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Transtemporal Endoscopic Deep Plane Face Lift

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Background: Facial aging involves multifactorial changes affecting the bone, superficial musculoaponeurotic system, fat pads, and skin, primarily manifesting as the downward displacement of these structures. The transtemporal endoscopic deep plane face lift (TEDPF) suggests a vertical lifting method, targeting these issues without a preauricular incision.

Methods: A retrospective study was conducted on 140 patients (133 women and 7 men) 33–67 years of age who underwent TEDPF from February 2020 to March 2023. Of these, 42 patients also received a neck lift. The surgical technique involved endoscopic dissection and vertical lifting and fixation of the superficial musculoaponeurotic system layer using specific suture points. An objective photographic analysis was performed by measuring preoperative and postoperative lower eyelid lengths to assess aesthetic outcomes.

Results: The follow-up period ranged from 18 to 36 months. Temporary frontal neuropraxia occurred in 5 patients, resolving within 3 weeks to 3 months. Revision surgery was required for 6 patients due to excess preauricular skin or temporal skin accumulation malar dimpling. Significant improvements were observed, especially in periorbital, nasolabial, and jowl areas, enhancing eye shape and reducing the need for lower blepharoplasty. Objective photographic analysis showed a significant reduction in lower eyelid length postoperatively, with a mean percentage reduction of 22.45% in eyelid length ($P < 0.05$).

Conclusions: TEDPF achieves effective vertical lifting for facial rejuvenation, minimizes scarring, and reduces surgery time. It provides notable aesthetic improvements with manageable complications, suitable for patients prone to keloids or seeking less invasive options. *(Plast Reconstr Surg Glob Open 2025; 13:e6461; doi: 10.1097/GOX.0000000000006461; Published online 23 January 2025.)*

INTRODUCTION

Facial aging is a dynamic and multilayered process that affects not only the skin but also the underlying bone structure, superficial musculoaponeurotic system (SMAS), and fat pads. However, the primary physiopathological change is the downward displacement of the skin, subcutaneous fat tissue, and SMAS as a composite.[1] Therefore, the basic philosophy of a face lift is to adequately mobilize the SMAS layer and lift it using an appropriate vector in the sub-SMAS plane.[2] Because the ptosis vector from the temporal region to the lower face is inferior, the ideal vector for a face lift should be vertical and directed superiorly.[3] Therefore, although the classic sub-SMAS face lift is performed via a preauricular approach, the approach must be transtemporal to achieve a true vertical lifting effect.

Because the dissection plane and retaining ligaments that need to be released are the same as in a deep plane face lift, an endoscope must be used during the transtemporal approach to ensure safe dissection. Furthermore, because the SMAS lifting is performed in a vertical vector, it does not cause excess skin accumulation in the preauricular area. As a result, the transtemporal endoscopic deep plane face lift (TEDPF) eliminates the need for a preauricular incision, particularly in young and middle-aged patients who prefer to avoid a preauricular scar. Another advantage of TEDPF is that because the SMAS is attenuated medially to the zygomaticus major (Zma) and there is no real dissection plane in this area, it allows surgeons to

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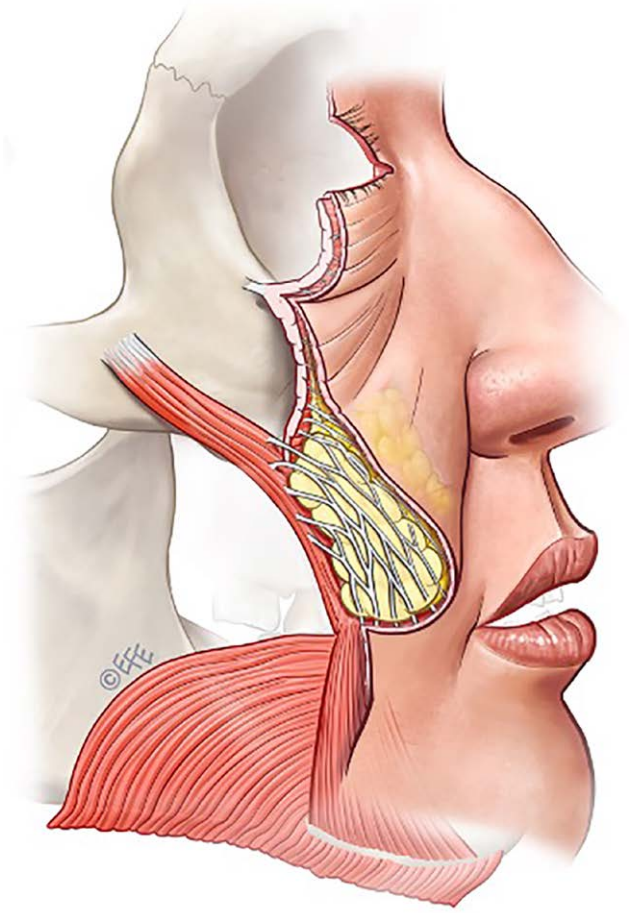

