Clinical, Cosmetic and Investigational Dermatology

Dovepress
Taylor & Francis Group

Open Access Full Text Article

CASE SERIES

Double Chin Correction with Combination of High Intensity Focused Ultrasound and Hyaluronic Acid: A 24-Week Case Report

Aira Fujimaki[1,2], Akiko Imaizumi[1]

[1]Imaizumi Skin Clinic, Tokyo, Japan; [2]Department of Hospital Administration, Juntendo University School of Medicine, Tokyo, Japan

Correspondence: Aira Fujimaki, Imaizumi Skin Clinic, 7-18-8 Roppongi, Minato-ku, Tokyo, 106-0032, Japan, Email a-fujimaki@juntendo.ac.jp

Video Abstract

Point your SmartPhone at the code above. If you have a QR code reader the video abstract will appear. Or use: https://youtu.be/NdQ10MjJ_O8
Access transcript:

Abstract: Submental fullness, commonly referred to as a double chin, is a frequent aesthetic concern influenced by subcutaneous fat accumulation and underlying skeletal structure. High-intensity focused ultrasound (HIFU) and hyaluronic acid (HA) filler injection have each been used as minimally invasive treatment options; however, reports on their combined use remain limited. We report two Asian female patients with mild to moderate submental fullness who were treated with a sequential combination of linear HIFU and HA filler injection in routine clinical practice. One patient underwent HIFU followed by HA injection, whereas the other received HA injection prior to HIFU treatment. Both patients demonstrated improvement in submental contour, cervicomental angle, and chin projection during follow-up, with results maintained at 24 weeks. Patient satisfaction was high, treatment-related discomfort was minimal, and no immediate or delayed adverse events were observed. Although limited by the small number of cases, these observations suggest that a combined approach using HIFU and HA filler may represent a well-tolerated, minimally invasive option for selected patients with submental fullness.

Keywords: submental fullness, double chin, high-intensity focused ultrasound, hyaluronic acid filler, minimally invasive aesthetics, Asian patients

Introduction

Submental fullness, commonly referred to as a "double chin," is a prevalent aesthetic concern that can significantly affect facial harmony and the cervicomental angle.[1] The etiology of a double chin is multifactorial, involving the deposition of excess subcutaneous fat, skeletal structure, skin laxity, and the anatomical characteristics of the platysma muscle.[2,3] In Asian populations, specific anatomical characteristics such as a relatively short chin and less prominent mandibular projection can exacerbate the appearance of submental fullness and contribute to the blunting of the cervicomental angle.[2] Conventional treatment options for double chin correction include surgical interventions, such as liposuction.[4] While these methods are effective, they are invasive, require downtime, and may not be suitable for all patients, especially those seeking minimally invasive alternatives. Non-surgical modalities such as high-intensity focused ultrasound (HIFU), cryolipolysis, and deoxycholic acid injection have gained popularity due to their efficacy, safety, and minimal downtime.[4,5]

HIFU is a well-established modality that delivers focused ultrasound energy to specific depths beneath the skin, inducing thermal coagulation and fat cell disruption at approximately 58°C while sparing surrounding tissues.[5] In addition to lipolysis, HIFU also stimulates neocollagenesis, leading to skin tightening and enhanced elasticity. Several studies have demonstrated the effectiveness of HIFU in reducing localized fat deposits and improving skin laxity in the submental region.[5]

https://doi.org/10.2147/CCID.S599307
Received: 27 January 2026
Accepted: 29 March 2026
Published: 12 April 2026

Hyaluronic acid fillers, on the other hand, are widely used for facial contouring and structural augmentation.[6] In the context of double chin treatment, HA can enhance chin projection, thereby improving the cervicomental angle and overall facial profile.[6] Although each modality has shown promising results individually, there is a paucity of literature exploring the combined use of HIFU and HA for submental contour and cervicomental angle improvement, particularly in Asian patients with unique anatomical considerations.

Combining these modalities may contribute to improvement in submental contour by addressing both submental fat and chin projection, potentially leading to a more balanced lower facial profile. Furthermore, this approach may benefit patients who exhibit mild to moderate submental convexity but are reluctant to undergo invasive surgery. In this case report, we present the clinical outcomes of two Asian female patients who underwent a sequential treatment protocol combining HIFU and HA injection for double chin correction. Clinical observations included changes in submental contour, cervicomental angle, submental fullness severity, patient-reported satisfaction, and short- to mid-term outcome maintenance.

