

Use of Tension Threads in Facial Rejuvenation

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Abstract

Introduction: Tension threads have evolved over time, from their beginnings with non-absorbable threads to the present day with absorbable threads, offering excellent short-term results for facial rejuvenation, with the middle and lower thirds of the face being the most relevant. Various types of threads are used, taking into account their advantages and disadvantages, as well as potential adverse effects. **Material and Method:** Information was sought from medical articles with high levels of evidence, finding 1268 articles ($n = 1268$). These articles were filtered using language search criteria (English-Spanish) and limited to those no older than 10 years. The Canadian Task Force evidence levels were applied, along with the use of key terms, resulting in 32 articles ($n = 32$), with 15 ($n = 15$) being used. **Results:** A total of 15 articles were selected. Among them, high levels of evidence were found, such as Randomized Clinical Trials, non-randomized trials, Cohort Studies, and Case-Control Studies. These were categorized by author name, articles title, and the finding each of the medical articles. **Discussion:** A comparison of the 15 ($n = 15$) articles was conducted, taking into account the full study and its results. **Conclusion:** The reviewed studies suggest that the physician's experience, along with the patient's age, degree of facial sagging, and other associated factors, are crucial for successful outcomes in the placement of tension threads. Additionally, reducing the incidence of complications is important. More studies on this subject are needed to further assess and especially evaluate the long-term effects.

Keywords

Tension Threads, Suspension Sutures, Face Lift, Non-Surgical Lift

1. Introduction

The use of threads in Aesthetic Medicine (AM) has been a practice employed both for the face and body since 1956, when Buttkewitz published a correction for the nasolabial fold using Nylon thread [1].

In 1964, Dr John Alcamo introduced the first patent related to a suspension suture with barbs. Meanwhile, in the late 1960s, Dr. Cauz in France developed a technique for implanting gold threads at the subdermal level on the facial surface, from the ear to the nose, mouth, or chin, in areas where wrinkles appeared a certain flattening compared to those in untreated areas [1]. In 1966, Galland and Clavier described a new methodology using local anesthesia [1]. In 1975, J. Conley and D. Baker described a new technique for gold thread implants based on the implantation of the thread directly under the wrinkles and complementing in with two vertical lines [1]. In 1992, this technique was improved by Dr. P. Orenes, who began applying it to the neck as well. Thanks to his work, the Spanish company Loca Marin, started industrial production of a gold thread implantation kit [1].

Until that point, all the sutures presented were made from non-absorbable materials [1], until 1992 when Gregory Ruff developed an absorbable polydioxanone suture with microscopic projections arranged in a spiral along the entire thread [1].

In 1999, a Russian surgeon, Salamanidze, who is credited with applying suspension sutures for facial rejuvenation, developed sutures with bidirectional angled hooks [1]. In 2002, the first experience using suspension sutures with antiptosis action was published, leading to the naming of APTOS threads, the first generation of suspension sutures, which were fundamental for the development of facial rejuvenation techniques using tension threads [1].

In 2004, the U.S. Food and Drugs Administration (FDA) authorized the use of unidirectional sutures, initially made from polypropylene and later made with polylactic acid, making them absorbable [1]. The evolution of materials led to treatments being performed with absorbable thread, such as polydioxanone (PDO) first and then polylactic acid (PLA) with bidirectional cones [2]. Continuous research improved the anchoring system from barbs to cones, giving rise to the third generation of suspension sutures [1].

Today the culture ingrained in people's minds regarding external image care has been experiencing significant growth recently, leading to an increased demand for facial and body treatments without surgery. Among the most in-demand treatments are the use of tension threads [3].

Facial rejuvenation techniques using tension threads are part of non-surgical procedures; they are capable of repositioning the soft tissues of the face that descend along a vertical vector, a process determined by structural changes, micro-circulatory, and metabolic alterations. The use of tension threads aims to "help individuals improve their self-esteem, give them more confidence in social contexts, and ultimately achieve harmony: a word that embodies the concept of beauty" [1] [2]. This innovative technique, which does not require hospitalization, is outpatient, and performed quickly and safely with minimal or no risk. Its goal is to improve skin quality, reduce sagging, and increase collagen production around the implanted thread. Currently, these threads are made of biocompatible and absorbable materials, acting as an artificial extracellular matrix, providing both a

chemical and mechanical effect [3].