Fig. 1. Illustration showing the descent of superficial fat pads over the lip elevator muscles in an inferomedial direction during midfacial aging. © Levent Efe. Used with permission.

create a surgical plane between the fat pads and mimetic muscles.

As stated by Hamra,[4] the main problem of midfacial aging is that the superficial fat pads undergo ptosis over the lip elevator muscles in the inferomedial direction. Lifting these fat pads vertically in the suborbicular plane directly addresses this issue (Fig. 1). Mendelson's anatomical spaces principles[5,6] used for deep plane face lifts are also applied in the transtemporal approach, ensuring safe, bloodless dissection. For patients needing a neck lift, platysmal procedures can be done via a postauricular incision, with a submental incision added if necessary.

This study aims to assess the aesthetic outcomes of the TEDPF through objective photographic analysis, focusing on midface rejuvenation without the need for a preauricular incision, and share details of the surgical technique of the TEDPF.

METHODS

Study Design

This study was conducted as a prospective cohort study involving patients who underwent TEDPF from February 2020 to March 2023. We collected data on patient demographics, surgical details, and postoperative outcomes. Ethical considerations were addressed in accordance with the principles of the Declaration of Helsinki, and the study protocol was approved by the ethical committee of Uskudar University (Document Number: 232654; Date: January 21, 2020). Written informed consent has been provided from all participants before inclusion. To objectively assess the aesthetic outcomes of the surgical intervention, we utilized standardized 2-dimensional photographs taken before and after the procedure. The interpupillary distance was used as a reference to align and scale the images in Adobe Photoshop 2024, ensuring consistent size standardization across all photographs. We then measured the lower eyelid length in pixels from the lash line to the eyelid-cheek junction using Photoshop's ruler tool. Preoperative and postoperative images were analyzed with same pixel-per-inch resolution. These measurements were proportionally compared between the preopeartive and postoperative images to calculate the reduction in eyelid length. Other key variables analyzed included patient demographics and complication rates.

Inclusion criteria were adults 30–70 years of age with mild-to-moderate skin laxity, positive orbital vector, and prominent malar eminence. Exclusion criteria included patients with neutral or negative vector, weak malar eminence, previous sub-SMAS face lift surgery and significant medical comorbidities.

Surgical Technique

Key anatomical landmarks, including the arcus zygomaticus, infraorbital and lateral orbital rims, prezygomatic space boundaries, and the frontal nerve were marked preoperatively (Fig. 2). Under general anesthesia, a tumescent solution of 0.5% bupivacaine with 1:200,000 epinephrine was injected into the temporal region, supraorbital rim, midface, and along the deep plane entry line. A 3-cm incision was made lateral to the superior temporal line and 2 cm posterior to the hairline. The upper temporal compartment was accessed and dissected under the superficial temporal fascia, releasing the superior temporal septum to enter the subperiosteal plane. Dissection proceeded to 2 cm above

Takeaways

Question: What is the key problem or question your study is trying to solve? How can the transtemporal endoscopic deep plane face lift (TEDPF) effectively treat facial aging without the need for a preauricular incision?

Findings: This study on 140 patients (133 women and 7 men) 33–67 years of age demonstrated that TEDPF provides significant aesthetic improvements by vertically lifting the superficial musculoaponeurotic system layer. This technique shortens surgery time without the need for a preauricular scar.

Meaning: The transtemporal endoscopic midface lift offers a unique lifting vector opposite to the true aging vector, achieving effective results with minimal scarring and shorter surgical time.

