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A New Approach to Thread Facelifting

Mariano Busso MD
Miami Rejuvenation Institute, Miami, FL

ABSTRACT

Background: Facial rejuvenation has traditionally been achieved by repositioning soft tissue via invasive surgery.
Objectives: The present work describes a thread-based, face-lifting (TBFL) technique (BussoLyft™ that has provided reproducible and predictable results for 200 to 300 patients.
Methods: To reposition the orbital, nasolabial, and jowl fat pads, three primary vectors (one vertical, two oblique) are established on the side(s) of the face that requires lifting. The vertical vector for the orbital fat pad is volumetric and the oblique vectors for the nasolabial and jowl fat pads lift by thread-tissue engagement and repositioning.
Results: Repositioning the superficial fat pads of the orbital, nasolabial, and jowls areas results in a pleasant cosmetic outcome. In the treated nasolabial and jowl fat pads, the primary repositioning vector results from engaging cogs with fat septa, which places fat in a cosmetically optimal position. The primary mobilization of the superficial fat pad through the septal attachments to the dermis and superficial fascia creates a secondary movement and repositions the overlying skin and underlying superficial muscular aponeurotic system (SMAS). Very few threads are needed to reposition full-face superficial fat.
Conclusions: By optimizing every step of thread placement, the TBFL technique provides an efficient and effective method to reposition facial fat pads.

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INTRODUCTION

Facial aging is associated with gravitational redistribution of facial soft tissue. To date, rejuvenation has been achieved by repositioning soft tissue via invasive surgery. A more recent approach is thread lifting, a closed facial lifting technique in which threads are inserted and passed under the skin surface, pulled to lift the ptotic tissue, and anchored at the point of entry.[1,2]

Thread lifting, or suture suspension, has yielded variable results[1,3] and progress in its application has been questioned.[4] Nevertheless, suspension sutures have progressed from non-absorbable polypropylene[5,6] to resorbable multianchor suspension sutures with knots,[7] absorbable poly-L-lactic acid,[8] polydioxanone (PDO),[9,10] and from barbed threads[5] to threads with cogs or cones[4,11] specifically designed to hold tissue in place.

As important as thread and cannula design are for a successful lift, the technique of thread placement is also important. In general, thread placement publications fail to address the details of technique.[12] The present work describes, in detail, a thread-based, face-lifting technique that has provided reproducible and predictable results for 200 to 300 patients.

MATERIALS AND METHODS

Patients

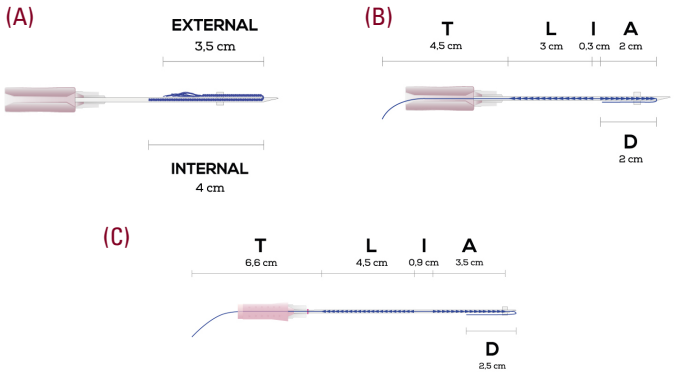
Adult patients with descended superficial fat pads are candidates for a new thread-based, face-lifting (TBFL) technique (BussoLyft™) regardless of age, skin thickness, and body weight. Thin patients with significant fat pad descent and skin laxity achieve the most dramatic results.

Thread Design

Volumetric PDO threads (50 mm mesh) and tissue-engaging PDO threads (60-mm harpoon and 100-mm harpoon) were purchased (Medyglobal America, Miami, FL) for use in three primary vectors (Figure 1). Knowledge of different parts of a thread and their distribution in a cannula (Figure 2) is essential for performance of the TBFL.

