

Facial Rejuvenation and Improvement of Malar Projection Using Sutures with Absorbable Cones: Surgical Technique and Case Series

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Abstract

Background Currently, the face can be reshaped with minimally invasive procedures. This report describes how the midface can be suspended by increasing the projection of the malar area, decreasing the nasolabial fold depth, and improving the jaw definition using 3-0 polypropylene sutures with absorbable cones (Silhouette Sutures).

Methods Preoperative skin marks were made to indicate the four points on each side of the face where the sutures would exit through the skin: 1 cm lateral to the middle of the nasolabial fold, at the corner of the mouth, and on the line from the lateral corner of the lips to the angle of the mandible. The sutures were inserted through a 1.5-cm incision positioned in the temporal area. After insertion of the needle, the sutures were fixed to a small polypropylene mesh over the deep temporal fascia.

Results A total of 316 patients were treated between January 2007 and December 2009. The results over a mean follow-up period of 18 months were good, with high patient satisfaction. All the complications experienced by 42 patients (13.3%) were minor and temporary including temporal area pain (7%), visible dermal pinching (3.5%), hematoma (1.3%), asymmetry (0.6%), and suture palpability (0.3%). There were no infections.

Conclusions Face-lifts were performed for 257 women with a mean age of 47 years and 59 men with a mean age of 49.5 years. This procedure can be performed for various age groups to rejuvenate and reshape the middle face. Men

whose scars cannot be easily hidden due to baldness are good candidates as well. The technique led to stable results and only minor, temporary complications, with a high level of satisfaction among patients and surgeons. The longevity of the results beyond the mean follow-up period of 18 months needs to be determined.

Keywords Midface · Silhouette sutures · Suture suspension

Currently, the face can be reshaped with minimally invasive procedures [1] that can achieve good results with a fast recovery time and a very low risk of complications [2, 3]. These minimally invasive procedures may be performed separately or in combination with other facial surgical procedures [4]. Candidates for these procedures include aged patients with facial skin laxity needing rejuvenation, younger patients who need better malar projection, and patients of any age with asymmetry due to facial palsy and no possibility of functional nerve restoration.

We applied the suture suspension technique using 3-0 polypropylene sutures with absorbable cones (Silhouette Sutures; Kolster Methods, Inc., Corona, CA, USA) (Fig. 1), approved by the Food and Drug Administration for facial surgeries to obtain better malar projection, to decrease the depth of the nasolabial fold, and to improve jaw line definition. The sutures were fixed to the deep temporal fascia (DTF) reinforced with a polypropylene mesh [5, 6].

Materials and Methods

The suture we used is composed of an 8-in. (20-cm) straight needle (Fig. 2) attached to a 14.7-in. (37.3-cm) 3-0

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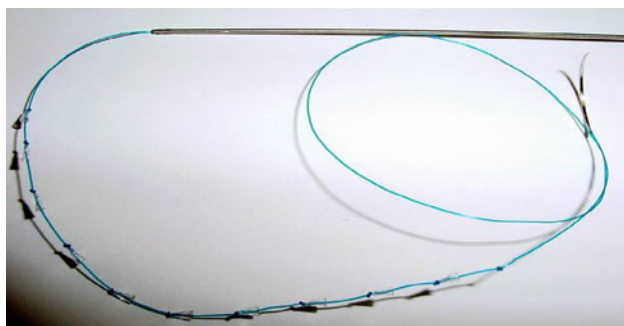


Fig. 1 The 3-0 polypropylene sutures

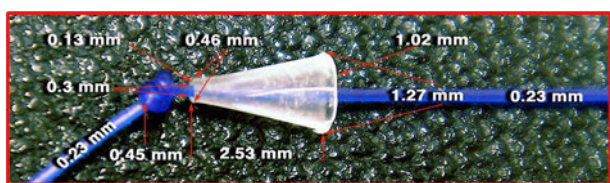


Fig. 2 The cone/knot system with absorbable cones

polypropylene suture. In the middle of the suture are nine knots spanning 8 cm (at approximately 10-mm intervals). Each knot is intercalated with an absorbable cone, making up a series of eight engaging elements. The cones are hollow, with an outer diameter of 1.27 mm at the base and 0.46 mm at the top and a length of 2.53 mm. They are made with an L-lactic acid and glycolide copolymer. The proximal end of the suture is swaged to a 26-mm, one-half circular needle. The proximal end of the 3-0 polypropylene sutures with absorbable cones was fixed during the procedure to a nonabsorbable synthetic knitted surgical mesh (0.5/1.0 cm) to reinforce the DTF.

