

# Guide Needle–assisted Ultrasound-guided (SIBUS) Filler Injections: Improving Needle Visualization for Safer Aesthetic Procedures

Ascher Benjamin, MD\*  
 Youkyoung Cho, MD†  
 Leonie Schelke, MD, PhD‡  
 Peter J. Velthuis, MD, PhD‡  
 Ji-Soo Kim, MD§  
 Jin-Hyun Kim, MD¶  
 Kyu-Ho Yi, MD, PhD||

**Summary:** This study evaluated whether echogenic needles improve ultrasound visibility during hyaluronic acid filler injections in the cheek—a high-risk area due to anatomical variability of facial vessels. In a single-patient in vivo setting, 3 types of needles (23G nonechogenic and 23G and 30G echogenic) were tested under ultrasound guidance. Echogenic needles showed better tip and shaft visibility across angles and depths, including dynamic movement. Reviewers noted greater procedural confidence and a reduced need for probe adjustment. These findings suggest that echogenic needles may enhance safety and precision in ultrasound-guided aesthetic procedures. (*Plast Reconstr Surg Glob Open* 2026;14:e7326; doi: 10.1097/GOX.00000000000007326; Published online 29 January 2026.)

## INTRODUCTION

The global demand for dermal fillers has grown with the rise of nonsurgical aesthetic procedures.<sup>1</sup> Fillers are favored for being minimally invasive, but complications such as swelling, necrosis, and even blindness may occur.<sup>2</sup> These are often due to intravascular injection or inaccurate placement in complex anatomy. A review of 2813 adverse events reported in the US Food and Drug Administration’s database (2013–2017) showed that the cheek (32.5%), lips (17.9%), and nasolabial fold (14.6%) were most frequently affected.<sup>3</sup> The cheek is high-risk due to major vessels such as the facial and angular arteries, and the variability in depth and position.

Ultrasound guidance helps reduce these risks by providing real-time visualization of soft tissue and needle position.<sup>4–6</sup> However, its effectiveness depends on the operator’s technique, including needle-ultrasound beam alignment.<sup>6,7</sup> Echogenic needles, with surface modifications enhancing ultrasound reflection, are widely used in nerve blocks and biopsies but remain limited in facial

aesthetics, where finer needles are used.<sup>8–10</sup> This study evaluated the visibility and safety benefits of echogenic design in cheek filler injections.

## METHODS

Ultrasound-guided hyaluronic acid (HA) filler injections were performed in the cheek of a healthy adult volunteer at a private clinic in France to compare the ultrasound visibility of 3 needles: a 23G 50-mm nonechogenic needle, a 23G 60-mm echogenic needle (Thiebaud, France), and a 30G 40-mm echogenic needle (Thiebaud, France). All needles were straight, beveled, and differed in gauge, length, and surface finish. Echogenic needles had microtextured surfaces; the nonechogenic needle had a smooth metallic finish (Fig. 1).

The participant was recruited between March 1 and March 5, 2024, and the injections were performed on March 10, 2024. Follow-up was continued for 28 days to monitor adverse effects. Data collection, including ultrasound video and subjective assessments, was completed between March 10 and April 10, 2024. Written informed consent was obtained.

Ultrasound imaging was performed using a 15-MHz curved high-frequency transducer (SibUs-In, Thinkin Tech SAS, France) in B-mode, with sterile gel. The transducer was held in-plane with the needle trajectory.

Needles were inserted at the zygionion and advanced under continuous ultrasound guidance. A plastic surgeon performed all injections using the retrograde linear

From the \*SibUs-In, Thinkin Tech SAS, Paris, France; †CHA University School of Medicine, Pocheon, South Korea; ‡Department of Dermatology, Erasmus University Medical Center, Rotterdam, The Netherlands; §Private Practice, Hochimin City, Vietnam; ¶You and I Clinic, Seoul, South Korea; and ||Division in Anatomy & Developmental Biology, Department of Oral Biology, Yonsei University College of Dentistry, Seoul, South Korea.

Received for publication April 9, 2025; accepted October 8, 2025.

Copyright © 2026 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: 10.1097/GOX.00000000000007326

Disclosure statements are at the end of this article, following the correspondence information.

Related Digital Media are available in the full-text version of the article on [www.PRSGlobalOpen.com](http://www.PRSGlobalOpen.com).



