Review Article

Thread Lifting in Aesthetic Dermatology: Basic Concepts, Techniques, and Clinical Considerations

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Abstract

Background: Skin aging is an emerging problem in the cosmetic field as life expectancy increases. There has been a trend to seek the least invasive techniques of facial rejuvenation. Thread lifting is one of them.

Purpose: To discuss the basics of thread lifting.

Review: Thread lifting uses threads produced from the same material used to seal wounds in surgery to lift and straighten sagging tissue and define facial contours. The implanted thread could be utilized to tighten tissue and give volume to the applied area by being placed beneath the skin. Considered a minimally invasive procedure, it still possesses risks of injury for several anatomical structures in the targeted area. Several threads and techniques have been introduced for thread lifts with various efficacies and safety profiles. There is no one absolute type of thread or technique for thread lifting. However, absorbable and barbed threads are currently the most frequently chosen for thread lifting due to their minimal side effects and long-lasting results. Conclusion: Thread lifting could be a choice for tackling the skin aging phenomenon.

Keywords: Thread lifting, facial rejuvenation, skin aging.

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Introduction

In the united states (us) and other industrialized countries, life expectancy is increasing steadily and is expected to reach 100 years in approximately 2025. The mean life expectancy of women is longer than men's. Thus, it could be estimated that more than one-third of their lives are affected by menopause.[1] Organ aging starts from the moment when a person is born, and the skin is no exception. As the most voluminous organ of the human body, the skin shows the most visible signs of aging. Many people, particularly women, spend a significant portion of their daily income on medications and cosmetics intended to slow down or reverse the aging process of their skin.[2]

The trend of patients seeking the least invasive techniques of facial rejuvenation has increased dramatically over the last three decades. Interest in this procedure is growing, and so is the search for long-lasting alternatives to surgical facelifts. non-surgical lifting has gained a bigger market because of its shorter recovery time.[3] The critical elements that determine the success and effectiveness of thread lifting effects include lifting and retaining lifted soft tissue in addition to preserving the lifting effect itself, regardless of the specific lifting technique used.4 the purpose of this review is to discuss the basics of thread lifting, various threads and methods that are used, and their side effects.

Review

Thread lifting is a cosmetic procedure that uses

threads derived from the same material used to seal wounds in surgery to lift and straighten sagging tissue and define facial contours. The implanted thread could be utilized to tighten tissue and give volume to the applied area by being placed beneath the skin.[5]

Thread lift is suitable for mild to moderate signs of aging, such as a slightly blurred mandibular margin, skin laxity on the neck and chin, nasobuccal deepening, and desire for a V-shaped lift. However, patients with more severe aging indications, like a prominently unclear mandibular margin, facial lipoatrophy, significant naso-buccal deepening, zygomatic malar region sagging, and the existence of a double chin or large neck fat pad, may not be ideal candidates and may benefit more from SMAS ritidectomy. Contraindications to thread lift include acute inflammatory skin conditions, autoimmune and somatic diseases, hemophilia, keloid scar tendency, allergies to thread materials or procedure drugs, use of anticoagulants, mental and neurotic disorders, pregnancy, breastfeeding, history of non-biodegradable material injection, presence of implants in the treatment area, immunologically risky diseases, and patients with atopic conditions.[6]

The facial structure can be best understood by examining its various layers, starting from the outermost layer and moving towards the deeper layers. The skin, subcutaneous fat, deep fascia, superficial muscle aponeurotic system (SMAS), and deep fat are some of these layers (Figure 1). The epidermis and dermis are the two additional divisions of the skin layer itself. The epidermis is the outer layer and is made up of squamous, stratified, and keratinized epithelium. Hemidesmosomes in the basal membrane provide a strong connection between it and the dermis underneath. This connection serves as a barrier of defense and gives the epidermis mechanical support. The dermis, on the other hand, is composed of connective tissue that contains pilosebaceous units, collagen, elastin, and an intricate web of blood vessels and nerves. It is responsible for giving the skin its flexibility, elasticity, and strength. The thickness of the dermis can vary in different regions of the face, leading to variations in overall skin thickness.[7-9]

