

DISCUSSION

Plastic surgery quest for the ultimate face lift has taken us on a journey from skin to bone, from two to three dimensions, and more recently, back to the skin. The continuing improvements in rhytidectomy have resulted from a better understanding of anatomical facial soft tissue relationships, anatomic changes induced by aging, and a greater appreciation of aesthetic concepts pertinent to the aging face. The myriad emerging techniques in rhytidectomy attest to the continuing controversies about incisions, technical approach, and which is the optimal plane for dissection.

The face is the window of the human emotion and self image to the world, and it is here that the first signs of aging appear. Facial rejuvenation surgery attempts to erase the visible signs of aging, thereby turning back the clock. Candidates for facial rejuvenation struggle with the fact that they feel younger than they appear, regardless of their chronological age. They long for the chiseled features of their youth, the harmonious relationship that existed before their features became captive to forces of gravity and time. The role of the aesthetic surgeon is to restore the lost harmony of facial balance and not try to create a new one.

Every year more aging patients present themselves to plastic surgeons requesting facial rejuvenation. They hope to regain some measure of what they had in their youth. Most of these patients do not seek a dramatic change in physical identity but they seek to appear more rested, involved and confident. This trend is also reflected in the evolution of less invasive methods of rhytidectomy.

Minimally-invasive surgical techniques are welcomed in many surgical disciplines as well as in aesthetic surgery techniques, as long as the quality of the result remains good and the complication rate stays low. The ideal facial rejuvenation procedure should be quick and safe, with little or no hospital stay, a swift recovery, and inconspicuous scars. The operation should produce a natural and stable rejuvenation with few or no stigmata of facial surgery (126-129). In this discussion the MACS-lift is tested for fulfillment for these criteria.

Most classical face-lifts act on the subcutaneous or SMAS level with an oblique cranio-posterior vector (63, 78), which can be broken into a horizontal and a vertical component. In recent years more emphasis has been placed on reorienting this vector in a vertical direction (130). It is our opinion that the horizontal vector only produces flattening on the face, whereas the vertical vector is the rejuvenating one. A pure vertical vector on the deep tissues and the skin produces the same rejuvenating effect without flattening the face making rejuvenation appear more natural. Moreover this avoids the need for a retroauricular incision in most of the cases.

This vertical vector is also important in correcting the neck. Strong vertical pull in the lateral region of the platysma muscle mostly corrects the more medially located platysmal bands, as can be simulated in front of the mirror by pulling the region of the mandibular angle upwards (131). This is exactly the action of the first purse-string suture.

The MACS-lift is designed to obtain antigravitational volume redistribution in the face and upper neck by suspending the soft tissues of the face and working in the superficial subcutaneous plane without any deeper undermining (31). The skin excess is redraped in a vertical direction and resected in the temporal region, preventing the formation of a dog-ear at the earlobe usually appears when lateral skin redraping is performed, which necessitates redraping by retroauricular flap dissection.

Detailed anatomical studies of the human face have revealed the existence of skin retaining ligaments. Some surgeons suggest the need for releasing several of these ligaments to allow adequate repositioning of the skin flap (132). This maneuver is indeed necessary when lateral traction on the cheek flap is performed. However, it is unnecessary and probably disadvantageous when the skin and deep soft tissues are lifted in the same vertical direction.

Furthermore, it seems illogical in a procedure intended to reverse the forces of gravity on aging facial tissue to destroy a structure that provides the skin with extra support against gravitational pull. The classic concept of skin undermining seems to change when vertical suspension of soft tissue and vertical skin redraping are performed. Cutting and releasing of skin retaining ligaments especially the mandibular retaining ligament, which is considered mandatory to permit good correction of the jowling deformity (132), is not necessary when performing MACS-lift which adds more to the safety of the procedure.

It is now well known that the restoration of facial volumes is more important than the amount of skin resected and the tension on the skin and SMAS (26). There are many methods to obtain this volumetric restoration, volume can be added by lipofilling for example, or the tissues can be shifted or plicated into a more cranial position.

