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VIDEO ARTICLE

Tommy's 3-5-7 Method: A Novel Surface-Landmark Technique for Minimally Invasive Identification of the Facial Nerve Buccal Branch

Yen-Ting Liu, MD[1,2]; W.K. Fraser Hill, MD[1,2]; Lisa Wen-Yu Chen, MD[1,2]; Johnny Chuieng-Yi Lu, MD, MSCI[1,2]; Jung-Ju Huang, MD, FACS[1,2]; David Chwei-Chin Chuang, MD[1,2]; Tommy Nai-Jen Chang, MD[1,2]

[1] Division of Reconstructive Microsurgery, Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Taoyuan, Taiwan

[2] College of Medicine, Chang Gung University, Taoyuan, Taiwan

ABSTRACT

Background: Precise identification of the facial nerve, particularly the buccal branch, is essential in facial reanimation, selective neurectomy, parotid surgery, and aesthetic facial procedures. Although established landmark based techniques, including Zuker's point and trunk-based approaches such as Borle's and Conley's triangles, are reliable, they frequently require extensive exposure or deep dissection. These limitations pose particular challenges in scarred, previously operated, or pediatric surgical fields, where efficient and minimally invasive localization is preferred.

Objective: This video article introduces Tommy's 3-5-7 method, a simplified and reproducible surface landmark technique designed to enable rapid and selective identification of the buccal branch of the facial nerve. The approach uses a limited preauricular incision to minimize tissue disruption while maintaining anatomic accuracy.

Methods: The technique is demonstrated step-by-step using operative footage and annotated diagrams. A vertical reference line is drawn immediately anterior to the tragus, and the target point for buccal branch identification is defined as 3.5 cm anterior and 0.7 cm caudal to the tragus along this line. Following a 5-cm preauricular incision, subcutaneous elevation exposes the superficial musculoaponeurotic system (SMAS). Blunt dissection at the predefined coordinates reveals the buccal branch immediately deep to the surface marking. Intraoperative nerve stimulation is used to confirm branch identity. When clinically indicated, retrograde dissection is subsequently performed to facilitate identification of the main facial nerve trunk and additional branches.

Observations: Across a series of illustrative cases, including selective neurectomy, masseteric to facial nerve transfer, parotid tumor dissection, and rhytidectomy, the method enabled consistent and efficient identification of the buccal branch. The approach allowed nerve isolation through a limited preauricular incision, reducing the need for direct cheek incisions or extensive deep plane exposure.

Conclusion: Tommy's 3-5-7 method offers a practical and minimally invasive technique for localization of the buccal branch of the facial nerve. This video demonstrates its value as a precise and efficient tool for surgeons performing branch level facial nerve dissection.

INTRODUCTION

Precise identification of the facial nerve and its branches remains a cornerstone of head and neck surgery, encompassing procedures such as facial reanimation, parotidectomy, trauma reconstruction, and aesthetic rhytidectomy. Standardized localization methods are essential to optimize operative efficiency, reduce the risk of iatrogenic injury, and preserve facial function. As such, reliable intraoperative identification directly influences both surgical safety and functional outcomes.

Nevertheless, consistent localization remains challenging, reflecting inherent anatomical complexity. Despite advances in anatomical mapping and refinements in surgical technique, the facial nerve's intricate course and substantial variability in branching patterns continue to pose significant obstacles during intraoperative identification. These factors collectively highlight the persistent gap between anatomical knowledge and practical, reproducible nerve localization in the operative setting.

Limitations of Proximal Facial Nerve Landmarks

To address anatomical variability of the facial nerve, surgeons have traditionally relied on deep-tissue landmarks to identify the main facial nerve trunk. Established proximal localization techniques, including Borle's triangle [1], May's triangle [2], and Conley's (Trident) triangle [3], have demonstrated high accuracy in both cadaveric studies and clinical practice. These techniques are widely adopted as reliable reference points for trunk-level identification of the facial nerve.

Despite their proven reliability, these approaches require extensive deep dissection to expose proximal nerve segments. This requirement introduces substantial technical challenges, particularly in scarred, previously operated, or revision surgical fields, where normal tissue planes are distorted and less clearly defined. In such settings, deep dissection can increase operative complexity and prolong surgical time.