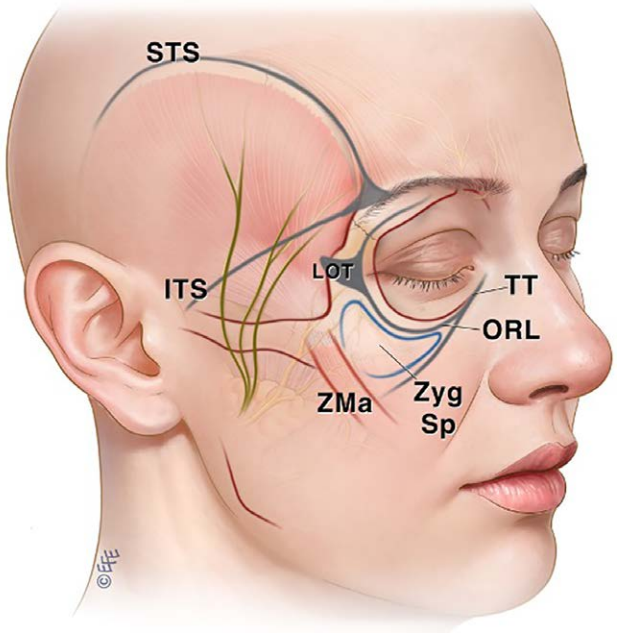

Fig. 2. Preoperative markings showing key anatomical landmarks to guide precise dissection and lifting. ITS, inferior temporal septum; LOT, lateral orbital thickening; ORL, orbicular retaining ligament; STS: superior temporal septum; TT, tear trough ligament; ZMa, zygomaticus major; Zyg Sp, zygomatic space. © Levent Efe. Used with permission.

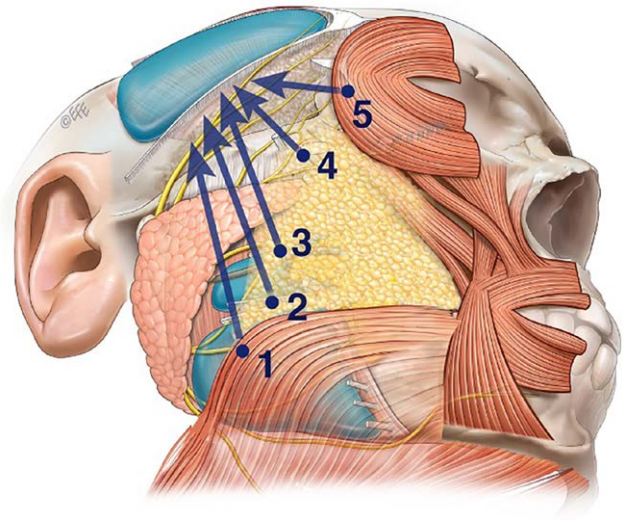

Fig. 3. Five fixation points from the lower premasseteric space to the upper temporal compartment for vertical lifting and SMAS fixation. © Levent Efe. Used with permission.

the supraorbital rim, followed by endoscopic release of the temporal ligamentous adhesion and supraorbital periosteum for effective brow lift. Dissection continued into the inferior temporal compartment, releasing the inferior temporal septum to expose the sentinel vein and zygomaticotemporal nerves. (**See Video [online],** which displays intraoperative footage of key steps in the TEDPF, including dissection, ligament release, fat pad elevation, and suture placement.)

After releasing the lateral orbital thickening, the orbicularis retaining ligament (ORL) is exposed. The ORL, separating the prezygomatic and preseptal spaces, is suspended with a 3/0 Ethibond suture, followed by its release along the infraorbital rim, including the tear trough ligament. This creates a space with the orbicularis oculi muscle (OOm) and sub–orbicularis oculi fat superiorly, the zygomatic cutaneous ligaments (ZCLs) inferiorly, and preperiosteal fat on the floor.

To safely elevate the superficial fat pads of midface to the nasolabial sulcus, dissection must remain above Zma. After the origin of the muscle is identified, the ZCLs along the lower border of the prezygomatic space are released, allowing the elevation of the superficial fat pads with a spoon-shaped elevator as a composite unit. Because the fat pads extend laterally, the main zygomatic and upper masseteric ligaments must also be released for a long-lasting lift. Care is taken to preserve the zygomatic and buccal branches of the facial nerve during this release. After releasing the upper masseteric ligament, the middle premasseteric space is entered, exposing the buccal fat pad and the buccal branches of the facial nerve above it. The fat pad is either elevated with its capsule or reduced intracapsularly if needed.

