1470 nm Diode laser for enhancement of the Lower Face: a prospective evaluation with patients' and physicians' reported outcomes

Reem Karami
The Ghanem Clinic
Ahmad Kassas
The Ghanem Clinic
Ghassan Abu Sittah
American University of Beirut Medical Center
George Christopoulos
The Ghanem Clinic
Mahmoud Elkouly
The Ghanem Clinic
Zara Nusser
The Ghanem Clinic
Ali Ghanem
amg@theghanemclinic.com

The Ghanem Clinic

Research Article

Keywords: Diode lase, Subdermal Laser, Jowl, Jawline, Lower face laxity

Posted Date: March 30th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9050373/v1

Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at European Journal of Plastic Surgery on May 19th, 2026. See the published version at https://doi.org/10.1007/s00238-026-02451-5.

Abstract

Background

Lower facial aging and loss of jawline definition are common concerns among many patients. While surgical procedures offer definitive correction, many individuals seek minimally invasive options with shorter recovery times. The 1470-nm diode laser aims to address this by promoting skin tightening and restoration of the mandibular contour.

Aims

Evaluate the efficacy and safety of this laser in the treatment of mild to moderate lower facial laxity using validated patient-reported outcomes and independent clinician assessments.

Methods

We identified patients with mild to moderate lower facial laxity who underwent a single treatment; those with severe laxity, previous procedures in the treatment area, or used combined modalities were excluded. Assessments included the FACE-Q® Satisfaction with Facial Appearance scale and standardized 2D/3D photography at baseline, 3 months, and 6 months. Three independent plastic surgeons, blinded to timing, evaluated pre- and post-treatment images using the Global Aesthetic Improvement Scale (GAIS).

Results

Twenty-six patients were included. FACE-Q® scores improved from a baseline mean of 47 to 54 at 3 months and 62 at 6 months. GAIS evaluations showed aesthetic improvement in 61–74% of patients, with no cases of worsening. Two patients developed temporary marginal mandibular neuropraxia, resolving by 6–10 weeks.

Conclusion

the 1470 nm diode laser demonstrated measurable improvement in lower facial laxity with minimal downtime and acceptable safety. It represents a promising minimally invasive alternative for selected patients, although longer-term and controlled studies are needed to validate durability and refine indications.

Introduction

The lower face and neck, particularly the mandibular border, are central to facial aesthetic harmony. A youthful jawline is defined by a sharp inferior mandibular contour without cutaneous redundancy or jowl formation[1]. Age-related loss of definition reflects a multifactorial, three-dimensional process involving skeletal resorption, soft tissue descent, and cutaneous degeneration[2]. Intrinsic and extrinsic aging mechanisms contribute to dermal thinning, reduced elasticity, and progressive laxity. Simultaneously, volumetric redistribution of fat compartments, attenuation of retaining ligaments, weakening of the mandibular septum, and mandibular recession collectively promote lower facial ptosis [3,4,5]. Collectively, these factors play a significant role in aging of the lower face [6]. The mandibular ligament is a key structural determinant in jowl development. As described by Furnas [7], it consists of deep and superficial components. The deep layer provides firm fixation of the platysma and depressor musculature to the mandible and is central to deep-plane rhytidectomy techniques. The superficial component comprises retinacular cutis fibers tethering the dermis to the platysma, influencing lower facial contour dynamics [8].

The face, being our most prominent feature, holds a significant cosmetic and psychosocial importance for individuals [9]. Current approaches to rejuvenating the lower face and neck include non-surgical treatments, minimally invasive options, and surgical interventions. While facelifts and neck lifts can effectively address age-related changes and enhance youthful appearance, some patients may find them undesirable due to the increased downtime, higher costs and elevated risk of complications [10,11]. There is a growing demand for non-surgical aesthetic solutions that is evidenced by the substantial expansion of this field over the past decade [12].