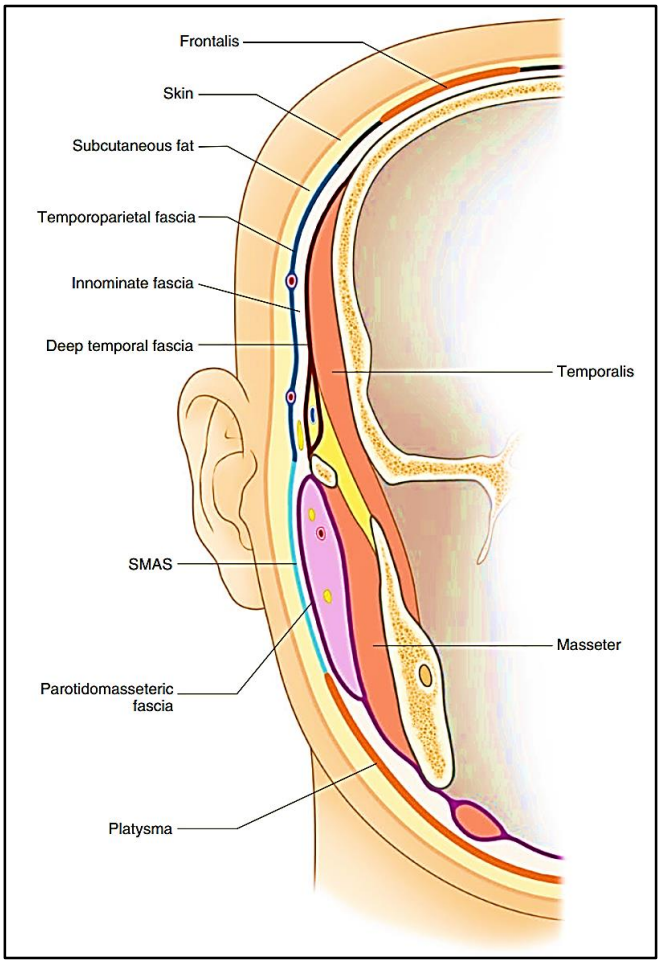

Figure 1: Facial layers.[8]

Even though non-surgical lifting is thought to be a minimally intrusive method, there could be a risk of harm to some anatomical components. Because the majority of thread lifting occurs vertically from top to bottom, there is a chance that structures that are positioned obliquely or horizontally on the facial lateral surfaces could be injured (Table 1).[8]

Based on the mode of absorption, threads can be classified as either absorbable or nonabsorbable. APTOS, Contour, Silhouette Lift, and Woffles (polypropylene) threads are examples of non-absorbable threads. Polydioxanone (PDO) sutures, poly-lactic acid (PLLA) sutures, and tiny sutures including a bi-directional absorbable cone

Table 1: Anatomical structures that are at risk of damage during thread lifting.[8]

Blood vessels	The superficial temporal artery's frontal branch Zygomatico-orbital artery Transverse facial artery Middle temporal vein
Nerves	The facial nerve's temporal, zygomatic, buccal, and mandibular marginal branches
Other structures	Parotid glands

are examples of absorbable sutures.[5,10]

Natural PDO thread, a biocompatible and bioabsorbable polymer of polylactic caprolactone, has gained popularity for its positive outcomes in various surgical procedures.[11] It is indicated for loose or relaxed skin and prophylactic therapy. The thread, absorbed in 6 to 8 months via hydrolytic action, is inserted into the dermis. For periocular dermatochalasis, threads are placed along the frontal and/or forehead of the periorbicular area. At the eye side, the thread is manually placed obliquely into one centimeter of the medial canthus. To shape the lips and improve facial expression, the thread is inserted perpendicular to the wrinkles at the corners of the lips and along the vermilion.[12,13]

The PLLA suture is a type of bi-directional cone thread that has found its application in orthopedic rods and screws for treating fracture cases. This suture is designed to be absorbable and works effectively on the deeper layers of the skin to stimulate collagen production. Some of the examples of this suture include Silhouette Soft, Instalift, and Spring Thread.[14,15]