Moreover, initiating dissection at the main trunk is procedurally inefficient when the primary surgical objective is selective access to distal facial nerve branches. This discrepancy between surgical intent and dissection strategy highlights the need for alternative localization methods that enable more targeted and efficient branch-level identification.

Challenges of Distal Facial Nerve Identification

To limit the invasiveness of deep proximal exposure, distal branch identification using surface landmarks is commonly applied in clinical practice, particularly in procedures such as nerve protection during parotidectomy,

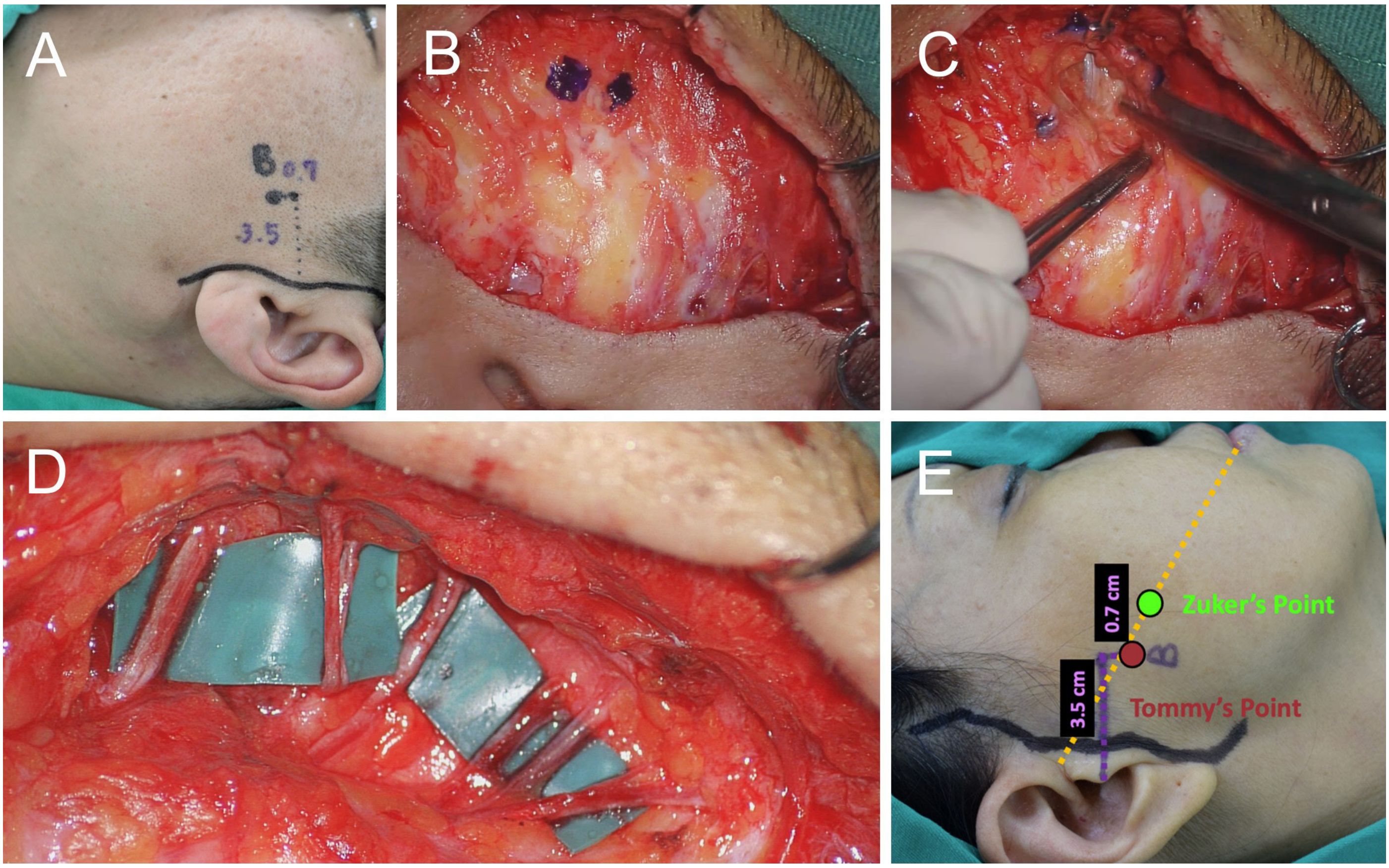

Figure 1. Surgical sequence and anatomical landmarks of Tommy's 3-5-7 method for facial nerve identification. (A) Preoperative surface markings. A vertical reference line is drawn immediately anterior to the tragus. The target point for the buccal branch is defined by marking a location 3.5 cm anterior to the tragus, followed by a second mark placed 0.7 cm caudal to this point. (B) Intraoperative verification. After a 5-cm preauricular incision and elevation of the subcutaneous skin flap, the predefined coordinates are reidentified on the exposed superficial musculoaponeurotic system (SMAS). This step confirms the intended site for SMAS entry before deep dissection. (C) Targeted dissection. Blunt dissection through the SMAS and parotid fascia at the designated location reveals the buccal branch immediately deep to the surface marking. (D) Retrograde dissection and branch exposure. After identification of the buccal branch, retrograde dissection is performed to expose the main facial nerve trunk and to facilitate subsequent identification of additional branches, including the zygomatic, temporal, marginal mandibular, and cervical branches. (E) Anatomical comparison of landmarks. A schematic comparison illustrates the proximal location of Tommy's point, defined by the 3-5-7 coordinates, relative to the more distal Zuker's point. Localization using Tommy's point permits nerve identification through a preauricular incision, thereby offering a cosmetic advantage by avoiding a direct cheek incision.

selective neurectomy, and facial nerve reconstruction.

Zuker's point [4], a surface landmark located midway between the root of the helix and the oral commissure, is widely used to identify the middle division of the facial nerve responsible for smile function. While this landmark provides consistent identification of the target branch, its distal location necessitates retrograde dissection when additional zygomatic or buccal branches require exploration, thereby increasing operative complexity.

Direct cheek incisions may further facilitate nerve exposure but carry a risk of visible scarring that may be unacceptable in certain patient populations. Collectively, these limitations support the need for a more proximal localization approach that enables accurate facial nerve identification through a concealed preauricular incision.