The subdermal use of the 1470 nm diode laser for is a minimally invasive outpatient treatment designed to address skin aging. This technique employs the use of micro-optical fibers inserted beneath the skin to deliver energy at a 1470 nm wavelength. This targeted energy promotes collagen remodeling and skin tightening, resulting in a rejuvenated, more youthful appearance [13]. This study aims to retrospectively evaluate the efficacy of this procedure in addressing lower facial skin laxity, with the aim of establishing an evidence base for this technology.

Material and methods

This study conducted at our clinic in London, United Kingdom, with the aim of evaluating the efficacy and safety of the 1470 nm diode laser in the management of lower facial laxity. We identified patients who had previously voluntarily presented to our plastic surgery clinic with concerns about sagging or laxity in the lower face. Inclusion criteria included both male and female patients with mild to moderate laxity who underwent skin tightening with the 1470 nm diode laser. Patients with severe laxity, those who had undergone previous facial procedures in the targeted area, or individuals who received combination treatments involving other aesthetic modalities in the lower face or neck were excluded from the study to ensure a homogeneous sample and to better isolate the effects of the laser alone.

The primary objective was to assess the degree of aesthetic improvement following treatment, utilizing patient-reported outcomes, clinician evaluations, and objective measurements. Prior to treatment all patients completed the FACE-Q® questionnaire, specifically the satisfaction with facial appearance scale. This is a validated patient-reported outcome measure used to evaluate satisfaction with overall facial appearance. It consists of 10 questions which generated a converted numerical score, with a scale of 0 to 100, that served as the baseline measurement. Standardized two- and three - dimensional (2D and 3D) photographs were also captured at presentation. Follow-up FACE-Q® assessments and photographs were obtained at 3 and 6 months post-treatment. Additionally, three independent plastic surgeons evaluated the pre- and 6 months post-treatment photographs using the Global Aesthetic Improvement Scale (GAIS), a five point scale ranging from worse to very much improved.

The procedure was performed using the Eufoton® LASEmaR® 1500 system under local anesthesia. A total of 10 ml of local anesthetic was administered, consisting of 8 ml of normal saline solution combined with 2 ml of 1% Lidocaine without adrenaline. The lower face was divided into five anatomical treatment zones: two mandibular zones, two submandibular zones, and one submental zone (Fig. 1).

Device settings per anatomical area followed the inbuilt manufacturer's device settings for these areas at level 3. This included a power of 4–7 Watts and pulse duration of 100–300 milliseconds. The energy delivered per treatment area ranged between 300–400 Joules, with the total delivered energy to be 1500 Joules. The fiber used was the standard 300 microns in diameter. These fibers are sterile and designed for single use. Laser energy is delivered through the tip of the optical fiber, which is moved in a fan-shaped motion to evenly disperse the energy and ensure all targeted areas are treated effectively. Each patient received one treatment session.

Results

A total of 26 patients were included in this study, consisting of 24 women and 2 men, with ages ranging from 32 to 64 years. All participants were in good general health, with no underlying co-morbidities. The procedure was performed as an outpatient treatment, allowing patients to return home shortly after completion. Figures 2 and 3 display pre- and post-procedure images of two of our patients. Figure 4 provides a volumetric assessment using 3D imaging with Vectra H2 (Canfield Scientific, Parsippany, N.J), revealing a 4.2 cc reduction in the jowl area volume following the Endolift procedure.

FACE-Q® Patient Assessment

Regarding patient-reported outcomes assessed using the validated FACE-Q® questionnaire for overall satisfaction with facial appearance, the pre-treatment scores averaged 47, reflecting the baseline level of satisfaction with facial appearance prior to undergoing the Endolift® procedure. This initial score indicates a moderate level of concern or dissatisfaction, which motivated the patients to seek treatment. At the 3-month postoperative mark, the average FACE-Q® score increased to 54, suggesting that patients perceived a noticeable and meaningful improvement in their facial aesthetics. By the 6-month

follow-up, the scores continued to rise further, reaching an average of 62 (Fig. 5). This sustained and progressive increase in scores over time suggests a continued enhancement in patient satisfaction beyond the immediate recovery period.

