed by two statistics unaware of the surgical procedure. Data are then statistically analyzed and reported in a spreadsheet.

Pre- and postoperative pictures (minimum follow-up at three months) are analyzed by two independent plastic surgeons, unaware of each other results and of the technique used for nasolabial fold correction. To evaluate the preoperative condition and the postoperative improvement, Modified Fitzpatrick Wrinkle Scale (MFWS) for Nasolabial fold is used as evaluation tool (3). The MFWS comprised three main classes of nasolabial wrinkling: 1, 2, and 3, representing fine, moderate, and deep wrinkles, respectively. A 0 is also used to designate an absence of nasolabial wrinkles. Furthermore, three interclasses could be used to assess wrinkle severity (i.e., 0.5, 1.5, and 2.5) in ac-

cordance to the definitions with an estimated wrinkle depth. The definitions of the entire classes of the scale are the following:

- 1) Class 0 - No wrinkle. No visible wrinkle; continuous skin line
- 2) Class 0.5- Very shallow yet visible wrinkle
- 3) Class 1 -Fine wrinkle. Visible wrinkle and slight indentation
- 4) Class 1.5 - Visible wrinkle and clear indentation and less than 1 mm wrinkle depth
- 5) Class 2 - Moderate wrinkle. Clearly visible wrinkle, 1- to 2-mm wrinkle depth
- 6) Class 2.5 - Prominent and visible wrinkle. More than 2-mm and less than 3-mm wrinkle depth
- 7) Class 3 - Deep wrinkle. Deep and furrow wrinkle; more than 3-mm wrinkle depth

Wrinkle depth is based on assessors' estimation rather than physical measurement.

## Results

A total number of 23 patients underwent previously mentioned procedure, but one patient did not accept to respond to the provided questionnaire and therefore excluded from the study. 22 patients were declared eligible for the study. 20 patients were female, accounting for 90,91%. Mean age was 53 years old (ranging from 47 to 61). Simultaneous procedures were performed in 17 patients, including upper blepharoplasty (3, 13,63%), upper and lower blepharoplasty (5, 22,73%) and submental neck lift with platysma plication (15, 68,18%) (4-6). Minimum follow-up was 3 months, maximum was 18 months with a mean follow-up of 9 months (Tab. 1). No major complications have been recorded. All patients experienced bruising and swelling, as usual after a surgical procedure. Only one case of minimal hematoma in the retroauricular region have been recorded, requiring a single percutaneous

**Table 1.** Demographic data of patients including ancillary procedures and complications.

Patient number	Age	Gender	Smoking	Ancillary procedure(s)	Complications
1	52	F	Yes	Neck lift	No complications
2	54	F	No	No	No complications
3	61	F	No	Neck lift	No complications
4	47	F	No	Neck lift	No complications
5	49	F	Yes	No	No complications
6	51	F	No	Neck lift	No complications
7	51	M	No	No	No complications
8	48	F	No	Upper blepharoplasty	No complications
9	57	F	No	Neck lift	No complications
10	58	F	Yes	Neck lift	Pathological scar
11	57	F	No	Upper blepharoplasty, neck lift	No complications
12	49	F	No	upper blepharoplasty	No complications
13	52	F	No	upper and lower blepharoplasty, neck lift	No complications
14	51	F	No	neck lift	Hematoma
15	48	F	Yes	No	No complications
16	49	F	Yes	neck lift	No complications
17	53	F	No	No	No complications
18	56	M	No	upper and lower blepharoplasty, neck lift	No complications
19	60	F	No	neck lift	No complications
20	59	F	No	upper and lower blepharoplasty, neck lift	No complications
21	51	F	No	neck lift	No complications
22	54	F	No	neck lift	No complications



**Figure 1.** A) Preoperative picture of 53-year-old patient; B) 12 months postoperative result; C) Preoperative picture of 48-year-old patient; D) 12 months postoperative result; E) Preoperative picture of 52-year-old patient; F) 12 months postoperative result

evacuation and self-limited. One patient required on both side laser treatment for pathological scar in the retroauricular region. These complications are reported but could not be considered as a direct consequence of the SMAS graft. Data resulting from FACE-Q have been reported in a data spreadsheet and analyzed (Tab. 2). Figure 1 illustrate pre- and postoperative photographs of 3 patients at 12-months follow-up.

