ContourLift™: A New Method of Minimally Invasive Facial Rejuvenation

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The ContourLift™ is a minimally invasive cosmetic lifting procedure that uses barbed sutures threaded through the soft tissues of the face and neck along surgeon-determined vectors. The sutures are then fixed to an anchoring point to produce elevation of ptotic tissue that is sustained in most patients for at least 12 months. Five common procedures, including elevation of the brow, mid face, jowl, lower face, and neck, are reviewed, and the benefits and limitations of this novel technique are discussed.

The use of barbed sutures in aesthetic procedures was pioneered by several cosmetic surgeons working independently. In the 1990s, Dr. Harry Buncke in San Mateo, Calif, received a patent describing his discovery of specific uses and methods of delivery of barbed sutures.[1] In the late 1990s, a bidirectional barbed suture (Aptos® thread) was used by Dr. Marlen Sulamanidze in Russia.[2] In the United States, these free-floating sutures have been marketed under several brand names, including FeatherLift®. In 2004, barbed sutures developed by Dr. Gregory Ruff in Chapel Hill, NC, obtained US Food and Drug Administration clearance for aesthetic applications and are marketed under the trade name Contour Threads™.[3]

The key element of the thread techniques has been the ability to predictably move tissues along surgeon-determined vectors to produce tissue elevation without visible scarring and significant morbidity.[4,5] The so-called "knock" on threads has been the limited longevity results to date, as well as the lack of controlled, multicenter studies to evaluate their efficacy. Early threads that were not fixed to an anchor point have met with limited long-term success.[6] Although thread-based lifting procedures remained interesting, results were spotty. However, the ContourLift™ introduces the concept of fixation to an anchoring point, which in theory should improve longevity and predictability of results.[7,8] In this review, the various ContourLift procedures discussed are based on our experience with nearly 60 cases and 14 months of postoperative follow-up. Ultimately, controlled, multicenter studies will be needed to validate, or potentially invalidate, some of the concepts presented in this article.

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PATIENT SELECTION

Patient selection is perhaps one of the most essential elements in achieving success with the ContourLift. The initial consultation is important in 3 particular ways: assessing patient acceptance and tolerance of risk and reward, determining if the patient's anatomy is appropriate for Contour Threads, and discussing salient features of the postoperative recovery period. Each of these 3 elements is important to the overall success of the procedure and will help establish whether the patient has appropriate expectations of what the ContourLift can and cannot do.

For many patients, a traditional cold-steel approach to aging will be most effective when considering a

"lifting" procedure. It is a given that many patients eschew this surgical approach, which has led to the popularity of minimally invasive cosmetic treatments such as botulinum toxin type A and Restylane® (nonanimal stabilized hyaluronic acid). However, some patients still benefit from elevation of sagging or ptotic tissues, and it is for this subgroup of patients that the ContourLift is an option. When discussing threads, physicians should also include a discussion of other related alternatives, such as a traditional face-lift and radiofrequency tissue tightening.

The ideal candidate is one who has limited tissue sagging but measurable and appreciable brow ptosis, malar fat pad descent, jowl formation, platysma banding with neck laxity, or any combination of these conditions. Patients with extreme cases of tissue laxity are unlikely to respond as well to the ContourLift as patients with early or limited aging changes. In addition, patients with excessively heavy or thin faces should not be considered for this procedure, nor should patients with significant festoons in the malar region. In extremely thin patients, there is a risk of thread visibility under the skin, and in heavy patients, results are often extremely subtle. As with many of the procedures in this minimally invasive space, those patients who need it the least tend to respond the best.

MATERIALS AND TECHNIQUES

There are 2 major types of barbed fixation sutures (Contour Threads), both based on nonabsorbable 2-0 polypropylene sutures: 1) the original model, including the CT200, CT210, CT300, and CT310 series, and 2) the Articulus™ 400 series. The CT200 series is designed specifically for use in the midface and neck regions, whereas the CT300 series is designed for use in the brow. Both series incorporate a half-circle taper fixation needle on the proximal end of the thread, with a straight tapercut deployment needle at the distal end in diameters of 0.044 in and 0.034 in, respectively. The CT200 and CT300 series have the curved fixation needle opposite the deployment needle to facilitate fixation to fascia and require a knot to secure them.