Physician Assessment

Three independent plastic surgeons evaluated the 2D and 3D photographs of the patients, all of whom were blinded to the timing of the intervention to minimize assessment bias and ensure objectivity. The detailed results of their evaluations are summarized in Table 1. Notably, none of the physicians observed any deterioration in facial aesthetics following the treatment. Furthermore, no patients were rated as "very much improved," which aligns with the typical expected outcomes of energy-based devices that aim to enhance skin quality and contour rather than achieve dramatic, full correction of laxity.

Table 1
Physician assessment of paitents pre treatment and 6 months post treatment photographs, blinded to treatment time.

Global Aesthetic improvement scale	**Percentage of patients**		
	Physician 1	**Physician 2**	**Physician 3**
Worsened	0%	0%	0%
Unchanged	25.8%	22.6%	19.4%
Improved	61.3%	64.5%	74.2%
Much improved	12.9%	12.9%	6.4%
Very much improved	0%	0%	0%

The most common finding across all evaluations was an improvement in facial aesthetics after the procedure. Specifically, Physician 1 noted improvement in 61.4% of patients, Physician 2 observed similar gains in 64.5%, and Physician 3 reported improvements in 74.2%. These rates highlight that a significant proportion of patients experienced noticeable benefits in facial appearance. Meanwhile, a subset of patients—25.8%, 22.6%, and 19.4% respectively—were rated as unchanged, indicating minimal or no visible change in their photographs. The remaining patients, representing 12.9%, 12.9%, and 6.4%, were classified as "much improved," suggesting some patients achieved appreciable aesthetic enhancement, although not to a full or dramatic extent.

Complications

During the follow-up period, patients reported mild post-procedure pain, swelling, bruising and discomfort that persisted for a few days. All symptoms resolved within 5–7 days after the procedure. We had two patients who had experienced temporary unilateral neuropraxia of the marginal mandibular

nerve, necessisating botulinum toxin injection to the contralateral side for symmetrization. Full recovery and symmetry of the mouth movement was reported after 6 weeks in one patient and 10 weeks in the other.

Discussion

The lower face continues to pose a significant treatment challenge for plastic surgeons, owing to its complex anatomy and wide range of available treatment modalities. Surgical interventions, such as deep plane facelifts with soft tissue repositioning, skin tightening, and volume restoration through fat grafting, remain the gold standard for significant rejuvenation, delivering the most dramatic and durable results. However, the inherent invasiveness, longer recovery times, and higher costs associated with surgery often deter many patients, especially those seeking minimal downtime or concerned about surgical risks. Consequently, non-surgical and minimally invasive options have gained popularity, including botulinum toxin, dermal fillers, radiofrequency devices, ultrasound, and laser technologies[14]. Energy-based devices offer a promising middle ground, targeting skin laxity with minimal recovery.

The 1470 nm diode laser exemplifies this trend and offers a dependable alternative for patients with mild to moderate skin laxity of the lower face. The mechanism of action of the laser is multifacated and can be summarized into three primary effects. First, the high absorption coefficient of the 1470 nm wavelength by water molecules which generates controlled thermal energy, inducing collagen fiber contraction. Second, the delivery of laser energy creates micro-injuries within the deep dermal layers, initiating a wound-healing cascade that stimulates neocollagenesis. Third, the procedure induces lipolysis, facilitating the emulsification and subsequent resorption of small localized fat deposits [15,16]. The subdermal laser operates on the fibroseptal network described by Minelli et al. [8], primarily functioning through a stimulatory mechanism. It activates and enhances the existing fibroseptal structures without inducing significant fibrosis or scarring. This targeted stimulation promotes tissue tightening and rejuvenation while avoiding the formation of dense, fixed scar tissue that could impair future surgical procedures.