Materials and Methods

Patients

This case report included two Asian female patients with mild to moderate submental fullness who sought minimally invasive treatment for double chin correction. Both patients had more than 1 cm of submental soft tissue thickness, as confirmed by clinical examination including a pinch test, and exhibited insufficient chin projection associated with an obtuse cervicomental angle. The patients had no history of prior neck procedures, significant weight change within six months, thyroid disease, or systemic conditions affecting fat distribution. Written informed consent was obtained from all patients for treatment, data collection, and publication of clinical images.

Treatment Protocol

Both patients underwent combination treatment using high-intensity focused ultrasound (HIFU) and hyaluronic acid (HA) filler injection. All treatments were completed within a 4-week period (weeks 0, 2, and 4), consisting of two HIFU sessions and one HA filler injection.

The sequence of HIFU and HA administration was individualized according to patient preference.

Linear HIFU treatments were performed using UltracelZ (Jeisys Med Inc., South Korea) with a frequency of 4 MHz, an energy setting of 0.6 J, and a total of 200 shots per session. Transducers with focal depths of 6.0 mm, 4.5 mm, and 3.0 mm were used in a linear pattern across the submental region, with approximately 65 shots delivered at each depth. HIFU sessions were administered at two of the three scheduled visits (weeks 0, 2, or 4), with a two-week interval between sessions. Care was taken to avoid the marginal mandibular nerve zone.

A single session of hyaluronic acid filler injection was performed at one of the scheduled visits (week 0 or week 4) using a high G′ cross-linked HA product (25 mg/mL; Juvéderm Volux, Allergan Aesthetics, Irvine, CA, USA). A total volume of 1.0 mL was injected into the mandibular angle, gnathion, and prejowl sulcus at the periosteal plane, with the majority of the volume placed at the chin to improve projection. No molding or touch-up injections were performed.

Outcome Assessment

Clinical outcomes were documented using caliper-based submental fat thickness measurements, cervicomental angle evaluation, standardized photography, patient-reported satisfaction, and safety observations.

Submental fat thickness was measured using calipers at the midline submental point, 2 cm inferior to the menton, with the patient in a neutral head position. Eligibility for treatment was determined based on clinical examination, including a pinch test demonstrating more than 1 cm of submental soft tissue thickness. Measurements were obtained by an independent physician who was not involved in the treatment procedures. Each measurement was performed in triplicate at each visit and recorded for clinical documentation. Cervicomental angle was measured using standardized lateral photographs. Consistent anatomical landmarks were used across all time points for angle measurement. Measurements were performed by an independent physician who was not involved in the treatment procedures in

order to minimize potential measurement bias. Standardized photographic documentation was obtained using the VECTRA H1 imaging system (Canfield Scientific) with fixed camera distance, Frankfort horizontal plane, neutral chin position, consistent lighting conditions, and identical time of day for each imaging session.

Patients were instructed to avoid significant skincare changes, facial massage, or cosmetic procedures for four weeks before and throughout the follow-up period. Body weight was maintained during the study period. Imaging sessions were scheduled outside of the menstrual period to minimize fluid retention. No dental procedures or changes in systemic medications occurred during follow-up.

Submental fullness severity was graded according to the McDiarmid grading system. Patient satisfaction and pain were assessed using a visual analog scale (VAS).

Follow-Up and Safety Evaluation

Follow-up visits were conducted at weeks 2, 4, 6, and 24 after the initial treatment as part of routine clinical care. Adverse events, including edema, ecchymosis, dysesthesia, nodules, post-inflammatory hyperpigmentation, and vascular complications, were monitored at each visit.

Ethics Statement

This case report describes retrospective observations from routine clinical practice. According to institutional policy and national guidelines, ethics committee approval was not required. Written informed consent was obtained from all participants for treatment and publication of their clinical data and images.

Case Presentations

Case 1

A 38-year-old East-Asian woman with mild submental fullness (SMF) visited our clinic seeking a minimally invasive solution for her lower face and double chin area. She also expressed concern about her short chin projection, which further blunted her cervicomental angle. Her body mass index (BMI) was 21.4, and Fitzpatrick skin type was III. McDiarmid grade at baseline was classified as "mild." She had no prior neck treatments or significant weight changes in the preceding 6 months.