The preoperative marking of the exit points begins at the nasolabial fold and the “marionette lines.” We mark at least four points. The first point is 1 cm lateral to the corner of the mouth, and the second point is 1 cm lateral to the midpoint of the nasolabial fold. The third and fourth points are 1.5 cm from each other in the line between the corner of the lips and the angle of the mandible (Fig. 3). If necessary, the fifth and sixth points can be placed in the same line more lateral to the previous ones. The incision is placed in the hair-bearing temporal area parallel to the zygomatic arch.

A small pocket is dissected at the level of the DTF (Fig. 4), and a 1 × 0.5-cm nonabsorbable mesh is sutured to the fascia. Before we introduce the suture, we measure the distance between the exit points and the lateral orbital rim to keep the superior part of the zygomatic arch free of cones.

A blunt introducer guide is used (Fig. 5) to protect the integrity of the tissues. The course of the guide begins in a

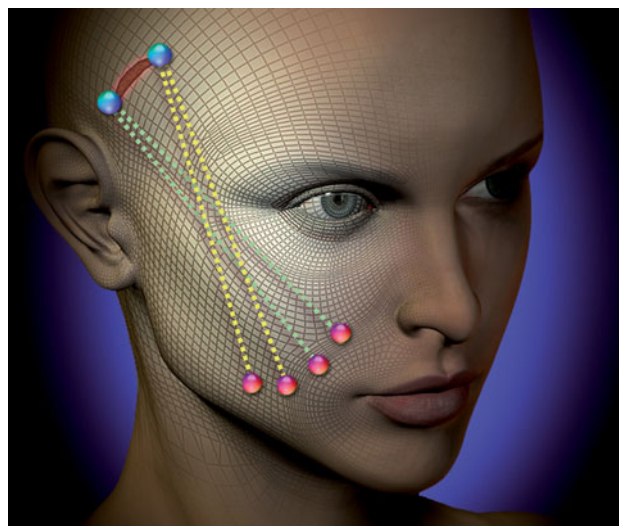


Fig. 3 Marking of the exit points



Fig. 4 The deep temporal fascia is visible

deep plane between the superficial parietotemporal fascia and the DTF. At the level of the hairline, the guide runs in the subcutaneous tissue to prevent facial nerve injury. Lower to the zygomatic arch, the suture plane is between the superficial muscular aponeurotic system and the subcutaneous level (Fig. 6).

When the introducer arrives at the exit point, the internal blunt guide has to be removed proximally. The needle with the suture is gently pulled and removed distally to allow the cones to be placed in the desired location. Once the thread is positioned, the suture out of the skin must be removed (Fig. 7).

After the sutures are applied, their proximal ends are pulled from the temporal incision to achieve the desired midface elevation and fixed together in pairs to the DTF through the mesh by the curved needles (Fig. 8). The