Nilforoushzadeh et al.[17], similar to our study, explored the use of the laser to address jowling. In their study, patients' biometric characteristics were assessed using the VisioFace 1000 D, the multi-probe adapter Cutometer (Courage & Khazaka Electronics, Cologne, Germany), and a skin ultrasound imaging system (TPM, Lüneburg, Germany) to measure skin layer thickness and elasticity. Results demonstrated increased density in both the dermis and epidermis. The study also reported a 90% patient satisfaction rate; however, it was unclear how this figure was derived or whether a validated questionnaire was used to assess satisfaction. Additionally, the findings are limited by the small sample size of only nine participants, which restricts the generalizability of the results to a broader population.

The versatility offered by the diode laser is particularly valuable for aesthetic practitioners, as it broadens the range of treatments achievable with a single device. Numerous case series have been published to evaluate its efficacy across different areas of the face. For example, Nilforoushzadeh et al. [18] conducted

a study assessing its the effectiveness in treating nasolabial folds and marionette lines. The results were promising, demonstrating improvements in skin thickness and high patient satisfaction. However, similar to earlier studies, this research was limited by a small sample size and lacked objective measures for grading patient satisfaction. Conversely, Lotfi et al. [19] evaluated the improvement of the upper face, providing more objective data by measuring eyebrow position—specifically, eyebrow height from the center of the pupil in medial, central, and lateral regions. They reported a 71.5% improvement in these measurements, indicating effective results in this area.

We believe our study offers more comprehensive and reliable results compared to existing literature, particularly due to its larger sample size of 26 patients and the implementation of standardized assessment tools, such as the FACE-Q® questionnaire and GAIS scores. These tools provide validated measures of patient satisfaction and aesthetic improvement, enhancing the objectivity of our findings. Limitations of this study include its relatively short follow-up period which restricts our capacity to determine the long-term durability of outcomes. Moreover, there is a potential for observer bias of the plastic surgeons assessing the pictures, despite efforts to employ validated subjective tools.

There is a scarcity in data about the diode laser, with most studies being case series of small sizes. A recent systematic review evaluating the current evidence surrounding it highlighted a significant gap in high-quality, randomized controlled trials. The review emphasized that the existing literature is primarily composed of small case series and observational studies, which limits the strength and generalizability of the conclusions regarding the procedure's safety and efficacy. This paucity of rigorous scientific data accenuates the need for larger, prospective, and controlled studies to better understand the long-term outcomes and to firmly establish the role of the laser in minimally invasive facial rejuvenation [20].

This review also noted that none of the included studies reported any adverse outcomes. This finding aligns with previous reviews that concluded adverse events associated with laser treatments are generally mild and self-limiting [21]. However, it is important to acknowledge the potential for both reporting and publication bias, as thermal energy from laser procedures can, in certain cases, lead to adverse effects such as skin burns, seromas, hematomas, neuropraxia, and local infection [22]. In our series, we had two serious complications of injury to the marginal mandibular nerve that recovered within 10 weeks. Although the literature does not address nerve injury as something common, there have been many cases of neuropathy related to the marginal mandibular nerve, causing paresthesia, paresis and even muscle paralysis [23]. It is important to emphasize this to help raise awareness among practitioners using the device, thereby promoting safer application and better patient outcomes.

Conclusion

The 1470 nm diode laser is a minimally invasive technique that has demonstrated encouraging results in improving signs of lower face aging. The procedure offers several advantages, including minimal downtime and a low complication rate, making it an attractive alternative to more invasive surgical options. Many patients prefer it due to its safety profile, quick recovery, and the ability to achieve visible

improvements without the need for extensive surgical intervention, as we have shown with our patient cohort. As the technique continues to develop, it is increasingly being integrated into the comprehensive management of facial aging. However, further research and longitudinal studies are necessary to fully establish its long-term efficacy and optimal patient selection criteria.

Declarations

Ethics approval

The Ethics Committee has confirmed that ethical approval is waived.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Consent to publish

The authors affirm that subject provided informed consent for publication of the images in Figs. 2, 3 and 4.