TOMMY'S 3-5-7 METHOD

To address the tradeoff between the invasiveness of deep proximal dissection and the aesthetic concerns associated with distal facial incisions, we developed a novel localization strategy that prioritizes both surgical precision and cosmetic preservation. Designated Tommy's 3-5-7 method, this technique provides a simplified, surface-based approach for selective identification of the buccal branch while minimizing the extent of tissue exposure. By integrating predictable surface landmarks with targeted dissection, the method aims to improve procedural efficiency without compromising anatomical accuracy.

The technique has been applied across a range of clinical scenarios that require precise branch-level localization, including selective neurectomy, facial reanimation, facial trauma repair, facial nerve schwannoma surgery, and parotid tumor resection. In this video article, we present a step-by-step demonstration of the method to illustrate its practical application, reproducibility, and effectiveness in isolating the buccal branch of the facial nerve.

Clinical Indications and Surgical Utility

To translate anatomical precision into clinical practice, this section delineates the surgical scenarios in which Tommy's 3-5-7 method offers advantages over traditional approaches. The technique is indicated when safe, rapid, and selective identification of the buccal branch is required, with minimal dissection and maximal preservation of surrounding soft tissue. These indications define settings in which precise branch localization is central to operative success.

Functional reconstruction

Primary indications focus on functional reconstruction. These include selective neurectomy for post-paralytic facial synkinesis, and facial reanimation procedures, such as masseteric-to-facial nerve transfer, selective coaptation for functioning free muscle transplantation, and cross-face nerve grafting.

Parotid and aesthetic surgery

The technique also proves valuable in routine and aesthetic preservation. It is indicated during primary or revision parotid and peri-parotid surgery to preserve the buccal branch while limiting the extent of the dissection field. Additionally, it provides significant utility in aesthetic surgery, specifically during superficial musculoaponeurotic system (SMAS) or deep-plane facelifts, where precise branch localization mitigates the risk of iatrogenic injury.

Complex secondary interventions

Finally, the method demonstrates particular strength in complex secondary procedures performed in scarred or radiated operative fields. In these settings, normal anatomical planes are distorted, and conventional landmarks become unreliable. Clearly defined surface-based landmarks therefore simplify initial branch mapping and provide a dependable starting point before the surgeon proceeds with careful retrograde dissection toward the main facial nerve trunk.

