

The S-Plus lift: a short-scar, long-flap rhytidectomy

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ABSTRACT

INTRODUCTION As rhytidectomy is one of the most elective surgical procedures, there is a strong trend toward less aggressive operative techniques. The authors introduce the S-Plus lift, a ‘long flap’ superficial musculo-aponeurotic system (SMAS) imbrication technique that diminishes risks, decreases recovery time, and yields long-lasting results.

PATIENTS AND METHODS This paper describes a novel approach to mid-facial rejuvenation that combines the limited incision of an S-lift with two SMASectomies, purse-string suture imbrication of the extended supraplatysmal plane (ESP) and SMAS, and malar soft tissue suspension. SMAS excisions are performed pre-auricularly, and in the region overlying the anterior edge of the parotid gland. Purse-string imbrication sutures are designed to close the SMAS defects, pull the soft tissues of the neck upward, pull the jowl and lower face posteriorly and superiorly, and tighten the platysma. Ancillary purse-string suture lifts the malar fat pad and cheek soft tissues vertically, which achieves mid-face fullness and lifting. Compared to S-lift, the technique extends its efficacy in those patients who have moderate-to-severe mid-facial laxity, prominent nasolabial folds, and platysma redundancy.

RESULTS A review of 144 consecutive S-Plus lifts performed by a single surgeon (SBH), with at least 6 months of follow-up, was performed. Over a 3-year period, 130 (90.3%) females and 14 (9.7%) males underwent S-Plus lift. S-Plus lift as primary rhytidectomy was performed in 132 (91.7%) and as secondary in 12 (8.3%) cases. Complication rate was low and comparable with other techniques of rhytidectomy.

CONCLUSIONS The S-Plus lift is a novel, hybrid technique with pleasing results, short down-time, and high patient satisfaction rate. The technique combines two SMASectomies with purse-string suture imbrication of the ESP and SMAS, and malar fat suture suspension.

KEYWORDS

Rhytidectomy – Face-lift – SMAS – SMASectomy – Purse-string suture – Imbrication

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Many patients seeking facial rejuvenation desire a more limited procedure, minimal risks, rapid return to usual activities, and a natural, ‘non-operated’ look. Cosmetic surgeons must continually strive to maximise results and minimise complications while, at the same time, trying to embrace patients’ desires. As early as 1919, Passot reported the earliest form of short-scar rhytidectomy, describing an S-shaped pre-auricular skin incision.¹ Major advances in facial rejuvenation occurred following the description of the superficial musculo-aponeurotic system (SMAS) by Mitz and Peyronie.^{2,3} Skoog⁴ further revolutionised the rhytidectomy procedure by describing the importance of

SMAS suspension. Hamra^{5,6} eloquently described the highly sophisticated, and technically challenging deep-plane and composite rhytidectomy, completing a trend toward more aggressive, lengthier, multiplanar procedures. Perhaps not surprisingly, a concomitant increase in facial nerve injuries and dyskinesias was noted. Seckel⁷ reported that, with more aggressive and deeper-plane facelift techniques, the peripheral nerves of the face are more often exposed, lie closer to the plane of dissection, and are more likely to be injured.

Rhytidectomy is one of the most elective surgical procedures. Therefore, every attempt to minimise morbidity and

risks should be of the utmost importance. Long-term complications, especially motor nerve dysfunctions, are simply not acceptable for most patients. Additionally, interruption of one of the major sensory nerves in the face can result in permanent disability secondary to numbness or intractable dysesthesia and pain.⁷ Unsurprisingly, authors started to question if the benefits of deep-plane techniques outweigh their risks significantly enough to justify using them routinely.⁸⁻¹⁰

The S-lift is a short-scar, short-flap, face-lift technique originally popularized by Saylan.¹¹ The S-lift combines the advantages of a limited incision and dissection with the advantages of SMAS lifting and manipulation. Saylan's original contribution to the technique involves the effective use of purse-string sutures plicating the mobile SMAS and the extended supraplatysmal plane (ESP) to the fixed periosteum-fascia of the zygomatic arch.^{11,12} Tonnard *et al.*¹³ modified the S-lift technique by suspending the ptotic malar fat pad to the deep temporal fascia with an oblique purse-string suture. Baker¹⁴ reinforced the concept of SMAS manipulation and suspension by describing the lateral SMASectomy. Following subcutaneous skin undermining, SMAS is resected over the anterior edge of the parotid. This allows for the more mobile anteromedial SMAS to be suspended to the fixed portion of SMAS overlying the parotid.