The Articulus series is a single-thread deployment system, and thus eliminates the need for knot tying. It allows for deployment of 2 Contour Threads that are preattached to deployment needles through a single (or double) puncture/entry site, thereby simplifying the process. The 2 threads of one Articulus are the equivalent of deploying two CT200- or CT300-series threads, which then need to be tied or knotted together. Regardless of which system the surgeon uses, threads are always inserted in pairs to facilitate anchoring to fixed tissue points (fascia, periosteum, cartilage). The Articulus CT400 is designed for use in the mid face and neck and contains two 7-inch straight needles with a 0.034-in diameter. The Articulus CT410 is for the brow region and combines two 4.25-in straight needles, also with a 0.034-in diameter. The Articulus series of threads was introduced in early 2006; as a result, follow-up data are limited. Although theoretically easier to deploy with similar longevity to the knotted threads, this still remains to be confirmed with longer-term evidence.

The Articulus series is, in most cases, easier to deploy than the CT200 and CT300 threads because of the elimination of the knot-tying step, and in turn, procedure times can be decreased. However, the deployment needle on the CT400 Articulus thread is smaller in diameter than that on the CT200-series thread, and this smaller needle can be difficult to precisely place in some locations on the face. When firm, robust anchoring is needed, the CT200-series thread attached or anchored to fascia over the temporalis muscle or over the mastoid process can produce significant results. In addition, when the area or vector to be accessed is curvilinear, the larger-diameter CT200 needle is advantageous. However, the ease of use of the Articulus series makes it attractive to use in the brow region and on the neck, where placement of the smaller-diameter needle is less difficult.

All threads are deployed along vectors that have been determined and drawn or marked with the patient in the sitting position immediately before surgery. One of the unique features of thread lifting is its ability to obtain vertical vectors, not usually achieved with standard face-lifting, where the vectors are more posteriorly oriented. Fine- or medium-tipped red Sharpie® markers are excellent for preoperative marking because they do not come off with standard preparatory or sterilizing solutions but can be relatively easily removed postoperatively without aggressive scrubbing, which can dislodge the threads. Anesthesia is obtained locally with lidocaine 1% with 1:100,000 epinephrine or similar injectable anesthet -ics. Some physicians augment this with regional nerve blocks, but an injectable anesthetic is invaluable along the path of the deployment needle to reduce bleeding, as well as to hydro-dissect a plane to facilitate thread introduction. In some cases where multiple threads will be deployed, it is necessary to dilute the anesthetic solution with normal saline 0.9% to stay under the recommended total dosing for lidocaine and produce a final anesthetic of lidocaine 0.5% with 1:200,000 epinephrine. This diluted anesthetic, which can also be mixed with sodium bicarbonate, is often used to anesthetize the vectors or tracks of deployment, whereas the 1% concentration, often mixed with bupivacaine for longer-lasting anesthesia, is used for needle-entry and -exit sites, where postoperative pain is most often focused.

When deploying a thread, physicians should move the introduction needle in a zigzag, sinusoidal pattern to increase the linear length of the deployed thread (Figure 1).

Figure 1. Schematic representation of a barbed suture being deployed in a sinusoidal pattern in the midface. Inset: Barbed suture threaded through adipose tissue along a surgeon-determined vector. Figure courtesy of Angiotech Pharmaceuticals, Inc.

Early studies have shown that the holding force of threads deployed in a sinusoidal pattern is substantially greater than for those threads simply placed in a linear pattern. To accomplish sinusoidal thread insertion, the surgeon moves the deployment needle back and forth in a horizontal plane parallel to the cutaneous surface. As a general rule, as many as 20 to 30 sinusoidal motions should be achieved with each thread that is inserted.

PREOPERATIVE MANAGEMENT

It is helpful to order blood work in advance of the ContourLift to rule out bleeding disorders if the patient presents with a history of bruising and heavy bleeding. In these patients, routine tests are performed, including prothrombin time, partial thromboplastin time, and bleeding and clotting times. In addition, some physicians screen for hepatitis, human immunodeficiency virus, or both because of the sharp nature of the dissection and the potential risk of infection due to the retained sutures. In some states, because of local regulations, patients older than 50 years may be required to have medical clearance from their general practitioner before undergoing a ContourLift.