The satisfaction rate for “Appraisal of Lines-Nasolabial folds” is 81,5% (mean Rasch Score: 19,5%), with a “Satisfaction with Facial Appearance Overall” rate of 60,3%. The mean satisfaction rate for the “Satisfaction with outcome” is 72,2%.

As evinced from the FACE-Q analysis, the overall satisfaction rate is extremely high. High satisfaction values are obtained with the use of SMAS graft for the section Appraisal of Lines-Nasolabial folds, Satisfaction with facial appearance overall and satisfaction with outcome. These are very convincing data regarding the effectiveness of the technique and, despite a

little bit longer downtime, is not invasive and led to natural long-lasting results event during motion.

Photographic analysis showed a mean preoperative value for the Modified Fitzpatrick Wrinkle Scale of 2,07/3 as final calculated mean derived from the mean of the results for each evaluator, respectively 2,1/3 and 2,05/3. At three months follow-up, the mean value decreased to 1,192/3 (Tab. 3). These data showed a decrease of 29,5% of the mean value.

## Discussion

Nasolabial folds represent one of the earliest signs of aging and loss of skin elasticity and they usually become apparent in the 30s even if sometimes it can appear in young subjects as congenital morphological expression. Genetic factors, lifestyle, smoking ultraviolet radiations and sever ponderal variations can aggravate or anticipate the process. Currently, several options for nasolabial improvements are available, including artificial dermal fillers, such as hyaluronic acid or polymethylmethacrylate (7), laser resurfacing (8), radiofrequency devices (9), fat grafting (10), HIFU (11) and direct subcision (12). During short-scar rhytidectomy, mobilization of deep tissues ensures more natural results, but often nasolabial folds cannot be satisfactorily achieved. In most cases, patients underwent rhytidectomy previously underwent temporary correction of aging signs but requires long-stable results.

The use of SMAS graft during face-lift as nasolabial fold filler results in a satisfactory but natural filling of the nasolabial fold, reducing the need for lateral tension and therefore assuring more natural results. Morphologically, SMAS is composed by thin fibromuscular septa surrounding fat tissue compartments connecting the skin to a fibrous fascia and mimic musculature (13). Since its nature, SMAS, reduced in width to properly fit into the nasolabial fold, can be considered as an optimal autologous graft for replenish loss volumes of the face with aging. The use of SMAS tissue as graft has been previously reported in literature for different purposes and anatomical regions (14,15). Several authors already described this technique: Lamperti and Moody firstly described the insertion of the SMAS tissue harvested during the facelift proce-

Table 2. Face-Q data reported for each patient and section

Patient	Appraisal of Lines-Nasolabial folds		Satisfaction with Facial Appearance Overall		Aging Appraisal		Appearance-related psychosocial distress		Early life impact of treatment		Psychological function		Satisfaction with decision		Satisfaction with outcome	
	SUM	RASCH	SUM	RASCH	SUM	RASCH	SUM	RASCH	SUM	RASCH	SUM	RASCH	SUM	RASCH	SUM	RASCH
1	7	18	32	66	8	7	10	13	14	16	37	84	17	55	15	48
2	5	0	39	92	7	0	8	0	16	26	40	100	24	100	23	87
3	8	24	24	46	13	35	12	26	20	40	20	36	12	38	15	48
4	9	30	28	55	18	53	14	35	18	34	32	68	18	59	18	59
5	7	18	31	64	14	38	11	20	15	22	36	80	17	55	20	68
6	7	18	33	69	13	35	12	26	15	22	36	80	19	64	22	79
7	5	0	33	69	11	26	12	26	16	26	39	93	22	82	21	73
8	6	10	28	55	20	60	10	13	17	30	32	68	16	51	23	87
9	6	10	26	51	22	66	17	45	18	34	25	47	12	38	18	59
10	12	47	24	46	20	60	15	39	16	26	28	55	16	51	21	68
11	10	36	26	51	17	50	9	3	19	37	35	77	17	55	20	68
12	7	18	28	55	11	26	9	3	21	43	28	55	17	55	23	87
13	7	18	27	53	19	56	13	31	22	46	25	47	13	48	19	63
14	9	30	31	64	17	50	12	26	17	30	25	47	17	55	19	63
15	7	18	26	51	13	35	12	26	18	34	29	58	17	55	22	79
16	6	10	27	53	17	50	16	42	17	30	31	65	18	59	22	79
17	10	36	33	69	10	21	9	3	17	30	37	84	22	82	22	79
18	9	30	30	61	10	21	8	0	16	26	31	65	21	75	23	87
19	8	24	31	64	11	26	9	3	19	37	36	80	21	75	22	79
20	8	24	35	76	12	30	9	3	17	30	34	74	20	69	20	68
21	6	10	26	51	15	42	9	3	17	30	34	74	18	59	23	87
22	5	0	32	66	15	42	11	20	16	26	32	68	21	75	21	73
	19,5		60,3		37,68		18,5		30,7		68,4		61,59		72,2	