Once the middle premasseteric space is dissected, the lower premasseteric space is addressed using a Trepsat dissector or blunt-tip Metzenbaum scissors. Vertical lifting and fixation of the composite flap are performed from the lower premasseteric space to the upper temporal compartment with five suture points (Fig. 3). The first suture (3/0 Ethibond) is placed in the platysma, the second at the septum between the middle and lower premasseteric spaces, the third on the roof of the middle premasseteric space, the fourth at the main zygomatic ligament, and the fifth at the lateral part of the ORL, fixing these points to the deep temporal fascia. In the final stage, a temporal lift is performed for lateral brow elevation and to remove tissue accumulation in the lateral orbital and temporal regions.

If skin dimpling or irregularities occur due to flap fixation, they are corrected through a scalp incision using a spatula cannula or Metzenbaum scissors. The vertical lift of the malar fat pad often leads to excess skin in the lower eyelid, which is typically removed with pinch blepharoplasty. For patients needing a neck lift, a postauricular incision is used to create a composite skin-muscle flap, suspended to the mastoid bone with a 2/0 Ethibond suture. If subplatysmal fat or digastric muscle reduction and plication, or submandibular gland reduction is needed, a submental approach is used. Because the skin is not separated from the muscle, no drains are required, and a tie-over bandage around the ear for 24 hours ensures hemostasis. Ancillary procedures included upper and lower pinch blepharoplasty.

Statistical Method

Statistical analyses were conducted using SPSS version 28. Descriptive statistics, including mean and SD, were calculated for preoperative and postoperative right lower eyelid lengths. A paired *t* test was used to assess

Table 1. Summary of Complications and Interventions

No. Patients	Complication	Recovery Time or Additional Intervention
5	Temporary frontal neuropraxia	Nerve function returned within 3 wk to 3 mo
4	Dimpling in the malar region	Reoperated
1	Excess skin in the preauricular region	Reoperated
1	Excess skin in the temporal region	Reoperated

the significance of changes, with effect size measured by Cohen's d. A P value of less than 0.05 was considered statistically significant.

RESULTS

TEDPF was performed on 133 female patients (33–67 years) and 7 male patients (38–52 years). Additionally, 42 patients (41 women and 1 man) underwent neck lifts using a postauricular incision, with or without a submental approach. The follow-up period ranged from 18 to 36 months. Temporary frontal neuropraxia occurred in 5 patients, with nerve function returning within 3 weeks to 3 months. Reoperations were necessary for 4 patients due to malar dimpling, 1 female patient for skin excision in the preauricular area, and 1 male patient for excess temporal skin (Table 1).

The mean right lower eyelid length decreased significantly from 138.83 to 107.50 pixels, with a percentage reduction of −22.45% ($P < 0.05$). The effect size (Cohen's d = −1.36) indicated a large impact of the surgical intervention on eyelid length.

Of the 140 patients, 108 underwent concurrent lower pinch blepharoplasty, 52 had upper blepharoplasty, and 40 underwent both in conjunction with TEDPF. All patients had ORL suspension, which resulted in a positive canthal tilt. Although not a conventional canthoplasty, this procedure effectively adjusted the lateral canthal angle.

Fig. 4. Preoperative and postoperative photographs of a 40-year-old female patient showing improvements in periorbital region, infraorbital hollowing, malar bag, nasolabial fold, and jowl deformity. A, Preoperative picture in frontal view. B, Postoperative picture in frontal view.

Evaluation of preoperative and postoperative results revealed significant improvements in the periorbital region, infraorbital hollowing, malar bags, nasolabial folds, and jowl deformities (Figs. 4, 5). The ORL suspension lifted the lower eyelid, and the temporal lift reshaped the eye into an almond form by repositioning the lateral OOm. This repositioning also reduced the need for lower eyelid blepharoplasty in patients with minimal fat bulging (Figs. 6, 7).