Clinical trial number

Not applicable

Funding

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Author Contribution

R.K. Manuscript writing and study designA.K. Data collection and performing the researchG.C. Patient recruitment and performing the researchG.A.S Patient rectruitment and performing the researchM.E. Data collectionZ.N. Data collection and analysisA.G.Patient recruitment and study design

References

1. Ellenbogen R, Karlin JV (1980) Visual criteria for success in restoring the youthful neck. *Plastic and reconstructive surgery.* ;66(6):826-837.10.1097/00006534-198012000-00003

2. Swift A, Liew S, Weinkle S, Garcia JK, Silberberg MB (2021) The facial aging process from the inside out. *Aesthetic surgery journal.* ;41(10):1107-1119.10.1093/asj/sjaa339
3. Fernández-Varela-Gómez F, Sandoval-García A, Cabrera-Rios KV (2024) Signs of skin aging: a review. Int J Res Med Sci 12(7):2674
4. Hussein RS, Bin Dayel S, Abahussein O, El-Sherbiny AA (2025) Influences on skin and intrinsic aging: biologicnvironmental, and therapeutic insights. *Journal of Cosmetic Dermatology.* ;24(2):e16688.10.1111/jocd.16688
5. Coleman SR, Grover R (2006) The anatomy of the aging face: volume loss and changes in 3-dimensional topography. *Aesthetic surgery journal.* ;26(1_Supplement):S4-S9.10.1016/j.asj.2005.09.012
6. Romo T, Yalamanchili H, Sclafani AP (2005) Chin and prejowl augmentation in the management of the aging jawline. *Facial plastic surgery.* ;21(01):38-46.10.1055/s-2005-871762
7. Furnas DW (1989) The retaining ligaments of the cheek. *Plastic and reconstructive surgery.* ;83(1):11-16.10.1097/00006534-198901000-00003
8. Minelli L, Yang H-M, van der Lei B, Mendelson B (2023) The surgical anatomy of the jowl and the mandibular ligament reassessed. *Aesthetic plastic surgery.* ;47(1):170-180.10.1007/s00266-022-02996-3
9. Zargaran D, Zoller F, Zargaran A, Weyrich T, Mosahebi A (2022) Facial skin ageing: Key concepts and overview of processes. *International journal of cosmetic science.* ;44(4):414-420.10.1111/ics.12779
10. Jacono AA, Malone MH, Lavin TJ (2017) Nonsurgical facial rejuvenation procedures in patients under 50 prior to undergoing facelift: habits, costs, and results. *Aesthetic Surgery Journal.* ;37(4):448-453.10.1093/asj/sjw217
11. Corduff N (2023) Surgical or nonsurgical facial rejuvenation: the patients' choice. *Plastic and Reconstructive Surgery–Global Open.* ;11(10):e5318.10.1097/GOX.0000000000005318
12. Fitzgerald R, Graivier MH, Kane M et al (2010) Surgical versus nonsurgical rejuvenation. *Aesthetic Surgery Journal.* ;30(1_Supplement):28S-30S.10.1177/1090820X10373365
13. Markabayeva A, Kaliterna D, Karimov S, Abdelmaksoud A, Kamalska M, Binić I (2023) Topical treatment of cutaneous ptosis: Endolift® treatment with 1470-nm wavelength Eufoton® LASEmaR® 1500. *Journal of Applied Cosmetology.* ;41(1):45/48 – 45/48.10.56609/jac.v41i1.69
14. Magacho-Vieira FN, Bezerra LJR, Boro D, Santos FA (2024) Revitalizing the lower face: Therapeutic insights and an innovative treatment guideline for jowl rejuvenation. *Journal of Cosmetic Dermatology.* ;23(6):1969-1972.10.1111/jocd.16263
15. Benar H, Benar EB (2024) A new nonsurgical combination approach for skin tightening and remodeling; Endoskin—A comparative study. *Journal of Cosmetic Dermatology.* ;23(8):2574-2580.10.1111/jocd.16306
16. Kubik P, Gruszczyński W, Łukasik B Assessment of Safety and Mechanisms of Action of the 1470 nm LaserMe Device. Clin Case Rep Int (2024) ; *8.* 2024;1683.