Tension threads represent an aesthetic technique for men and women who seek to improve their physical appearance without needing surgery, avoiding the risks of surgery and long recovery periods [3].

Nowadays, suspension sutures can be classified depending on: [1]

- 1) Suture Desing: Smooth, Barbed, or with Cones.
- 2) Orientation of Barbs or Cones: Bidirectional or Unidirectional.
- 3) Material Composition and Duration in the Body: Non-absorbable and permanent or Absorbable and temporary.
- 4) Mechanism of Action: Tensioning, Lifting, Suspension, or Delayed Revitalizing Action.
- 5) Implant Technique: Floating Threads or Anchored Threads.

It is essential to understand the biological effect produced by the induction of threads. There is a stimulation of type I and III collagen and a fibroblastic reaction around the threads, which helps maintain the results. What is novel is the use of the threads into an atraumatic needle, which greatly facilitates the technique, also making it minimally painful. It can be performed with only topical anesthesia, such as EMLA or COLD [1].

It is also a simple and sage technique, in which with minimal training and a well-planned thread implantation design good results can be achieved. The technique is commonly known as the Japanese lifting, since the most commonly use threads (PDO) are manufactured in JAPAN or South Korea, and from these countries they are distributed worldwide [1].

Despite having multiple advantages, there are contraindications for their use, such as in pregnant or breastfeeding women, people with skin infections, or those with open wounds. Additionally, there are disadvantages, the main one being the duration of the effect over time, which leads to the recurrence or sagging [3] [4].

2. Objectives

To develop a review study of various medical studies according to the score of the Canada Task Force on Preventive Health Care (CTFPHC) from I, II1 and II2, on the use of Thread Lifts in facial rejuvenation within aesthetic medicine. The aim is to assess the study results and provide a global perspective on the use of thread lifts, considering their therapeutic effects, patient satisfaction levels, as well as possible complications and adverse effects.

3. Materials and Methods

To carry out this research, a search was conducted in the following database: Pub-Med, Cochrane Library, LILACS, Embase, Ebsco, Scielo, and the National Library of Medicine (NIH). Using keywords: Tension Threads, Suspension Sutures, Face Lift, Non-surgical Lift, the search was initiated, yielding 1268 medical articles. These articles filtered using the following search according to the Canada Task Force on Preventive Health Care (CTFPHC) from I, II1 and II2 and studies with

lower levels of evidence were excluded. After filtering the articles using the search criteria, 32 medical articles were obtained, of which 15 articles were selected, these 15 articles were selected based on inclusion criteria, with a publication date no older than 10 years. The characteristics of the studies were also taken into account, such as the population studied, the articles analyzed, and the presentation of complications, since this topic is addressed as part of the elements of this study and the selection considered systematic review, meta-analyses, as well as cohort and case-control studies, prioritizing those with the highest levels of evidence.

4. Results

The correction of facial sagging through non-surgical technique has gained popularity in aesthetic medicine in recent years, with thread lifting being one of the most requested procedures. The studies presented below cover a wide variety of approaches, technique, and evaluations of the effectiveness of facial thread lifting. In this comparative analysis, the results obtained in various studies are discussed, ranging from those exploring aesthetic effectiveness to the duration of the effect and associated complications.

1) Aesthetic effectiveness and improvement in Sagging

The significant improvement in facial sagging, reflecting the success of thread lifting in treating in various areas of the face [4] [10]. In Study Tavares J de P [4], which involved 357 patients with facial ptosis, treatment with thread lifting resulted in an improvement maintained for 2 years. This study reports a significant decrease in the WSRS scale (from 3.88 to 1.93), indicating an important long-term aesthetic improvement. Similarly, in study Li YL [9], the aesthetic effects were visible for 2 years, with improvements in the GAIS and GSS scales, which were highly satisfactory for the patients.

