

Mini-midface Lift Using Polydioxanone Cog Threads

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Background: Deepening of the nasolabial fold with reduced malar highlight caused by sagging of the midface is one of the most important characteristics of facial aging. This report describes the use of 18-G polydioxanone (PDO) cog threads to improve midface soft tissue sagging and achieve satisfactory results through a minimally invasive procedure.

Methods: In total, 64 patients (all women; age, 33–60 years) underwent a midface thread lift from January 2017 to January 2018. After a stab incision was made through an 18-G needle over the lateral orbital rim, three 18-G precannulated PDO cog threads were inserted, targeting the deep medial fat pad and inner layer of the superficial muscular aponeurotic system. The threads were anchored to the periosteum of the lateral orbit, suspending the soft tissue to a more superior direction. Surgical results were evaluated subjectively (patient satisfaction ratings) and objectively (blinded physician ratings based on changes in the vertical position of the malar highlight).

Results: No major complications (postoperative hematoma, infection, or temporary sensory/motor decreases) were observed. The mean procedural time was 15 minutes, and all patients underwent local anesthesia. Patient satisfaction was the highest at 1 month postoperatively (mean, 4.7/5.0), decreasing at 1 year postoperatively (2.8/5.0). The scores on the objective assessment followed the same trend (4.5/5.0 at 1 month; 3.1/5.0 at 1 year).

Conclusion: Using PDO cog threads for midface lifting is simpler, quicker, and less invasive than using conventional surgical methods, and this method simultaneously achieves satisfactory results for at least 6 months. (*Plast Reconstr Surg Glob Open* 2020;8:e2920; doi: [10.1097/GOX.0000000000002920](https://doi.org/10.1097/GOX.0000000000002920); Published online 24 June 2020.)

INTRODUCTION

As facial aging progresses, soft tissue ptosis occurs in every part of the face due to gravitational effects. Particularly in the case of the anterior cheek, which can signify youth, the downward migration of adipose tissue and volume can lead to a deeper-appearing nasolabial fold and an older-appearing face.^{1,2}

A variety of conventional midface lifting techniques have been introduced to increase the volume of the reduced anterior cranial region and to correct soft tissue ptosis.^{3–5} The most representative conventional method involves a lower blepharoplasty incision with an extensive dissection of the subperiosteal layer, and the soft tissue

is mechanically fixed in an upward direction through a device, such as an endotine,⁶ followed by remnant skin excision. However, these procedures require sedation or general anesthesia and a long recovery time for wound healing. Additionally, various complications can occur,^{7,8} burdening the decision-making process for the patients.

In recent years, especially in East Asia, polydioxanone (PDO) threads of various lengths and shapes have been approved for use,^{9,10} and many lifting procedures can now be performed in a much less invasive manner.^{11–13} In an effort to improve patient satisfaction, we used cog threads made of PDO material to perform a mini-midface lift that has a shorter operative time and postoperative downtime and yields satisfactory results without incisions or postoperative scarring. Herein, we show the effect of this technique in terms of both patient satisfaction and an objective assessment of the physical change in the midface area.

METHODS

Patients

In total, 64 patients who underwent the “mini-midface lift” using PDO cog threads between January 2017

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and January 2018 were included in this study. Patients who underwent simultaneous surgeries, such as an incisional facelift, lower blepharoplasty, surgery with fillers, or autologous fat injection, in addition to thread lifting in the midface area, were excluded. Cases with thread lifting using nonabsorbable or poly(L-)lactic acid thread were also excluded. The study procedures adhered to the principles of the Declaration of Helsinki. Informed written consent was obtained from all the participants.

