

University of Groningen

Effectiveness, Longevity, and Complications of Facelift by Barbed Suture Insertion

Bertossi, Dario; Botti, Giovanni; Gualdi, Alessandro; Fundaro, Piero; Nocini, Riccardo; Pirayesh, Ali; van der Lei, Berend

Published in:
Aesthetic Surgery Journal

DOI:
[10.1093/asj/sjy042](https://doi.org/10.1093/asj/sjy042)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Bertossi, D., Botti, G., Gualdi, A., Fundaro, P., Nocini, R., Pirayesh, A., & van der Lei, B. (2019). Effectiveness, Longevity, and Complications of Facelift by Barbed Suture Insertion. *Aesthetic Surgery Journal*, 39(3), 241-247. <https://doi.org/10.1093/asj/sjy042>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Effectiveness, Longevity, and Complications of Facelift by Barbed Suture Insertion

Aesthetic Surgery Journal
2019, Vol 39(3) 241–247
© 2018 The American Society for
Aesthetic Plastic Surgery, Inc.
Reprints and permission:
journals.permissions@oup.com
DOI: 10.1093/asj/sjy042
www.aestheticsurgeryjournal.com

OXFORD
UNIVERSITY PRESS

Dario Bertossi, MD; Giovanni Botti, MD; Alessandro Gualdi, MD;
Piero Fundarò, MD; Riccardo Nocini, MD; Ali Pirayesh, MD; and
Berend van der Lei, MD, PhD

Abstract

Background: Minimally invasive facelift techniques involving barbed suture insertion have become popular among patients who wish to correct facial tissue ptosis.

Objectives: The authors sought to determine the effectiveness, longevity, complications, and postoperative sequelae associated with facelift by means of barbed polydioxanone (PDO) threads.

Methods: A total of 160 consecutive patients who underwent facelift with barbed threads were evaluated retrospectively. For malar augmentation and correction of nasolabial grooves, 2 or 3 PDO threads (23 gauge) were placed per side; for treatment of mandibular lines, 2 to 4 PDO threads (21 gauge) were inserted per side.

Results: Immediately after suture placement and for 1 month postoperatively, patients experienced improvement in facial tissue ptosis. This aesthetic result declined noticeably by 6 months and was absent by 1 year. The overall complication rate in the early postoperative period was 34% (55 of 160 patients). Eighteen patients (11.2%) had superficial displacement of the barbed sutures, 15 (9.4%) experienced transient erythema, 10 (6.2%) had infection, 10 (6.2%) experienced skin dimpling, and 2 (1.2%) had temporary facial stiffness.

Conclusions: Placement of barbed threads yields instantaneous improvement in facial ptosis that is no longer apparent by 1 year. Given this transient benefit and the complication rate of 34%, we recommend limiting this procedure to patients with contraindications for more invasive facial surgery.

Level of Evidence: 4



Editorial Decision date: January 22, 2018; online publish-ahead-of-print June 28, 2018.

During the past 2 decades, placement of barbed sutures has garnered attention as a minimally invasive modality to treat facial ptosis. This so-called lunchtime facelift involves little downtime and a low risk of complications and has been purported to yield aesthetic results equivalent to those of more invasive facelift procedures.¹ Facelift with barbed sutures entails the passage of threads under the skin of the face and neck to counteract skin laxity and tissue descent. This procedure also produces a biostimulatory effect on collagen formation, thereby inducing natural tissue stability.¹ Early results of barbed suture facelift were not consistently favorable, but semipermanent suture materials with improved barbs, cones, and other prominences have been developed that offer better soft-tissue lift and stability.