Operational advantages

Across these clinical contexts, the method facilitates intraoperative nerve confirmation through stimulation, allowing early verification of branch identity. This precision supports targeted neurorrhaphy or controlled dissection, while limiting unnecessary tissue manipulation, reducing operative trauma, and minimizing postoperative scarring.

Operative Technique

Preoperative preparation and surface markings

The patient is placed under general anesthesia in the supine position, with the head turned slightly toward the contralateral side to optimize exposure of the operative field. To preserve the accuracy of intraoperative nerve monitoring, neuromuscular blockade is avoided. Local hemostasis is achieved by infiltrating epinephrine at a concentration of 1:200,000 five minutes before skin incision. This anesthetic strategy ensures both adequate operative conditions and reliable electrophysiologic confirmation of facial nerve function.

Surface marking is performed using the tragus as the primary anatomical reference point. A vertical imaginary line is drawn immediately anterior to the tragus. Along this line, the first reference point is marked 3.5 cm anterior to the tragus. From this point, a second mark is placed 0.7 cm caudal (Figure 1A; Video, available at https://scitemed.com/article/5439/scitemed-imj-2025-00203). These coordinates, 3.5 cm anterior and 0.7 cm caudal, form the anatomical basis of the "3-5-7" nomenclature. This defined surface coordinate represents the anticipated emergence of the facial nerve buccal branch beneath the SMAS.

By relying on a consistent tragal reference rather than variable soft tissue landmarks, this method provides a precise and reproducible guide for branch level localization. This approach reduces anatomic uncertainty and facilitates targeted dissection while minimizing unnecessary tissue manipulation.

Incision and exposure of the SMAS

Guided by the predefined surface markings, the surgeon initiates surgical access through a preauricular approach. A 5-cm preauricular incision is made, beginning within the temporal scalp, coursing immediately anterior to the tragus, and extending inferiorly beneath the earlobe. Subcutaneous dissection is then performed to elevate a skin flap in the preauricular region, allowing exposure of the SMAS and the underlying parotid fascia. This stepwise exposure preserves tissue planes while maintaining orientation to the premarked surface coordinates. Before entering the SMAS, the surgeon reconfirms the buccal branch landmark to ensure accurate alignment with the planned site of SMAS dissection (Figure 1B).

Targeted dissection and nerve verification

Dissection begins with gentle spreading of the SMAS and parotid fascia at the predefined coordinates to isolate the buccal branch, which typically lies directly beneath the surface mark (Figure 1C). This targeted approach leverages the predictable sub-SMAS anatomy to limit dissection while maintaining precise spatial orientation. The defined sub-SMAS target facilitates efficient nerve confirmation using electrical stimulation, allowing either targeted neurorrhaphy or safe branch dissection, depending on the operative objective. A nerve stimulator is used to identify motor branches that elicit perioral or nasolabial movement, thereby confirming buccal branch activation. Bipolar coagulation is applied as needed to achieve hemostasis.

Retrograde dissection and branch extension

After identification of the buccal branch, dissection proceeds based on the specific surgical indication. This process typically involves retrograde dissection from the buccal branch toward the main facial nerve trunk, followed by identification of additional branches, including the zygomatic, frontal, and marginal mandibular branches (Figure 1D). This retrograde strategy provides controlled expansion of the operative field while preserving anatomic continuity between branches. Retrograde dissection preserves fascicular architecture and facilitates nerve coaptation, which is a critical consideration in reconstructive procedures such as facial nerve transfers. Throughout this stage, the surgeon advances cautiously along the predefined trajectory established by Tommy's 3-5-7 method. In experienced hands, adjacent branches may be identified within the same dissection plane without requiring extensive tissue exposure.

CLINICAL OBSERVATIONS

Presented as a Video Article, this manuscript introduces a novel anatomical concept and a standardized surgical workflow. The primary objective is to demonstrate technical feasibility and procedural reproducibility rather than to provide a statistical analysis derived from a large cohort. Accordingly, the findings are framed as descriptive intraoperative observations that reflect procedural consistency and an acceptable safety profile within a defined clinical context. Future prospective and comparative studies are planned to further quantify outcomes and validate these observations across broader populations.