Caprolactone facilitates the slow absorption and consistency of polylactic acid, while simultaneously preserving the thread's mechanical integrity and flexibility. This thread also has a time-related bio-stimulation capacity with a traction effect in restoring skin luminosity and tone.[12]

Two categories of non-barbed threads exist: the first one comprises plain monofilament threads, such as the plain Miracu thread and TR lift thread, while the second category consists of twisted or spiral monofilament threads, exemplified by the K2 screw lifting thread and T Screw lifting thread.[5]

For barbed-threads, there are three types: bi-directional sutures, unidirectional sutures, and cogged sutures. Bidirectional sutures (long sutures) are applied at the desired spot using a hollow needle. Unidirectional sutures are also long sutures and are used to secure stable structures like the deep temporal fascia. Contrarily, cogged sutures are short sutures. There are three types of cogged sutures: multidirectional, bidirectional, and unidirectional PDO cogged thread.[4,5]

Compared to unidirectional and non-barbed thread, bi-directional thread has an advantage as it is incapable of moving in both directions due to the bidirectional fixation caused by the presence of barbs. Conversely, in cases of facial asymmetry, unidirectional or non-barbed sutures make postoperative correction easier.[5]

The utilization of cogged thread is predominantly influenced by the prevailing preference for absorbable thread in the present trend. Monothread is still advertised for use in thread lifting. To put it more accurately, the cogged thread is utilized to tighten and contract the inner tissue. Stronger and more durable molded PDO thread is developed and used for a strong and sustainable lifting effect. The development of threads from a technical and materials engineering standpoint is the basis for the development of various indications and procedural procedures. More recently, absorbable sutures are being used for another purpose (i.e. to shrink the nostrils).[16]

Comprehending pinch anatomy is crucial for ensuring a safe procedure, as it helps safeguard blood vessels in the temporal region and nerves in the zygomatic arch area. Minimizing such hazards requires an understanding of how blood vessels and nerves move in a pinch. In the temporal area, pinching may cause injury to the fat layer at the same depth as it raises the fat surrounding the superficial temporal artery without endangering the blood vessels (Figures 2 and 3). Fascinating outcomes arise with deep pinching in the temporalis area, elevating not only the skin

and subcutaneous fat but also the superficial temporal fascia (Figure 4). Threading the fascia in the temporalis region proves to be the most efficient among the various techniques, though not without technical challenges. The anchoring process lacks visual confirmation of whether the thread is fully suspended in the superficial temporal fascia (STF) or extends to the deep temporalis fascia, making it a "blind" technique. Ensuring a secure attachment point requires the thread to hang over the fascia, but confirming this during the procedure remains challenging.[8,17,18]

The zygomatic arch is traversed by the facial nerve. In facial surgical lifting, the facial nerve may sustain damage, resulting in weakened frontal muscles and drooping eyebrows. When the cannula crosses the zygomatic arch, proceed with caution during absorbable thread lifting. It is crucial to remember that the facial nerve is located

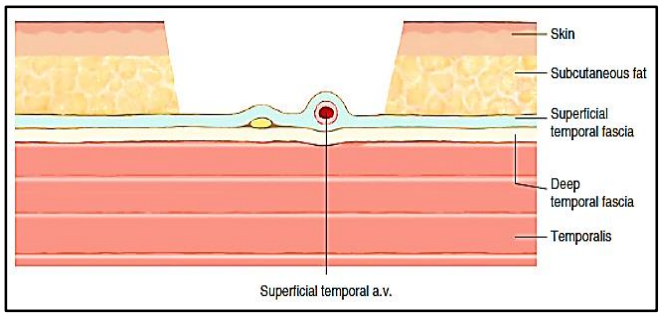

Figure 2: The superficial temporal artery's location following pinching.[8]

