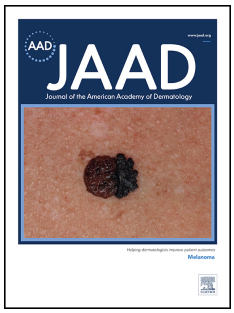

Integrating Facial Ultrasound into Medical Aesthetics Practice

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Abstract

Background: The increasing prevalence of dermal filler procedures has highlighted the need for enhanced visualization techniques to optimize outcomes and reduce complications.

Objective: To evaluate the impact of pre-procedural ultrasound scanning on bruising outcomes in dermal filler treatments.

Methods: This prospective quality improvement study compared bruising outcomes between patients who received pre-procedural ultrasound scanning (intervention group, n=80) versus standard care (control group, n=80) at a single center. The Bruising Visibility Scale (BVS) was used to assess outcomes. Three experienced providers performed all procedures following standardized protocols, using a MindRay 16 MHz ultrasound device for the intervention group.

Results: Chi-square analysis revealed a statistically significant reduction in bruising incidence with pre-procedural ultrasound scanning ($\chi^2 = 29.928$, $p < 0.05$). The intervention group demonstrated significantly higher rates of bruise-free outcomes (70% vs 28.8%, OR = 5.77, 95% CI: 2.98-11.18).

Limitations: Single-center design and immediate post-procedure assessment timepoint.

Conclusion: Pre-procedural ultrasound scanning significantly reduces bruising in dermal filler procedures, suggesting improved vascular visualization may enhance procedural outcomes. These findings provide quantitative evidence supporting the integration of ultrasound guidance in aesthetic practice.

Capsule summary:

- Pre-procedural facial ultrasound scanning significantly reduces bruising incidence in dermal filler procedures
- Ultrasound-guided filler procedures showed a 70% bruise-free rate versus 28.8% in standard procedures
- Facial ultrasound may serve as a crucial procedural safeguard by providing real-time visualization of individual patient's vascular anatomy
- The significant reduction in bruising (OR = 5.77, 95% CI: 2.98-11.18) suggests decreased vascular trauma during injection
- Integrating ultrasound mapping may be particularly valuable for less experienced practitioners as more non-specialists enter the aesthetic medicine field

INTEGRATING FACIAL ULTRASOUND INTO MEDICAL AESTHETICS PRACTICE

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To the editor:

The increasing prevalence of dermal filler procedures has been accompanied by a rise in complications.[1] Even experienced injectors cannot reliably account for individual vascular variations. While vascular complications from dermal fillers are rare, they can be catastrophic, potentially resulting in tissue necrosis, blindness, or stroke.[2] Ultrasound scanning prior to dermal filler injection has been proposed to optimize outcomes by allowing real-time visualization of vascular structures.[3] Until now, no quantitative studies have demonstrated its efficacy in reducing complications.

This prospective quality improvement study compared outcomes between patients who underwent ultrasound scanning prior to dermal filler injections (intervention group, n=80) and those who did not (control group, n=80) at a single aesthetic medicine center. The intervention group included consecutive eligible patients between June-August 2024, while the control group comprised randomized retrospective cases from July 2020-June 2024. Inclusion criteria encompassed adults aged 18-80 years seeking dermal filler treatment. Exclusion criteria included: pregnancy/nursing, prior facial surgery or trauma, filler to lip, nose, forehead, glabellar regions, bleeding disorders, anticoagulation therapy, immunosuppressive therapy, recent neuromodulator treatment, and conditions affecting facial vascular patterns.

Three similarly experienced providers (a nurse practitioner, physician assistant, and nurse) performed vascular mapping with a Mindray 16 MHz ultrasound prior to FDA-approved filler

injection. Each completed 40 hours of ultrasound training and over 100 supervised scans. The non-handheld Mindray unit was selected for its cost-effectiveness and image quality.

Standardized ultrasound protocol was used to map vascular anatomy within and around the injection site. While the exact mechanism is uncertain, reduced bruising likely reflects improved visualization and modified injection planes, decreasing the risk of vascular trauma.

Bruising was assessed using the validated Bruising Visibility Scale (BVS), where 1 indicates barely visible bruising, 3 moderately visible bruising, 5 clearly visible bruising, and 6 indicates no bruising. Standardized photographs were taken immediately post-procedure. This quality improvement initiative was not subject to IRB oversight per institutional policy and national guidelines.

Patient demographics were comparable between groups: mean age 45.3 vs. 44.8 years, female 90% vs. 92.5%, previous filler 60% vs. 56.3%. Participants represented multiple racial and ethnic groups. Bruising outcomes showed significant differences: 70% of patients in the intervention group had no bruising compared to only 28.8% in the control group. Chi-square analysis revealed a statistically significant reduction in bruising with ultrasound ($\chi^2 = 29.928$, $p < 0.05$). Patients scanned with ultrasound were significantly more likely to have no bruising (OR = 5.77, 95% CI: 2.98-11.18).

Table 1. Patient Characteristics

Characteristic	**Intervention Group (n=80)**	**Control Group (n=)80**
Age, mean (SD)	45.3 (12.4)	44.8 (13.1)
Female sex, n (%)	72 (90)	74 (92.5)
Previous filler, n (%)	48 (60)	45 (56.3)

Table 2. Bruising Outcomes by Group (BVS=Bruising Visibility Scale)

BVS Score	**Intervention Group n (%)**	**Control Group n (%)**
1 (Barely visible)	11 (13.8)	24 (30.0)
2	8 (10.0)	27 (33.8)
3 (Moderately visible)	5 (6.2)	5 (6.2)
4	0 (0)	1 (1.2)
5 (Clearly visible)	0 (0)	0 (0)
6 (No bruising)	56 (70.0)	23 (28.8)

This study provides quantitative evidence that ultrasound scanning prior to filler injection significantly reduces bruising. While bruising does not definitively indicate intravascular injection, it often reflects vascular trauma that may increase this risk.[2]

Recent studies show vascular patterns vary significantly between patients, making blind injections riskier.[5] These findings are relevant given the growing number of aesthetic providers.[1] Ultrasound mapping may serve as a key safeguard.

Limitations include single-center design and immediate assessment. Future multi-center studies with longer follow-up are warranted. A split-face design may better isolate ultrasound's role. Though broader inclusion would enhance generalizability, this cohort reflects typical aesthetic patients.

References:

1. Zargaran D, Zargaran A, Terranova T, et al. Profiling UK injectable aesthetic practitioners: A national cohort analysis. J Plast Reconstr Aesthet Surg. 2023;86:150-154.
2. King M, Walker L, Convery C, Davies E. Management of a Vascular Occlusion Associated with Cosmetic Injections. J Clin Aesthet Dermatol. 2020;13(1):E53-E58.
3. Schelke LW, Decates TS, Velthuis PJ. Ultrasound to improve the safety of hyaluronic acid filler treatments. J Cosmet Dermatol. 2018;17(6):1019-1024.
4. Scafide KN, Sheridan DJ, Campbell J, et al. Evaluating the scientific rigor of simulation research: The development and psychometric testing of the NLN/Jeffries Simulation Framework instruments. Nurs Educ Perspect. 2021;37(1):5-15.
5. Kroumpouzos G, Harris S, Bhargava S, Wortsman X. Complications of fillers in the lips and perioral area: Prevention, assessment, and management focusing on ultrasound guidance. J Plast Reconstr Aesthet Surg. 2023;84:656-669.