Operative Methods

The patients did not undergo sedation before or after surgery; rather, they underwent surgery in a fully conscious state. Before surgery, a local anesthetic solution was injected into the bilateral lateral canthus, and an additional infraorbital nerve block was performed. After local anesthesia administration, a stab incision was made on the skin just above the lateral orbital rim using an 18-G needle to secure an insertion point wide enough for the preannulated PDO cog thread to pass through. The PDO cog thread (total length, 15 cm) was precannulated using a Medicut catheter type 18-G cannula (total length, 12.5 cm; Mint THIN; HansBiomed, Seoul, South Korea) (Fig. 1). Via the secured insertion point, the catheter was advanced into the subperiosteal level of the lateral orbital rim and pushed through the anterior cheek to the inferior level, passing the nasolabial fold. The cannula traversed through the lateral orbital rim underneath the periosteal layer to achieve a sufficient anchoring force between the cog thread and the periosteum. As the cannula advanced into the inferior level, the direction of insertion was headed further toward the superficial layer, passing through the deep fat pad and superficial muscular aponeurotic system (SMAS) layer, and stopped superficially under the dermis, medial to the nasolabial fold (Fig. 2).

After the cannula containing the thread was fully inserted, the cannula was pulled out, and the thread was kept in place. In all patients, 3 threads each were inserted into both sides of the cheek, in different directions from the superior to the inferior portion (Fig. 3). After the removal of the cannula, the thread was pulled out of the skin using moderate force. In this instance, the operator ensured that the thread was anchored to the periosteum of the lateral orbit, as the anchoring resisted the outward pulling force. After adequate pulling, the skin opening was pushed against the pulling direction as far as possible to prevent further thread exposure, and the excess thread that was pulled outside the incision was cut with sharp scissors. Subsequently, a gentle manual pressure was applied over the cheek to release the dimpled area around the nasolabial fold. The stab incision was then sealed with a tape or hydrocolloid dressing material, without sutures.

Subjective and Objective Evaluations

Surgical results were evaluated subjectively and objectively. For the subjective evaluation, patients were asked to complete a questionnaire regarding their level of satisfaction, using a 5-point grading system [from 1 (very poor) to 5 points (very satisfied)], preoperatively and at 1 month, 6 months, and 1 year postoperatively. For the

objective evaluation, frontal-, 45-degree-, and lateral-view photographs were taken preoperatively and at 1 month, 6 months, and 1 year postoperatively. Two independent doctors (1 plastic surgeon and 1 dermatologist) who were not involved in the surgery evaluated the surgical effects using a 5-point Global Aesthetic Improvement Scale (5, very much improved; 4, much improved; 3, improved; 2, no change; and 1, worse). The objective assessment mainly focused on the lifting effect and the degree of facial rejuvenation.

Statistical Analyses

Statistical analyses were conducted comparing the satisfaction scores on each time table by using paired *t* test methods, and descriptive statistics were presented as mean scale values and SD. A *P* value <0.05 was interpreted as significant. Analyses were performed using SPSS software version 25 (IBM Corp., Armonk, N.Y.).

RESULTS

All patients were women, and the mean age was 48 years (range, 36–61 years). Twenty patients had previously undergone lower blepharoplasty, conventional face lifting, or fat injection. Patient demographics and previous surgical history are summarized in Table 1.

No major complications (postoperative hematoma, infection, or temporary sensory/motor decreases) were observed. The mean procedural time was 15 minutes. Patient satisfaction was higher at 1 month (mean, 4.7 points) and at 6 months (mean, 4.1 points) after surgery than that at the preoperative assessment (mean, 2.5 points), showing a statistically significant change. However, patient satisfaction decreased to an average of 2.8 points at 1 year after surgery. The physicians' assessments showed a pattern similar to that of patient satisfaction, with mean scores of 4.5 and 3.8 points at 1 month and 6 months after surgery, respectively; however, the mean score decreased to 3.1 points at 1 year after surgery (Table 2).

Case

A 36-year-old woman visited our clinic for a mini-midface lift. She had a history of facial fat injection in the midface area 4 years ago. The patient complained of soft tissue sagging in the anterior cheek and a deeper-appearing nasolabial fold. Three PDO threads were inserted into both sides of the midface (see Video [online], which displays the mini-midface lift technique in a representative case). No serious complications were observed during or after surgery. The patient was very satisfied with the outcome of the surgery (Fig. 4).