Cryolipolysis and deoxycholic acid (ATX-101) injections were discussed, but did not offer simultaneous improvement in skin tightening or chin projection, and would have required multiple sessions. After discussing the cost–benefit and expected outcomes, the patient chose a combination treatment involving linear HIFU and HA injection. The treatment protocol consisted of two sessions of linear HIFU at weeks 0 and 2 followed by injection of 1.0 mL of cross-linked HA for chin projection at week 4.

At baseline, submental fat thickness was 16 mm, and the cervicomental angle measured 110°. Progressive improvement was observed during follow-up based on objective measurements of submental fat thickness and cervicomental angle. At 6 weeks, improvement in submental contour and jawline definition was observed, with submental fat thickness measuring 12 mm and a cervicomental angle measuring 105°. At 24 weeks, submental fat thickness was 10 mm, and the cervicomental angle was 100°, with sustained enhancement of chin projection and lower facial definition (Figures 1A–Figures 1C and Figure 2A–Figure 2C). According to the McDiarmid grading system, SMF improved from mild at baseline to absent at 24 weeks.

The patient reported high overall satisfaction at final follow-up (VAS score, 86/100). Treatment-related pain was mild and transient (VAS range, 24–37/100). No immediate or delayed adverse events were observed during the 24-week follow-up period.

Case 2

A 43-year-old East Asian woman with moderate SMF and mandibular retrusion sought treatment for lower face rejuvenation. Her BMI was 20.9, Fitzpatrick skin type was III, and baseline SMF was classified as moderate according

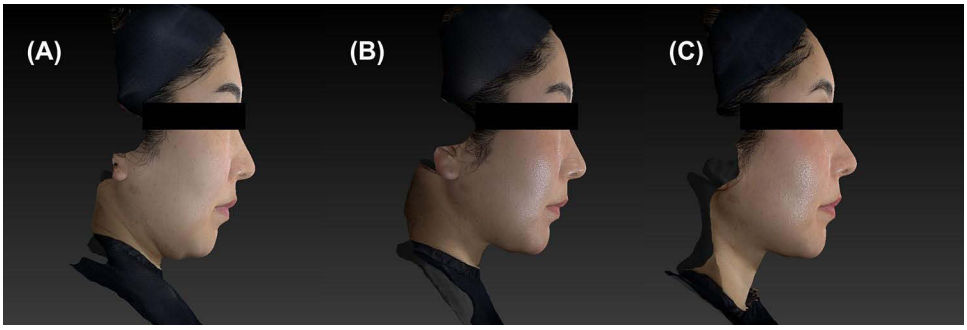

Figure 1 Case 1: A 38-year-old Asian female patient with mild submental fullness. (**A**) Pretreatment standardized photograph showing a blunted cervicomental angle and submental soft tissue fullness. (**B**) Six weeks after two sessions of HIFU followed by HA injection, demonstrating improved submental contour and chin projection. (**C**) Twenty-four weeks after treatment, showing maintenance of the improved cervicomental angle and submental contour without evidence of rebound fullness. Clinical photographs were obtained unDer Standardized conditions with consistent lighting, camera distance, and patient positioning, with the Frankfort horizontal plane parallel to the floor.

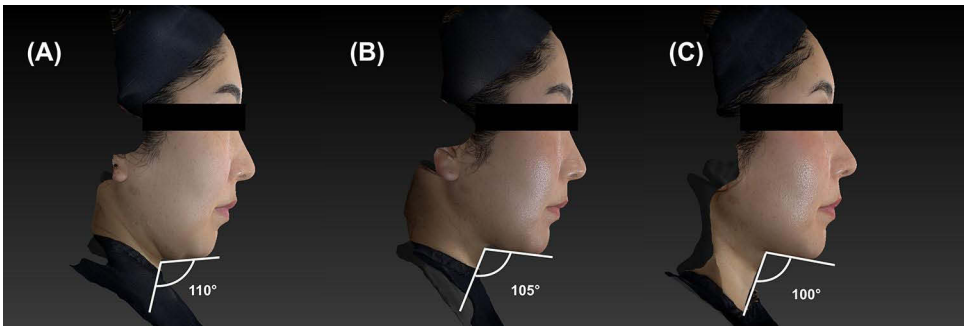

Figure 2 Submental and chin profile improvement following combined high-intensity focused ultrasound (HIFU) and hyaluronic acid (HA) filler treatment in Case 1. (**A**) Baseline standardized lateral photograph of a 38-year-old East Asian woman with mild submental fullness and insufficient chin projection, demonstrating a blunted cervicomental angle (110°). (**B**) Six weeks after treatment with two sessions of linear HIFU followed by injection of 1.0 mL of cross-linked HA filler, showing improvement in submental contour, jawline definition, and cervicomental angle (105°). (**C**) Twenty-four weeks after treatment, demonstrating further improvement in the cervicomental angle (100°) with sustained enhancement of chin projection and lower facial contour. All photographs were obtained unDer Standardized conditions.