FIGURE 1. The lifting vectors design for a 62-year-old female. The white O marks on the lower face are the entry points. The X marks show the most salient point of fat pad to be lifted. The dotted lines show the trajectory of the cannula and thread path. Moving from the lower to the upper face, the O marks show the jowl fat pad, the (middle) nasolabial fat pad, and the orbital fat pad.

FIGURE 2. Threads used in the TBFL and their distribution along the cannula: (A) 50-mm mesh, (B) 60-mm harpoon, and (C) 100-mm harpoon. In the B and C figures, T = the portion of unattached thread to be trimmed, L = the lifting cogs section, I = the intermediate section with bidirectional tissue mobility, A = the anchoring cog section, and D = the disengagement section with no cogs.



Vectors

To reposition the orbital, nasolabial, and jowl fat pads, three primary lifting vectors (one vertical, two oblique) are established on the side(s) of the face that requires lifting. Each lifting vector requires a specific PDO thread. PDO threads lift by two mechanisms: (1) volumetric and (2) thread-tissue engagement and repositioning. The vertical vector for the orbital fat pad lifts by volumetric threads and the oblique vectors for the nasolabial and jowl fat pads lift by thread-tissue engagement and repositioning.

To lift the orbital fat pads, a vertical (antigravitational) vector is drawn parallel to and in a direction opposite to the gravity vector. The fixed anchoring point is the superior face of the zygomatic bone. An entry point is marked, and anesthesia applied both as a bleb on the marked skin and through the path of the cannula. Entry is achieved with an 18-gauge needle with the bevel up. Four PDO threads (50-mm mesh) are placed between the zygomatic bone and fat pads to elevate the fat pad on each side of the face. As many threads as necessary (eg, 4 to 8 on each side) are used to obtain the desired lift as judged visually.

As stated earlier, the nasolabial and jowl fat pads are lifted by thread-tissue engagement and repositioning. The mobile nasolabial fat pad is repositioned using an oblique vector with a fixed anchoring point at McGregor's patch. Lifting is achieved with a 60-mm, 18-gauge, double-cog harpoon thread.

For the jowl fat pad, an oblique vector with a fixed anchoring point over the less mobile masticatory region between the zygomatic and the masseteric ligaments is established. Lifting is accomplished with a 100-mm, 18-gauge, double-cog harpoon thread.

Procedure

Pretreatment or washout periods are not necessary before the procedure. On the day of the procedure, the patient is asked to remove make-up and cleanse the face before anesthesia and surgical marking.

The two oblique vectors lift by thread-tissue engagement and repositioning. The TBFL technique takes advantage of several principles. One is that the entry point should be proximal to the area of greatest mobility (the fat pad) and distal to the anchoring area. With this approach, it's easier to control thread placement because the natural face curvatures do not interfere with placement, as they would with distal entry.

The second principle is that when the target tissue is at the desired final position, it must be distributed along the cannula. This assures that the area to be lifted coincides with the distribution of lifting cogs and that the anchoring cogs correlate externally with the anchoring area. For this to occur, the surgeon must, of course, know how the lifting and anchoring cogs are distributed along the cannula.

The third principle is that to ensure correct thread-tissue engagement, the cannula is introduced with bevel up and advanced so that it perforates as many vertical septa of the superficial fat pads as possible. Superficial fat is highly partitioned and the more septa/cog interactions, the better the tissue holding and repositioning. The surgeon must also fold the skin to create a subcutaneous tunnel, which allows the cannula to advance in the correct subcutaneous plane. The cannula is kept close to the dermis without touching it so that it traverses through as many septa as possible. The more septa engaged, the better the fixation.

For the thread-tissue engagement just described, cogs of the thread are distributed in a single plane. It's important that the axis of the septal perforation does not coincide with the axis of this plane. If the planes coincide, the available space on the septal wall for the cog to attach is reduced, increasing the likelihood that the thread will disengage. Threads with one cog per site overcome this issue by having a helicoidal distribution of cogs.