On the other hand, other authors [5] [6], although a significant aesthetic improvement in sagging was reported, the effects were less durable, with the effect lasting only 6 months. This suggests that, compared to more invasive treatment, thread lifting may not offer the same long-term durability, although it remains effective in the short term.

2) Comparison with Surgical Techniques

Regarding the comparison with surgical procedures, other authors reveal that surgical lifting combined with blepharoplasty offered longer-lasting improvements in facial sagging compared to thread lifting treatments. Patients who received this combination showed more noticeable aesthetic results, and the durability of the effects lasted at least 12 months, which may represent an advantage over thread lifting that, in some cases, does not exceed 6 months of effectiveness [5].

However, it is important to note that surgical lifting involves a higher risk of complications and longer recovery times, which may lead patients to opt for less invasive option such as thread lifting. In this regard, highlights that major complications were minimal in patients treated with thread lifting, despite the notable

long-term aesthetic improvement [4]. On the other hand, indicates that, although complications in surgical procedures were low, the risk of scarring and other side effects was not insignificant [5].

3) Complications and Side Effects

One of the main advantages of thread lifting over surgical procedures is the low rate of serious complications. Tavares J de P. [4] minor side effects such as bruising (39.8%), edema (30%), and tenderness (20.7%) were reported, most of which were short-lived. The rate of serious complications was nil, suggesting that thread lifting is a relatively safe option for correcting facial sagging, especially in patients seeking quick results with minimal recovery time.

Similarly, [6] [7] also report minor complications such as bruising, pain, and slight asymmetry, although these issues were managed without the need for additional intervention. Li YL [9], which compares surgical and non-surgical techniques, mentions that minor side effects such as bruising and swelling are common in both types of procedures, but no serious complications were reported.

Additionally, on the Mint Lift fine (21 patients) showed a similar rate of minor complications, most of which resolved spontaneously [7]. This study also noted that the lifting effect lasted for 6 months, although some patients required touch-ups, highlighting the temporal limitation of thread lifting compared to the more stable long-term results of surgery.

4) Durability of the Effect

A crucial aspect in the evaluation of thread lifting is the durability of the effect. Others authors [4] [8] demonstrated that the aesthetic results, particularly the facial lift, were maintained for 2 years, positioning thread lifting as an effective option for patients seeking long-term correction without resorting to invasive surgery. On the other hand, studies [6] [7] such as showed that, although the effects were evident, they lasted for only 6 months, which could be a limitation for patients desiring more prolonged results.

Li YL [9], which compares different types of facial lifting, reveals that both surgical and non-surgical techniques have a durability of between 6 and 12 months, but the effects of surgical lifting tend to be more sustainable. However, thread lifting offers a less invasive option with shorter recovery time, making it attractive to many patients who do not wish to undergo more invasive surgery.

5) Patient Satisfaction

Patient satisfaction was a common point across all studies, and overall, the results showed high satisfaction with thread lifting. Other authors mention that significant percentages of patients reported an aesthetic improvement that was maintained during the 2 years post-treatment, as reflected in an increase in the GAIS score (Global Aesthetic Improvement Scale) [4]. Similarly, Niu Z and Gülbitti HA; mention also showed that, despite the limited duration of the effects, patients were satisfied with the immediate results [6] [7].

In contrast, Li YL mention which compares surgical and non-surgical procedures, highlights that although patients were satisfied with thread lifting, those

who underwent surgery reported a greater overall improvement and a more durable effect, albeit at the cost of longer recovery time and a higher risk of complications [9]. For this, review **Table 1** where the results are summarized.

Table 1. Summary of the study results.