DISCUSSION

Deep plane face lift surgery has gained popularity in recent years due to advances in anatomical studies and surgical techniques related to sub-SMAS plane dissection. Isse[7] first introduced the use of endoscopy in face lift surgery in 1994, and Ramirez[8] extended its use to perform complete facial rejuvenation via subperiosteal dissection. This technique is particularly suitable for patients with good skin tone and early signs of aging, as it allows repositioning of the soft tissues without significant skin removal. The "ponytail lift" technique, as described by Kao and Duscher,[9] utilizes endoscopic methods to achieve facial rejuvenation. This technique simulates the natural tension of ponytail to treat facial aging with minimal scarring.[9] Mani[10] was the first to describe and publish sub-SMAS face lift with a transtemporal approach and without using a preauricular incision. Our technique differs in the following ways: We first reach the prezygomatic space through the temporal tunnel in the suborbicular plane, and in the same plane, we release the ZCLs and elevate the malar fat pad. Then we release the main zygomatic ligament lateral to the Zma we continue the dissection in the sub-SMAS plane until reaching the premasseteric space. We fixate the SMAS layer to the deep temporal fascia by using deep plane fixation points. Mendelson's work on defining facial spaces has greatly improved the safety and ease of dissection in the sub-SMAS plane.[5,6]

Although the preauricular approach has been common, the transtemporal incision is often preferred for addressing midfacial ptosis, as the lifting vector of the malar fat pad in this region cannot always be purely vertical. Historically, the most popular dissection plane for transtemporal midface lifts has been subperiosteal.[11,12] However, it is a fact that ptosis of the malar fat pad occurs in the supraperiosteal plane, not in the subperiosteal

Fig. 5. Preoperative and postoperative results of a patient undergoing the TEDPF, highlighting aesthetic improvements from different angles. A, Preoperative result in oblique view. B, Postoperative result in oblique view.

Fig. 6. Preoperative and postoperative results of a patient undergoing the TEDPF, highlighting aesthetic improvements from different angles. A, Preoperative picture of a 47-year-old female patient in frontal view. B, Postoperative result in frontal view.

plane.[13,14] Therefore, the transtemporal dissection plane should begin under the superficial temporal fascia and proceed in the sub–orbicularis oculi-malar fat pad plane.

The use of endoscopy provides several key benefits: it allows easy access to distant areas, such as the lower premasseteric space, while protecting facial nerve branches near the ligaments during their release. It also facilitates the reduction or lifting of the buccal fat pad and ensures precise placement of vertical lifting sutures.

According to research by Fezza and Massry,[15] there is a roughly linear rise in lower eyelid length from young adulthood to old age. The longer lower eyelid length contributes to the older appearance of the lower eyelid, emphasizing the importance of addressing these alterations in cosmetic procedures. Thus, we compared preoperative and postoperative lower eyelid lengths to assess the effectiveness of our interventions. By comparing the preoperative and postoperative lower eyelid lengths, our results demonstrated a significant reduction in eyelid length postoperatively, indicating the effectiveness of our intervention in reversing age-related changes. This reduction not only contributes to a more youthful appearance but also addresses the underlying anatomical alterations that lead to the elongation of the lower eyelid over time.

In our surgical technique, we reduce the risk of injury to the frontal branch of the facial nerve by meticulous planning of the surgical approach. Tunnels are created that pass through the medial and lateral thirds of the zygomatic arch, providing access to the sub-SMAS plane without disruption to the frontal nerve. This strategic approach allows for the elevation of the entire face as a composite unit while maintaining the integrity of the frontal branch. By avoiding direct dissection in the area where the frontal nerve emerges, it is ensured that the nerve remains intact and protected throughout the procedure.

Similar to traditional deep plane face lift procedures, the composite flap we prepare in our technique becomes securely adapted to its new position through fibrosis. Consequently, there is no significant difference in the durability between our technique and the classic deep plane method. The longevity of the lifting effect is not solely dependent on the sutures but is maintained by the newly formed fibrotic tissue. We also prefer to use the cortical tunnel for fixation when adding a brow lift to this procedure.

Fig. 7. Preoperative and postoperative results of a patient undergoing the TEDPF, highlighting aesthetic improvements from different angles. A, Preoperative picture of a female patient in oblique view. B, Postoperative result in oblique view.