This study introduces the 'S-Plus lift', the senior author's (SBH) technique of rhytidectomy. The S-Plus lift is a novel, hybrid technique that combines the limited incision of an S-lift with two SMASectomies, purse-string suture imbrication of the ESP and SMAS, and malar soft tissue suspension. Compared to the S-lift that addresses the sagging tissues of jowls and the anterior neck, the S-Plus technique extends its efficacy in those patients who have mid-facial ptosis, and prominent nasolabial folds. Furthermore, the introduction of the vertical SMASectomy and its extension below the mandible to include lateral platysma allows for great correction of neck laxity and platysma redundancy. The S-lift is generally a 'short-flap', SMAS plication procedure, whereas the S-Plus lift with its mid-face extension is a 'long-flap', SMAS imbrication rhytidectomy.

Patients and Methods

Patients

Over a 3-year period, 144 patients underwent an S-Plus lift by the senior author (SBH). All the procedures were performed under intravenous sedation anaesthesia in an Accreditation Association for Ambulatory Health Care (AAAHC) accredited surgical office.

Surgical technique

Modified tumescent solution (1000 mg normal saline mixed with 100 ml 1% xylocaine plain and 2 mg epinephrine) is infiltrated into all operative areas with a No. 20 gauge needle. Approximately 30–50 ml is used per side. The same tumescent



Figure 1 Placement of the incision. The markings should follow the natural curves of the ear. In both men and women, a retrotragal incision is used, except for smokers in whom a pretragal incision is utilised.

solution is used for concomitant cervicofacial liposuction. At least 15 min is allowed for maximal haemostatic effect.

The skin flap is marked, with the patient in an upright position. In both men and women, a retrotragal incision is used, except for smokers in whom a pretragal incision is utilised (Fig. 1). The No. 15 blade is used in bevelled fashion to develop the flap over the parotid fascia. Pre-excision of pretragal skin, as described for the S-lift,¹¹ is not necessary as long as subcutaneous dissection is deep (*i.e.* the level of flap dissection is just superficial to parotid fascia). Complete flap elevation is further performed under direct vision with face-lift scissors. Flap dissection is in the subcutaneous plane and avoids injury to the facial nerve. The extent of undermining is determined by extent of mid-face laxity, with greater mid-face laxity warranting further undermining. Generally, the undermined areas have an oval shape and extend slightly above the zygomatic arch cranially, below mandibular angle caudally and near to the myelolabial fold anteriorly, encompassing the area over the malar fat pad (Fig. 2). Closed and open liposuction may also be performed, but in order to maximise flap viability it is recommended only after complete skin flap elevation.

The first SMAS excision is a vertical SMASectomy, started pre-auricularly at the level of the tragus and extending to a point just posterior to the angle of the mandible (Fig. 2). It is designed primarily for advancement of the soft tissue of the neck. We found this manoeuvre very useful, as fixed SMAS is often