**Tab. 3:** Preoperative and postoperative values for the Modified Fitzpatrick Wrinkle Scale

Scale Patient	Preoperative Evaluation		Postoperative Evaluation	
	Evaluator 1	Evaluator 2	Evaluator 1	Evaluator 2
1	2	2	1	1
2	2.5	2.5	1.5	1.5
3	3	2.5	1.5	1.5
4	2.5	2.5	1.5	1
5	2.5	2.5	2	2
6	2.5	2.5	1.5	2
7	2	2	1.5	1.5
8	2.5	2.5	1	1
9	2.5	2.5	1.5	1.5
10	2.5	2	1	1
11	2	2	1.5	0.5
12	2.5	2.5	1	1
13	2.5	2.5	1.5	1.5
14	2	2.5	1	1
15	2.5	2.5	1.5	1.5
16	2.5	2.5	1.5	2
17	2	2	1.5	1.5
18	2	2,5	1	1
19	2	2	1.5	1.5
20	2	2	1	0.5
21	2	2	1	1
22	2.5	2.5	1.5	1.5
Mean	2,1	2,05	1,11	1,27
Final Mean	2,077		1,192	

ture into the nasolabial fold, with a visible scar on the cheek<sup>8,10</sup> Calderon suggested to pass the SMAS graft through the nasal mucosa., but this procedure has a higher risk of contamination and infection (16).

In 2012 Stenekes proposed nasolabial fold augmentation with SMAS graft in 14 patients through a tunnel in the fold itself, but there was no analysis of patient's satisfaction (17). Authors decided to analyze patients' satisfaction with FACE-Q questionnaire, including evaluation of the satisfaction with the results and the associated psychological distress and limitations to the social life. Furthermore, since improve-

ment is a mandatory aspect to be evaluated not only by patients, but also by surgeons, a pre- and postoperative evaluation of the results by the use of a Modified Fitzpatrick Wrinkle Scale have been also analyzed.

Both patients and surgeons' evaluation showed a dramatic improvement of the satisfaction rate with the SMAS graft for nasolabial folds correction.

In our proposed technique, SMAS is passed through a subcutaneous incision in the nasolabial fold at the junction with the nasal ala and at the bottom part of the fold to hide the surgical access. Careful dissection of the SMAS should be performed thus to avoid damage to the tissue itself.

This technique has many advantages: with a single incision, it provides an effective rhytidectomy with a natural-looking filling of the nasolabial folds, avoiding puffy and overdone aspect. Lipofilling is a reliable alternative, but, especially in the most severe cases reported very deep fold it requires a secondary surgical site and, especially in skinny patients, the risk for irregularities should be considered. Furthermore, removal of fat tissue is usually painful, increasing patient's discomfort, and requires in most cases the use of compressive garments. SMAS graft is a totally natural and biocompatible material and, moreover, just a small increase in the downtime is needed for return to social life, mostly due to reactive edema and ecchymosis. Scars do not represent for this technique a sensitive issue, but pathological scar should be always considered even if incisions are minimal.

## Conclusions

The use of a strip of SMAS as autologous graft for nasolabial fold correction could be an adjunctive step during facial rejuvenation procedures that may increase the satisfaction rate for the final results in this region, decreasing the need for more aggressive rhytidectomy and avoiding a secondary donor site, with minimal scars and no longer downtime for patients.

**Conflict of Interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

**Ethical approval:** all procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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