If a harpoon thread is used (as with the jowl fat pads), the double cogs are distributed in a single plane. To optimize cog-septal engagement, the surgeon should turn the cannula about 45 degrees each time a septum is perforated. Septal perforation is felt as a sudden loss of resistance to cannula advancement. To optimize fat pad repositioning, the surgeon should advance the cannula until it engages the most distal septum in the anchoring zone. Harpoon cogs have three components: double cogs for septal interaction, a support system to minimize cog bending, and a septal piercing/anchoring piece.

Another principle is that the distance between the first lifting cog and the final anchoring cog should remain constant. It should

not be altered by tissue manipulation along the cannula or after the thread is released. If the distance is reduced, the result will be new wrinkles or folds.

Figures 3 to 5 illustrate the steps in thread placement.

FIGURE 3. Insertion of the 50-mm mesh thread into the orbital entry point.

FIGURE 4. Use of a 60-mm harpoon thread to elevate the nasolabial fat pad. The cannula is inserted to reach the farthest fibrous septum. The patient's head is tilted while the physician's thumb lifts the nasolabial fat pad. The physician's index finger stretches the skin in front of the cannula before the physician releases the thread.

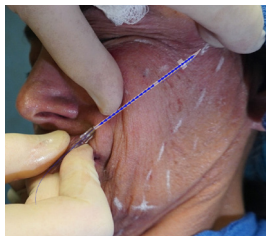


FIGURE 5. Use of a 100-mm harpoon thread to elevate the jowls fat pad. The entry point is on the paramedial neck. The patient's head is tilted while the physician's right hand pushes the cannula to the farthest septum and the left index finger stretches the skin in front of the cannula tip. At this point the physician releases the thread from the cannula.

Surgical Steps. The following is a step-by-step description of the TBFL technique for lifting the orbital, nasolabial, and jowl fat pads.

Orbital fat pads

The patient is sitting for the following steps.

1. Mark the entry point (O) for easy access to the superior aspect of the zygoma.
2. Apply chlorhexidine to the target area.
3. Place a bleb of anesthetic at the entry point and allow to infiltrate the intended path of the thread.
4. Create an entry point with an 18-gauge needle with the bevel up.
5. Place a 50-mm mesh thread into the target area, touching the supraperiosteum.
6. Continue to place threads as necessary to obtain the desired correction.

Nasolabial fat pads

1. Follow steps 1 through 3 of the orbital fat pads.
2. Create an entry point with an 18-gauge needle, bevel up and parallel to the skin.
3. Tilt the patient's head slightly to accentuate gravitational changes.
4. Introduce a 60-mm harpoon thread, bevel up.
5. Create a subcutaneous fat tunnel by folding the skin.
6. Advance the cannula through the superficial subcutaneous fat without touching the dermis.
7. When you feel resistance due to septum perforation, rotate the cannula about 45 degrees and continue to advance the cannula.
8. Advance the cannula until you reach the most distal septum in the anchoring area. This is in the subcutaneous tissue around McGregor's patch (zygomatic retaining ligament).
9. Stretch the skin on the anchoring area with the index finger to prevent skin folding.
10. Using the thumb, reposition the superficial fat pad to the desired location. This maneuver maintains the distance between the first lifting cog and the last anchoring cog constant.
11. Before releasing the thread, distribute the tissue along the cannula so the fat pad to be lifted falls where the lifting cogs are located; then place the anchoring cogs in the anchoring area.
12. Remove the cannula without further tissue manipulation.
13. Trim the excess unattached thread up to the first lifting cogs.

Jowl fat pads

1. Follow steps 1 through 3 of nasolabial fat pads.
2. Introduce a 100-mm harpoon thread, bevel up.
3. Create a subcutaneous fat tunnel by folding the skin.
4. Advance the cannula through the superficial subcutaneous fat without touching the dermis.
5. When you feel resistance due to septum perforation, rotate the cannula about 45 degrees and continue to advance the cannula.
6. Advance the cannula until you reach the most distal septum in the anchoring area, the area over the less mobile masticatory region between the zygomatic and the masseteric ligaments. At this stage, the cannula hub has moved the skin around the entry point to the base of the mandible.
7. Stretch the skin on the anchoring area with the index finger to prevent skin folding. This maneuver maintains the distance between the first lifting cog and the last anchoring cog constant.

