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Multiple, Combined Plications of the SMAS-Platysma Complex: Breaking Down the Face-Aging Vectors

[Cosmetic]

Cárdenas-Camarena, Lázaro M.D.; González, Luis E. M.D.
Guadalajara, Mexico
Plastic Surgery Unit; Av. Chapalita No. 1300; Guadalajara, Jal. 45000 México; plassurg@foreigner.class.udg.mx (Cárdenas-Camarena)
From the Reconstructive Surgery Institute of Jalisco.
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Abstract TOP

After analyzing how facial tissues are affected during the aging process, 36 rhytidoplasties were performed by plicating the superficial musculoaponeurotic system (SMAS)-platysma complex. Also, additional procedures were performed to improve the aesthetic result. Patients were followed for 3 to 33 months (median, 13 months); their ages ranged from 42 to 72 years (median, 53 years). Because the facial soft tissues present specific anatomic particularities and the force-vector determinants for facial ptosis are many and varied, specific plications were combined to obtain the desired results during a rhytidoplasty. Combinations of six different types of plications are described; some of them are used individually by various authors to manage the SMAS-platysma complex. Major complications did not occur, despite extensive cutaneous undermining, and morbidity was similar to that of other techniques that handle the SMAS. The results were satisfactory for all patients, and clinical improvement was noted in all cases. On the basis of these results, using combined plication to manage the SMAS-platysma complex during a rhytidoplasty is recommended. The opposing vectors should be considered when planning the combination of plications.

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Since the superficial musculoaponeurotic system (SMAS) was described by Mitz and Peyronie in 1976,[1] the handling of the facial soft tissues during a rhytidoplasty has undergone important modifications. This evolution has gone from skin extirpation only[2] to the manipulation of the SMAS by different techniques,[3-7] including various treatments of the platysma muscle[8-10] and the composite rhytidoplasty described by Hamra.[11] In combination with the management of the SMAS, some procedures may assist in the process and offer better aesthetic results. These procedures include lipectomy or liposuction of the neck[12-14] and face,[15,16] the handling of the malar fat,[17] and the use of alloplastic material to compensate for the loss of bony prominences.[3] This clinical study presents the management of the SMAS-platysma complex in 36 patients using plication alone, according to the particular needs of each patient. To accomplish this, different combinations of SMAS-platysma plication[5,6,8,9] were performed; plication was improved by considering the condition of each patient and adding some procedures to achieve better results.

Clinical Cases TOP

During a 33-month period from March of 1995 to December of 1997, we operated on 31 female patients and 5 male patients; the ages of the patients ranged from 42 to 72 years (median age, 53 years). An extensive rhytidoplasty was performed to handle the SMAS-platysma complex by different types of plication. In all plications, an added procedure (or procedures) was done to improve the final result. These procedures are outlined in Table I. Before surgery, laboratory tests, an electrocardiogram, and a complete medical evaluation by a doctor of internal medicine were performed in all patients.

TABLE I Additional Procedures

Surgical Technique TOP

The patients underwent surgery under sedation and local anesthesia with 0.5% lidocaine and 1:400,000 epinephrine. Additional procedures were performed before or after the rhytidoplasty, according to each case and type of procedure to be done. During the rhytidoplasty, extensive skin undermining over the SMAS was completed with the following borderlines: in the parietal region, undermining continued 6 to 8 cm over the superior auricle ridge and extended out to the external third portion of the eyebrows. In the inferior eyelid, undermining was carried up the infraorbital ridge by performing a blepharoplasty-type incision. Undermining of the blepharoplasty is attached to the undermining of the malar and frontoparietal regions. The malar fat pad was left in the deep plane fastened to the SMAS. Skin undermining in the lateral cervical regions was done up to 6 to 7 cm under the mandibular border through preauricular and postauricular incisions. In the central cervical region, undermining was done down to the thyroid cartilage level through a submental incision; this was

joined to the lateral cervical undermining. When undermining was complete, a complete view of the SMAS-platysma complex was obtained, allowing the surgeon to handle it adequately. To manage the SMAS-platysma complex, four to six different types of combined plication were performed, according to the needs of each patient. They were done in the following order (Fig. 1):

Fig. 1. Plication techniques used to handle the SMAS-platysma complex. (*1*) Medial traction of the anterior ridges of the platysma. (*2*) Upward traction of the SMAS toward the zygomatic arc. (*3*) Posterior traction of the SMAS toward the preauricular fascia. (*4*) Posterior traction of the platysma. (*5*) Upward traction of the SMAS inferior portion to elevate the jowl. (*6*) Upward traction of the malar fat pad.

