



Thread Lifting and Rejuvenation

Abdulathim Amhimmid Miftah Areef^{*1}, Ahmed Mohamed Ali², Raafat Abdullatif Anani²
¹Plastic and Reconstructive Surgery department, Faculty of Medicine, Zagazig University, Egypt
²Plastic Surgery department, Faculty of Medicine, Sirt University-Libya

Corresponding author: Abdulathim Amhimmid Miftah Areef

E-mail: abdalatheemmarif@gmail.com

Article History

Volume 6, Issue Si4, 2024

Received: 30 June 2024

Accepted: 24 July 2024

doi:

10.48047/AFJBS.6.Si4.2024.4086-4092

Abstract:

Interest in noninvasive facial rejuvenation procedures continues to grow. With the advent of the so-called lunch-time face-lift, suture suspension facial rejuvenation has gained prominence and much popularity largely patient driven rather than data driven.

Keywords: Thread Lifting, Face, Rejuvenation

1. Introduction

The ancient Egyptians probably were the first to use embedded sutures to enhance facial appearance. There are references to gold threads placed beneath the facial skin. Some even believe that gold threads were responsible for the beauty of Cleopatra. Then all over centuries further researches were done as will be discussed (1).

Alcamo in 1964, received approval for what is probably the first "thread" with a roughened or barbed and unidirectional surface. Further modifications were done by **Fukuda** in 1984 and **Ruff** in 1994(2). All these trials used threads in suturing wounds without having to tie any knots. No facial cosmetic applications were described or practiced by these authors at the time (3).

Sulamanidze in 1998, made a revolution in the cosmetic field by introducing the first acceptable trial for threads with cogs for continuous suturing in surgical wounds for lifting of flabby, ptotic soft tissues, as well as for rejuvenation surgeries. These threads were named as antiptosis (Aptos). It is a safe and effective alternative to traditional lifting methods, since then, variations of the original antiptosis suture threads have been modified (4, 5).

Sulamanidze's modifications till reaching Aptos:

His first design incorporated monodirectional prolene and was anchored in the temporal fascia. He quickly became dissatisfied with this design for the poor duration of the effect. He believed that this design had not enough barbs to counteract the powerful muscles of facial animation, particularly when one of the ends was anchored (1, 6).

Further modifications were done to make the second design by combining two unidirectional sutures and tie them together in the midcheek area. This provided some improvement without the fixed anchor but he abandoned this design because of the visible incision in the midcheek. Finally, he designed a short bidirectional suture made of 2-0 polypropylene and named it APTOS (1, 6).

The APTOS spring:

Dissatisfaction with the regular effects of the APTOS threads along the jawline, and the intention to better improvement of the jowls led them trying to innovate new types of Aptos. Sulamanidze, in 2004, developed a completely new product named **APTOS spring** (1, 6). [Fig.1) (6).

It is special twisted spring polypropylene non-absorbable 2/0 thread with a memory. There are two variants of Aptos springs: the first is for the marionette line and the second is for the mouth corners lifting. Instead of resisting the powerful muscle action in the jaw area, this suture moves with the muscle and continues to provide lift and support to the overlying Tissues (6,7).



Fig. (1). Aptos springs (6)

The APTOS needle:

It is a very long APTOS suture with a unique needle called the APTOS needle. Owing to this double-ended needle design with a smooth suturing thread attached to it in the middle, the suture can be advanced and directed without having to remove and reinsert the needle. This avoids the dimples which occur when trying to replace a needle in the exactly the same hole it was removed from. The needle passes under the skin along a polygonal or elongated contour, also providing subcutaneous suturing through the softtissues and obtaining an even lifted contour (8).

Buncke in 1999, received the approval on his "surgical method using one way sutures". He described various designs of unidirectional and bidirectional sutures, their manufacture, and their deployment. He indicated they would have advantage in general wound closure, tendon repair, and other internal tissue repairs (1).

Wu in 2001, developed "**Woptos Lift**" which is also known as "**Woffles lift sutures**". It consisted of a 60cm length of 2-0 prolene with two long barbed sections each 20 cm and a 4-cm clear section for the bend. It provides a more direct and longer lasting soft tissue elevation (1,4,9,10).

However, some patients dislike the idea of insertion of nonabsorbable threads that remain permanently in the facial soft tissue. For that reason, new, absorbable, barbed suture designed using polydioxanone (PDO) nowadays (9).

Mechanism of action:

According to Fukaya in his recent research in 2018, there are 2 mechanisms underlying the effect of thread lifting: **The first mechanism** exhibits a purely mechanical effect of lifting through involving the distribution of the gravity load to the surrounding areas via a thread while **The other mechanism involves the fibrosis of the surrounding tissue** due to the inserted thread, which acts as a foreign body (11).