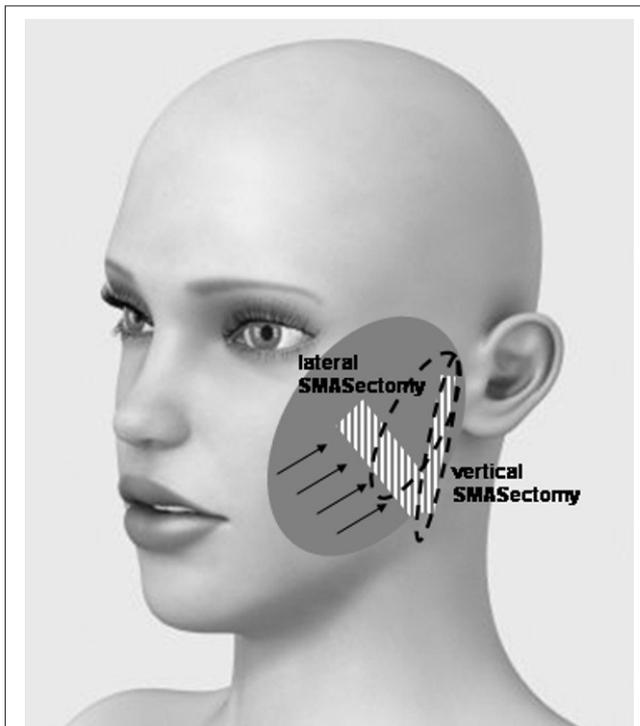


Figure 2 The extent of flap undermining (grey area) and SMAS excisions. Flap dissection is in the subcutaneous plane and avoids injury to the facial nerve. The undermined area extends slightly above the zygomatic arch cranially, below mandibular angle caudally and near to the myelolabial fold anteriorly, encompassing the area over the malar fat pad. SMAS excisions (vertical lines) are performed pre-auricularly and in the region overlying the anterior edge of the parotid gland. On purse-string imbrication of lateral SMASectomy and skin closure, the mobile SMAS is brought up to the junction of the fixed SMAS overlying the parotid which creates a lift of the midface and flattening of the nasolabial folds (arrows).

thickest in this area, while pure plication of such redundancy can sometimes leave the sense of subcutaneous bulging in thin-skinned individuals. The inferior limb of a vertical SMASectomy can sometimes be extended several centimetres below the jaw line, facilitating tightening of the platysma and good correction of neck laxity upon purse-string suture placement. Width of vertical excision depends on SMAS redundancy and is determined by grasping with a forceps. The extended supraplatysmal plane (ESP) is then identified, grasped with a long forceps and an ideal location for elevation and rotation of the neck tissues is evaluated. The first purse-string suture, U-suture (2-0 Vicryl), is placed vertically, beginning 2 cm anteriorly to the skin incision at the periosteum of the zygomatic arch and extending inferiorly, with small superficial bites being made in the SMAS. The most inferior bite is in the ESP point approximately 1–2 cm inferior and posterior to the angle of the mandible. This stitch continues superiorly in a U-shape, closing the vertical SMAS defect. The vector of pull of this suture is craniocaudal, moving the more mobile SMAS of the platysma superiorly and vertically towards

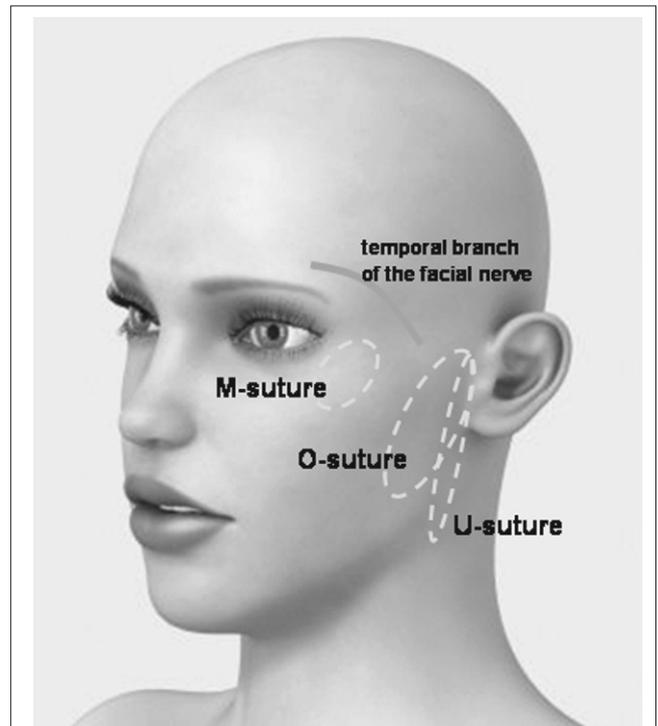


Figure 3 The placement of purse-string U-, O- and M-sutures. The U- and O-sutures are imbrication sutures which close vertical and lateral SMASectomy. The M-suture is designed to lift the malar fat pad and cheek soft tissues vertically, which achieves mid-face fullness and lifting. In order to protect the temporal branch of the facial nerve, the suture is secured at least 1 cm anterior and inferior to the nerve course.