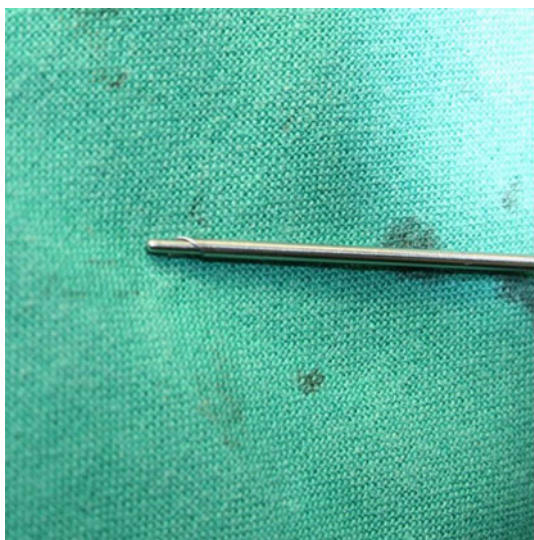


Fig. 5 The blunt guide introducer



Fig. 6 The position of the suture at the subcutaneous level

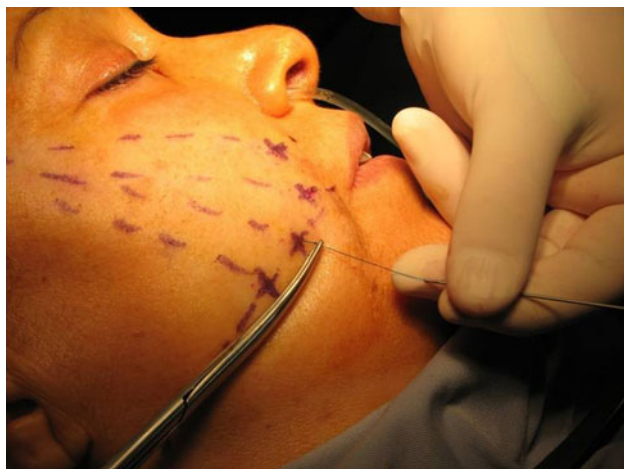


Fig. 7 Cutting the suture

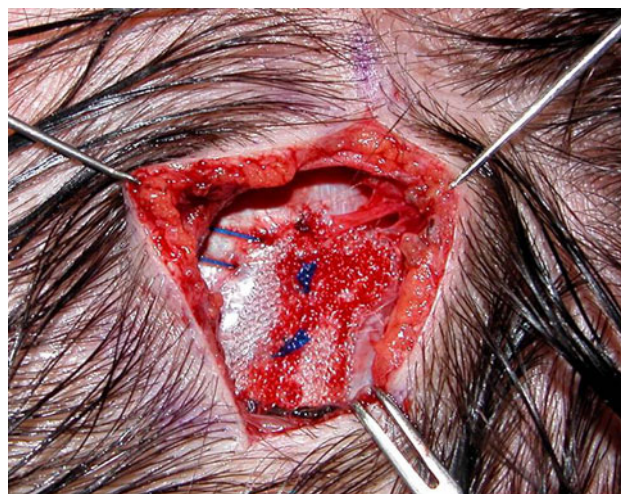


Fig. 8 The mesh and the sutures knotted in pairs

incision is closed in the subdermal plane with 4-0 Vicryl sutures and staples.

Results

The study included 316 patients who underwent mid-face-lifts using 3-0 polypropylene threads with absorbable cones from January 2007 to December 2009. Of these patients, 257 were women with a mean age of 47 years (range, 28–66 years), and 59 were men with a mean age of 49.5 years (range, 31–68 years). The average follow-up period was 18 months, from January 2007 to December 2009. The average number of sutures per patient was 8.1. Of the 316 patients, 310 received 8 sutures and 6 received 12 sutures. A total of 22 patients underwent a combined midface suture lift and endoscopic forehead-lift or upper and/or lower blepharoplasty or neck-lift. No patients were removed from the study. All the patients had stable results during the follow-up period.

Complications

The 316 procedures resulted in 42 complications (13.3%) for the same number of patients. All the complications were temporary and minor, and no infections occurred. The intraoperative complications were hematoma in the temporal area in four cases (1.3%). In two of these cases, the blunt introducer was not used, and the suture ruptured due to excessive traction during knotting.

The most common immediate postsurgical complication was moderate pain in the temporal area for 22 patients (7%): 19 patients for 2 weeks and 3 patients for 4 weeks. Visible dermal pinching was present in 11 cases (3.5%)

1 week after surgery. These resolved within 2 to 4 weeks without any treatment.