Author	No of Patients	No of Articles reviewed	Articles Title	Year	Complications	Results
Tavares J de P, Oliveira CACP, Torres RP, Bahmad F. [4]	7262	18	Facial Thread lifting with suture Suspension	2017	The most important complications are bruising; bleeding; edema; erythema; visible threads; asymmetry; discomfort.	It's a minimally invasive procedure with a low percentage of complications, providing good short-terms results, but with limited durability of its effects.
Contreras C, Ariza-Donado A, Ariza-Fontalvo A. [5]	Not recorded	16	Using PDO threads: A scarcely studied rejuvenation technique.	2023	Not complications	This ultrasound-guided technique demonstrated excellent results, avoiding complications with the superficial temporal artery. Additionally, the substitution of polydioxanone threads with polycaprolactone threads seems to provide better Benefit.
Niu Z, Zhang K, Yao W, Li Y, Jiang W, Zhang Q, <i>et al.</i> [6]	Not recorded	26	Incidences of Complications Following Facial Thread-Lifting.	2021	Swelling was the most commonly reported; pooled incidence of 35%; Skin dimpling 10%; paresthesia 6%; thread visibility/palpability 4%; infection 2%	The use of tension threads in older ages (>50 years) yields good results but increases the risk of dimpling (16% vs. 5.6%) and infection (5.9% vs. 0.7%) than their younger counterparts. Absorbable threads were associated with a significantly lower risk of paresthesia (3.1% vs. 11.7%) and thread extrusion (1.6% vs. 7.6%) than non-absorbable thread.
Gülbitti HA, Colebunders B, Pirayesh A, Bertossi D, van der Lei B. [7]	Not recorded	12	Thread-Lift Sutures: Still in the Lift?	2018	No Objective elevation measurement	Studies on the use of tension threads are limited; however, it has been shown that the main drawback of these threads is the limited durability of their effects in facial rejuvenation.
Pham CT, Chu S, Foulad DP, Mesinkovska NA. [8]	14222	59	Safety Profile of Thread Lifts on the Face and Neck	2021	Facial asymmetry (n = 6143) (43.19%); edema/tumefaction (n = 453) (3.18%); ecchymosis (n = 407) (2.86%)	The complications of the reads are mild and resolve on their own (paresthesias, alopecia, and injuries to vessels/glands). In severe cases, treatments are required.
Goldberg DJ. [9]	25	Not recorded	Stimulation of collagenesis by poly-L-lactic acid (PLLA) and -glycolide polymer (PLGA)-containing absorbable suspension suture and parallel sustained	2020	No Objective elevation measurement	The benefits of collagen stimulation, along with the mechanical effects of the tension threads, are essential for facial rejuvenation.
Li YL, Li ZH, Chen XY, Xing WS, Hu JT. [10]	190	Not recorded	Facial Thread Lifting Complications in China: Analysis and Treatment.	2021	Skin dimpling 40.5%; contour irregularity 16.8%; visible threads 16.3%; thread extrusion 5.3%; infection 8.9%; swelling 4.7%; incomplete facial paralysis 2.5%; hyperpigmentation 2.1%; hematoma 2.1%; allergy 0.05%	The main complications of these threads are dimpling of the skin, irregularity of the contour, and thread visibility.