**Fig. 1.** Photographic comparison of the 3 needles used in this study. The 23G 60-mm echogenic needle (Thiebaud, France) (A), the 30G 40-mm echogenic needle (Thiebaud, France) (B), and the 23G 50-mm nonechogenic needle (C). All needles are straight and beveled but differ in gauge, length, and surface texture. The echogenic needles feature microtextured surfaces designed to enhance ultrasound visibility, whereas the nonechogenic needle has a smooth metallic finish.

threading technique. The same HA filler (Lorient No. 6,  $G' = 583$ ; Joonghun Pharmaceutical, Seoul, Korea) was injected into the deep layer near the periosteum to simulate standard cheek augmentation.

Procedures were recorded and independently reviewed by a plastic surgeon and a cosmetic physician. Needle visibility—specifically the tip and shaft—was qualitatively assessed for clarity, continuity, and stability.

## RESULTS

Echogenic needles demonstrated superior ultrasound visibility compared with the nonechogenic needle. Both the 23G and 30G echogenic types provided consistently clearer appearance of the shaft and tip. The echogenic tip appeared as a sharp, high-contrast point, whereas the nonechogenic tip was faint or invisible. (See Video 1 [online], which displays the ultrasound visualization of a 23G 50-mm nonechogenic needle during a filler injection in the cheek. The needle shaft seems intermittent and lacks a clear delineation of the tip. Tip identification requires optimal angulation, and visibility is inconsistent throughout the procedure. This video illustrates the

## Takeaways

**Question:** How can needle visibility under ultrasound be enhanced to improve the safety and accuracy of ultrasound-guided filler injections?

**Findings:** This study evaluated a newly designed guide needle optimized for echogenicity. Compared with conventional needles, it showed superior real-time visibility of the shaft and tip during ultrasound-guided injections, suggesting enhanced control and reduced risk of vascular complications.

**Meaning:** Guide needles designed for better ultrasound visibility may improve the accuracy and safety of filler injections in high-risk facial areas.

limited sonographic traceability typically observed with nonechogenic designs.)

This difference was especially noticeable during needle movement. The echogenic tip remained visible across various angles and depths, whereas the nonechogenic tip frequently disappeared with minor adjustments in probe or needle position. Echogenic shafts also appeared more continuous and linear.

The 23G echogenic needle maintained high visibility throughout. (See Video 2 [online], which displays the ultrasound visualization of a 23G 60-mm echogenic needle during a filler injection in the cheek. The needle tip and shaft are clearly visible as continuous hyperechoic structures. The echogenic surface allows for consistent tracking during advancement, even with changes in the insertion angle. This video demonstrates the improved visibility achievable with the echogenic needle design.)

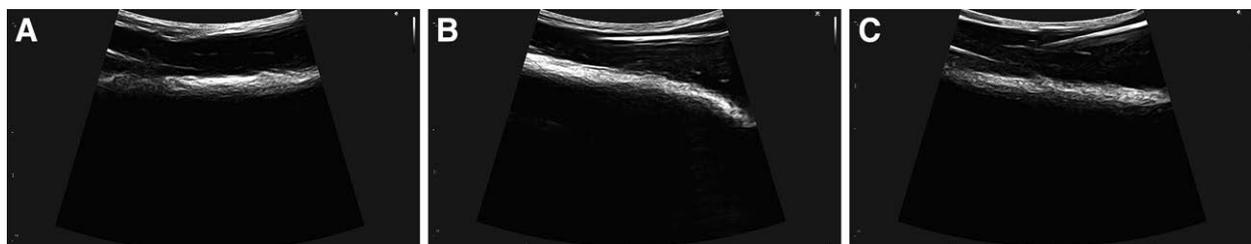
The 30G echogenic needle also showed adequate visibility with only slight contrast reduction. (See Video 3 [online], which displays the ultrasound visualization of a 30G 40-mm echogenic needle during a filler injection in the cheek. Despite the smaller gauge, the needle tip remains identifiable under ultrasound. The shaft seems slightly less intense than that of the 23G echogenic needle, but visualization is sufficient for real-time monitoring. This video supports the feasibility of echogenic enhancement in fine-gauge aesthetic needles.)

Reviewers reported greater confidence and less need for probe adjustment with echogenic needles across evaluations. Representative images are shown in Figure 2.

## DISCUSSION

This study evaluated the ultrasound visibility of 3 needles during HA filler injections, focusing on tip and shaft clarity under real-time guidance. Echogenic needles consistently showed superior visibility in both static and dynamic conditions.