Technique of threads

All versions of the thread-lift rely on a similar basic technique, which involves the subcutaneous placement of cogged threads along planned lines.

The threads are then pulled to achieve the desired skin lift, and they are secured and trimmed at the entry point thereafter (4, 5, 12).

This lifting is obtained through barbs along the thread that act as cogs to grasp, lift and suspend a relaxed facial area. The barbs open like an umbrella to form a support structure that lifts the sagging tissue (4). These barbs under the skin also tend to gather tissues to fill out and lift the cheeks and sagging skin. Collagen formation occurs around the threads and their cogs or barbs, producing an increasing effect (5, 12).

Cutaneous changes after thread insertion:

Kim and his colleagues found histologically in his experiment on guinea pigs the presence of visible threads surrounded by a fibrous sheath in samples obtained at 1 and 3 months after implantation. It was thicker at 1 month than at 3 months. Many inflammatory cells and fibroblasts found centrally toward the suture material. At 7 months, no thread can be detected while many fibroblasts and multinucleated giant cells were noted. The overlying epidermis showed no prominent changes in all specimens (13). Dermal layers directly above the implanted thread showed denser collagen components compared to normal skin. The changes were more notable at 7 months than at 1 and 3 months (13).

Threads classification(12, 14, 15).

Many classifications are used to differentiate between different types of threads. They are classified according to material, shape and direction of spikes:

According to manufacturing material: made of non-absorbable material as: polypropylene, polytetrafluoroethylene or polycapromide. Some patients are worried about the insertion of non-absorbable threads, which remain permanently in their facial soft tissue. Therefore, barbed suture that is absorbable and has a temporary effect has been designed such as polydioxanone sutures.

According to shape Barbed, Non-barbed and Coned sutures or slings are invented.

According to direction of spikes, there are two main types: first, the **bi-directional threads**, with no anchoring points, inserted within a hollow needle and placed in such a manner that the thread cannot move either way because of the two-way direction of barbs fixing it nicely as Aptos threads. Secondly, the **uni-directional barbed threads**, which are anchored at a higher level fixation point as Silhouette threads.

Examples for available threads:

- **The APTOS threads** are barbed monofilament polypropylene threads available in 3-0 and 2-0 sizes with lengths of 10 to 14 cm (4) (Fig.2) (6)

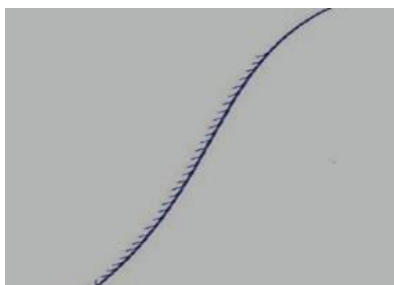


Fig. (2). Aptos suture, scheme of the wound suturing(6)

- **The WOFFLES** thread is made of the same material and is available in the 2-0 size at a 60-cm length for optimal handling (4).
- **Silhouette sutures** have the 3-0 knotted polypropylene, the absorbable cones made of copolymers of glycolic and lactic acids [Fig.3] (16)

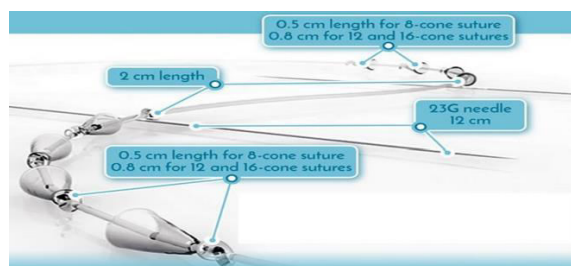


Fig.(3): Silhouette sutures assembly showing the straight needle, the 3-0 knotted polypropylene, the absorbable cones made of copolymers of glycolic and lactic acids, and the curved needle (16).

- **Polydioxanone (PDO)** is a product previously used especially in cardiac surgery and hydrolyzed in tissue within 6 months. PDO has also been used in the field of cosmetic surgery for a while. It is a synthetic polymer that can be modified with a laser to have unidirectional and / or bidirectional sharp barbs(15).

PDO sutures are more pliable than polypropylene sutures and have greater strength than other absorbable sutures. When used in soft tissue Approximation, PDO undergoes hydrolysis, which decreases its strength inversely and increases the strength of a wound during healing. This occurs Over a period of 6 months. Also it is of low tissue reactivity and being a monofilament, makes it less likely to harbor bacteria (16, 17,18).