1. A midline plication of the medial platysma borders with a 3-0 polydioxanone suture is done through a submental incision. This plication goes from the posterior ridge of the chin downward to the thyroid cartilage level; it is similar to the one described by Feldman.9

2. The SMAS is elevated toward the zygomatic arc ridge by plicating it with a 2-0 polydioxanone suture. The amount of plication needed is estimated during surgery according to tissue flaccidity; the plication begins in the malar region and finishes 1 cm in front of the tragus.

3. Posterior traction of the SMAS toward the preauricular parotid fascia is done with a 2-0 polydioxanone suture. This plication continues at a 90-degree angle downward to the anterior one and concludes at the level of the mandibular angle. These two last plications are similar to those described by Guerrerosantos.6

4. Lateral traction of the platysma muscle is done with a 2-0 polydioxanone suture by continuing the anterior plication downward and following it parallel to the posterior ridge of the sternocleidomastoid muscle. It ends 4 to 5 cm beneath the mandibular ridge.

5. The SMAS is plicated at the level of Bichat's fat pad with a 3-0 polydioxanone suture. This plication begins 1 to 2 cm behind the corner of the mouth and continues in an oblique direction toward the auricle tragus; it ends 0.5 to 1 cm in front of the third plication.

6. The malar fat pad is plicated and elevated to the lateral eye orbit periosteum with two separated 2-0 polydioxanone sutures.

Plications 2, 3, and 4 are the only continuous ones, but each has a different traction vector. The rest of the plications are done separately. Not all patients required all six plications; the needs of each particular case determined which plications were used. Cutaneous closure is done in a traditional manner, with special attention paid to the level of the inferior eyelid because the sixth plication creates too much remaining skin in this region. The skin resection must be done entirely within the limits of the remaining skin by marking the site with the patient's open mouth to avoid removing too much skin. The additional procedures described in Table I were performed during the course of surgery, depending on each patient's particular case. A negative suction drain system and occlusive bandage were left in all patients for 24 hours. The patients were discharged from the hospital the day after the surgery, after the bandage and the drain were removed.

Results TOP

Follow-up ranged from 3 to 33 months (median, 13 months). A total of 15 patients (42 percent) underwent all six described plications; 17 patients (47 percent) required only five plications (they did not need plication 5); and in the remaining four patients (11 percent), only four plications were performed (plications 4 and 5 were not done). The number, type, and frequency of plications used in the patients are summarized in Table II. The evaluation of results was done with clinical parameters, most of which are subjective. This evaluation was done in all cases, with the results being appraised by the surgeon and graded by patient satisfaction. The postsurgical evaluation was done during the patient's most recent appointment in the follow-up period. This assessment also considered early and late complications and a comparative analysis of the preoperative and postoperative photographs by the surgical team (Figs. 2 through 4). Patient satisfaction was determined anonymously; during his or her most recent appointment, each patient was asked to fill out a special form and return it to the hospital without including his or her name.

No. of Plications	No. of Patients	Type of Plication
6	15	1, 2, 3, 4, 5, and 6
5	17	1, 2, 3, 4, and 6
4	4	1, 2, 3, and 6

TABLE II Frequency and Distribution of Plication

Fig. 2. A 48-year-old woman before (*above*) and 18 months after (*below*) surgery using only four plications (1, 2, 3 and 6).

Fig. 3. A 57-year-old woman before (*above*) and 6 months after surgery (*below*). All six plications were used; additional procedures included a forehead lift, blepharoplasty, frontal and perioral dermabrasion, neck liposuction, and lipoinjection in the glabellar region.