The question remains, in what plane should we work to obtain a good result without too much morbidity. The subperiosteal approach dramatic changes and is safe with respect to facial nerve. Nevertheless, the morbidity of this approach is quite high and the recovery time extensive (132). Use of this approach seems illogical, because the periosteum is the only facial structure that is unaffected by gravity.

Deep plane SMAS techniques deliver good results, but the dissection is extensive and tedious, resulting in high morbidity and slower recovery (132). The MACS-lift technique acts directly on the ptotic soft tissues with suspension sutures in the superficial subcutaneous level, together with a limited skin undermining. This is far more producible technique. It is safe and as durable as the deep plane and subperiosteal approaches and offers the added benefits of significantly lower morbidity and faster recovery.

Traditional teaching indicates that adherence between the raw surface of two flaps is necessary to obtain a long and lasting result. Suturing techniques are often viewed with skepticism and are presumed to produce poor or ephemeral results. It is well established that suturing techniques produce reliable results in several other facial aesthetic procedures, such as in endoscopic brow lift and in nasal tip surgery: it therefore stands to reason that they can play a role in face lift surgery as well.

The reason for skepticism about suturing techniques is the assumption that the result will rely on the integrity of the suture or the anchor point. Indeed, in the case of pure cable suturing between two points, the result does depend on the fragile connection and may be lost if the suture breaks or is torn through the tissue in a cheese-wiring mechanism (133).

However, purse-string sutures woven into the SMAS tissue are very different from cable sutures. A purse-string suturing technique, as advocated in the MACS-lift, is in fact a facial sculpturing technique that acts by the mechanism of multiple microimbrications of the subcutaneous tissues (121).

The multiple microimbrications adhere to each other, resulting in a fibrotic three-dimensional scar: this leads to a stable volume shift in the subcutaneous tissues of the face. In all probability the action of the sutures is replaced by this subcutaneous scarring. Moreover, because the skin redraping is in a purely vertical direction, the resection of the excess skin in the same direction will actually solidly fix the results of the microimbrications to the underlying subcutaneous tissues.

This is reflected on the stability of our result during the period of the study, where only one case showed regression from grade 1 of aging lower face and upper neck in early postoperative to grade 2 in the late postoperative period. Taking in consideration that the patient gained weight in this period that might contribute in changing the results obtained before.

The principal danger zone regarding placement of the sutures is on the zygomatic arch, halfway between the ear and the lateral orbital rim (zone 1). This zone is completely avoided; no suture crosses the zygomatic arch. The anchor point of the first two sutures is located posterior to the frontal branch of the facial nerve. The first loop is directed vertically downward and reaches the lateral edge of the platysma muscle in the region below the mandibular angle. The marginal mandibular branch of the facial nerve is out of danger for entrapment by the purse-string suture, because it runs more anteriorly.

The second purse-string suture loop runs at an angle of 25-30 degrees and reaches to 1 to 2 cm above the mandibular border. The third loop takes its origin in the temporalis muscle fascia, just lateral to the lateral orbital rim, and is also directed downward. It lies well anterior to the course of the frontal branch of the facial nerve.

The design of the course of the purse-string sutures, together with minimal amount of only subcutaneous dissection and the technique of blunt dissection applied, make the MACS-lift a very safe procedure as regard facial nerve injury. In our study none of the cases suffered from facial nerve impairment.

The tightening of the first purse-string suture leads to superior pulling of the lateral portion of the platysma. Together with the closed suction lipectomy of the neck, this suture produces a dramatic correction of the cervicomental angle and contour of the upper neck. According to the results obtained in our study first purse-string suture leads to mean improvement of 54% of the preoperative condition of the upper neck.

These results also shows that 7 cases of grade 2 in the upper neck region had a mean improvement by 65%, 3 cases of grade 3 improved by 55%, 8 cases of grade 4 improved by 46%, and 2 cases of grade 5 improved by 44%. Platysma-mastoid suture applied in 5 cases of grade 4 upper neck aging changes and was effective in downgrading these changes by 50% compared to 42% improvement in 3 cases of grade 4 without applying this suture.