Types of PDO:

Polydioxanone threads for facial rejuvenation can be classified into 3 different types, **Mono PDO thread** is monofilament, non-barbed, and thin (0.07—0.15 mm). **Spring or twin thread**, made from a twined single monofilament or two monofilaments braided, is more tensile than mono PDO thread. **Cog PDO thread** has barbs, which cling to tissues for lifting effects when inserted [Fig. 4, 5] (9)

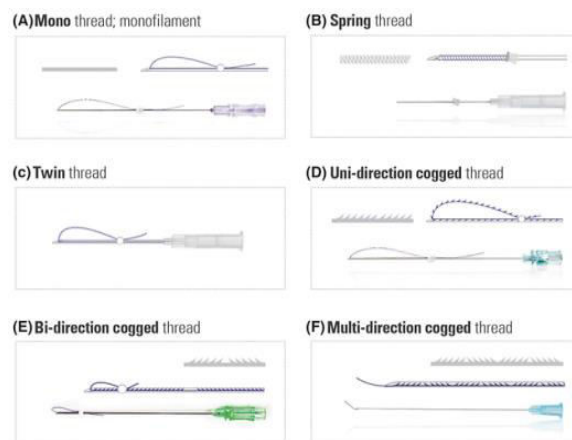


Fig. (4). various knotless PDO thread devices. (A) Mono thread, (B) Spring thread, (C) Twin thread, (D) Uni-direction cogged thread, (E) Bi-direction cogged thread, and (F) Multi-direction cogged thread (9)

Advantages of thread lifting (17):

Thread lifting is a minimally invasive with short downtime, and nearly invisible scarring method that requires no deep fixations or knots. Threads also are available in different lengths and sizes. They are loaded into a needle or cannula. Once inserted, the thread is placed into position and the cannula or needle removed. They can be used in improvement of jowls with mild to moderate sagging without surgery.

Since threads address volume descent and ptosis, the patient requires less filler when he or she has a thread-lift as well. This is because injectable fillers alone cannot "lift" tissues; they address only volume loss. There is an increase in collagen and elastin concentration in the skin during this time.

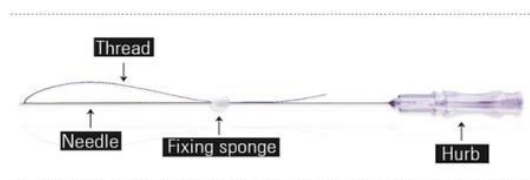


Fig. (5). Schematic figure of knotless PDO thread device (9)

Risk and complications:

The thread lift is a relatively new procedure, and its techniques are still being developed. Results are greatly variable among patients, but continue to improve. The most popular risks and complications the patients may face during or after the procedure: First, **noticing no improvement** is the worst risk and **asymmetry** is a very bothersome consequence. **Visibility of sutures** under thin skin people and **lack of sensitivity or numbness** in the treated area are reported in some cases (12). Sometimes, Hair roots are pushed in deep, leading to hair sinuses and **inclusion cysts**. Also some surgeons have noted rare migration or even total extrusion of the sutures, causing **an unbalanced facial appearance** (12).

Infection in the treatment area is an infrequent complication. The risk of infection associated with soluble threads is higher than that with insoluble threads (11,19). **Scar tissue formation** is also possible. The knot of the thread in the scalp may bleed due to formation of granulation tissue and also may be palpable (11, 19).

Bruising, erythema, hematoma and edema are common minor complications while the major complications such as Stensen's duct rupture and **facial nerve injury** have been reported in APTOS threads mainly used by Heling in 2 of his 4 cases who suffered from complications after APTOS technique (19).

Precautions to avoid these complication (12, 19)

Many precautions must be considered by surgeons to avoid complications and risks. *First*, we must carry out the procedure with great precision, from noticing pre-procedure asymmetries, to perfectly balanced markings, to ensuring the symmetry with the patient's consent before cutting off the ends of the thread.

Secondly, being careful while inserting the thread in thin skin people so as to keep it at the optimum depth and avoiding visibility of the sutures. If an infection develops, treat it with antibiotics. Rarely, an infection may require surgical drainage.

Informing patient that numbness or lack of sensitivity may be experienced and it will subside within weeks of procedure. Procedure should be avoided in people with keloid tendency. If the thread breaks, a simple reinsertion solves the problem together with choosing the proper sized cannula and thus to avoid extrusion of threads.

Cosmetic uses of threads:

Threads nowadays are used in many procedures for cosmetic purposes. They can be used in Face lifting, deep wrinkle of nasolabial folds and forehead, filling mid-face, tightening of jawline and double-chin, V-lifting, lower eyelid with wrinkles, and folds of skin on the face(20).

Body lifting threads are used in wrinkles and sagging in the neck, arms, inner region of thighs and abdominal area (20). **Lifting using threads** may be used nowadays in breast ptosis (21).