Dr Bertossi is Maxillofacial Surgeon, Section of Oral and Maxillofacial Surgery, Department of Surgical Sciences, Dentistry, Gynecology and Pediatrics, University of Verona, Verona, Italy. Dr Botti is a plastic surgeon in private practice in Brescia, Italy. Dr Gualdi is a plastic surgeon in private practice in Milan, Italy. Dr Fundarò is a general surgeon and esthetic surgeon in private practice in Bologna, Italy. Dr Nocini is Attending Doctor, Section of ENT, Department of Surgical Sciences, Dentistry, Gynecology and Pediatrics; University of Verona, Verona, Italy. Dr Pirayesh is a plastic surgeon in private practice in Amsterdam, The Netherlands. Dr van der lei is a Plastic Surgeon, University Medical Center of Groningen, The Netherlands.

Corresponding Author:

Dr Dario Bertossi, Department Maxillofacial Surgery, University of Verona, Policlinico GB Rossi, Piazzale LA Scuro, 10 37134 Verona, Italy.
E-mail: dario.bertossi@univr.it

Results of facelift with barbed sutures depend on careful selection of patients with adequate soft-tissue volume, meticulous preoperative planning, application of suitable suture materials, and technical skill and experience.^{1,2} Given recent improvements in barbed threads and ongoing demand for minimally invasive procedures, we began performing facelift with barbed sutures in our office in January 2014. We typically apply 23-G or 21-G barbed polydioxanone (PDO) threads. Herein, we present our findings regarding the effectiveness, longevity, and side effects of facelift with barbed sutures in a consecutive series of 160 patients.

METHODS

Patients and Study Design

The authors retrospectively analyzed 160 patients (136 women, 24 men) who underwent facelift by barbed suture insertion to address facial tissue ptosis from January 2014 to January 2015. Presenting conditions included deep nasolabial folds with or without midface ptosis and jowls. The inclusion criterion was soft-tissue thickness that was considered to be adequate to conceal the inserted threads. Excluded from the study were current smokers, patients with metabolic diseases, and patients who had undergone previous surgical or nonsurgical treatments involving the face. All patients gave informed consent. This study was conducted in accordance with principles set forth in the Declaration of Helsinki.

Surgical Procedures

All procedures and follow up were conducted in an outpatient setting. Patient selection and barbed suture placement were carried out by 2 of the authors (D.B. and B.V.L.). Preoperatively, the surgeon determined the vectors and extent of midface lifting or jawline lifting and tightening. The patient's face was marked for suture placement; needle insertion points generally were marked 1.8 cm lateral to a vertical line that intersected with the lateral canthus (Figure 1). Topical local anesthesia (a formulation of 40% lidocaine cream prepared in house at our pharmacy) was applied to the skin surface. Ten minutes later, antisepsis was conducted with sodium hypochlorite (0.2%; Merck, Kenilworth, NJ) and sterile draping.

During the procedure, patients were asked to rate pain severity on a visual analog scale (VAS) of 0 (no pain) to 10 (unbearable pain). For midface lifting (ie, malar augmentation to correct the nasolabial groove), 2 or 3 barbed PDO threads (23 G) were placed per side (average total, 6 threads) (Phoenix, BS Medical, Seoul, Korea) along the planned insertion points. The Phoenix barbed thread is



Figure 1. Intraoperative views of this 45-year-old woman who underwent facelift by means of barbed suture placement. A hollow needle containing the barbed thread is inserted at points in the malar area located 1.8 cm lateral to a vertical line that crosses the lateral canthus.

contained within a long hollow needle and is inserted and maneuvered in the subcutaneous plane, guided by the surgeon's other hand (Figure 2). For jawline lifting (ie, for correction of the mandibular line), 2 to 4 threads (21 G) were placed per side (average total, 6 sutures; Phoenix, BS Medical, Jeollabuk, South Korea). The needle was inserted in the subcutaneous plane starting 1 cm above the mandibular angle and perpendicular to the skin surface (Figure 3). Once the subcutaneous fibrofatty tissue was contacted, the needle was turned on a 15-degree angle so that it was parallel to the skin. Tension then was placed on the thread in the opposite direction of the barb splay to engage the barbs in the fatty fibrous tissue, thereby transferring the tension to lift the overlying dermis and skin.