When the second purse-string suture is tightened it put the SMAS under concentric tension, producing a lifting effect on the jowls, the marionette groove, and the corner of the mouth. This was able to improve the grading of the lower facial region by 84% mean improvement according to our results. We were able to improve 9 cases with grade 2 changes in the lower face by 95%, 7 cases with grade 3 by 77%, and 4 cases with grade 4 by 75%.

Tightening of the third purse-string suture produces a suspension of the malar fat pad. This provides a correction in the nasolabial groove and midface area and shortens the height of the lower eye lid. The third purse-string suture was utilized only in 5 cases of our study, in these cases the grading of the middle face region (3 grade 3 cases and 2 grade 4 cases) show mean improvement by 65%. While the overall mean improvement of the middle facial region of the 20 cases was about 70%, this was due to the much easier to correct grade 1 middle face aging changes (5 cases with mean improvement of 80%), and grade 2 (10 cases with mean improvement of 82%). These two grades were corrected through the vertical volume shift created by the second purse-string suture.

Standard MACS lifting includes submental liposuction for correction of the cervicomenal angle, but has no direct action on the medial platysmal borders or the underlying subplatysmal fat, digastric muscle, or submandibular gland. The benefits of acting on these structures, as in corset platysmarraphy with or without resection of the submandibular gland, are well known and its results have been reported (63, 134).

Suturing the platysmal bands together at the midline may produce a hammock effect (134), but seems to us unphysiological, as the medial platysmal edges of the muscle were never joined at the midline at a younger age. Moreover, suturing the platysmal edges medially produces a downward pull on the cheek volumes that acts against the desired lifting effect in the lower face.

Platysmorrhaphy is not exempt of complications (135): increased incidence of haematoma, risk of contour deformities by over-resection of subplatysmal fat or loosening of the raphy. The good and stable results obtained with extensive supraplatysmal suction lipectomy, combined with strong vertical purse-string suspension of the platysma, made us able to abandon classical platysmorrhaphy.

With our option of working as minimally invasively as possible while still achieving a good result, we try to avoid opening the neck whenever possible. In 90% of our cases, MACS lifting and submental liposuction alone produced a very satisfying correction of the neck and the cervicomenal angle. The idea behind short-scar face-lifting is that a simple, safe procedure is preferred over more radical but potentially more risky surgery.

One consequence of vertically redraping the facial skin flap is that in some patients, aesthetically unacceptable vertical folds appear in the infralobular region. This occurs primarily in patients with extreme neck laxity and thin, elastotic, wrinkled neck skin associated with severe sun damage.

After completion of a MACS lift procedure unacceptable skin folding in the infralobular region should be addressed by a posterior cervicoplasty in the same operation. With growing experience, the surgeon can predict preoperatively whether a posterior cervicoplasty will be necessary. With the patient in front of the mirror, the region of the mandibular angle is pulled upward. If vertical skin folds appear in the infralobular region, there is a high likelihood that a posterior cervicoplasty will be required.

Posterior cervicoplasty is essentially a pure skin redraping procedure for correction of possible vertical skin folds in the neck after a MACS lift. It has absolutely no effect on the submental area or the cervicomental angle. In our study only one case (case no 3) needed posterior cervicoplasty, and it effectively reduced the excess skin folds in the infralobular region with a very good scar results.

The quality of the preauricular scar is of utmost importance to avoid face-lift stigmata. Temporal pre-hairline incisions are unpopular because of fear concerning the visibility of the scar. The quality of the scar can be improved greatly by little tricks. The horizontal limb of the MACS-lift incision was done using a zigzag pattern incision as stated by Tonnard (31) and firstly suggested by Camirand (118), who was using it earlier in his face lift technique.

The zigzag incision unfolded and stretched into a linear scar when it was coapted to the linear resection border of the cheek flap after resection of the skin excess. The zigzag pattern partly compensates for the incongruence in length between incision and excision border, and the risk of dog-ears in this region will be reduced. Similar to the technique of Camirand (118), this incision was made with the blade oriented obliquely to the skin, and thus perpendicular to the hair shafts. This maneuver allowed hair regrowth through the skin in front of the scar, hiding the scar within the hair bearing skin, making it less conspicuous.