In our institutional experience, Tommy's 3-5-7 method has been applied across a spectrum of procedures, including facial reanimation, such as masseteric to facial nerve transfer, selective neurectomy, parotidectomy, and aesthetic rhytidectomy. When the described surface landmarks are followed precisely, the technique may allow consistent identification of the buccal branch, thereby reducing the need for extensive dissection or direct cheek incisions. This predictable localization may facilitate efficient retrograde mapping of the main facial nerve trunk and adjacent branches when clinically indicated.

Importantly, within the scope of these applications, no instances of permanent iatrogenic nerve injury or severe procedure related complications were observed. The use of a limited preauricular approach may also contribute to favorable cosmetic outcomes by avoiding additional visible incisions. On this basis, these observations support the role of Tommy's 3-5-7 method as a safe and reproducible adjunct for branch level facial nerve identification, while acknowledging the need for further validation through systematic study designs.

DISCUSSION

Limitations of Distal Surface Landmarks

Accurate identification of the facial nerve and its branches is a critical component of facial reanimation and aesthetic procedures, particularly for minimizing iatrogenic injury and optimizing functional outcomes. Multiple anatomical landmark based techniques have been proposed to facilitate facial nerve localization, yet each approach carries inherent limitations related to depth, exposure, or surgical accessibility.

Zuker's point [4] identifies the middle division of the facial nerve at the midpoint between the root of the helix and the oral commissure. Although this landmark demonstrates consistency in cadaveric studies, its clinical utility for comprehensive facial nerve mapping may be limited when compared with more proximal approaches such as Tommy's 3-5-7 method. The relatively distal position of Zuker's point corresponds to a smaller nerve fascicle, which may be more challenging to identify at the outset and may require extended retrograde dissection to delineate additional branches.

From a procedural standpoint, the distal location of this landmark imposes constraints on incision planning and dissection strategy. Accessing Zuker's point through a concealed preauricular incision typically necessitates broad dissection beneath the SMAS, thereby increasing the extent of tissue manipulation. This expanded dissection field may elevate the risk of soft tissue trauma and operative morbidity across a wider facial region, particularly when multiple branches must be identified.

Challenges of Deep Proximal Dissection

Conversely, targeting the proximal facial nerve trunk may circumvent the challenges associated with identifying small caliber distal branches. However, this strategy requires deep surgical exposure, which introduces greater anatomic complexity and procedural risk. Traditional approaches, such as Borle's triangle [1] and May's triangle [2], localize the facial nerve trunk using deep anatomic landmarks, including the mastoid tip, the posterior belly of the digastric muscle, the temporomandibular joint, and the mandibular angle.

Although these methods have demonstrated reproducibility and effectiveness in both cadaveric and clinical settings, they necessitate extensive dissection through deep tissue planes. Such exposure may be impractical in clinical scenarios involving large parotid neoplasms or operative fields distorted by prior surgery, fibrosis, or inflammation, where safe and efficient access to the nerve trunk becomes technically demanding. When less invasive access is sufficient, the depth and extent of dissection required by proximal trunk based techniques may increase operative complexity and procedural burden, thereby limiting their applicability in procedures where selective branch identification can achieve the desired surgical objective.

Emerging Techniques and Clinical Gaps

To mitigate the morbidity and technical demands associated with deep dissection, recent investigative efforts have explored hybrid strategies that combine bony landmarks with surface projections, with the goal of balancing anatomic precision and minimally invasive access. Approaches such as Conley's Trident triangle [3] and the intercept landmark described by Medhurst et al. [5] seek to refine facial nerve localization through intersecting surface reference lines.

Although these techniques have demonstrated promising accuracy in cadaveric studies and may offer utility in procedures involving deep plane dissection, such as rhytidectomy, their effectiveness in live surgical settings has not yet been systematically validated. The absence of prospective clinical data limits conclusions regarding their reproducibility, safety profile, and applicability across varied operative contexts.

In addition, reliance on established distal landmarks, including Zuker's point [4], may necessitate direct cheek incisions to achieve adequate exposure. Such incisions can compromise aesthetic outcomes and may be less acceptable in patient populations for whom scar concealment is a priority. Consequently, a persistent clinical gap remains for a proximal facial nerve identification strategy that enables accurate localization through a concealed preauricular incision while minimizing dissection and soft tissue disruption.