In some cases, after the release of the periorbital ligamentous structures, vertical repositioning of the OOm and suspension of the ORL create a canthopexy effect without the need for additional canthal surgery.

In addition, TEDPF can be performed in young and middle-aged patients, male patients, and those prone to keloid formation without requiring a preauricular incision, significantly reducing surgery time. Revision surgery was needed in only 1 case due to excess preauricular skin, indicating that lifting the composite SMAS flap vertically avoids skin accumulation in this area. The skin effectively redrapes over the repositioned facial structures. If skin accumulation or dimpling occurs in the preauricular or suture areas, a small incision in the sideburn allows for easy correction with a cannula or scissors, releasing the skin from the SMAS for spontaneous redraping.

However, significant elevation of the malar fat pad may cause minor skin redundancy in the lower eyelid, which can be efficiently corrected with pinch blepharoplasty, a minimally invasive method of removing excess skin. Any redundant skin in the temporal region is redraped posteriorly using a posterior flap elevated in the subgaleal plane, effectively repositioning the skin without extensive excision.

Additionally, in face lift patients who do not require a preauricular incision but have a neck-lift indication, only a postauricular incision and sometimes an additional submental incision are performed. In older patients where a preauricular approach is necessary, after transtemporal deep plane dissection and vertical suture placement, plication of the predissected SMAS layer at the premasseteric space is sufficient to achieve an effective lower face lift.

In the study focused on the endoscopic subperiosteal midface lift, published by Saltz and Ohana[16] present a technique utilizing the Endotine device for malar suspension. This approach has gained popularity due to its ability to provide long-lasting results with minimal scarring and reduced complications. Their approach is based on an endoscopic temporal method that focuses on subperiosteal dissection and fixation to enhance soft tissue elevation. This allows for effective control over midface projection, which in result reduces swelling, improves symmetry and decreases the incidence of postoperative complications. In contrast, our study on the TEDPF emphasizes supraperiosteal and sub-SMAS approach that prioritizes vertical lifting

of the SMAS layer of regions starting with temporal area until the lower face with the use of sutures for fixation to the deep temporal fascia. Furthermore, the TEDPF technique allows for the integration of ancillary procedures, such as neck lifts and blepharoplasty, thereby providing a comprehensive solution for facial rejuvenation. TEDPF's sub-SMAS approach effectively addresses facial aging concerns, including lateral brow ptosis and jowl deformity, through a vertical lift.

Although the TEDPF has numerous advantages, including minimal scarring and comprehensive facial rejuvenation, there are some limitations to the technique. One of the primary drawbacks is the steep learning curve associated with mastering the endoscopic approach. Surgeons must have significant experience with endoscopic techniques to safely navigate the complex anatomy and ensure precise placement of sutures. Furthermore, all forms of facial aging may not be sufficiently treated with the use of vertical lifting vectors, especially in patients who have significant skin laxity and require excessive skin removal due to the procedure's emphasis on midface and upper facial rejuvenation, ancillary procedures like neck lift and fat grafting might be required to achieve the best possible results in the lower face and neck, which could lengthen the surgical time and complicate the process. Moreover, although the technique reduces the necessity for preauricular incisions, it may not be appropriate for all patients, particularly those who present with significant asymmetries necessitating more extensive correction. As with any surgery, selecting suitable patients and planning individualized treatments are crucial for achieving the best outcomes. In cases where a volumetric effect is needed, the subperiosteal plane should indeed be the first choice, or the supraperiosteal midface lift should be combined with an implant in our opinion. Flattening of the malar fat pad can be observed due to traction, especially in patients with a negative vector or weak malar eminence. Because the patients included in the study had a positive vector and prominent malar eminence, flattening of the malar fat pad was not encountered in the postoperative period. The absence of a control group and relatively short follow-up period are notable limitations in this study. Further prospective studies with larger sample sizes are necessary to validate our findings. Additionally, long-term follow-up is required to assess the longevity of the aesthetic improvements.

CONCLUSIONS

Our objective analysis demonstrates that the TEDPF technique significantly improves midface aesthetics through vertical lifting, reducing the need for preauricular scarring while achieving optimal results in facial rejuvenation. This method, supported by standardized photographic assessments, offers substantial aesthetic improvements with manageable complications.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

PATIENT CONSENT

Patients provided written consent for the use of their images.

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