8. Before releasing the thread, distribute the tissue along the cannula so the fat pad to be lifted falls where the lifting cogs are located; then place the anchoring cogs in the anchoring area.
9. Remove the cannula without further tissue manipulation.
10. Trim the excess unattached thread up to the first lifting cogs.

When the procedure is completed, patients should avoid excessive mimetic/masticatory movements for 48 hours, keep the entry points covered with a band-aid for 24 hours, and take ibuprofen as needed for discomfort. Posttreatment products (for face washing, etc.) are applied only in an upward motion to minimize discomfort and avoid disengagement.

RESULTS

Repositioning the superficial fat pads of the orbital, nasolabial, and jowls areas results in a pleasant cosmetic outcome immediately after the procedure. Overcorrection to compensate for loss of lift, as often happens with other procedures, has never been necessary. Clinical examples are shown in Figures 6 to 8.

FIGURE 6. The left facial side of a 62-year-old female 2 months after elevation of her nasolabial and jowls fat pads by the TBFL technique. The improvement in her neck elevation is also remarkable.

FIGURE 7. A 59-year-old female before (left) and 1 month after (right) TBFL.

FIGURE 8. A 48-year-old female before (left) and 2 months after (right) TBFL.

In the treated nasolabial and jowl fat pads, the primary repositioning vector results from engaging cogs with fat septa, which places fat in a cosmetically optimal position. The primary mobilization of the superficial fat pad through the septal attachments to the dermis and superficial fascia creates a secondary movement and repositions the overlying skin and underlying superficial muscular aponeurotic system (SMAS). Very few threads are needed to reposition full-face superficial fat.

Note that although the threading targeted the face, the laxity of the neck improved as well (Figure 6).

DISCUSSION

The popularity of thread placement is increasing and multiple approaches to the technique have been reported[3,13,14] to optimize both material and design of the threads.

The goal of the present work has been to optimize technique for thread placement. The TBFL technique shows, for example, how threads can be used to provide volumetric lifts. The author has achieved a vertical lift by bulking up orbital fat pads with 50-mm threads.

Fillers have been the preferred device for non-invasive lateral cheek elevation. Drawbacks, however, include filler translocation with loss of lifting. Although translocation can be addressed by adding more filler, this approach may result in deformity due to uneven deposition of filler. In contrast, translocation behind fat pads (and subsequent fat pad protrusion) has not, to the author's knowledge, been reported with mesh/volumetric threads. Thread-based placement is not technically challenging, and, to the author's knowledge, the Tyndall effect,[15] vascular occlusion, and embolism have not been reported with this technique. For surgical fixation of the SMAS, braided sutures have been shown to generate a greater fibroblastic response than their monofilament counterparts.[16]

The TBFL technique targets superficial fat pads. To obtain predictable results, the surgeon must know the exact distribution of each structure along the inserted cannula. Because the procedure targets superficial fat pads, the length of the thread must match the length of the fat pads. For example, a 60-mm thread with 3-cm lifting length is appropriate for lifting the nasolabial fat pad whereas a 100-mm thread with a 5-cm lifting length is the thread of choice for the jowl's fat pad. It may be tempting to use a longer thread than necessary. This approach results in lifting an excess of tissue and increment on the required lifting forces. This unnecessarily increases the tension on thread-tissue engagement and increases the likelihood of slippage.

The technique is designed to optimize tissue-thread engagement. Septal perforation may be minimized by using an L-shaped cannula rather than a blunt cannula. Rotating the cannula 45 degrees after each septal perforation reduces the likelihood that the cog will go through the perforation without attaching to the septal wall. If the septal perforation is larger than the cog or cone, perforation is caused by the cannula and slippage can be anticipated.

With this technique, surgeons achieve more precision in placing the lifting cogs, thus maximizing the interaction with the superficial fat pad to be lifted.