A course of prophylactic, broad-spectrum antibiotics is recommended for all patients having a ContourLift performed. Although it is rare for bacteria to grow on a permanent thread, this situation can be difficult to eradicate if it does occur. Antibiotics are started 1 day preoperatively or on the morning of surgery and are continued for approximately 3 to 5 days postoperatively.

Patients should be instructed to discontinue vitamin E, aspirin and aspirin derivatives, and nonsteroidal anti-inflammatory drugs, which may inhibit clotting. Supplements containing ginkgo biloba and ginseng and any other medications that may contribute to bleeding should also be avoided for 1 to 2 weeks before the procedure. In some

TABLE 1

ContourLift™ Procedures by Facial Anatomic Zone

Facial Anatomic Zone*	Number of Threads
Brows—above the lateral canthus	6 total
Mid face—between the lateral canthus and the corner of the mouth	2 per side
Lower face—between the corner of the mouth and the jawline	2 per side
Jowls—straddle the jawline	2 per side
Neck—below the jawline	2 per side

*Multiple adjacent aesthetic units may be treated in 1 stage.

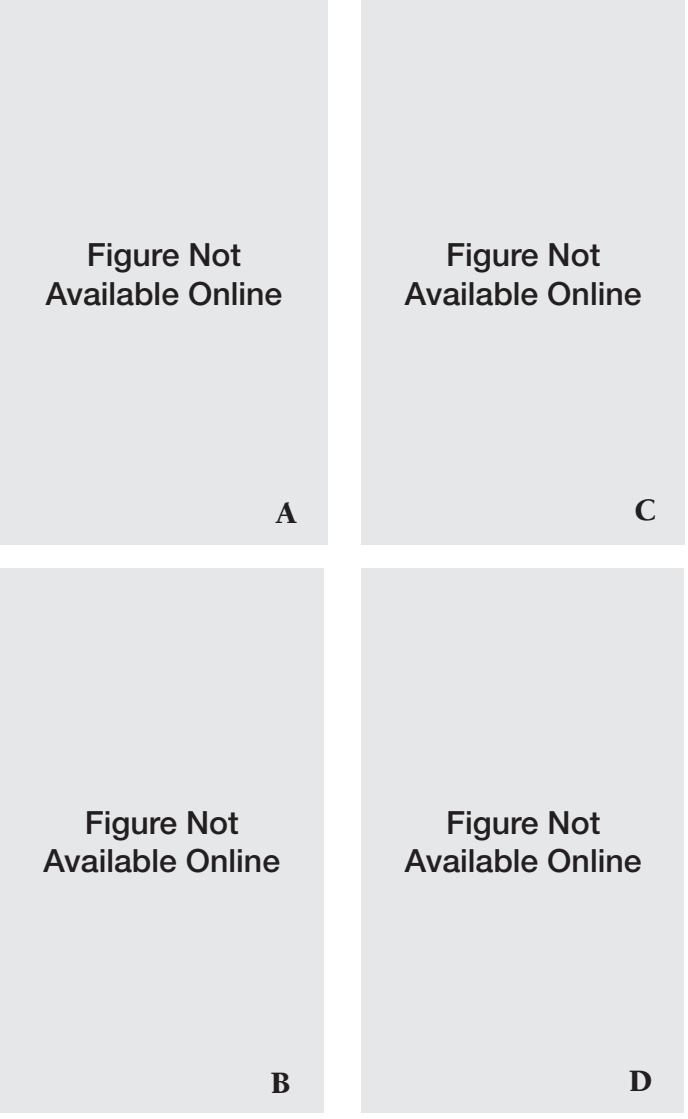

Figure 2. View of a 55-year-old patient before (A, B) and 4 months after (C, D) ContourLift™ to the mid face, jowls, and neck using 6 threads per side.

patients who are skeletonized or who have a thin face, volume enhancement or soft-tissue augmentation prior to performing the ContourLift can be considered. Deeper filler materials such as poly-L-lactic acid or autologous fat can be useful in these patients. For necks with significant adipose, it is also possible to combine the ContourLift with liposuction of the neck. Some surgeons perform these procedures on the same day, with the liposuction preceding the ContourLift. Other surgeons prefer to separate the procedures by several days or weeks, again performing the liposuction first. Platysma repair with one of several known techniques can also enhance postoperative results.