Continued

Wanitphakdeedecha R, Yan C, Ng JNC, Fundarò S. [11]	25	Not recorded	Absorbable Barbed Threads for Lower Facial Soft-Tissue Repositioning in Asians.	2021	No Objective elevation measurement	The use of long threads in Thain patients is an excellent treatment option with short-term lifting effects and no complications.
Park JH, Jeong JW, Park JU. [12]	94	Not recorded	Advanced Facial Rejuvenation: Synergistic Effects of Lower Blepharoplasty and Ultrasound Guided Mid-Face Lift Using Polydioxanone (PDO) Threads.	2024	No Objective elevation measurement	Facial rejuvenation with the use of tension threads is extensive, including the use of mid-facial lifting guided by ultrasound with blepharoplasty, showing excellent improvement over time, being a safe and effective technique.
Kim JS, Yang E, Kim W, Lee W, Kim H, Yi K. [13]	703	Not recorded	Ultrasound-guided thread lifting for the prevention of parotid gland and diagnosing parotid duct complications.	2023	Moderate swelling 11.24%; inflammation and persistent pain (>7 days) 1.14%; dimple and thread protrusion 2.99%; parotid gland perforation 1.14% and diagnosed with parotid duct injury using doppler ultrasound 0.14%.	Injury to the parotid gland during the placement of tension threads is a rare complication; however, its incidence is reduced with the use of doppler ultrasound.
Hong GW, Song S, Park SY, Lee SB, Wan J, Hu KS, <i>et al.</i> [14]	No recorded	Not recorded	Why Do Nasolabial Folds Appear? Exploring the Anatomical Perspectives and the Role of Thread-Based Interventions.	2024	No Objective elevation measurement	The reverse technique for placing threads promises better support for the structures compared to the conventional technique, taking into account anatomical structures and considering the use of the crossed technique with volumizing threads for better results.
Santorelli A, Cerullo F, Cirillo P, Cavallini M, Avvedimento S. [15]	60	Not recorded	Mid-face reshaping using threads with bidirectional convergent barbs.	2021	No Complications 73.3%; Minor and transient complications 26.6%; dermal pinching 11.7%; minor extrusion 6.7%; bruising 5.0%; mild edema 3.3%	The use of Definisse threads is safe and efficient, presenting few complications, with a high rate of satisfactory results for the mid-facial third.
Moon HJ, Chang D, Lee W. [16]	21	Not recorded	Short-term Treatment Outcomes of Facial Rejuvenation Using the Mint Lift Fine.	2020	Postoperative complications 19% all of which were spontaneously resolved within a maximum period of 4 months	The use of absorbable barbed threads clearly demonstrates superior aesthetic outcomes and a lower incidence of long-term complications when compared to both permanent and non-absorbable threads, with excellent mechanical and biological effects.
Zhukova O, Dydykin S, Kubíková E, Markova N, Vasil'ev Y, Kapitonova M. [17]	357	Not recorded	A New Complex Minimally Invasive Thread Lift Method for One-Time Three-Step Fixation of the Face and Neck Soft Tissues.	2022	With no major complications observed in the postoperative period; ecchymosis 39.8% (up to 2 weeks); edema 30% (5 to 7 days); tenderness 20.7% (1 to 2 days); dimpling 0.8%; asymmetry 0.6% which disappeared after massaging/pressing.	There is a high degree of effectiveness with the use of this especially when comparing the results two years after the procedures.
Nanouk van der Sluis N, Gülbitti HA, van Dongen JA, van der Lei B. [18]	968	11	Lifting the Mouth Corner.	2022	Hematoma and swelling 14.3% of all patients.	The surgical procedure within facial lifting has more lasting effects compared to lifting using tension threads for the mouth corners.

5. Discussion

Facial rejuvenation using tension threads is a minimally invasive technique aimed at tightening the skin while considering certain anatomical structures, providing the ability to deliver immediate and relatively long-lasting results. The use of tension threads for facial rejuvenation offers an immediate effect, as the threads promote the production of collagen, elastin, and provide a lifting effect [10] [14] [16]. However, some authors argue that there are no effects on elastin production [8], and the lifting effect is poor or inversely proportional to the patient's age [16] [17]. Some studies report a significant improvement in facial contour and skin appearance 6 months post-procedure [15] [17], while others suggest that the effect's duration is limited, especially in older patients or those with more aged skin [6] [8]. In this regard, evidence suggests that the dual mechanism of absorbable threads, for tissue repositioning and collagen stimulation, contributes to a more durable effect than other conventional threads, such as PDO threads that degrade more quickly [8]. Despite the immediate benefits of tension threads, current literature does not provide sufficient evidence to support sustained efficacy beyond 12 months [6]. However, depending on the technique used, this effect could last much longer than 12 months [16].

The impact of age on the results of thread lift procedures is another important aspect. Patients over 50 years old have a significantly higher risk of developing complications [5], which could be related to the reduced skin elasticity and lower cellular regeneration capacity [18]. These findings are complemented by results showing that patients with more pronounced skin sagging and loss of subcutaneous tissue are at higher risk of complications, potentially requiring a more cautious technique and the use of slower-absorbing threads [9]. The technique used is also crucial, as careful attention to thread depth can minimize the risk of complications and reduce adverse effects [17].