17. Nilforoushzadeh MA, Heidari-Kharaji M, Fakhim T, Hanifnia A, Nouri M, Roohaninasab M (2022) Endolift laser for jowl fat reduction: clinical evaluation and biometric measurement. *Lasers in Medical Science*. ;37(5):2397-2401.10.1007/s10103-021-03494-9
18. Nilforoushzadeh MA, Heidari-Kharaji M, Fakhim T et al (2023) Efficacy evaluation of endolift laser for treatment of nasolabial folds and marionette lines. *Skin Research and Technology*. ;29(10):e13480.10.1111/srt.13480
19. Lotfi E, DellAvanzato R, Ahramiyanpour N, Shadmanyazdi F, Khosravi S (2023) Evaluation of eyebrow position and upper eyelid laxity after endolift laser treatment. *Skin Research and Technology*. ;29(10):e13498.10.1111/srt.13498
20. Modena DAO, de Melo Yamamoto AP, da Silva TBF (2025) Endolift® is a non-surgical treatment for skin tissue conditions. Is there evidence for its application? *Lasers in Medical Science*. ;40(1):22.10.1007/s10103-025-04288-z
21. Nilforoushzadeh MA, Heidari A, Ghane Y et al (2024) The endo-lift laser (intralesional 1470 nm diode laser) for dermatological aesthetic conditions: a systematic review. *Aesthetic Plastic Surgery*. ;48(23):5097-5114.10.1007/s00266-024-04082-2
22. Prohaska J, Hohman MH (2018) Laser complications. *Stat Pearls*.
23. dos Santos Borges F, Jahara RS, Meyer PF, de Almeida ACT, Almeida M, Mendonça AC (2023) Complications from laser Endolift use: Case series and literature review. *World J Biol Pharm Heal Sci*. ;16(3):23-41.10.30574/wjbphs.2023.16.3.0496

Figures

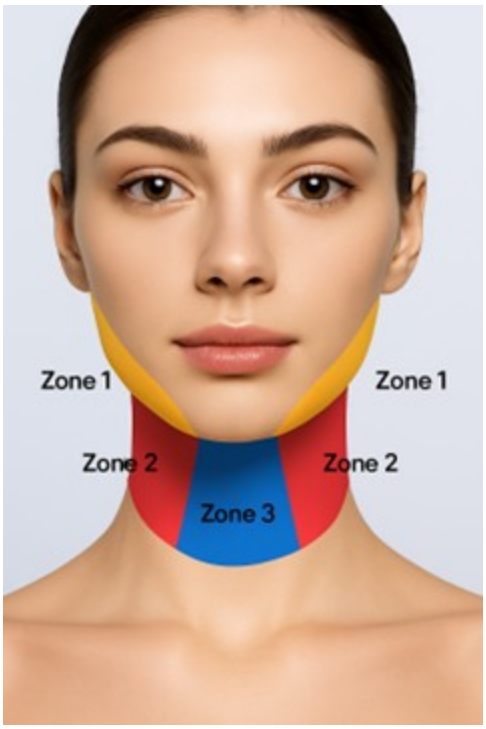

Figure 1

The anatominal treatment zones of the lower face of patients undergoing Endolift procedure. Two mandibular zones (zone 1), two submandibular zones (zone 2) and one submental zone (zone 3).