the fixed periosteum of the zygomatic arch. Any resultant bunching of SMAS is simply trimmed with a face-lift scissor until smooth and flat. This is a true imbrication suture, which closes the vertical SMASectomy, corrects the sagging in the pre-auricular area, tightens the platysma, and pulls the soft tissues of the neck upward (Fig. 3).

The second SMAS excision is a lateral SMASectomy, performed on a portion of the SMAS in the region directly overlying the anterior edge of the parotid gland (Fig. 2). It is designed to lift the jowl and mid-face tissues. Excision of the superficial fascia in this region secures more mobile anterior SMAS to the fixed posterior portion of the superficial fascia overlying the parotid gland. The direction in which the SMAS resection is performed is oriented so that the vectors of elevation following placement of the second purse-string suture and SMAS closure lie perpendicular to the nasolabial fold, producing flattening of the nasolabial fold and jowl line improvement. In most patients, this involves 1 cm of width of SMAS, in a line extending from a tail of a parotid gland toward lateral part of a malar eminence. A second purse-string suture, O-suture (2-0 Vicryl), is also secured to the fixed periosteum of the zygomatic arch and is directed in an angle of about 30° anterior to the first suture. The

second suture is also an imbrication suture that tightens and approximates the cut edges of the lateral SMAS resection. This suture incorporates the parotid fascia and jowl, and pulls the jowl and lower face posterior and superior, achieving jowl and lower mid-face tightening (Fig. 3).

The third purse-string suture, M-suture (3-0 Vicryl), has a very short course. Its superior placement goes through peripheral inferolateral fibres of orbicularis oculi muscle, ending at the lateral canthus. The lower bite of this suture is placed in the mobile malar fat pad. This suture is designed to lift the malar fat pad and cheek soft tissues vertically, which achieves mid-face fullness and lifting (Fig. 3). In order to protect temporal branch of facial nerve, the suture is secured at least 1 cm anterior and inferior to the nerve course.

The skin flap is pulled superior and posterior, using a flap demarcator for the accurate measurement of the amount of skin that can be safely excised. The S-designed horizontal temporal incision and excision preserves the temporal hairline while removing the temporal dog-ear. Patients with excessive redundancy in the mid-face often require a more extensive temporal excision. Patients with moderate redundancy in the neck require extending the standard S-Plus lift incision 1–2 cm postauricularly, sometimes combined with an M-plasty to keep the scar in the postauricular crease. Patients with excessive neck redundancy are not good candidates for a short-scar procedure and require the more traditional posterior incision and dissection. Complete haemostasis is of the utmost importance, and a 'second-look technique' is recommended before the final skin closure. Following completion on one side, temporary fixation sutures or surgical clips are applied. After the second side is completed, the initially operated side is rechecked for haemostasis.

On closure, oblique rotation of the cheek/neck flap is performed to add a vertical vector lift. This vector of rotation is indispensable to achieve the optimal results and avoid the 'wind-tunnel' look. The point of initial closure is superior to the root of helix (in temporal region), followed by closure inferior to ear lobule and anterior to tragus. Additionally, at the point of initial closure, the flap is also firmly secured to temporal fascia using a horizontal mattress suture (3-0 Vicryl). Closing skin tension should be highest in temporal region, as there should not be tension on pretragal and infralobular points. Final closure is in two layers (4-0 Vicryl for subcutaneous and subcuticular layers and 5-0 Monocryl for skin).

Upon completion of the procedure, we frequently perform autologous fat injections to smile, frown, marionette lines and the tear trough. In addition to effects of gravity, a large part of the ageing process is tissue atrophy. Effective rejuvenation must not only lift, but also fill.