DISCUSSION

Currently, there is an inclination toward noninvasiveness in the field of rejuvenation surgery, as shown by the increasing popularity of high-intensity focused ultrasound lifting and thread lifting, which has already become a global trend.^{14,15} Patients who seek a facial rejuvenation surgery worry about the risks associated with the invasive lifting surgery, including the use of general anesthesia,

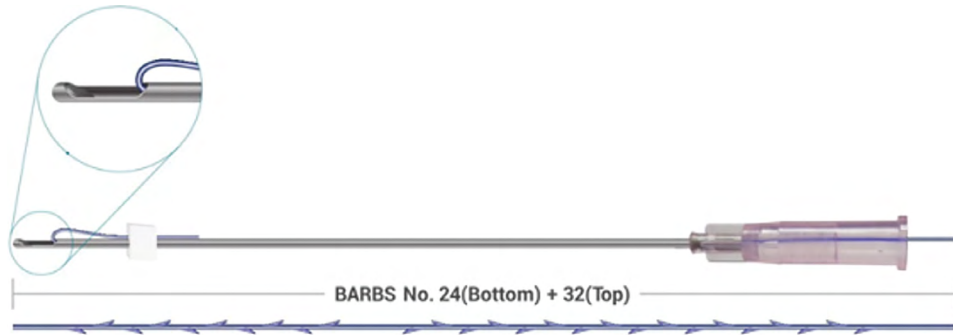


Fig. 1. Single, cogged polydioxanone thread with an attached 18-G catheter. The total length of the thread was 15 cm. The 3-dimensional cog design had 24 barbs at the bottom and 32 barbs at the top.

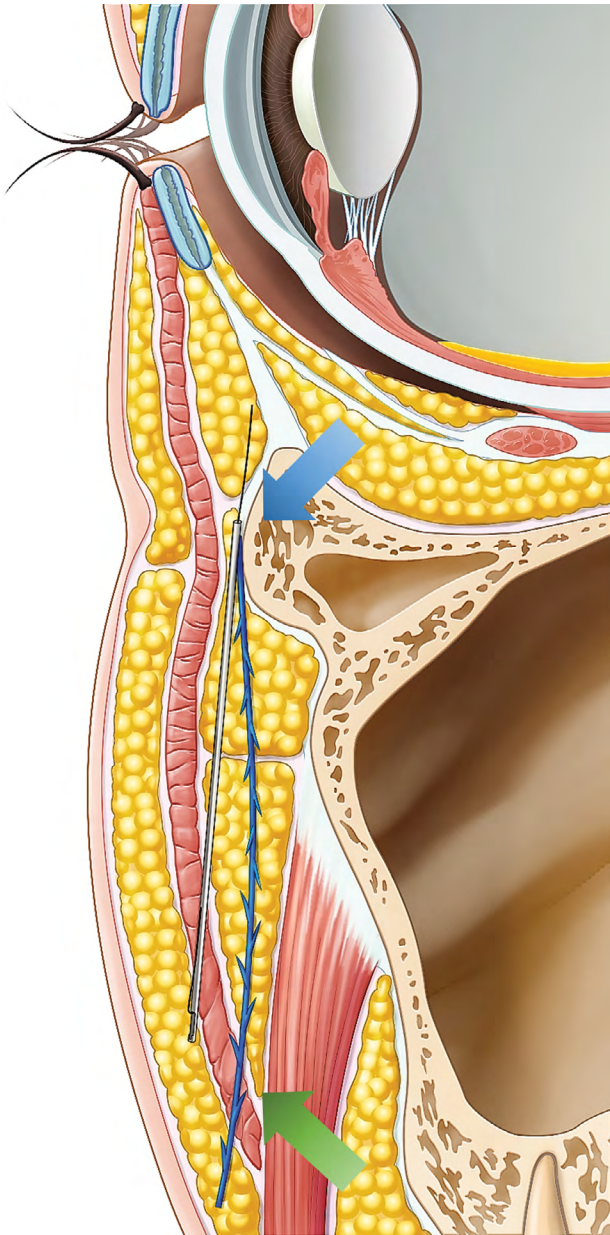


Fig. 2. Schematic illustration of thread insertion. Two threads each were inserted through a stab incision over the lateral orbital rim.