to the McDiarmid grading system. She had no history of prior lower face treatments, thyroid disease, or recent weight changes.

Like Case 1, other options, such as ATX-101, were discussed but declined due to cost and multiple-session requirements. The patient underwent a reverse-sequence combination protocol consisting of hyaluronic acid (HA) filler injection at week 0 followed by linear high-intensity focused ultrasound (HIFU) at weeks 2 and 4. A total of 1.0 mL of cross-linked HA was injected for chin projection, followed by two HIFU sessions using the same parameters as in Case 1.

At baseline, submental fat thickness was 14 mm, and the cervicomental angle was 130°. At 6 weeks, submental fat thickness decreased to 12 mm, and the cervicomental angle was 120°. At 24 weeks, submental fat thickness was 10 mm, and the cervicomental angle was 110° (Figures 3A–Figures 3C and Figures 4A–Figures 4C). According to the McDiarmid grading system, SMF improved from moderate at baseline to mild at 24 weeks. Patient satisfaction remained high throughout follow-up (VAS score, 99/100). Pain was minimal (VAS range, 8–9/100), and no treatment-related adverse events or clinically significant downtime were reported.

Discussion

Submental fullness (SMF) is a common aesthetic concern that negatively affects facial harmony and the cervicomental angle, particularly in East Asian populations, which tend to exhibit relatively short chin projection and a flatter mandibular profile.[1–3] In many patients, excess submental fat combined with skeletal retrusion results in a poorly defined jawline that cannot be adequately corrected by fat reduction alone, making a multimodal treatment approach particularly relevant.

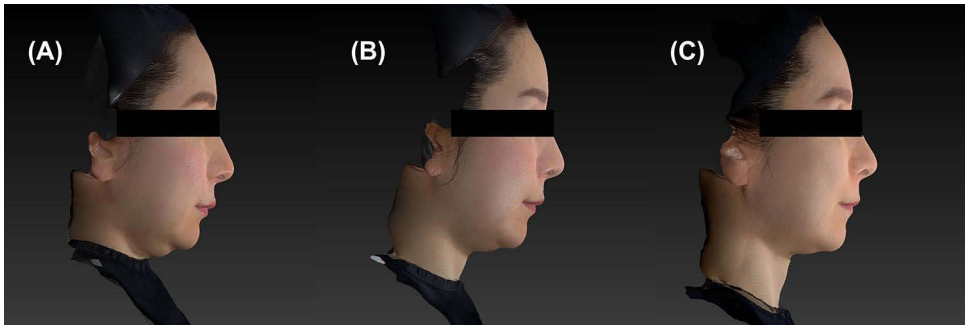

Figure 3 Sequential improvement in chin projection and cervicomental angle following hyaluronic acid (HA) filler injection followed by high-intensity focused ultrasound (HIFU) treatment in Case 2. (**A**) Pretreatment image showing moderate submental fullness and insufficient anterior chin projection. (**B**) Six weeks after treatment, demonstrating improved chin projection and jawline definition with reduction of submental convexity. (**C**) Twenty-four weeks after treatment, showing sustained improvement in chin projection and lower facial contour without evidence of recurrent submental fullness.