Results

Over a 5-year period (2003–2006), 144 patients underwent

an S-Plus lift by the senior author (SBH). Of these, 130 (90.3%) were females and 14 (9.7%) males. S-Plus lift was employed as a primary rhytidectomy in 132 cases (91.7%) and as secondary in 12 (8.3%). Follow-up ranged between 6 months and 2 years.

A retrospective review of complications from these 144 cases revealed major haematoma in two cases (1.4%). These cases required return to the operating room, with opening of the flaps, evacuation of haematoma, and control of bleeding. There were four cases (2.8%) of minor haematoma, which were treated with aspiration or manual compression, without flap opening. Two patients (1.4%) had postoperative skin depression. There were two cases (1.4%) of hypertrophic pre-auricular scarring, successfully managed with intralesional Kenalog injections (5 mg/ml). Suture extrusion was observed in one patient (0.7%), with the early experience of this procedure. Subsequent change from non-absorbable 2-0 Ethibond suture to absorbable 2-0 Vicryl successfully prevented recurrence of this problem. There were two cases of unsatisfactory results (1.4%), requiring secondary tuck-up procedures. These patients required a tighter face-lift. One case (0.7%) of facial nerve palsy was noted, which resolved within 3 months with expectant management. There was one case of infection and concomitant flap necrosis (0.7%) and one patient (0.7%) with parotid fistula.

The ultimate determinant of a successful rhytidectomy is a happy patient. As such, we tried to evaluate technique on the basis of subjective patient satisfaction. All 144 patients completed a short, non-validated questionnaire at 6 months' postoperatively. Overall, 55% (79 patients) indicated that they were 'very satisfied' with the results and 44% (63 patients) were 'satisfied'. Only 1% (2 patients) indicated that they were 'not satisfied' with their aesthetic results.

Discussion

Over the past two decades, there has been a trend towards more technically challenging, multiplanar, face-lift procedures, requiring higher levels of technical expertise and longer operative and anaesthesia times.^{5,15–17} Although difficult to document, there has been a suggestion of increased morbidity from some of these procedures, including temporary and permanent dyskinesias and facial nerve injuries.⁷ Certainly, there are good indications for these more sophisticated operations, especially for patients with advanced facial ageing. Not every patient, however, should receive a deep-plane or composite face-lift simply because they are technically in vogue.

There is a paradigm shift in the expectations and motivations of many of today's well-informed patients. Many people now seeking facial rejuvenation are not necessarily interested in the most sophisticated face-lift procedures offered. In fact, they are as concerned about the risks and the recovery from the procedures as they are about the aesthetic



Figure 4 Full face and lateral views of a patient before (left panels) and 12 months after (right) the S-Plus lift. Patient also received chin implant, autologous fat injections to the nasolabial folds, marionette lines, tear trough, the upper and lower lip, and underwent upper-lid blepharoplasty.

outcome. Few are willing to trade additional scarring, higher risk of complications, or significantly lengthier recovery periods for a somewhat better, subjective aesthetic result. With wide-spread availability of information, many patients seek safer, shorter procedures, with a rapid return to normal activities.

The S-lift and S-Plus lift represent a return of the pendulum in the direction of less aggressive rhytidectomy procedures. The S-lift, as described by Saylan,¹¹ is a short-flap SMAS plication face-lift that provides access to the mid-face, jaw-line, and neck through an incision that is principally limited to the pre-auricular area. It is a safe procedure that can be considered even in patients with a history of smoking, hypertension, controlled diabetes, or other medical problems. The vector of lift is vertical, which gives a natural appearance while providing rejuvenation to the neck and jowls.



Figure 5 Early postoperative results (35 days after the S-Plus lift). Oblique and lateral views of a patient with significant improvement in cheek and neck laxity.