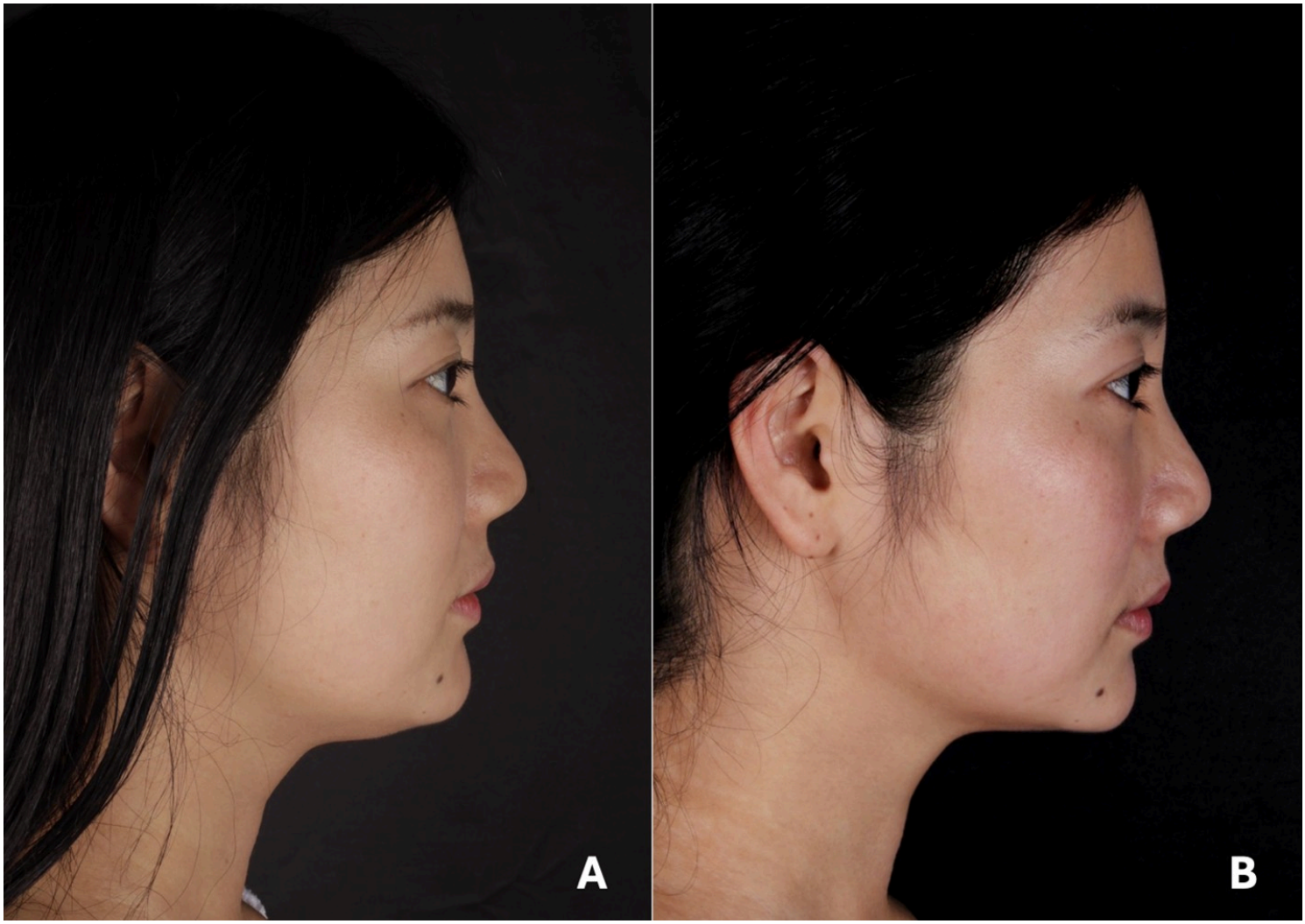

Figure 2

A. Pre-procedure photograph of a 37-year-old female presenting with a request for improved jawline definition. B. Six-month postoperative result following Endolift treatment.

Figure 3

A. Pre-procedure photograph of a 33-year-old female presenting with double chin and laxity of the jowls.
B. Six-month postoperative result following Endolift treatment showing enhanced jawline definition.