With most thread-lifting techniques, the surgeon places the insertion point close to the anchoring area.[17] The author, however, suggests placing the entry point proximal to the fat pad to provide more control in engaging the pad and to provide maximum lift. Note that the entry point is located 2 centimeters from the fat pad to ensure that first lifting cog coincides with the medial boundary of the superficial fat pad.

With the TBFL technique, the free thread on the area of the greatest tissue mobility is trimmed up to the first cog, thus avoiding thread protrusion, translocation, and discomfort. Both ends of the thread are free of cogs and therefore attachment to tissue does not occur.

The TBFL also simplifies thread insertion. By first determining the most efficient lifting vector, the surgeon can introduce multiple threads through a single-entry point and follow a single track that has been anesthetized. Two threads per insertion site are usually enough to accomplish a cosmetically elegant effect. Heavier fat pads or higher liftings might require 3 or 4 threads per site as judged by a visual endpoint.

Tissue holding is a function of thread design, septum integrity, and applied mimetic/gravity forces. Septum integrity is preserved by using a correctly designed cannula; as described earlier, trauma is reduced by using an L-shaped cannula rather than a blunt cannula.

Although duration of facial correction is correlated to duration of tissue-thread interaction and collagen deposition, the ultimate goal of TBFL is to trigger the proper mechanobiological stimuli that will result in self-sustaining correction. As opposed to an extensive facelift that requires SMAS fixation to deep fascia after releasing it from retaining ligaments, the goal of TBFL is to mobilize SMAS in a way that reduces tension of retaining ligaments and shortens them by decreasing collagen production.

Regarding threads, each is unique in material, caliber, geometry, direction, number of cogs/barbs/cones/knots, and cannula design. Therefore, each requires a specific technique to obtain reproducible and predictable results. Although many concepts described herein can be extrapolated to other thread systems, the techniques described apply specifically to the harpoon-shaped cog system.

Suspension sutures are designed to attach to specific firm structures such as fibrous septa, SMAS, or dermis. With the TBFL system, the primary movement of the skin is created by repositioning fat pads. Secondary movement is also achieved because the fibrous septa that traverse the superficial fat pads connect the SMAS to the dermis.

TBFL provides a mid-face lift that can stand alone or in combination with a short-scar face lift.[18] By optimizing every step of thread placement, the TBFL technique provides an efficient and effective method to reposition fat pads. Very few threads are needed to reposition full-face superficial fat.

Confirmation of results through long-term follow-up and a larger patient cohort are warranted.

Safety

Complications have been limited to transient swelling, discomfort, and minor bruising. Scars at the entry points are temporary and resolve without treatment.

The TBFL procedure requires the use of as many threads as necessary to achieve a satisfactory visual endpoint. In the author's experience, the threads have never disengaged. For this reason, it is unusual for suboptimal results to occur. If such results do occur, implantation of additional threads is warranted.

Procedure Duration

Patient preparation requires approximately 15 minutes and thread placement is completed in approximately 10 minutes.

Combinations

The TBFL may be used in combination with botulinum toxins, dermal fillers, or superficial procedures (restricted to the epidermis) several days after the TBFL procedure. Deep radiofrequency, focused ultrasound, deep resurfacing, or nitrogen-based plasma skin rejuvenation (nitrogen or helium-based) may be performed 3 months after the TBFL. The TBFL, which achieves volumetric positioning, may be complemented by volumetric support with fat tissue.

Limitations

The TBFL accomplishes what it was designed to perform, which is to predictably reshape the face with more angular contour, reducing the need for facial liposuction.

The Future

The TBFL has established a solid foundation for thread placement that will continue to improve as the technique achieves its full potential in facial rejuvenation.

CONCLUSION

By optimizing every step of thread placement, the TBFL technique provides an efficient and effective method to reposition fat pads.

DISCLOSURES

Dr. Busso is a consultant for Medyglobal America. He trains physicians on PDO thread techniques and is a speaker for Medyglobal America. He owns the BussoLyft trademark.

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AUTHOR CORRESPONDENCE

Mariano Busso MD
E-mail:..... drbusso@aol.com