The S-Plus lift with mid-face extension using SMASectomy and malar fat suture suspension is better suited for patients with moderate-to-severe mid-face laxity and ptosis, and pronounced nasolabial folds. The incision for the S-lift and S-Plus lift is exactly the same, but the latter is a long-flap technique that requires dissection nearly to the myelolabial fold to perform lateral SMASectomy and malar fat pad elevation. The malar fat is not undermined but is suspended from the lateral canthal region utilizing a purse-string suture. Moreover, lateral SMASectomy and O-suture imbrication produce significant improvement of the nasolabial folds deepening and, to a lesser degree, in jowl and jaw-line sagging. Excision of the superficial fascia in the region directly overlying the anterior edge of the parotid gland secures mobile SMAS to the fixed SMAS overlying the parotid.¹⁴ On skin closure, the mobile SMAS is brought up to the junction of the fixed SMAS, producing a durable elevation on both superficial fascia and facial fat. This creates a volumetric enhancement and lift of the mid-face, as well as flattening of the

nasolabial folds. At the same time, introduction of the novel, vertical SMASectomy improves redundancy of the fixed SMAS in the pre-auricular area. Moreover, the inferior limb of a vertical SMASectomy could be extended to the platysmal redundancy, allowing for platysmaplasty in one manoeuvre. Such inferior extension is done in the secure area behind the angle of the mandible, which makes the mandibular branch of the facial nerve perfectly safe.⁷ Our vertical SMASectomy thus allowed for avoidance of a classical corset-type platysmaplasty in many of our patients with the moderate neck laxity. Therefore, S-Plus lift should not be constructed as a simple, skin excision 'mini-lift', but rather as a complex face-lift that incorporates SMAS suspension techniques and principles.

Not all patients are good candidates for the S-Plus lift, and it behoves the surgeon to select the appropriate candidate carefully. In our experience, the best candidates are younger and middle-aged patients who would like to be pro-active in maintaining a youthful appearance, rejecting an over-pulled classical rhytidectomy stigma. While the S-lift yields best results in patients with mild-to-moderate neck laxity and mild-to-moderate jowling, the S-Plus lift is particularly suitable for patients with mid-face laxity or ptosis, moderate-to-severe neck laxity, moderate-to-severe jowling and prominent nasolabial grooves (Figs 4 and 5). Patients who have had previous face-lift surgery or patients with medical problems dictating a short anaesthetic and surgical procedure can also be considered for the S-Plus lift. The procedure can also be performed in smokers, but with caution. The problem with smokers is that, due to irreversible occlusive vascular changes, there is a higher incidence of skin necrosis.¹⁸ With the longer flap there is a higher possibility of complications. Therefore, we strongly recommend patients to discontinue smoking for at least 2 weeks prior to and following face-lift surgery. In heavy smokers who are unable to follow the recommendations, a deep plane procedure may be more appropriate, since a skin flap that is raised for an S-Plus lift or any other type of SMAS face-lift creates a much less viable flap than the composite flap.

In our series, encountered complications included haematomas, hypertrophic scarring, suture extrusion, facial nerve palsy, and parotid injury. The incidence of complications was similar to those for other SMAS face-lifting techniques.^{11,15,19} The use of tumescent anaesthesia and direct, rather than blind, dissection is strongly encouraged to preserve tissue planes and prevent facial nerve injuries. In primary rhytidectomy, good tumescent infiltration allows easy dissection of natural subcutaneous plane by simple spreading of scissors in a plane parallel to skin. Direct visualisation is particularly important in revision rhytidectomy, in which normal tissue planes may have been disrupted. In our procedure, surgical exposure to the neck is somewhat limited, compared with the more classical rhytidectomy approach. The novice surgeon may particularly be bothered by this limited exposure and the resultant difficulty with instru-

mentation. If this is the case, visualisation of the neck can significantly be improved by extending the standard S-Plus lift incision 1–2 cm postauricularly.

Conclusions

Many rhytidectomy patients demand safer and shorter procedures, less anaesthesia, and more rapid return to normal activities. The S-lift is generally a 'short-flap', SMAS plication face-lift procedure, whereas the S-Plus lift with its mid-face extension is a 'long-flap', SMAS imbrication rhytidectomy. It has a very low complication rate, high degree of patient satisfaction, and can be done safely in an office environment. Less is not always more, but in many patients it is more than enough.

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