Management of Face Lifts With Progressive Tension Sutures

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Background: Performance of deeper and more extensive dissections in face lift procedures has led to more complex procedures, a higher rate of reported complications, and more prolonged convalescence.

Objective: We investigated the use of progressive tension sutures (PTSs) to achieve more controlled, safe, and secure skin flap management and improved aesthetic results.

Methods: Defatting of the neck was performed by lipoplasty or direct excision. The face was dissected in a subcutaneous plane to enable individualized management of the deeper tissues. After employment of appropriate face lift techniques, the skin flaps were advanced and PTSs were placed from the deep surface of the skin flap to the underlying superficial musculoaponeurotic system and were also used to advance the lateral neck and postauricular skin flap.

Results: Early findings in a series of 10 patients followed up for at least 1 year showed excellent aesthetic results with no cases of skin flap necrosis or widening of scars, minimal swelling and ecchymosis, and no long-term complications.

Conclusions: The use of PTSs, in combination with individualized management of the deep tissues, can reduce wound complications, decrease postoperative edema, and promote shorter recovery. (Aesthetic Surg J 2003;23:28-33.)

The recent trend in face lift procedures to perform deeper and more extensive dissections has led to an increase in the complexity of procedures, a higher incidence of reported complications, and prolonged convalescence because of the extent and duration of edema. Most face lift procedures involve some degree of facial skin redraping, in which the flap is stretched along a particular vector and suspended from the skin closure. Dead space created by this closure is managed with drains and pressure dressings. Skin necrosis, hematoma formation, hypertrophic scars, and skin tension deformities may result from this dead space and skin tension. These observations, a personal renewed interest in the role of the skin flap in face lift procedures, and the work of Robbins et al., Baker, and Hoefflin led to our search for a simple, safe, and effective approach to management of the face lift skin flap.

Regardless of what technique is used to deal with the suspension or reshaping of the deeper tissues, most face lift techniques involve a subcutaneous dissection, mobilization, advancement, and closure of skin flaps. To prevent potential complications related to the skin flaps and to improve face lift results, we applied the concept of progressive tension sutures (PTSs), which was previously described in relation to abdominoplasty procedures (Figure 1). The addition of these sutures eliminates dead space, thereby preventing fluid accumulation and reducing early edema. Furthermore, the PTSs distribute the advancement tension over a broad area. This reduces tension on the closure, thus reducing the incidence of distal flap circulatory compromise and promoting favorable scars. We have found that use of PTSs for flap advancement, in combination with individualized management of the deep tissues, can reduce wound complications, decrease edema, promote shorter recovery, and improve both early and late aesthetic results in face lift procedures.

The success of this method in our first series of patients encouraged us to report our results in spite of the small number of cases involved.

Operative Technique

This prospective clinical study involved 10 consecutive patients undergoing primary face lift, who underwent procedures by a single surgeon (H.F.). All procedures were done with local anesthetic and intravenous sedation.

The operation began in the neck with appropriate defatting by lipoplasty or direct excision. When indicated, the platysma was plicated anteriorly and incised at the cervicomental angle, and the platysma was suspended posteriorly. The face was dissected in a subcuta-
Figure 1. Diagrammatic representation of the progressive tension suture. Each suture provides additional advancement of the flap, distributing the tension over a broad area and coapting the tissues.

Figure 2. Illustration demonstrates placement of the suture from the flap to deeper tissues.

Figure 3. The arrows indicate the location of individual suture placements and demonstrate the direction of flap advancement. The vector of flap advancement is individualized to accomplish a controlled redraping of the skin flap.

musculoaponeurotic system (SMAS) or appropriate sub-SMAS dissection with advancement and suture. The skin flaps were then advanced, and 3-0 Vicryl progressive tension sutures were placed from the deep surface of the skin flap to the underlying SMAS at intervals of about 1 cm (Figure 2). The vector of the advancement was individualized for each patient. Skin flaps were trimmed and inset under no tension.

After cervical fat reduction and appropriate platysmal support, progressive tension sutures were also used to advance the lateral neck and postauricular skin flap (Figure 3). Drains were rarely needed; however, extensive anterior cervical dissection occasionally required the use of a small suction drain for 24 hours. Additional adjunctive procedures (e.g., brow lift, blepharoplasty) were then performed as indicated.