To maintain suspension of the barbed sutures, an anchor was set in the tissue. After all the barbed sutures were positioned in the skin, the surgeon held the distal part of the suture in 1 hand and pushed the skin in the opposite direction with the other hand to fully engage the threads and lift the tissues. The end of the suture thread then was cut with scissors. (Cutting with a scalpel is not recommended because it could create a skin lesion.) Protrusions of thread tails that remained from elastic repositioning were concealed by massaging the skin with moderate force.

Postoperative Care and Financial Considerations

When the procedure was complete, the patient remained on the surgical bed and held ice packs to the face for 10 minutes. Patients were advised to avoid the following in the postoperative period: strenuous exercise (for 3 days), tanning devices, saunas and Turkish baths, hot



Figure 2. Angle of needle insertion.



Figure 3. The thread was inserted in the mandibular area 1 cm above the mandibular angle.

foods, and anticoagulative drugs. On the first or second postoperative day, patients were asked to rate pain severity. Follow up in an outpatient setting was scheduled for postoperative days 3 and 7 and months 1, 6, and 12. Immediately postoperatively and at follow-up visits, patients were photographed and were asked to score their satisfaction on a VAS.

The average cost to the patient for facelift with barbed sutures in our office was €3500 (US \$4100); this corresponds to approximately 40% of a surgeon's fee for a traditional facelift (€8500; US \$10,000).

RESULTS

The mean patient age was 51 years (range, 19-65 years); by gender, the mean age was 54 years for the women and 50 years for the men (Table 1). The 19-year-old woman in this study did not require a facelift but presented for aesthetic improvement of the midface, including treatment of deep nasolabial folds. The majority of the patients (89%) ranged in age from 40 to 55 years.

After the procedure, immediate aesthetic benefits were noted (Figures 4-5 and Supplemental Figure 1). These included a significant increase in malar projection, reduction of the nasolabial groove, and noticeable improvement in the mandibular line with reduction or disappearance of the jowls. In general, patients were pleased with the results immediately after surgery, although an objective assessment of patient satisfaction was not undertaken. VAS scores at completion of the procedure were 8 or 9 for all patients in the study (Table 2).

Patients received follow up for an average of 12 months (range, 0-14 months). One month postsurgically, patients noted additional improvement from the immediately postoperative result. By 6 months, the perceived aesthetic benefits had declined substantially; patients indicated significantly decreased or absent malar soft-tissue projection as well as reemergence of the

Table 1. Number of Patients by Age

Age range, years	No. of patients
19-34	1
35-44	12
45-54	141
54-65	6

nasolabial fold and jowls (Figures 4-5 and Supplemental Figure 1). VAS scores 6 months postoperatively were 3 or 4. By 1 year, the aesthetic results of facelift with barbed sutures could no longer be discerned. Forty of the 160 patients (25%) expressed disappointment with the loss of effect; these patients sought medical treatments for the face (eg, application of hyaluronic acid or botulinum toxin). Only 16 patients (10%) underwent a subsequent invasive operation (ie, facelift or midface lift) to improve the nasolabial fold, malar projection, or the jawline.

During the procedure, 125 of the 160 patients (78%) experienced minimal pain or no pain. The remaining 35 patients (22%) indicated an average pain rating of 5 (range, 0-10); in general, the patients found the pain level to be tolerable. In the early postoperative period (ie, 24-36 hours), patients rated pain as 0 (109 patients; 68%) or 1 (52 patients; 32%) on a VAS. Eight patients (5%) had mild intraoperative bleeding and hematoma, primarily at the entry points of the 21-G needle along the mandibular line.