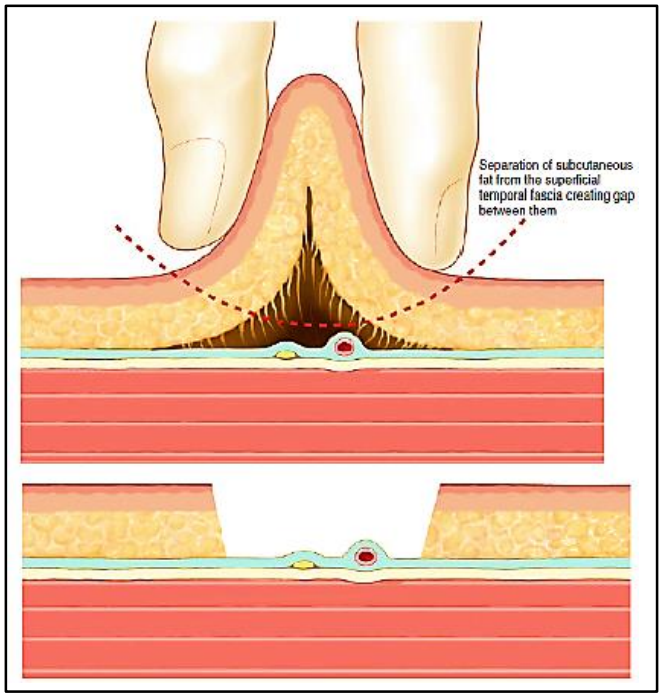

Figure 3: The theory of a superficial temporal artery that is intact and has all of its surrounding fat lifted.[8]

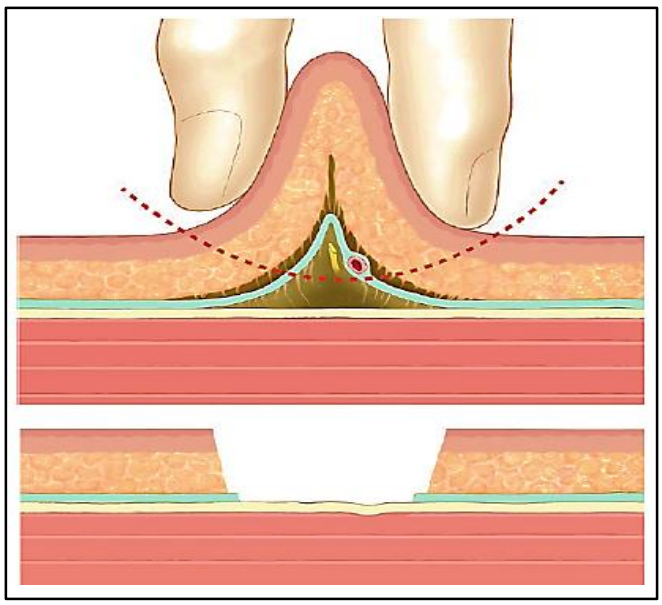

Figure 4: Proposed mechanism for lifting superficial temporal fascia.[8]

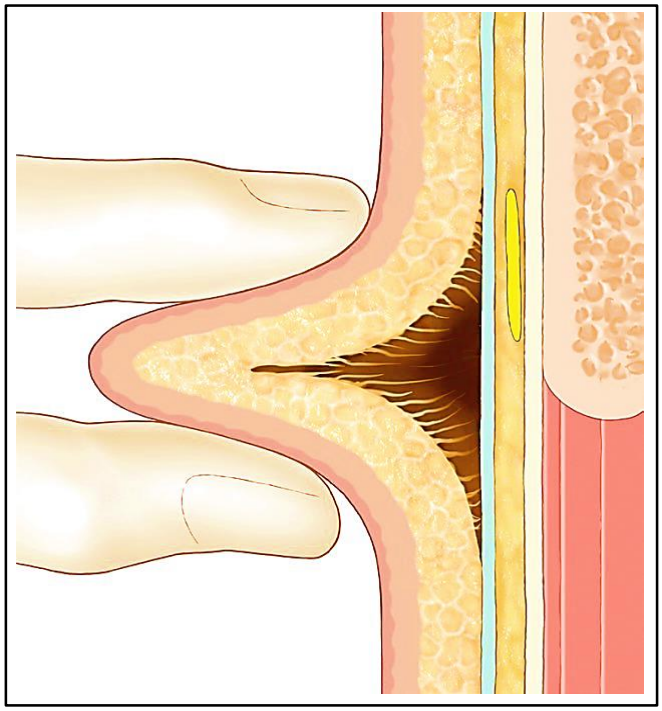

Figure 5: Pinching in the zygomatic area.[8]

underneath the STF and is not elevated with a gentle pinch (Figure 5). The cannula can enter the zygomatic arch through the subcutaneous fat layer without damaging the facial nerve.[8,17,18]