The risk of dermal pinching was minimized by soft massage performed on affected areas immediately after surgery. Asymmetry was experienced by two patients (0.6%), probably due to insufficiently meticulous pre-operative marking. These resolved with a retightening technique performed 3 months after the initial surgery. Suture palpability occurred for one patient (0.3%) and resolved when the too-superficial suture was removed.

Discussion

Several publications on facial suspension sutures report complications with barbed sutures [7–13]. Ecchymosis [8, 11] and swelling [8, 11] are generally transitory and common after any surgery.

Malposition [7] and asymmetry [11], in our opinion, result from a lack of a standard and clear surgical technique. Suture breakage [2], palpability [7–9, 12], and irregularity of visibility [11] and skin [8, 10, 12] are due to the physical effect of the “barb.”

To obtain an elevation of the soft tissue, barbs are used to fix the deep part of the dermis, and this requires the introduction of thread in a very superficial plane. Recurrent laxity [8], extrusion [8, 10, 13], and migration [12, 13] are the consequences of thread design. The barb represents a point of physical weakness in the body of the thread, raising the risk that the thread will break or “peel” under pullout tension [14]. Then the free part of the barbed thread can migrate during movements associated with facial expression [12, 13].

The 3-0 polypropylene sutures with absorbable cones are less likely to result in the complications associated with barbed sutures, and they must be used with a specific surgical technique. This latter feature reduces the risk of malposition, asymmetry, and, when performed with a special introducer, ecchymosis.

The cone has a 360° surface to resist suspension traction and immediately provides strong fixation [14] in the subcutaneous tissue, so the threads can be placed deeper to avoid palpability and visibility. The fibrous reaction around the cone creates a more solid support of the soft tissue than occurs with barbed sutures, providing a stronger result.

The suture suspension technique for the mid-face-lift is considered minimally invasive and can be performed in a short time with local anesthesia on an outpatient basis. The absorbable cones are the most important part of the sutures. These cones slide over the polypropylene suture and cover the knots at the time of insertion. Then during

the traction and fixation, the distal knot supports the tip of the cone, resulting in the attachment and elevation of the soft tissue.

The cones also allow for a solid 360° of anchoring with fibrosis, which provides a nonslipping base ensuring that the sutures remain in place during the entire healing process. The entire surface of the cone is smooth so that patients do not experience the “prickling” sensation common with other types of sutures.

The absorbable cones are responsible for the long-lasting result. Because they are foreign bodies, they stimulate inflammatory reactions (Fig. 9). While the cones are slowly degraded by the inflammatory response (Fig. 10), a

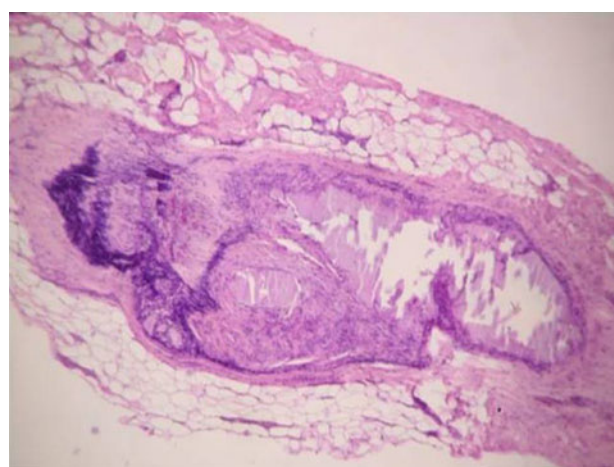


Fig. 9 Fibrosis around the cone. A micrograph (×40) of a histologic section showing a cross section (half cut) of a cone and ingrowing new fibrotic tissue