Because the purely vertical redraping of the skin, the vertical part of the incision was closed with absolutely no tension on the skin edge. In most case only a few millimeters of skin was resected at the area of the tragus, thereby preventing postoperative tragal retraction and exposure of the external auditory meatus on profile.

At the lower border of the tragus, a distinct horizontal incision was made to reconstruct a natural incisura intertragica and to prevent a linear vertical contraction band at this incisura. The ear lobe was inserted with absolutely no traction.

After MACS-lifting, the position of the auricle remained absolutely stable in the anteroposterior and craniocaudal directions, because there was very little skin resection in front of or below the auricle. The examples shown previously in results demonstrate the pleasing aspects of the preauricular region.

The results of scar assessment by both patients and doctors in our study shows that the scar in 19 cases was found of excellent quality leaving no obvious sign that the patient underwent a face lifting procedure. Only one case the scar was of bad quality showing an unsightly scar that was unacceptable by the patient and the surgeon, and required another procedure of scar revision.

Face lift surgery involves specific potential complications. The most dreaded ones are those which cause permanent and irreparable deformities, such as nerve paralysis, major skin slough, and hypertrophic scarring (135, 136). When complication in face lift surgery are analyzed, it is clear that the frequency and degree of complications are proportionate to the extent of the incision, the area of skin undermining, and the complexity of the work performed under the skin.

The most frequent complication in face lifting procedure is hematoma (137), which usually does not cause permanent damage but is disturbing for both the patient and the surgeon, because it requires reintervention. In some series the incidence of hematoma approaches 15%, but this diminishes as the surgeon gains experience (138).

It is logical that the risk of a hematoma is proportionate to the extent of the dissection. With limited dissection applied in the MACS-lift the risk of hematoma can be

easily decreased especially by gain more experience of the technique. In some series the incidence of hematoma approaches 15%, but this diminishes as the surgeon gains experience (138). The other complication encounter by us was obvious or unsightly scar in one patient (case no 11).

The occurrence paralysis of a facial nerve branch depends on the surgical technique applied and the surgical skills of the operator. Face lift techniques that avoid dissection in the vicinity of facial nerve branches like MACS-lift are less likely to cause nerve damage. Safe facial dissection together with careful placement of purse-string sutures leads to absence of facial nerve injury in all our cases.

No other major complication like infection, ischemia of the skin flap, or skin sloughing was encountered in our cases. Also we succeeded to avoid face lift stigmata, which are signs that a face lift has been performed, such as; visible scarring, temporal hair line elevation, wind tunnel effect with facial flattening and pseudomacrostromia, lateral sweep phenomena, or auricular displacement (129), as the purposes of face lift should be facial rejuvenation that leaves no obvious sign that surgery has been performed.

The MACS-lift proved to be an effective treatment in most of our patient seeking face lift surgery, but facial rejuvenation should be patient oriented, tailored to the individual's problems, wishes, and needs. This is in contrast with the tendency to impose a standardized total facial rejuvenation program on every patient. When the limits of the MACS-lift procedure are reached, ancillary procedures, such as laser, fillers, botulinum toxin, brow lift, upper and/or lower blephroplasty can be employed to complete the customized treatment, taking care not to overtreat any patient.

One of the limits of the MACS-lift is the forehead and the periocular region or the upper facial region, which is not handled by the MACS-lift. The indications for brow lifting are very surgeon dependent. Some surgeons consider every patient a candidate for a brow lift; other surgeons, and we fall into this category, are more conservative and do not routinely elevate every patient's eyebrows.

A vast array of procedures is available for forehead correction, ranging from open foreheadplasty to endoscopic brow lift or limited incision temporal lifting techniques. Since the introduction of Botulinum A toxin into our practice our indications for surgical brow lifting have diminished significantly. Many patients is offered Botulinum toxin treatment after surgery, this completes the treatment and optimizes the results.

At the end of this discussion we can tell that the MACS-lift as a short-scar rhytidectomy technique that can produce very pleasing and natural facial rejuvenation results through pure vertical shifting of facial deep tissues and skin. Morbidity and complication rate are very low, and the results seem to be stable over time. Both patient and surgeon satisfaction are high. On this basis, MACS-lifting can be a valuable tool in a modern face-lift practice.