Preoperative preparation is a crucial and time-intensive aspect of the process. While there are three sizes available for sutures (8, 12, or 16), the 8-cone suture is the most effective for facial procedures. Patients with moderate to severe facial aging may require 3 or 4 stitches per side, whereas those with mild to moderate mid-facial aging often require 2 to 3 sutures per side.[5,6]

Planning and executing a surgical procedure can be done in various ways, but there is significant variability among surgeons. To achieve the best results, a group of experts suggests using "straight-line vector planning." This technique involves placing stitches perpendicular to the plane they are meant to lift, which enhances thread lift capacity and minimizes the risk of shifting. By arranging the sutures in a straight line and dispersing them equally, the opposing suture cones maximize support and lift, while also maximizing the production of PLLA-stimulated collagen.[6]

The technique utilized for treatment involves drawings made with either pencils or markers. As a precautionary measure, prophylactic antibiotics are administered one hour before the treatment. Before inserting the thread, an anti-bacterial product like chlorhexidine is applied. For superficial plain threads, the patient receives lidocaine 7–15% cream 45 minutes before the surgery. Local anesthetic, such as 1-2% lidocaine solution with epinephrine (1/200,000), is given at the insertion site for cog threads and lengthy threads (greater than 90 mm). The thread is cut at the insertion location and the cog end is implanted into the skin to avoid protrusion. The affected area is cleaned and an ice pack is applied to minimize edema and bruising.[19,20]

There are two distinct approaches to thread insertion techniques, which are categorized based on the length of the threads used. These approaches are specifically designed for short and long sutures. When dealing with threads shorter than 90 mm, like PDO threads, the protocol involves employing the free-floating method. Additionally, there are established guidelines that outline the minimum number of threads needed for each treatment area. In cases where there is significant skin laxity or excess adipose tissue, it may be necessary to insert a greater number of threads.[19]

In the long suture protocol, threads longer than 90mm, mainly barbed sutures (bidirectional and unidirectional), are used. Unidirectional threads employ the fixed method with a fixing point, while bi-directional threads use the free-floating method. The double needle technique, another free-floating method, is the third procedure. All can be done under local anesthesia, with the fixed method requiring a 3-4 mm incision for straight needle insertion, targeting the temporalis profundus fascia or periosteum as a fixing point. Fixing points behind the frontalis and temporalis hairline lift the lower face and cheeks, and points posterior to the sternocleidomastoideus muscle elevate the neck.[19]

Various studies on thread lifting have been conducted. A prospective study was conducted by Savoia et al, involving 37 female patients, aged 37-65 years. The present investigation employed threads for lifting. Specifically, free-floating threads were utilized for the zygomatic and mandibular regions, while double needles were employed for the eyebrows and neck area. Additionally, anchorage was utilized to lift the middle face. The outcomes of the study revealed that out of the total of 37 patients, 24 individuals (65%) experienced highly favorable results, 9 patients (24%) achieved good results, and 4 patients (11%) reported unsatisfactory outcomes. It is worth emphasizing that this perfect cosmetic impact not only appeared immediately after the treatment but also lasted significantly for at least 6 months. ($p=0.005$).[21]

The following is a retrospective analysis conducted by Kwon et al. This investigation included 15 Korean individuals with mild to moderate skin laxity who underwent thread-lifting using polyglyconate barbed sutures. A dermatologist conducted the assessment using a 3D imaging equipment and the Global Aesthetic Improvement Sca-

le (GAIS). Subjective satisfaction was gauged at the start of the trial and again four months after the surgery. The result was that in most patients (84%), 20% got a GAIS score of 3 (improved), 40% got a GAIS score of 4 (greatly improved), and 24% got a GAIS score of 5 (very good). Facelifting involves volume migration from the lower face upwards, as shown by quantitative three-dimensional analysis. No significant adverse effects were observed.[22]