Fig. 4. A 66-year-old woman before (*above*) and 13 months after surgery (*below*). All six plications were used; additional procedures included neck liposuction and blepharoplasty.

Three postsurgical hematomas were identified; all were related to high blood pressure after surgery. Two of them were small and occurred during the first 24 hours after surgery; they were discovered when the bandages were removed. These two hematomas resolved with direct negative suction; 3 and 7 cc were removed, respectively. The other hematoma was detected on the fifth day after surgery; it originated from bleeding superficial temporal blood vessels and was the only case that required evacuation and hemostasis in the operating room (2.8 percent). In three patients (8.3 percent), superficial distal necrosis developed in the retroauricular flap. This necrosis was less than 2 cm^2, and it spontaneously resolved after skin sphacelation. None of the complications had any sequelae. We did not encounter any nervous lesions, facial asymmetry, infections, or dehiscence. Postsurgical edema persisted for up to 3 months and was most apparent at the malar fat pad region. Those patients who underwent cervicofacial liposuction had more swelling and induration in this region than those who did not have this type of procedure. Edema and induration resolved with postsurgical massages over a period of 3 to 4 months. Postsurgical ecchymoses were observed in 19 patients (53 percent); they disappeared 2 to 3 weeks after surgery without any side effects.

In this study, 32 patients (89 percent) had a high degree of satisfaction with their surgical results. Only four patients (11 percent) had some degree of dissatisfaction due to irregularities that could be felt; these irregularities occurred in the cervical region and in the areas where plications 2 and 4 were done. Clinically, all patients presented with facial improvement in the malar region, the cervical area, and the mandibular ridge. At the malar region, a younger appearance resulted from the filled tissue. In the cervical region, the obtuse angle, considered synonymous with old age, vanished. At the mandibular ridge, a more pleasing appearance was obtained by eliminating the jowl. No recurrence of tissue ptosis was seen during the follow-up period.

Discussion TOP

Facial aging has been extensively evaluated and studied by plastic surgeons. Most authors agree on the effects of aging in the facial tissues. Lassus[3] and Robbins et al.[5] claim that the fall of the malar fat pad is one of the main problems because it

creates a marked nasolabial fold; thus, the fat pad must be put in its correct anatomical position. Hamra[11] adds ptosis of the orbicular muscle and the fall of fat tissue at the jowl area to the list of problems; these structures must also be dealt with during the procedure. Lassus[3] mentions that besides tissue lassitude, additional factors such as abnormal fat deposition and loss of bony mass must be corrected.

We consider facial aging multifactorial; for this reason, all the factors and the effects they generate must by analyzed in conjunction to discover the best options for treatment. There is no doubt that the force of gravity on the soft facial structures over time is the main cause of sagging. Gravity generates downward traction on all tissues and, as time passes, ptosis is unavoidable. Nevertheless, anatomical factors, structural factors, and personal factors that promote ptosis also exist. For example, the adherence of the tissues of the nasolabial fold to deep structures[18] causes ptosis in the facial region adjacent to the fold to be modified in an oblique direction; thus, it is not totally vertical. To correct this, SMAS traction must be in the opposite oblique direction; we use plications 2 and 3 for this purpose. Ptosis in the medial third and external tissues of the face is completely vertical; therefore, lifting must be the same. When ptosis is not so marked, the problem can be solved with plication 2; when it is very evident, the cheek fat falls downward to the mandibular ridge and appears as a very marked jowl. In these cases, plication 2 is not sufficient, and additional plication must be done parallel to the mandibular ridge; this is obtained by plication 5. With this type of handling, all inferior facial tissue to the infraorbital ridge is lifted, but the malar fat pad is left under the infraorbital ridge and does not give a younger appearance to the cheek, as described by Hamra[11,19]; plication 6 is thus used to lift the malar fat pad.