Non Cosmetic uses of Threads:

Threads were used in Cerclage of eye ball but this procedure not used nowadays ⁽¹⁰⁹⁾.

Polydioxanone (PDO) threads were previously used especially in cardiac surgery and hydrolyzed in tissue within six months (15). The main non **Cosmetic** uses of threads in general wound closure, tendon repair and internal tissue repairs (1).

References:

1. Kress D. The history of barbed suture suspension: applications, and visions for the future. In Simplified facial rejuvenation. Shiffman MA, Blirrafati S, Lam SM, Cueteaux CG (Eds). Springer, Berlin, Heidelberg. 2008; 33: 247-257.
2. Wu WT. Barbed sutures in facial rejuvenation. Aesthet Surg J. 2004; 24(6):582-7.
3. Wu WT. Commentary on: Effectiveness, Longevity, and Complications of Facelift by Barbed Suture Insertion. Aesthet Surg J. 2019; 39(3):248.

4. Park TH, Seo SW, Whang KW. Facial rejuvenation with fine-barbed threads: the simple Miz lift. *Aesthetic Plast Surg.* 2014; 38(1):69-74.
5. Choe WJ, Kim HD, Han BH, Kim J. Thread lifting: a minimally invasive surgical technique for long-standing facial paralysis. *HNO.* 2017; 65(11):910-15.
6. Sulamanidze M, Sulamanidze G. Facial lifting with Aptos Methods. *J CutanAesthet Surg.* 2008; 1(1):7-11.
7. Sulamanidze M, Sulamanidze G, Vozdvizhenskiy I, Sulamanidze K, Kadzhaya A. New method of face elastic thread lift. In *Miniinvasive Face and Body Lifts: Closed Suture Lifts or Barbed Thread Lifts.* Nikolay Serdev(Eds). inTech,Croatia . 2013; 14:277-86.
8. Sulamanidze M, Sulamanidze G. APTOS suture lifting methods: 10 years of experience. *Clin. Plast. Surg...* 2009; 36(2):281-306.
9. Suh DH, Jang HW, Lee SJ, Lee WS, Ryu HJ. Outcomes of polydioxanone knotless thread lifting for facial rejuvenation. *Dermatol surg.* 2015; 41(6):720-5.
10. Arora G, Arora S. Thread lift in breast ptosis. *J. Cutan. Aesthet. Surg.* 2017; 10(4):228.
11. Baek WI, Kim WS, Suh JH, Kim BJ. Lower facial rejuvenation using absorbable casting barbed thread. *Dermatol. Surg* 2017;43(6):884-7.
12. Carruthers A, Carruthers J, Hardas B, Kaur M, Goertelmeyer R, Jones D, et al. A validated grading scale for marionette lines. *Dennatol surg...* 2008; 34: 167-72.
13. De Masi Ec, De Masi FD, De Masi RD. Suspension threads. *Facial mast. surg.* 2016; 32(6):662-3.
14. EL Maadawy IH, HodeibALshawadfy SA, Abada DL. Assessment of Efficacy and Safety of Thread Lift in Mid Facet *Med J Cairo Univ.* 2019;87:2621-9.
15. Fitzpatrick TB. The validity and practicality of sun reactive skin type's I-VI. *Arch Dermatol.* 1988;124(6) 869-71.
16. Isse N. Silhouette sutures for treatment of facial aging: facial rejuvenation, remodeling, and facial tissue support. *Clin Plast Surge.* 2008;35(4):481-6.
17. Karimi K, Reivitis A. Lifting the Lower Face with an Absorbable Polydioxanone (PDO) Thread. *J Drugs Dermatol.* 2017; 16(9):932-4.
18. Fukaya M. Two Mechanisms of Rejuvenation Using Thread Lifting. *PlastReconstr Surg Glob Open.* 2018 14; 6(12):e2068.
19. Tavares JP, Oliveira CACP, Torres RP, Bahmad F Jr. Facial thread lifting with suture suspension. *Braz J Otorhinolaryngol.* 2017; 83(6):712-9.
20. Gülbitti HA, Colebunders B, Pirayesh A, Bertossi D, Van Der Lei B. Thread-lift sutures: still in the lift A systematic review of the literature. *PlastReconstr Surg* . 2018; 141(3):341-7.
21. In Jae J, Dong Ju H, Dong Hyun K, Yoon MS, Lee HJ. Comparative study of buffered 50% glycolic acid (pH 3.0)+ 0.5% salicylic acid solution vs Jessner's solution in patients with acne vulgaris. *J Cosmet Dermatol.* 2018; 17(5):797-801.