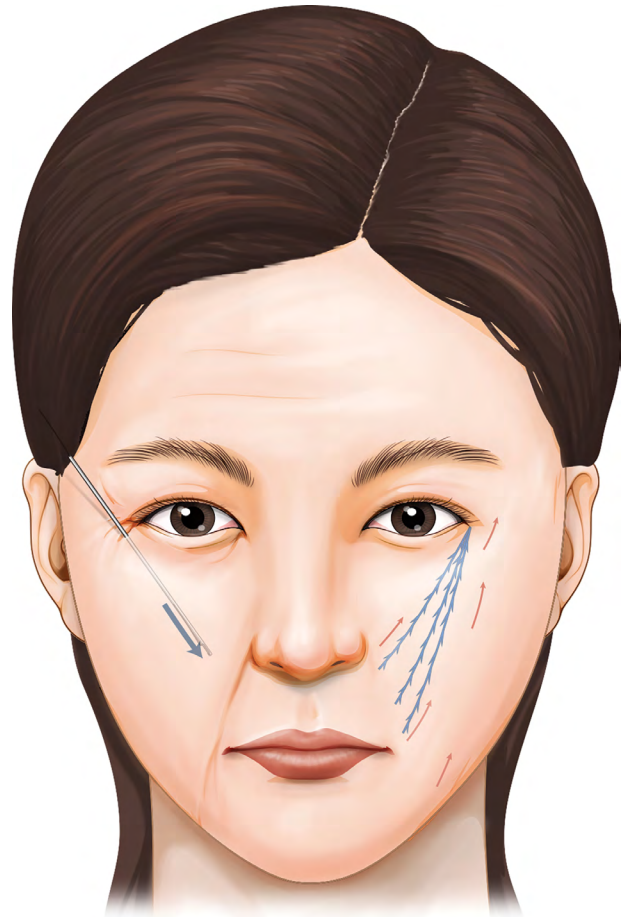


Fig. 3. The subcutaneous pathway of the thread. The cannula starts from the subperiosteal level at the entry point (blue arrow, lateral orbital rim) and advances into a more superficial direction, passing the deep fat pad and SMAS layer (green arrow, zygomaticus muscle).

long downtime, long skin incision, extensive dissection, and soft tissue fixation. Thus, more patients are presently choosing less invasive options, even though the procedures may yield a less lifting effect and have a shorter duration of treatment effect.

Thread lifting using PDO threads perfectly encompasses these recent trends. Unlike in conventional lifting

Table 1. Patient Demographics and Previous Surgical History

Patients (total)	64
Age, y (SD)	48 ± 13.3
Sex	
Male	0
Female	64
Past surgical history (duplicated)	
Lower blepharoplasty	17
Incisional face lift	4
Facial fat injection	15

SD, standard deviation.

Table 2. Patient Satisfaction Score Preoperatively and at 1 Week, 6 Months, and 1 Year Postoperatively

	Mean	P
Patient satisfaction		
Preoperative	2.5/5	
1 mo	4.7/5	<0.01
6 mo	4.1/5	<0.01
1 y	2.8/5	0.43
Physician Assessment Scale		
1 mo	4.5/5	
6 mo	3.8/5	
1 y	3.1/5	

surgery, general anesthesia is not necessary, and the surgeon can perform the procedure on the day of the patient’s visit to the clinic.¹⁶ The operative time is less than 30 minutes. There are no postoperative complications, with the exception of mild bruising and swelling, which may last for up to 1 or 2 weeks, and there is almost no postoperative scarring. In addition, as previously reported,^{11,12,17} PDO is less burdensome to the patients than other materials because it is hydrolyzed and released into the urine after 6 months. Because of these advantages, patients are more frequently choosing the thread lifting procedure.