The platysma muscle is the anatomic continuation of the facial SMAS, and any alteration to the SMAS will have repercussions on the platysma.[20] Platysma muscle flaccidity will produce a total vertical fall of the area, and this fall will cause a "hammock-like" deformity, with its main supporting points at the level of the anterior and posterior borders. At the medial level, flaccidity manifests with anterior border detachment because this portion of the muscle does not have a fixation point. Therefore, platysma flaccidity must be corrected by repairing both portions. SMAS management will improve the vertical ptosis suffered by the muscle, but the medial and lateral alterations to the platysma muscle must be treated with plications 1 and 4. These plications bring force vectors opposed to the ones that caused the fall of the muscle.

SMAS management is approached in multiple ways by a number of authors. Some only use plication in ptotic tissues to gain the desired effects,[3,5,6,21] others will detach the SMAS-platysma complex and handle it with traction and extirpation of the extra SMAS,[4] and still others will handle the complex with its adjacent structures to obtain traction in all soft tissues.[11] All authors report excellent results in both the short and long term with their surgical techniques. Some articles try to establish the morbidity[22] and effectiveness[23,24] of the different procedures for handling the SMAS; most techniques have similar complication rates. Considering a hematoma a collection of blood that requires evacuation and hemostasis in the operating room,[25] our incidence is similar to that of other authors.[3,11,21,22,25] However, our rate of other complications is lower. This clinical review does not try to establish which management option is best or proclaim SMAS plication a better alternative, because the diverse types of management provide excellent results. However, we believe that undermining in the subcutaneous plane is easier and has a lower risk of producing nervous damage, with similar improvements and results as other techniques.

We recommend considering the SMAS and platysma muscle a whole structure anatomically and functionally. Therefore, when handling this complex one must consider the alterations that the aging process makes in facial support. We think that the flaccidity of this structure allows it to be handled completely with plication as long as the plication is done correctly. The force vectors that aging produces in the facial soft tissues must be considered, and plication must oppose these vectors. In the same way, because in the facial tissues the vectors are many and varied, it is not possible to correct them with one plication or unidirectional vectors. SMAS-platysma correction should apply force in a direction opposite to that of the existing vector and use the patient's own facial tissues to best advantage.

Lázaro Cárdenas-Camarena, M.D.
Plastic Surgery Unit; Av. Chapalita No. 1300; Guadalajara, Jal. 45000 México; plassurg@foreigner.class.udg.mx

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REFERENCES TOP

1. Mitz, V., and Peyronie, M. The superficial musculoaponeurotic system (SMAS) in the parotid and cheek area. *Plast. Reconstr. Surg.* 58: 80, 1976.
[Medline Link] [CrossRef] [Context Link]
2. González-Ulloa, M. The history of rhytidectomy. *Aesthetic Plast. Surg.* 4: 1, 1980.
[Context Link]
3. Lassus, C. Cervicofacial rhytidectomy: The superficial plane. *Aesthetic Plast. Surg.* 21: 25, 1997.
[CrossRef] [Context Link]
4. Connell, B. F., and Marten, T. J. The trifurcated SMAS flap: Three-part segmentation of the conventional flap for improved results in the midface, cheek and neck. *Aesthetic Plast. Surg.* 19: 415, 1995.
[CrossRef] [Context Link]
5. Robbins, L. B., Brothers, D. B., and Marshall, D. M. Anterior SMAS plication for treatment of prominent nasomandibular folds and restoration of normal cheek contour. *Plast. Reconstr. Surg.* 96: 1279, 1995.
[Context Link]
6. Guerrerosantos, J. Rhytidoplasty: Improving Cheek and Neck with Simplified and Refined Surgical Technique. In R.C. Russell (Ed.), *Instructional Courses: Plastic Surgery Educational Foundation,* Vol. 4. St. Louis, Mo.: Mosby-Year Book, 1991. P. 27.
[Context Link]
7. Lewis, J. R., Jr. Multiple-tiered deep support of cheeks in meloplasty and rhytidectomy. *Aesthetic Plast. Surg.* 7: 21, 1983.
[Medline Link] [CrossRef] [Context Link]
8. Guerrerosantos, J., Espaillat, L., and Morales, F. Muscular lift in cervical rhytidoplasty. *Plast. Reconstr. Surg.* 54: 127, 1974.