Sharply defined tips and a continuous shaft allowed reliable tracking, even with changes in insertion angle or depth. Consistent visualization can improve procedural accuracy and safety, particularly in high-risk areas such as the cheek, where intravascular injection is a concern due to anatomical variability. Previous studies have linked



**Fig. 2.** Representative ultrasound images of needle tip visibility across different needle types: the 23G 50-mm nonechogenic needle (A), the 23G 60-mm echogenic needle (B), and the 30G 40-mm echogenic needle (C). Echogenic needles (B and C) exhibit clearer and earlier tip visualization compared with the nonechogenic needle (A), which shows limited definition and delayed appearance.

improved visibility to fewer complications such as embolism and necrosis.<sup>10</sup>

Importantly, even the 30G echogenic needle provided adequate visibility, indicating that surface modifications can be effective for fine-gauge needles commonly used in facial aesthetics. These findings align with findings in radiology and anesthesia, demonstrating echogenic needle benefits at steep angles.<sup>7,11,12</sup>

Improved visibility also enhances aesthetic precision. Real-time visualization allows dynamic adjustments for symmetry and contour refinement. Reviewers reported increased confidence and reduced need for probe manipulation.

Limitations include the single-subject design and subjective evaluation. Larger studies with objective image analysis are needed. The findings are limited to needle-based injections; future research should assess echogenicity in cannulas, which behave differently under ultrasound. Equipment and operator variability also warrant investigation. Moreover, the lack of a structured qualitative assessment limits the generalization of observations such as confidence and perceived ease of use.

Despite limitations, this study showed promise for improving both safety and procedural control in ultrasound-guided facial filler injections. Though slightly more expensive, their potential to reduce complications and improve injector control may justify broader use in aesthetic procedures.

## CONCLUSIONS

Echogenic needles offered enhanced ultrasound visibility of both tip and shaft, even during movement and depth changes. Compared with nonechogenic designs, they enabled safer and more precise filler placement in high-risk areas such as the cheek. Incorporating echogenic features into fine-gauge needles may offer a simple yet effective improvement for ultrasound-guided aesthetic procedures.

**Kyu-Ho Yi, MD, PhD**

Division in Anatomy & Developmental Biology, Department of Oral Biology  
Yonsei University College of Dentistry  
50-1 Yonsei-ro, Seodaemun-gu  
Seoul 03722, South Korea  
E-mail: kyuh90@daum.net

## DISCLOSURE

All the authors are scientific board members of the company SibUS-In.

## ACKNOWLEDGMENT

The authors thank the patient for their participation in this study.

## REFERENCES

- Fortune Business Insights. Dermal fillers market size, share & industry analysis. Fortune Business Insights. Available at <https://www.fortunebusinessinsights.com/industry-reports/dermal-fillers-market-100939>. Accessed May 28, 2025.
- Quach B, Clemons RA. Complications of injectables. *Atlas Oral Maxillofac Surg Clin North Am*. 2024;32:57–63.
- Beauvais D, Ferneini EM. Complications and litigation associated with injectable facial fillers: a cross-sectional study. *J Oral Maxillofac Surg*. 2020;78:133–140.
- Tirado A, Nagdev A, Henningsen C, et al. Ultrasound-guided procedures in the emergency department—needle guidance and localization. *Emerg Med Clin North Am*. 2013;31:87–115.
- Neal JM. Ultrasound-guided regional anesthesia and patient safety: an evidence-based analysis. *Region Anesth Pain Med*. 2010;35:S59–S67.
- Desyatnikova S. Ultrasound-guided temple filler injection. *Facial Plast Surg Aesthet Med*. 2022;24:501–503.
- Kimbova A, Pieters A, Tadayon P, et al. Advancements in needle visualization enhancement and localization methods in ultrasound: a literature review. *Artif Intelligence Surg*. 2024;4:149–169.
- Menhadji A, Nguyen V, Cho J, et al. In vitro comparison of a novel facilitated ultrasound targeting technology vs standard technique for percutaneous renal biopsy. *Urology*. 2013;82:734–737.
- Brookes J, Sondekoppam R, Armstrong K, et al. Comparative evaluation of the visibility and block characteristics of a stimulating needle and catheter vs an echogenic needle and catheter for sciatic nerve block with a low-frequency ultrasound probe. *Br J Anaesth*. 2015;115:912–919.
- Rocha PS, Guerra TA, Teixeira DA. Description of a safe Doppler ultrasound-guided technique for hyaluronic acid filler in the face—a method to avoid adverse vascular events. *J Cosmet Dermatol*. 2022;21:2783–2787.
- Hovgesen CH, Wilhjelm JE, Vilmann P, et al. Echogenic surface enhancements for improving needle visualization in ultrasound: a PRISMA systematic review. *J Ultrasound Med*. 2022;41:311–325.
- Beigi P, Salcudean SE, Ng GC, et al. Enhancement of needle visualization and localization in ultrasound. *Int J Comput Assist Radiol Surg*. 2021;16:169–178.