The optimal indications for thread lifting are thought to be the following: 30–49 years of age and a mild to moderate degree of skin and soft tissue ptosis.^{13,18,19} As the duration of the treatment effect is 6 months to 1 year, patients can decide to undergo additional thread lifting procedures as the effect diminishes over time. However, the procedure is not adequate for patients over 60 years of age, as they have much less skin laxity and a greater need for volume filling and skin texture improvement. In such cases, a more invasive facelift surgery should be performed to achieve patient satisfaction.

Since Sulamanidze et al²⁰ first reported on the thread lifting results using polypropylene barbed anti-ptosis sutures (APTOS), more materials and forms of lifting threads have been developed. Kim et al¹¹ reported that, in addition to physically pulling the skin directly, a reaction between the thread and the surrounding soft tissue could result in an additional lifting effect. After the PDO thread is implanted in the skin, type 1 collagen and transforming growth factor-β1 (TGF-β1) levels are increased via this tissue reaction, which is strongest at 1 month after surgery and lasts up to 7 months after surgery.

Midface lifting surgeries were conventionally performed with extensive dissection, transconjunctival or lower blepharoplasty incisions, and complete fixation



Fig. 4. A 36-year-old woman with drooping of the midface. A, Preoperative photograph. B, One month after surgery. C, Six months after surgery. D, One year after surgery.

of deep plane tissue with an absorbable fixation material (endotine) or permanent suture.⁶ Certainly, we do not claim that our method shows similar results as those achieved by conventional midface lifting; it is clear that thread lifting is less effective and has a shorter maintenance period. Short-term improvement after thread lifting is attributed mainly to the local inflammation and swelling of the soft tissue on the insertion area of the face. In addition, as our method does not include actual mechanical anchoring of the thread other than surface cogs on PDO threads, we can assume that the effect will not last in the long term. However, for patients who prefer less invasive techniques and a shorter downtime, thread lifting is superior to conventional facelift surgery, even with its limited effect and shorter maintenance period.

In this study, we aimed to elevate the deep facial fat directly by targeting the fat pad below the SMAS to obtain the midface lifting effect. For this purpose, the thread was inserted so that it traversed through the periosteal layer of the supraorbital rim and advanced into a sufficiently deep layer. Although the thread traversed along the superficial direction as it approached the nasolabial fold, the majority of the thread was kept in deep layers of facial tissue to prevent unwanted skin dimpling.²¹ In addition, when performing the procedure in patients who have thinner skin, including most white patients, the thread should be advanced more deeply to prevent exposure and dimpling, with extra caution. The mini-midface lift using cog threads is optimal for patients with mild soft tissue sagging of the midface who do not require or prefer a lifting surgery that involves a long skin incision. The patient should have enough fat tissue under and over the SMAS layer to lift the tissue upward.

The main limitation of the present study is that the study population comprised only patients without severe facial aging. However, based on the authors' experience, the surgical results are suboptimal, and the results are often unsatisfactory when thread lifting is performed on patients over 60 years of age with severe skin elasticity and advanced facial aging. As indicated in several previous articles,^{12,17} the key to successful thread lifting is selecting patients with good indications for the procedure. For patients with extensive progression of fat degeneration due to facial aging, it is better to avoid thread lifting and choose another surgical option.

CONCLUSIONS

We performed mini-midface lifting using PDO cog threads, which showed satisfactory results for 6 months postoperatively in terms of both an objective assessment by physicians and the patient's subjective satisfaction. Although this method has a shorter maintenance period than that for conventional surgical midface lifting and is not suitable for severe facial aging, selecting patients who meet the indications for this procedure can lead to fair surgical results. The mini-midface lifting surgery can be performed under local anesthesia and has a shorter operative time, less postoperative downtime, lower complication risk, and less financial and psychological burden than do the conventional techniques.

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PATIENT CONSENT

The patient provided written consent for the use of her image.

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