[Medline Link] [CrossRef] [Context Link]
9. Feldman, J. J. Corset platysmaplasty. *Plast. Reconstr. Surg.* 85: 333, 1990.
[Medline Link] [CrossRef] [Context Link]
10. McKinney, P. The management of platysma bands. *Plast. Reconstr. Surg.* 98: 999, 1996.
[Fulltext Link] [CrossRef] [Context Link]
11. Hamra, S. T. Composite rhytidectomy. *Plast. Reconstr. Surg.* 90: 1, 1992.
[Medline Link] [CrossRef] [Context Link]
12. Michalany, F. S. Neck rhytidectomy: Aesthetic treatment variations. *Aesthetic Plast. Surg.* 21: 32, 1997.
[CrossRef] [Context Link]
13. Teimourian, B. Face and neck suction-assisted lipectomy associated with rhytidectomy. *Plast. Reconstr. Surg.* 72: 627, 1983.
[Medline Link] [CrossRef] [Context Link]
14. Robbins, L. B., and Shaw, K. E. En bloc cervical lipectomy for treatment of the problem neck in facial rejuvenation surgery. *Plast. Reconstr. Surg.* 83: 53, 1989.
[Medline Link] [CrossRef] [Context Link]
15. Goodstein, W. A. Superficial liposculpture of the face and neck. *Plast. Reconstr. Surg.* 98: 988, 1996.
[Fulltext Link] [CrossRef] [Context Link]
16. Ellenbogen, R., Wethe, J., Jankauskas, S., and Collini, F. Curette fat sculpture in rhytidectomy: Improving the nasolabial and labiomandibular folds. *Plast. Reconstr. Surg.* 88: 433, 1991.
[Context Link]
17. Owsley, J. Q. Lifting the malar fat pad for correction of prominent nasolabial folds. *Plast. Reconstr. Surg.* 91: 463, 1993.
[Medline Link] [CrossRef] [Context Link]
18. Yousif, N. J., Gosain, A. K., Sanger, J. R., Larson, D. L., and Matloub, H. S. The Nasolabial Fold: A Multifactorial Analysis. Presented at the Annual Meeting of the American Association of Plastic Surgeons, San Antonio, Texas, April of 1991.
[Context Link]
19. Hamra, S. T. Is there a difference? A prospective study comparing lateral and standard SMAS face lifts with extended SMAS and composite rhytidectomies (Discussion). *Plast. Reconstr. Surg.* 98: 1144, 1996.
[Context Link]
20. Rees, T. D. The SMAS and the Platysma. In *Aesthetic Plastic Surgery,* Vol. II. Philadelphia: Saunders, 1980. Pp. 634-682.
[Context Link]
21. Hamilton, J. M. Serial plication facelift. *Aesthetic Plast. Surg.* 22: 304, 1998.
[CrossRef] [Context Link]
22. Rubin, L. R., and Simpson, R. L. The new deep plane face lift dissections versus the old superficial techniques: A comparison of neurologic complications. *Plast. Reconstr. Surg.* 97: 1461, 1996.
[Fulltext Link] [CrossRef] [Context Link]
23. Ivy, E. J., Lorenc, Z. P., and Aston, S. J. Is there a difference? A prospective study comparing lateral and standard SMAS face lifts with extended SMAS and composite rhytidectomies. *Plast. Reconstr. Surg.* 98: 1135, 1996.
[Context Link]
24. Kamer, F. M., and Frankel, A. S. SMAS rhytidectomy versus deep plane rhytidectomy: An objective comparison. *Plast. Reconstr. Surg.* 102: 878, 1998.
[Fulltext Link] [CrossRef] [Context Link]
25. Rees, T. D., Barone, C. M., Valauri, F. A., Ginsberg, G. D., and Nolan, W. B., III. Hematomas requiring surgical evacuation following face lift surgery. *Plast. Reconstr. Surg.* 93: 1185, 1994.
[CrossRef] [Context Link]