The overall complication rate was 34% (55 patients) (Table 3). One month postoperatively, 18 patients (11.2%) had superficial displacement of the barbed threads into the dermis and underwent suture removal. Specifically, the patient was advised to massage the threaded area 3 times a day for 6 days, and the threads subsequently were extracted by the surgeon in the direction opposite that of



Figure 4. This 45-year-old woman underwent facelift by means of barbed suture placement to treat an underprojected malar area and bilateral jowls. Frontal views (A) before, (B) one month after treatment, and (C) six months after treatment, the aesthetic improvement is diminished. The same results are also visible in (D-F) profile views where the lifted effect in the malar soft tissues and jawline is going to be lost after 6 months.

placement. Fifteen patients (9.4%) experienced erythema that resolved spontaneously within a few days and was not present at 1 month follow up. Ten patients (6.2%) had skin dimpling after the procedure that resolved after several days or weeks, with the patient applying light massage

daily. Infection that necessitated suture removal occurred in 10 patients (6.2%) and it was done with the same procedure as the displaced sutures. Two patients experienced temporary facial stiffness that resolved spontaneously by 7 to 15 weeks.



Figure 5. This 49-year-old woman underwent facelift by means of barbed suture placement to treat an underprojected malar area and marionette lines. Frontal views (A) before, (B) one month after treatment, and (C) six months after treatment, the aesthetic improvement is gone. The same results are also visible in (D-F) profile views where the lifted effect in the malar soft tissues and jawline is going to be lost after 6 months.

Table 2. Patient Satisfaction^a (N = 160)

Facial region treated	VAS score (percentage of patients)
Malar	8 (88%)
Mandibular line	9 (99.3%)

VAS, visual analog scale. ^aPatients indicated level of satisfaction on a VAS immediately postsurgically.

DISCUSSION

In this retrospective study, we found that placement of barbed PDO sutures to treat the nasolabial groove/malar area or the mandibular line/jowls yielded an immediate lift with limited longevity. The lifted effect was most pronounced 1 month postsurgically, possibly owing to secondary edema and mild inflammation that resulted in

Table 3. Complications of Barbed Suture Placement for Facelift (N = 160)

Type of complication	No. of complications (%)
Superficial displacement	18 (11.2)
Erythema (temporary)	15 (9.4)
Skin dimpling (temporary)	10 (6.2)
Infection	10 (6.2)
Facial stiffness (temporary)	2 (1.2)
Overall	55 (34.4)

biostimulation and collagen production. However, this aesthetic improvement had diminished by 6 months and was no longer apparent by 12 months. Moreover, complications occurred in approximately one third of the patients. Considering the average fee of €3500 (US \$4100), the cost effectiveness of this procedure is questionable.

Several types of barbed threads are available commercially for lifting procedures.³⁻⁶ These threads have unique features and insertion techniques. Aptos threads (Aptos, Tbilisi, Georgia) are bidirectional and have no anchoring points. These threads are inserted into the subcutaneous fat by means of a hollow needle and are immobilized by engaging the bidirectional barbs. Aptos thread products include permanent nonabsorbable surgical lift threads and absorbable light lift threads.

Contour threads (Surgical Specialties [DBA Angiotech], Reading, PA) are made of polypropylene and have unidirectional barbs. The barbed threads are prepared by nicking the surface of 2-0 polypropylene sutures to create projections angled unidirectionally or bidirectionally along the thread length in a linear or helicoidal array. The tensile strength of a barbed contour thread is equivalent to that of a 2-0 polypropylene suture. Contour threads are inserted through a cutaneous incision and positioned subdermally. The threads are stabilized by suturing to the fascia, temple, or mastoid area. The procedure is relatively invasive and involves a recovery time approximately 2 weeks longer than with Aptos threads.⁷ Silhouette suture materials (Sinclair Pharma, London, UK) are available as polypropylene threads or as softer biodegradable threads prepared from poly-L-lactic acid. The cones of the biodegradable threads are thought to spear the soft tissues, thereby inducing neocollagenesis and potentially prolonging the aesthetic result.