In a prospective study conducted by Rezaee et al, a total of 193 patients were involved. Among them, there were 23 men (11.9%) and 170 women (88.1%). The Proma Happy Lift twin needle and Silhouette Soft were used to lift threads in these patients. The evaluation of the patients took place at 1, 3, and 6 months after the procedure. The Global Aesthetic Improvement Scale (GAIS) was used by two surgeons and the patients to evaluate the results. The jawline (46.1%), mid-face (33.7%), eyebrows (12.4%), and neck (7.8%) were the most frequently treated areas. The patient assessment states that after six months, the satisfaction percentages rose from 94% in the first week to 99% in 6 months. However, according to the surgeons' assessments, the first surgeon's GAIS score went from 94% to 99%, while the second surgeon's went from 83% to 98%.[23]

Numerous studies, including a meta-analysis conducted by Niu and colleagues, have consistently demonstrated that thread lifts can pose significant complications. After closely reviewing 26 published papers, Niu et al, found that the most frequently reported complication was swelling, occurring in 35% of patients. Other common complications included skin dimpling (10%), paresthesia (6%), thread visibility/palpability (4%), infection (2%), and thread extrusion (2%). Interestingly, absorbable sutures showed a significantly lower risk of thread extrusion (1.6% vs. 7.6%) and paresthesia (3.1% vs. 11.7%) compared to non-absorbable sutures. Furthermore, older individuals over the age of 50 were found to have a higher incidence of infection (5.9% vs. 0.7%) and skin dimpling (16% vs. 5.6%) compared to younger patients. Additionally, the overall satisfaction rate over a prolonged period was notably lower compared to the satisfaction level right after the thread lift procedure, with a difference of 10% (88% vs. 98%).[24]

Wu and colleagues conducted a comprehensive analysis of electronic medical records pertaining to patients who experienced complications following facial thread lift procedures from January 2016 to January 2020. The study included a sample of 61 female patients, with an average age of 36.3 ± 8.9 years. Infection accounted for 31.2% of consultations, with dissatisfaction with altered facial features following at 23%, paresthesia at 19.7%, skin dimpling and abnormalities at 16.4%, subcutaneous induration at 13.1%, thread extrusion at 4.9%, and facial nerve injury at 3.3%. The majority of problems were first treated conservatively without surgery. After receiving non-operative treatment, 51 patients (83.6%) had improved symptoms, but 10 patients (16.4%) needed surgical revision, which included debridement and thread removal.[25]

Patients experiencing recurrent infections, suture extrusion, and subcutaneous induration are advised to undergo debridement and suture removal. The use of pre-operative ultrasound is highly recommended to accurately identify the affected area. Partial or complete removal of threads can be done within three months after the thread lift. Majority of the patients have shown good recovery and expressed satisfaction with the clinical outcomes.[25,26]

Conclusion

Patients' preference for minimally invasive methods of face rejuvenation has increased dramatically over the last three decades. Thread lift has become an alternative method that has emerged recently because it is more non-invasive than surgical lifting but has a relatively long-lasting effect. A thread lift is a type of aesthetic procedure that uses threads to define facial contours and lift and straighten drooping tissue. Knowledge of facial anatomy and pinch anatomy is needed to help prevent damage to the anatomical structures on the face. Various recent studies have explained that there is no evidence that a particular type of

thread is better, however absorbable and barbed threads are currently the most frequently chosen for thread lifting due to their minimal side effects and long-lasting results.