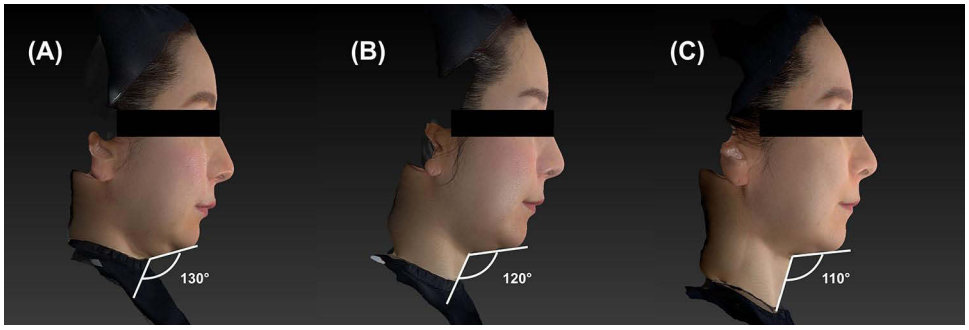

Figure 4 Submental contour and chin profile changes in Case 2 following hyaluronic acid (HA) filler injection followed by high-intensity focused ultrasound (HIFU) treatment. (**A**) Baseline lateral photograph of a 43-year-old East Asian woman with moderate submental fullness and mandibular retrusion, showing an obtuse cervicomental angle (130°). (**B**) Six weeks after treatment, demonstrating improvement in submental contour and jawline definition with enhancement of the cervicomental angle (120°). (**C**) Twenty-four weeks after treatment, showing improvement in submental contour and chin projection, with maintenance of the improved cervicomental angle (110°).

Historically, invasive procedures such as liposuction or neck lift have been used to correct SMF and provide predictable outcomes; however, these interventions are associated with surgical risks and downtime that many patients prefer to avoid.[4] Non-surgical alternatives, including cryolipolysis and injectable deoxycholic acid (ATX-101), have demonstrated efficacy for localized fat reduction but typically require multiple treatment sessions and do not address underlying skeletal insufficiency or soft tissue support.

High-intensity focused ultrasound (HIFU) is well established for its dual mechanism of action, inducing selective adipocyte disruption and promoting neocollagenesis, which results in both fat reduction and skin tightening.[5] Nevertheless, in patients with insufficient chin projection or mandibular retrusion, HIFU alone may be insufficient to achieve optimal improvement in the cervicomental angle. Hyaluronic acid (HA) fillers, conversely, are widely used for structural augmentation and chin projection enhancement, thereby improving lower facial balance and cervicomental contour.[6] Previous studies have also reported that chin augmentation with HA fillers may contribute to improvement in the cervicomental angle and mandibular profile. For example, Shimojima et al observed a reduction in the cervicomental angle following HA filler injections in patients undergoing jawline enhancement procedures.[7] Anatomically guided HA filler injection allows predictable and safe restoration of skeletal support. The combination of HIFU and HA filler therefore offers a complementary strategy, simultaneously addressing adipose tissue excess and skeletal deficiency. These observations are consistent with the proposed complementary mechanisms of HIFU-induced adipose reduction and HA-based structural support, which together may contribute to improvement in submental contour and cervicomental angle. To our knowledge, there are limited reports describing the combined use of high-intensity focused ultrasound and hyaluronic acid injection specifically for improving submental contour and cervicomental angle.

In the present case report, both patients demonstrated clinical improvements in submental fat thickness, jawline definition, and cervicomental angle, with high patient satisfaction and no significant adverse events. Importantly, all treatments were completed within a short treatment window, using a relatively small volume of HA filler, which may contribute to reduced treatment burden and improved accessibility compared with previously reported approaches. The sequential approach was tailored to each patient: the first patient underwent HIFU followed by HA filler, while the second patient preferred HA filler injection first. This flexibility reflects real-world clinical practice, underscoring that both sequences can be effective when carefully planned.

Additionally, a time-dependent improvement was observed in both cases, with clinical outcomes maintained at 24 weeks compared with earlier follow-up. This delayed improvement is consistent with the known biological response to HIFU treatment. A recent systematic review by Kumar et al reported that a majority of HIFU-induced adipocyte destruction is resorbed within 12 weeks, with approximately 95% of adipocytes resorbed by 18 weeks after treatment.[8] This gradual adipocyte clearance process may partially explain the continued improvement in submental contour and cervicomental angle observed at the 24-week follow-up in the present cases. These findings suggest that the full clinical effect of combination HIFU and HA filler therapy may not be immediately apparent at early follow-up and should be evaluated over a longer observation period.

From a safety perspective, no immediate or delayed adverse events were observed, and pain levels were minimal to mild, consistent with previous reports of HIFU and HA filler when used independently.[5,6] All patients resumed normal social activities without downtime, suggesting that this combination protocol is well tolerated and suitable for patients seeking minimally invasive alternatives to surgery.