No pressure dressings or elastic support was used on the face. Absorbent gauze pads were secured over the incisions with a sterile towel used as a scarf. No vitamins, herbal supplements, or steroids were included in the preoperative, perioperative, or postoperative regimen.

Results

Ten consecutive patients who underwent procedures beginning in January 2000 were monitored prospectively. Patient ages ranged from 53 to 71 years, with an average age of 60 years. All patients were American Society of Anesthesiologists class 1. All procedures were performed in an accredited office surgical suite (American...
Association for Accreditation of Ambulatory Surgery Facilities) with intravenous sedation administered by a certified registered nurse anesthetist. After operation, all patients were seen within the first 24 hours, at 1 week, 6 months, and 1 year at minimum. All visits were documented with photographs. Figures 4 to 8 illustrate representative cases (documentation for all 10 cases was submitted but could not be published given space consideration).

There were no anesthetic or long-term complications. There was one case of transient frontal branch palsy, and one patient had a minor parotid leak, which resolved after 2 aspirations. Because in this series malar lift was not always included in the facelift technique, 1 patient required a secondary malar lift and one had Alloderm (Lifecell Corp, Branchburg, NJ) implanted into the nasolabial folds. No complications resulted directly from use of the progressive tension sutures, although occasionally early dimpling was seen. This was caused by early edema and resolved within 1 to 3 weeks. When dimpling is noted following placement of a PTS, it will usually disappear when the next advancement suture is placed. If this does not eliminate the depression, then the suture should be removed and replaced. The 3 main reasons for dimpling are sutures placed too superficially in the flap, a faulty direction of advancement, or advancement that is too aggressive. Several patients had transient skin excess in the temporal area, which can be prevented by the proper direction of skin draping and the inclusion of a lateral brow lift when indicated. No cases of seroma or hematoma were seen. There were no cases of skin flap necrosis and no widening of scars. Postoperative swelling and ecchymosis were minimal, and most patients appeared socially presentable within 7 to 10 days.

Discussion

Progressive tension sutures can be used in skin flap management in any current facelift technique in which subcutaneous undermining is performed. The diffuse distribution of tension results in a natural appearance of the
Figure 5. A-C, Preoperative views of a 71-year-old woman. D-F, Postoperative views 1 month after cervicofacial rhytidoplasty, coronal brow lift, and upper and lower lid blepharoplasty. G-I, One-year postoperative views.

Figure 6. A-C, Preoperative views of a 53-year-old woman. D-F, Postoperative views 2 weeks after cervicofacial rhytidoplasty, lateral brow lift, and upper and lower lid blepharoplasty. G-I, One-year postoperative views.
Figure 7. **A-C**, Preoperative views of a 59-year-old woman. **D-F**, Postoperative views 1 week after cervicofacial rhytidoplasty and lateral brow lift. **G-I**, Two-year postoperative views.

Figure 8. **A-G**, Preoperative views of a 66-year-old woman. **D-F**, Postoperative views 3 weeks after cervicofacial rhytidoplasty, upper and lower lid blepharoplasty, and rhinoplasty. **G-I**, One-year postoperative views.
face without visible lines of pull. Additionally, these sutures eliminate tension on the wound closure, improving blood supply to the distal flap, thereby preventing necrosis and minimizing final scars. Finally, the PTSs firmly coapt the skin flap to the deeper tissues, reducing dead space and potential disruption of early healing, thereby preventing fluid accumulation. Swelling and bruising are minimized, local complications are avoided, and convalescence is shortened.

The simplicity of this technique results in a short learning curve. The dimpling that may result from a PTS usually disappears as subsequent sutures are placed. Although permanent dimpling has not been observed, care should be exercised to avoid this potential problem. The PTS should only include enough tissue (subcutaneous fat and if necessary deep dermis) to permit anchoring of the flap in an advanced position. Also, the direction and amount of pull must be consistent through the advancement. Care must be exercised in the placement of the PTS to avoid the frontal branches of the facial nerve and the posterior auricular nerve.

The authors have had no experience with fibrin glue; however, the following advantages of the PTS technique are suggested:

1. A simple surgical technique
2. Precision redraping of the flap
3. Resistance to shearing movement of the flap
4. No added risk of disease transmission
5. No logistical support required
6. Lower cost

Conclusion

By using a simple suture technique, progressive tension sutures, the management of the face lift skin flap is precisely controlled, resulting in reduction of local complications while speeding convalescence.

References