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References

1. Farage MA, Miller KW, Elsner P, Maibach HI. Characteristics of the aging skin. Adv Wound Care (New Rochelle). 2013;2(1):5–10.
2. Zhang S, Duan E. Fighting against skin aging: the way from bench to bedside. Cell Transplant. 2018; 27:729–38.
3. Stoian A, Hainarosie R, Pietrosanu C, Rusescu A, Andronache L, Paunica S, et al. Modern concepts in non-surgical esthetics; a review. J Mind Med Sci. 2019;6(2):190–5.
4. Atiyeh BS, Chahine F, Ghanem OA. Percutaneous thread lifts facial rejuvenation: literature review and evidence-based analysis. Aesthet Plast Surg. 2021;45:1540–50.
5. Atiyeh BS, Chahine F, Ghanem OA. Percutaneous thread lifts facial rejuvenation: literature review and evidence-based analysis. Aesthet Plast Surg. 2021;45:1540–50.
6. Spring LK, Callaghan DJ. Update on thread-lifting. Adv Cosmet Surg. 2020;3(1):165–71.
7. Halepas S, Chen XJ, Ferneini EM. Thread-lift sutures: anatomy, technique, and review of current literature. J Oral Maxillofac Surg. 2020;78:813–20.
8. Derby BM, Codner MA. Evidence-Based Medicine: Face Lift. Plast Reconstr Surg. 2017; 139(1):151e–67e.
9. Charafeddine AH, Drake R, McBride J, Zins JE. Facelift: history and anatomy. Clin Plast Surg. 2019;46:505–13.
10. Ogilvie MP, Few JW, Tomur SS, Teven CM, Semersky AJ, Bruno CR, et al. Rejuvenating the Face: An Analysis of 100 Absorbable Suture Suspension Patients. Aesthet Surg J. 2018;38(6):654–63.
11. 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.
12. Lovreglio R, Fabbrocini G, Delfino M. The non-surgical thread lifts for facial rejuvenation. In: Nonsurgical Lip and Eye Rejuvenation Techniques. Springer International Publishing; 2016. p. 85–95.
13. Kang SH, Byun EJ, Kim HS. Vertical lifting: a new optimal thread lifting technique for Asians. Dermatol Surg. 2017;43(10):1263–70.
14. Keyhan SO, Fattahi T, Bagheri SC, Bohluli B, Amirzade-Iranaq MH. Integrated procedures in facial cosmetic surgery. Integr Proc Facial Cosmet Surg. 2021.
15. 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. Plast Reconstr Surg. 2018;141:341e–7e.
16. Kim B, Oh S, Jung W. Based on Pinch Anatomy The Art and Science of Thread Lifting.
17. Tsai YT, Zhang Y, Wu Y, Yang HH, Chen L, Huang PPH, et al. The surgical anatomy and the deep plane thread lift of the buccal fat pad. Plast Reconstr Surg Glob Open. 2020;8(6):e2839
18. Oh SM, Kim BC, Jung W. Changes in the layers of the temple during pinch manipulation: implications for thread lifting. Dermatol Surg. 2019;45(8): 1063–8.
19. Yongtrakul P, Sirithanabadeekul P, Siriphan P. Thread lift: classification, technique, and how to approach to the patient. Int J Med Health Sci. 2016; 10.
20. Kim B, Oh S, Jung W. The Art and Science of Thread Lifting : Based on Pinch Anatomy. Incheon, South Korea: Springer; 2019.
21. Savoia A, Accardo C, Vannini F, Di Pasquale B, Baldi A. Outcomes in thread lift for facial rejuvenation: a study performed with Happy Lift™ Revitalizing. Dermatol Ther (Heidelb). 2014;4(1): 103–14.
22. Kwon HH, Choi SC, Park GH, Jung JY. Clinical evaluations of a novel thread lifting regimen using barbed polyglyconate suture for facial rejuvenation: analysis using a 3-dimensional imaging system. Dermatol Surg. 2019;45(3):431–7.
23. Rezaee Khiabanloo S, Jebreili R, Aalipour E, Saljoughi N, Shahidi A. Outcomes in thread lift for face and neck: a study performed with Silhouette

Soft and Promo Happy Lift double needle, innovative and classic techniques. J Cosmet Dermatol. 2019;18(1):84–93.
24. Niu Z, Zhang K, Yao W, Li Y, Jiang W, Zhang Q, et al. A meta-analysis and systematic review of the incidences of complications following facial thread-lifting. Aesthet Plast Surg. 2021;45:2148–58.
25. Wu ZY, Han HH, Eom JS, Ahn SH, Ko BS. Treatment of complications following facial thread-lifting. Plast Reconstr Surg. 2021;148(1):158e–9e.
26. Yeo SH, Lee YB, Han DG. Early complications from absorbable anchoring suture following thread-lift for facial rejuvenation. Arch Aesthetic Plast Surg. 2017;23(1):11–6.