PDO threads have been applied as absorbable suture materials since 1981. PDO threads generally undergo complete absorption 8 months after insertion and elicit a minimal foreign-body reaction. In facelift applications, nonbarbed monofilament PDO threads require anchoring to stable structures. This procedure evokes temporary edema, which has a biostimulatory effect. Barbed PDO threads are knotless and can be prepared with unidirectional or bidirectional barbs. Unidirectional barbed threads

are inserted with 1 needle, whereas bidirectional barbed threads have a needle on each end, and the barbs change direction at the suture midpoint.⁷

To achieve favorable results of facelift with barbed sutures, the surgeon must have expertise in muscle kinetics, soft-tissue anatomy, thread mechanics, and immunologic processes associated with suture placement. Facial areas with significant muscle activity, such as the perioral region, can be particularly challenging. Lifting these soft tissues vertically would oppose muscle contraction and result in failure of the lift effect, owing to so-called cheesewiring. In the current study, we accounted for lift direction but still observed significant cheesewiring against the rigid core of the thread and its barbs. The lifted effect also likely was diminished by thread weakening or breaking caused by muscle activity.

In scientific literature and in commercial advertisements, facelift with barbed sutures has been described as having immediate patient satisfaction,⁸⁻¹⁰ no need for general anesthesia, minimal downtime, and a low risk of complications,¹¹ compared with more invasive procedures.^{12,13} We agree that patients had tolerable or no pain with this procedure under local anesthesia and that patient satisfaction in the immediate postoperative period was high. However, patients in the current study had similar downtime to those who undergo mini-facelift procedures which is about one week to ten days.¹⁴ Moreover, the complication rate of this procedure was 34% and included superficial displacement of the barbed sutures into the dermis, transient erythema, folding and dimpling of the skin, and infection that necessitated thread removal.

Infection occurred in 6.2% of the patients in this study. Therefore, it may be helpful to administer antibiotic prophylaxis before suture placement. Antibiotics routinely are given before other types of implantation (eg, breast or buttock augmentation) and have been recommended by other surgeons who perform facelift with barbed sutures.

In the present study, 11.2% of the patients experienced displacement of the barbed sutures into the dermis. We acknowledge that this complication might be attributed, at least in part, to our technique of suture insertion. Facial massage generally did not resolve this issue, and thread removal was necessary for most of these patients. The 6.2% of patients with skin folds and dimpling postsurgically had resolution of this condition by performing light massage daily for several days or weeks. Patients with transient erythema (9.4%) had spontaneous resolution within a few days.

Other researchers have noted the following complications of barbed suture placement for facelift: a temporary feeling of tightness, transient neuropathy, and damage to the parotid duct or the branches of the regional nerves. In a pair of studies,^{15,16} Sulamanidze et al found that 157 patients who underwent insertion of Contour threads and were monitored for 2.5 years had moderate rates of skin dimpling (14.6%), hematoma and/or hemorrhage (9.5%), and hypercorrection (9.5%). In a study of 102 patients

who received facelift with Aptos threads, Wu¹ noted that 4.9% had infection, 4.9% had skin dimpling, 7.8% experienced thread migration, and 11% had pain and could feel the threads by palpation.

The findings of the current and previous studies suggest a lack of evidence regarding prolonged benefits of barbed suture placement in a closed procedure.¹⁷ We found that the tissue lift afforded by thread placement had deteriorated by 3 to 6 months and was absent by 1 year. We suggest that cheesewiring is the most likely reason for the limited longevity of this effect. Specifically, muscle activity and gravity cause the lifted tissues to gradually extrude beyond the barbed threads. This facelift procedure does not reduce skin excess, nor does it involve undermining and anchoring of the threads to firm scar tissue. As Atiyeh et al¹⁰ concluded in a review of barbed sutures, a surgical approach to redistribute the anatomic layers of the face by standard open or endoscopic facelift cannot be replaced by simply suspending ptotic tissue with threads like a marionette.¹⁸⁻²⁰ Because of the short-lived aesthetic results of this procedure, we have stopped performing facelift by barbed suture insertion for most patients; we recommend that this procedure be limited to patients with contraindications for invasive facial surgery.

CONCLUSIONS

In this study, facelift with barbed PDO threads immediately improved the appearance of sagging tissues of the midface and jawline. This effect was most pronounced 1 month postoperatively and declined thereafter with no discernable aesthetic improvement by 1 year. Complications occurred in approximately one third of patients in this study. Because the benefits of this treatment are transient, closed facelift with barbed sutures should be performed only for patients with contraindications to invasive surgery or those willing to accept a short-term result for a lower expense. Barbed PDO sutures might best be applied in combination with open facelift procedures.