The outcomes of thread lift procedures demonstrate a high level of satisfaction immediately after the procedure [15]. Satisfaction varies depending on the technique used, the physician's skill, and the type of thread chosen [5] [9]. This high satisfaction rate indicates that patients perceive significant improvements in facial contour, skin firmness, and texture, although these improvements are not always maintained long-term [6] [9]. These effects tend to diminish notably after six months [9] [10], with the decrease in the lifting effect directly related to the resorption of the threads.

In addition to the short-term benefits of thread placement, complications may arise, including dimpling of the skin, thread visibility, infections, thread extrusion, and facial asymmetries [5] [9] [14] [15]. The incidence of these complications varies considerably, with some studies reporting rates between 20% - 30% [17], with skin dimpling and thread visibility being the most common complications [7] [9] [10]. These effects are more frequent when threads are placed too superficially or when the technique is not properly followed. It's important to note that the use of

absorbable threads alone reduces the incidence of complications compared to non-absorbable threads, especially in older patients or those with sagging skin [15] [16].

6. Conclusion

The use of tension threads for facial rejuvenation represents a promising minimally invasive option, offering good immediate results and enhanced collagen production, in addition to a lifting effect. However, complications, the duration of the effect, and long-term satisfaction are areas that require further investigation. The technique and the physician's experience, as well as the patient's age and the type of thread used, are important factors influencing the procedure's success. Despite current advances, it is essential to conduct more in-depth research to address existing gaps, particularly in regions such as Latin America and Europe, where research in this field is limited. Furthermore, education and training of professionals should be promoted to minimize complications and maximize long-term outcomes. It is also necessary to conduct more studies on the longevity of the effects of thread lifting, as well as research involving different ethnic groups, which would allow for more generalizable and applicable conclusions to diverse population. Additionally, education and training of professionals should be promoted to minimize complications and maximize long-term results.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- [1] Tejero García, P. (2023) Hilos de sustentación facial: Revisión de técnicas y materiales. *Medicina Estética. Revista Científica de la Sociedad Española de Medicina Estética (SEME)*, **36**, 57-69. <https://doi.org/10.48158/medicinaestetica.036.04>
- [2] García García, J. and Alcolea López, J.M. (2019) Tratamiento con hilos rectos de ácido poliláctico con conos. Estudio clínico prospectivo. *Medicina Estética. Revista Científica de la Sociedad Española de Medicina Estética (SEME)*, **59**, 28-37. <https://doi.org/10.48158/medicinaestetica.059.04>
- [3] Ortega, G.J.P. and Armas, I.I.G. (2020) Nuevas tendencias en la aplicación de hilos tensores. *Revista Innovación Estética*, **1**, 45-56.
- [4] Tavares, J.d.P., Oliveira, C.A.C.P., Torres, R.P. and Bahmad, F. (2017) Facial Thread Lifting with Suture Suspension. *Brazilian Journal of Otorhinolaryngology*, **83**, 712-719. <https://doi.org/10.1016/j.bjorl.2017.03.015>
- [5] Niu, Z., Zhang, K., Yao, W., Li, Y., Jiang, W., Zhang, Q., *et al.* (2021) A Meta-Analysis and Systematic Review of the Incidences of Complications Following Facial Thread-lifting. *Aesthetic Plastic Surgery*, **45**, 2148-2158. <https://doi.org/10.1007/s00266-021-02256-w>
- [6] Gülbitti, H.A., Colebunders, B., Pirayesh, A., Bertossi, D. and van der Lei, B. (2018) Thread-Lift Sutures: Still in the Lift? A Systematic Review of the Literature. *Plastic & Reconstructive Surgery*, **141**, 341e-347e. <https://doi.org/10.1097/prs.0000000000004101>