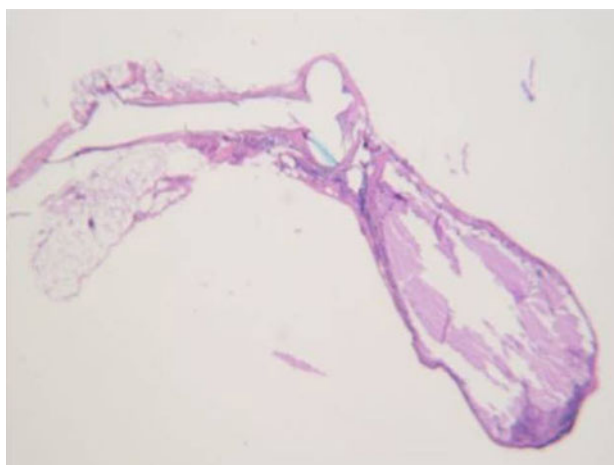


Fig. 10 Micrograph of the suture and cone. Image of the suture (×40) with a knot in the center and one of the preserved polyglycolic cones surrounded by a fine fibrous capsule

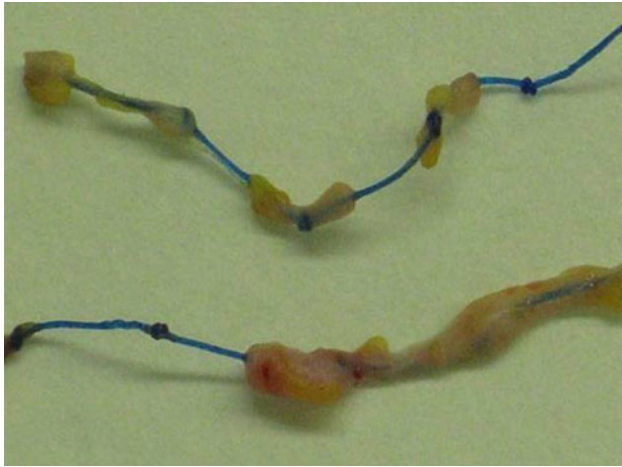


Fig. 11 Suture material with fibro-adipose tissue removed 1 year after insertion during a mid-face-lift for a male patient

fibrous capsule forms around them. In 11 months, 75% of the cone material is reabsorbed. The fibrous capsule forms in layers and functions as a scar around the knots of the suture (Fig. 11). This type of capsule, not present with barbed sutures, provides a better attachment to the superficial adipose tissue.

Conclusions

The suture suspension technique is minimally invasive and can be performed easily with local anesthesia on an outpatient basis. It is applicable for various age groups to rejuvenate and reshape the midface (Figs. 12, 13, 14, 15).



Fig. 13 **a** Preoperative view of a 51-year-old patient. **b** Face- and neck-lift with cone sutures 21 months postoperatively

The results are relatively long-lasting (3 years is the longest follow-up period to date in this study), with high levels of patient satisfaction. However, the longevity of the sutures remains to be determined. The ideal surgical indications are moderate skin laxity, malar fat ptosis, deep nasolabial folds, and an irregular jaw line.

The procedure also may be used for static correction of facial palsy when functional restoration of the nerve is not possible. Patients with a previous face-lift procedure who need correction also are good candidates. Men whose scars are difficult to hide when baldness is present are good candidates as well. The brief recovery time allows for rapid return to social life, 3 to 5 days after surgery.



Fig. 12 **a** Preoperative view of a 40-year-old patient. **b** Endoforehead-lift, upper blepharoplasty, and mid-face-lift with cone sutures 6 days postoperatively. **c** Preoperative profile view. **d** Postoperative profile view



Fig. 14 **a** Preoperative view of a 49-year-old patient. **b** Endoforehead-lift, mid-face-lift with cone sutures, and neck-lift (lateral and middle platysma) 15 months postoperatively. **c** Preoperative profile view. **d** Postoperative profile view 15 months postoperatively



Fig. 15 **a** Preoperative view of a 49-year-old patient. **b** Midface suture suspension 2½ years postoperatively. **c** Preoperative profile view. **d** Profile view of midface suture suspension 2½ years postoperatively

Conflict of interest Dr. Javier de Benito discloses that he has received consulting fees from Silhouette Lift Company for travel and hotel expenses associated with providing lecture and surgery workshops for the company. The author received no profits, shares or other economical consideration.

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