Supplementary Material

This article contains supplementary material located online at www.aestheticsurgeryjournal.com.

Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

REFERENCES

1. Wu WT. Barbed sutures in facial rejuvenation. *Aesthet Surg J*. 2004;24(6):582-587.
2. Sulamanidze MA, Fournier PF, Paikidze TG, Sulamanidze GM. Removal of facial soft tissue ptosis with special threads. *Dermatol Surg*. 2002;28(5):367-371.
3. Villa MT, White LE, Alam M, Yoo SS, Walton RL. Barbed sutures: a review of the literature. *Plast Reconstr Surg*. 2008;121(3):102e-108e.
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. Silva-Siwady JG, Díaz-Garza C, Ocampo-Candiani J. A case of Aptos thread migration and partial expulsion. *Dermatol Surg*. 2005;31(3):356-358.
6. Suh DH, Jang HW, Lee SJ, Lee WS, Ryu HJ. Outcomes of polydioxanone knotless thread lifting for facial rejuvenation. *Dermatol Surg*. 2015;41(6):720-725.
7. Abraham RF, DeFatta RJ, Williams EF 3rd. Thread-lift for facial rejuvenation: assessment of long-term results. *Arch Facial Plast Surg*. 2009;11(3):178-183.
8. Kaminer MS, Bogart M, Choi C, Wee SA. Long-term efficacy of anchored barbed sutures in the face and neck. *Dermatol Surg*. 2008;34(8):1041-1047.
9. Houchman M. Midface barbed suture lift. *Facial Plast Surg Clin North Am*. 2007;15(2):201-207.
10. Atiyeh BS, Dibo SA, Costagliola M, Hayek SN. Barbed sutures "lunch time" lifting: evidence-based efficacy. *J Cosmet Dermatol*. 2010;9(2):132-141.
11. Rachel JD, Lack EB, Larson B. Incidence of complications and early recurrence in 29 patients after facial rejuvenation with barbed suture lifting. *Dermatol Surg*. 2010;36(3):348-354.
12. Trévidic P, Alkebaïsi A. Facial threads for face lift. *Rev Laryngol Otol Rhinol (Bord)*. 2006;127(1-2):57-59.
13. Eremia S, Willoughby MA. Novel face-lift suspension suture and inserting instrument: use of large anchors knotted into a suture with attached needle and inserting device allowing for single entry point placement of suspension suture. Preliminary report of 20 cases with 6-to 12-month follow-up. *Dermatol Surg*. 2006;32(3):335-345.
14. Rousso DE, Brys AK, Agata B. Minimal incision face-lifting. *Facial Plast Surg*. 2012;28(1):76-88.
15. Sulamanidze M, Sulamanidze G. APTOS suture lifting methods: 10 years of experience. *Clin Plast Surg*. 2009;36(2):281-306, viii.
16. Sulamanidze MA, Paikidze TG, Sulamanidze GM, Neigel JM. Facial lifting with "APTOS" threads: featherlift. *Otolaryngol Clin North Am*. 2005;38(5):1109-1117.
17. Gulbitti HA, Colebunder B, Pirayesh A, Bertossi D, van der Lei B. Thread-lifts sutures: still in the lift? A systematic review of the literature. *Plast Reconstr Surg*. 2018;141(3):341e-347e.
18. Kalra R. Use of barbed threads in facial rejuvenation. *Indian J Plast Surg*. 2008;41:S93-S100.
19. Garvey PB, Ricciardelli EJ, Gampper T. Outcomes in threadlift for facial rejuvenation. *Ann Plast Surg*. 2009;62(5):482-485.
20. Lee S, Isse N. Barbed polypropylene sutures for mid-face elevation: early results. *Arch Facial Plast Surg*. 2005;7(1):55-61.