Anatomical Rationale and Surgical Application

Tommy's 3-5-7 method addresses the limitations of existing localization strategies by introducing a simplified and anatomically grounded approach for identifying the buccal branch of the facial nerve. The technique uses a vertical reference line anterior to the tragus to localize the nerve at fixed coordinates of 3.5 cm anterior and 0.7 cm caudal to the tragus. These coordinates were derived from repeated intraoperative measurements that consistently localized the buccal branch within a narrow corridor deep to the SMAS. This anatomic consistency supports the use of a predefined surface target rather than reliance on variable soft tissue landmarks.

The designated point corresponds to a predictable targeting window where the nerve lies immediately deep to the SMAS, thereby facilitating rapid and targeted dissection. When anatomic variation is encountered, this point provides a reliable initial zone from which controlled retrograde dissection can be undertaken without expanding the exposure unnecessarily.

This approach offers several procedural advantages. First, reliance on a reproducible surface landmark limits the dissection field required to identify the appropriate donor branch, which may reduce the risk of injury to adjacent facial nerve branches and minimize overall tissue trauma. Second, accurate preoperative localization may decrease the time required for intraoperative nerve identification. This efficiency is particularly relevant in pediatric patients and in technically demanding procedures, including facial reanimation, selective neurectomy, and cross face nerve grafting, where precision is critical. Third, these landmarks delineate a clearly defined critical zone that can guide surgeons during facial procedures such as rhytidectomy and assist in avoiding inadvertent nerve injury. Fourth, the more proximal target reduces the dissection corridor compared with distal landmarks such as Zuker's point. In our institutional experience, this approach allowed buccal branch identification through a limited 5-cm preauricular incision, thereby avoiding a cheek incision and supporting favorable aesthetic outcomes (Figure 1E).

Based on these observations, the method streamlines the operative workflow by transforming a variable anatomic search into a predictable procedural sequence. This reproducibility facilitates precise nerve confirmation and targeted repair while supporting both functional preservation and aesthetic considerations.

Study Limitations and Future Directions

Although this technique offers potential advantages in operative efficiency and aesthetic outcomes, a rigorous scientific assessment requires careful consideration of its limitations. At present, the proposed method is constrained by its primary focus on the buccal branch and by the absence of large scale clinical validation. Accordingly, the findings should be interpreted as descriptive and hypothesis generating rather than definitive evidence of comparative superiority.

In addition, the potential influence of anatomic variation or altered surface landmarks in patients with a history of prior surgery, trauma, or fibrosis warrants further investigation. The accuracy and reproducibility of this approach across diverse pediatric age groups have also not been fully established. Although extensive clinical experience with Zuker's point suggests that age related positional changes of the buccal branch may be limited, direct validation of the 3-5-7 coordinates in pediatric populations remains necessary.

Future prospective studies comparing this method with established anatomic localization techniques across a range of ages, patient populations, and surgical indications are necessary to define its reproducibility, generalizability, and long term clinical value.

CONCLUSION

Tommy's 3-5-7 method minimizes tissue disruption while providing a reproducible protocol for localization of the buccal branch of the facial nerve. The technique may reduce operative time and support accurate nerve identification, thereby promoting favorable functional outcomes in facial procedures and nerve repair. Overall, it offers a systematic and anatomically grounded framework for safe and precise buccal branch exploration.

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ARTICLE INFORMATION

***Correspondence:** Tommy Nai-Jen Chang, MD, Division of Reconstructive Microsurgery, Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Linkou Medical Center; College of Medicine, Chang Gung University, No. 5, Fu-Hsing St., Kuei-Shan Dist., Taoyuan City 333, Taiwan. Email: tommynjchang@gmail.com

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Ethics Approval and Consent to Participate: The study adheres to the ethical principles outlined in the 1964 Helsinki Declaration and its subsequent revisions, or other equivalent ethical standards that may be applicable. These ethical standards govern the use of human subjects in research and ensure that the study is conducted in an ethical and responsible manner. The researchers have taken extensive care to ensure that the study complies with all ethical standards and guidelines to protect the well-being and privacy of the participants.

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Conflict of Interest: Dr. Tommy Nai-Jen Chang is the founder of the International Microsurgery Club. Aside from this affiliation, the authors declare no financial or competing interests that could influence the integrity of this work. Furthermore, the authors affirm that this manuscript is their original intellectual property and that no undeclared third parties have contributed significantly to its content.

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