Radiofrequency tissue tightening may be performed several months before or after the ContourLift to enhance collagen tightening and achieve additional tissue movement. There is evidence that radiofrequency tissue tightening can be a useful adjunct to other procedures that produce skin movement, such as liposuction (R. Fitzpatrick, personal communication, August 2005), and early evidence is encouraging as to the synergistic effects of liposuction, radiofrequency tissue tightening, and the ContourLift.

The ContourLift has been used effectively in a number of applications, including brow and mid-face elevation, as well as in jowl, lower-face, and neck procedures (Table 1). The overall effect that can be achieved with these procedures matures over a period of 3 to 6 months. In some cases, the short-term results (4 to 8 weeks) are dramatic but over time relax to a more modest improvement (Figures 2 and 3). However, the overall effect is one with which patients are pleased. In particular, mid-face (malar fat pad) correction tends to be quite

Figure 3. View of a 56-year-old patient before (A) and 6 weeks (B) and 1 year (C) after ContourLift™ to the forehead, brows, mid face, jowls, and neck using 8 threads per side.

stable, whereas results on the neck are less predictable. The important factor to date appears to be that patients are pleased with the amount of correction they obtain with the ContourLift in the absence of more aggressive surgical procedures.

Brow Elevation

When treating the brow area, surgeons should administer injections of botulinum toxin type A at least 2 weeks prior to performing the ContourLift so that the brow can heal without opposing muscular movement. The ContourLift and treatment with botulinum toxin type A should not be performed simultaneously because botulinum toxin type A can migrate as a result of operative manipulation and postoperative edema, leading to lid ptosis.

With the brow-lift technique, patients should be counseled to expect a minimum of 2 to 3 days of downtime before they can return to work. There may be some bunching of the tissues after the procedure, which will relax during this period. With the brow procedure, there are normally 2 days of postoperative discomfort that is easily managed with pain medications or acetaminophen as needed.

For the brow area, Articulus CT400 is the ideal tool for the dermasurgeon. One thread is placed laterally on each side, exiting at the tail and middle of the brow, and one centrally incorporating each medial brow, for a total of 3 or 4 Articulus threads. When just starting out with this technique, surgeons will find that the Articulus CT400 threads are the simplest to deploy, requiring no knot. A brow-lift can be performed in 30 to 45 minutes in most cases, and patients may be able to return to work after a long weekend.

Midface Elevation

The midface area will generally require up to 2 weeks of healing time for patients to look fully normal and up to 1 month for them to look their best. The result seen at 2 to 3 months postoperatively is usually stable for up to 14 months follow-up to date.

The technique may include some moderate undermining, limited to 5 to 7 mm on either side of each thread. This can be accomplished using the Sharpoint® V-Dissector. In theory, undermining tends to add more bruising, and patients should be made aware of this during the consultation process. Undermining creates the movement of an entire tissue plane and causes an additional healing response, which is thought to better anchor the threads. Whether undermining improves results is not known.

The dermatologist should tailor the procedure to the individual patient, using either Articulus CT400, CT200, or both systems on the same patient as needed. In the midface, Articulus CT400 may also be combined with the CT200 thread model, especially in a heavier face.

Midface correction in previously face-lifted patients is often ideal. It is difficult to sufficiently correct nasolabial folds and marionette lines with traditional surgery. However, Contour Threads can accomplish a very satisfying midface correction that is often superior to open surgery. The authors have found that they can achieve a successful vertical lift by elevating the malar fat pad in

this manner. Deployment ports are about 1 cm behind the hairline and 1 cm above the anterior edge of the pinna. Exit ports are never in the folds, but rather at the roundest portion of the nasolabial or jugal fold, which helps to efface them.

Jowls and Lower-Face Procedure

It is important to properly evaluate patients during the consultation to determine whether there is too much redundancy or too much fat present on the lower face and neck to produce a satisfactory result with the ContourLift. Patients with severe laxity of the lower face and excess neck skin may experience an accordion-pleated look at the lateral edge of the neck that can take months to resolve in some cases. Patients should be advised of this possibility ahead of time. The jowls may be addressed, depending on the patient, from a more vertical vector with deployment in the temple, a more posterior vector at the mastoid process, or both.