This case report has several limitations. The small sample size and case report design limit the generalizability of the findings. Because this report does not include a control group, it is not possible to determine the relative contribution of HIFU and HA filler to the observed clinical changes. Caliper-based measurement of submental fat thickness is operator-dependent and may not completely isolate pre-platysmal fat, which represents an additional limitation of the present study. Although standardized photography was performed using a three-dimensional imaging system, quantitative volumetric analysis of the submental region could not be reliably obtained, and outcome assessment relied primarily on linear measurements and qualitative image comparison. Slight variation in head positioning during clinical photography may also influence the apparent cervicomental angle and should be considered when interpreting the results. In addition, follow-up was limited to 24 weeks, and longer-term durability beyond the short- to mid-term period remains to be established. Future studies with larger cohorts, standardized volumetric assessment, and extended follow-up are warranted to further elucidate the optimal sequencing and long-term outcomes of combination HIFU and HA filler therapy. Therefore, the present report should be interpreted as a hypothesis-generating clinical observation rather than definitive evidence of efficacy.

Despite these limitations, the present findings suggest that a combined approach using HIFU and HA filler may represent a practical and potentially effective non-surgical strategy for double chin correction, particularly in East Asian patients who may benefit from both adipose reduction and skeletal support. Individualizing treatment sequence may further optimize clinical outcomes and reflect real-world aesthetic practice.

Conclusion

In these two cases, combination treatment with high-intensity focused ultrasound and hyaluronic acid filler was well tolerated and associated with improvement in submental fullness. Clinical changes in the cervicomental angle appeared to evolve gradually during follow-up, with outcomes maintained at 24 weeks. These observations suggest that this minimally invasive approach may be a potential treatment option for selected patients with submental fullness who prefer to avoid surgical intervention.

Acknowledgments

Part of the content of this work was presented at an international scientific meeting (IMCAS Asia 2025).

Disclosure

Dr Aira Fujimaki received an honorarium from Jeisys Medical Inc. for a conference presentation related to the subject of this manuscript. Jeisys Medical Inc. had no role in the study design, data collection, data analysis, manuscript preparation, or decision to submit this manuscript for publication. In addition, Dr Aira Fujimaki also reports personal fees, non-financial support from Allergan(Abbvie), outside the submitted work. The authors report no other conflicts of interest in this work.

References

1. van de Lande LS, Eyck BM, Mooij JJ, et al. The rainbow scale for the assessment of the cervicomental angle: a validated scale. *Aesthet Surg J*. 2020;40(9):931–937. doi:10.1093/asj/sjz122
2. Swift A, Liew S, Weinkle S, et al. The facial aging process from the "Inside Out". *Aesthet Surg J*. 2021;41(10):1107–1119. doi:10.1093/asj/sjaa339
3. McDiarmid J, Ruiz JB, Lee D, et al. Results from a pooled analysis of two European, randomized, placebo-controlled, Phase 3 studies of ATX-101 for the pharmacologic reduction of excess submental fat. *Aesthetic Plast Surg*. 2014;38(5):849–860. doi:10.1007/s00266-014-0364-9
4. Patel S, Kridel R. Current trends in management of submental liposis: a pooled analysis and survey. *JAMA Facial Plast Surg*. 2018;20(3):202–206. doi:10.1001/jamafacial.2017.1567
5. Goo B, Kim E, Yoon SE, et al. Efficacy and safety of High-Intensity Focused Ultrasound (HIFU) on reduction of unwanted submental fat in Asian patients. *Aesthetic Plast Surg*. 2025;49(11):3348–3349. doi:10.1007/s00266-025-05000-w
6. Peng JH, Peng HP. Treating the double chin with hyaluronic acid injection. *J Cosmet Dermatol*. 2024;23(1):79–83. doi:10.1111/jocd.16100
7. Shimojima K, Hashimoto M, Yamaoka Y, et al. Combination treatment with cryolipolysis and hyaluronic acid fillers for Jawline enhancement. *Clin Cosmet Invest Dermatol*. 2024;17:2989–2998. doi:10.2147/CCID.S492091
8. Kumar V, Jain A, Vadera S, et al. Effectiveness of HIFU therapy for nonsurgical facial and body contouring: a systematic review of prospective and experimental studies. *Plast Reconstr Surg*. 2023;151(3):533–544. doi:10.1097/PRS.0000000000009912