- [7] Pham, C.T., Chu, S., Foulad, D.P. and Mesinkovska, N.A. (2021) Safety Profile of Thread Lifts on the Face and Neck: An Evidence-Based Systematic Review. *Dermatologic Surgery*, **47**, 1460-1465. <https://doi.org/10.1097/dss.0000000000003189>
- [8] Goldberg, D.J. (2020) Stimulation of Collagenesis by Poly-L-lactic Acid (PLLA) and Glycolide Polymer (PLGA)-Containing Absorbable Suspension Suture and Parallel Sustained Clinical Benefit. *Journal of Cosmetic Dermatology*, **19**, 1172-1178. <https://doi.org/10.1111/jocd.13371>
- [9] Li, Y., Li, Z., Chen, X., Xing, W. and Hu, J. (2021) Facial Thread Lifting Complications in China: Analysis and Treatment. *Plastic and Reconstructive Surgery—Global Open*, **9**, e3820. <https://doi.org/10.1097/gox.0000000000003820>
- [10] Wanitphakdeedecha, R., Yan, C., Ng, J.N.C. and Fundarò, S. (2021) Absorbable Barbed Threads for Lower Facial Soft-Tissue Repositioning in Asians. *Dermatology and Therapy*, **11**, 1395-1408. <https://doi.org/10.1007/s13555-021-00569-x>
- [11] Park, J.H., Jeong, J.W. and Park, J. (2024) Advanced Facial Rejuvenation: Synergistic Effects of Lower Blepharoplasty and Ultrasound Guided Mid-Face Lift Using Polydi-oxanone (PDO) Threads. *Aesthetic Plastic Surgery*, **48**, 1706-1714. <https://doi.org/10.1007/s00266-024-03975-6>
- [12] Kim, J.S., Yang, E., Kim, W., Lee, W., Kim, H. and Yi, K. (2023) Ultrasound-Guided Thread Lifting for the Prevention of Parotid Gland and Diagnosing Parotid Duct Complications. *Skin Research and Technology*, **29**, e13535. <https://doi.org/10.1111/srt.13535>
- [13] Hong, G., Song, S., Park, S.Y., Lee, S., Wan, J., Hu, K., *et al.* (2024) Why Do Nasolabial Folds Appear? Exploring the Anatomical Perspectives and the Role of Thread-Based Interventions. *Diagnostics*, **14**, Article No. 716. <https://doi.org/10.3390/diagnostics14070716>
- [14] Santorelli, A., Cerullo, F., Cirillo, P., Cavallini, M. and Avvedimento, S. (2021) Mid-face Reshaping Using Threads with Bidirectional Convergent Barbs: A Retrospective Study. *Journal of Cosmetic Dermatology*, **20**, 1591-1597. <https://doi.org/10.1111/jocd.14038>
- [15] Moon, H., Chang, D. and Lee, W. (2020) Short-Term Treatment Outcomes of Facial Rejuvenation Using the Mint Lift Fine. *Plastic and Reconstructive Surgery—Global Open*, **8**, e2775. <https://doi.org/10.1097/gox.0000000000002775>
- [16] Zhukova, O., Dydykin, S., Kubíková, E., Markova, N., Vasil'ev, Y. and Kapitonova, M. (2022) A New Complex Minimally Invasive Thread Lift Method for One-Time Three-Step Fixation of the Face and Neck Soft Tissues. *Archives of Plastic Surgery*, **49**, 296-303. <https://doi.org/10.1055/s-0042-1748641>
- [17] van der Sluis, N., Gülbitti, H.A., van Dongen, J.A. and van der Lei, B. (2022) Lifting the Mouth Corner: A Systematic Review of Techniques, Clinical Outcomes, and Patient Satisfaction. *Aesthetic Surgery Journal*, **42**, 833-841. <https://doi.org/10.1093/asj/sjac077>
- [18] Contreras, C., Ariza-Donado, A. and Ariza-Fontalvo, A. (2023) Using PDO Threads: A Scarcely Studied Rejuvenation Technique. Case Report and Systematic Review. *Journal of Cosmetic Dermatology*, **22**, 2158-2165. <https://doi.org/10.1111/jocd.15709>