Neck Procedure

Severely actinically damaged and redundant skin will result in accordion-like folds laterally, which will largely resolve after 3 months. Very heavy necks should be treated with liposuction either previously to or simultaneously with the ContourLift. In such a case, CT200 threads provide secure anchoring for the heavy neck. Deployment ports are in the mastoid area, and exit ports are in the lateral tracheal groove. Staying well in the subcutaneous plane will avoid vital structures.

POSTOPERATIVE MANAGEMENT

Postoperative pain can usually be managed with acetaminophen, acetaminophen with codeine, or extra-strength acetaminophen with hydrocodone. Patients are advised to take pain medications as soon as the pain begins and continue them for 48 hours. Sedatives may be prescribed, if needed. A horseshoe-shaped airline pillow is recommended to keep the head from moving from side to side during sleep and disturbing the threads. Patients tend to be cautious with movement postoperatively because of pain and awareness that they have had something implanted since they can, in most cases, feel the pull of the threads.

Methods of reducing swelling, such as the use of ice compresses or oral prednisone (in rare cases), may be useful. Applying a chin strap or tape may be helpful and add gentle support for patients recovering from neck and mid- or lower-face procedures.

The first postoperative visit is normally scheduled for 1 to 3 days following the procedure, although some surgeons prefer to have the first visit 1 week postoperatively. An option is to leave the threads cut short, but exposed at their exit sites, and kept in place with tape so that the threads can be adjusted over the first 48 to 72 hours. Threads are usually trimmed to their final length at the time of surgery or by 72 hours postprocedure. Possible complications associated with ContourLift procedures are listed in Table 2.

TABLE 2

Possible Complications of the ContourLift™

- Infection
- Extrusion
- Cyst or abscess formation at deployment site
- Asymmetry
- Inadequate lift
- Bunching or puckering
- Dimpling
- Neuropraxia
- Hematoma
- Skin irregularities
- Seroma
- Thread migration
- Thread breakage

DISCUSSION

The increasing demand for minimally invasive rejuvenative procedures is well documented. Physicians are often faced with patients who might not achieve their desired results with only a dermal filler or skin-tightening device, yet who are not interested in or ready for invasive surgery. The ContourLift is a new viable, minimally invasive option for elevating the soft tissues of the face and neck. The procedure does not require twilight or general anesthesia and can be performed under local anesthesia in the office surgical suite. The procedure can be mastered by surgeons with varying skill levels, but there is definitely a learning curve through at least the first 4 to 5 procedures. Ultimately, the ContourLift is a technique-dependent procedure whose results are determined by a combination of patient-selection factors and surgical technique.

It is essential to stress that the ContourLift is not a lunchtime or risk-free procedure. All too often, new cosmetic procedures are advertised and marketed by some physicians, and companies as well, as the next

greatest, easy-to-perform, no-downtime procedure. Healthy skepticism has become an important part of the cosmetic surgeon's and dermatologist's arsenal and skill set. The ContourLift is no different. What it can do is produce elevation of ptotic tissue in carefully selected patients with results that last at least 12 months in most cases. It is indeed a surgical procedure, albeit one that produces nearly invisible scars and relatively rapid recovery that is, for the most part, well tolerated by patients.

The ContourLift does have its limitations. To date, results on the neck have been modest, although some of the new techniques to increase the number of threads deployed on the neck and changes in vector placement appear to have improved predictability. Recovery is quick, but patients should be counseled to expect at least 7 to 10 days of bruising and swelling, as well as some postoperative discomfort from the pull of threads with facial motion. Many patients note they can feel the distal ends of some threads, in particular in the perioral or oral commissure region, "poking" the underside of the skin. This typically resolves in 3 to 4 weeks but can be troubling to patients. Importantly, controlled, prospective or retrospective multicenter trials are lacking to date, which precludes any objective discussion of efficacy or longevity. Until more data are obtained, the ContourLift will remain a promising procedure with some advocates. But the skeptics will appropriately question the validity of conclusions reached in the absence of more rigorous studies.

Further refinements in technique and technology will likely improve the results and predictability of thread-based procedures. Development of novel thread technologies, such as long-lasting absorbable threads or thread coating with factors that promote integration into host tissue, is a promising area for future research. Ultimately, time will tell whether barbed-suture technology is hype or reality, but the early returns suggest a promising future for this novel technique.

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