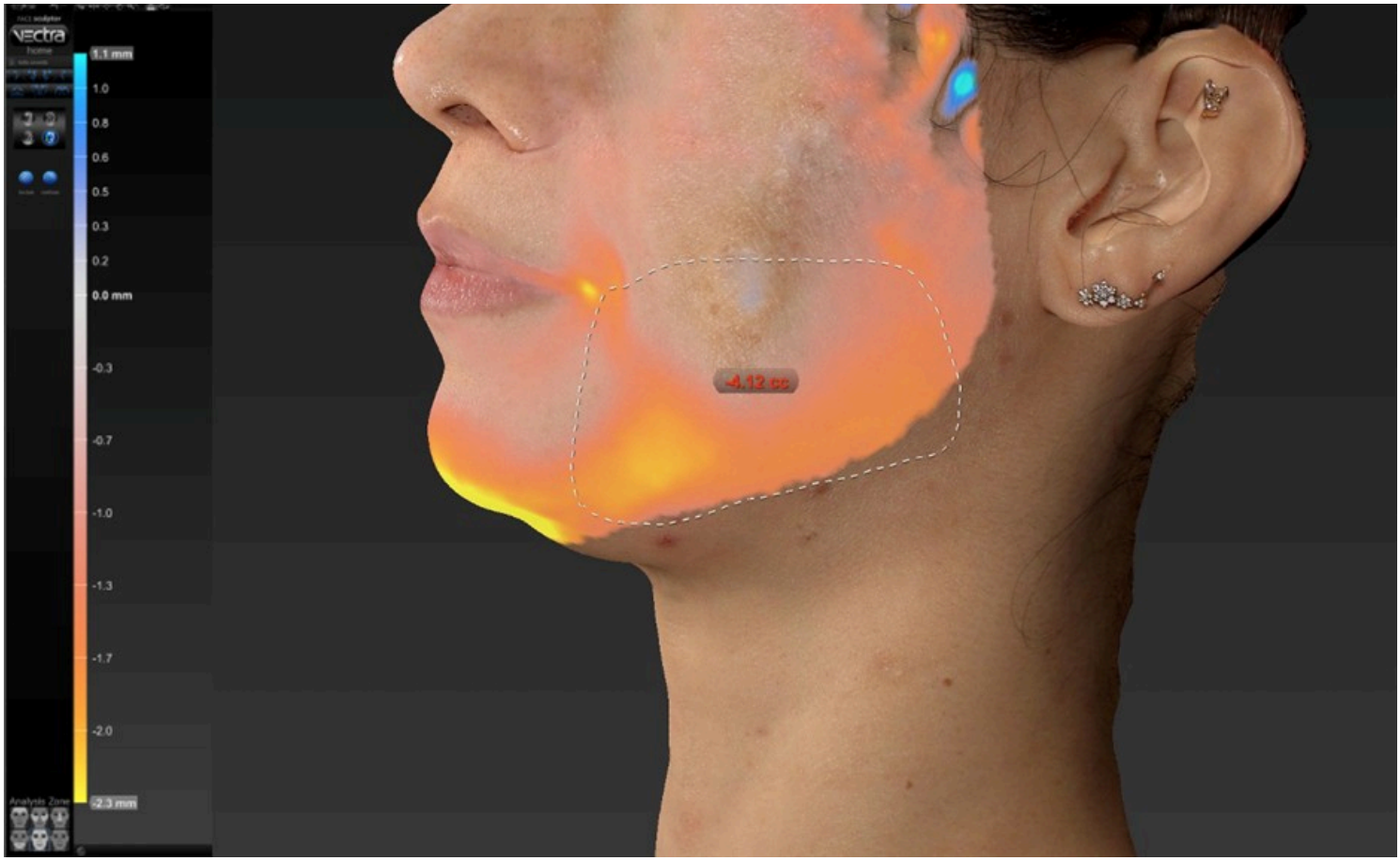

Figure 4

Volumetric assessment using 3D imaging with Vectra H2 (Canfield Scientific, Parsippany, N.J) comparing the pre and post procedure volme of the jowl area. Analysis revealed a 4.2 cc reduction in the jowl area volume following the Endolift procedure.

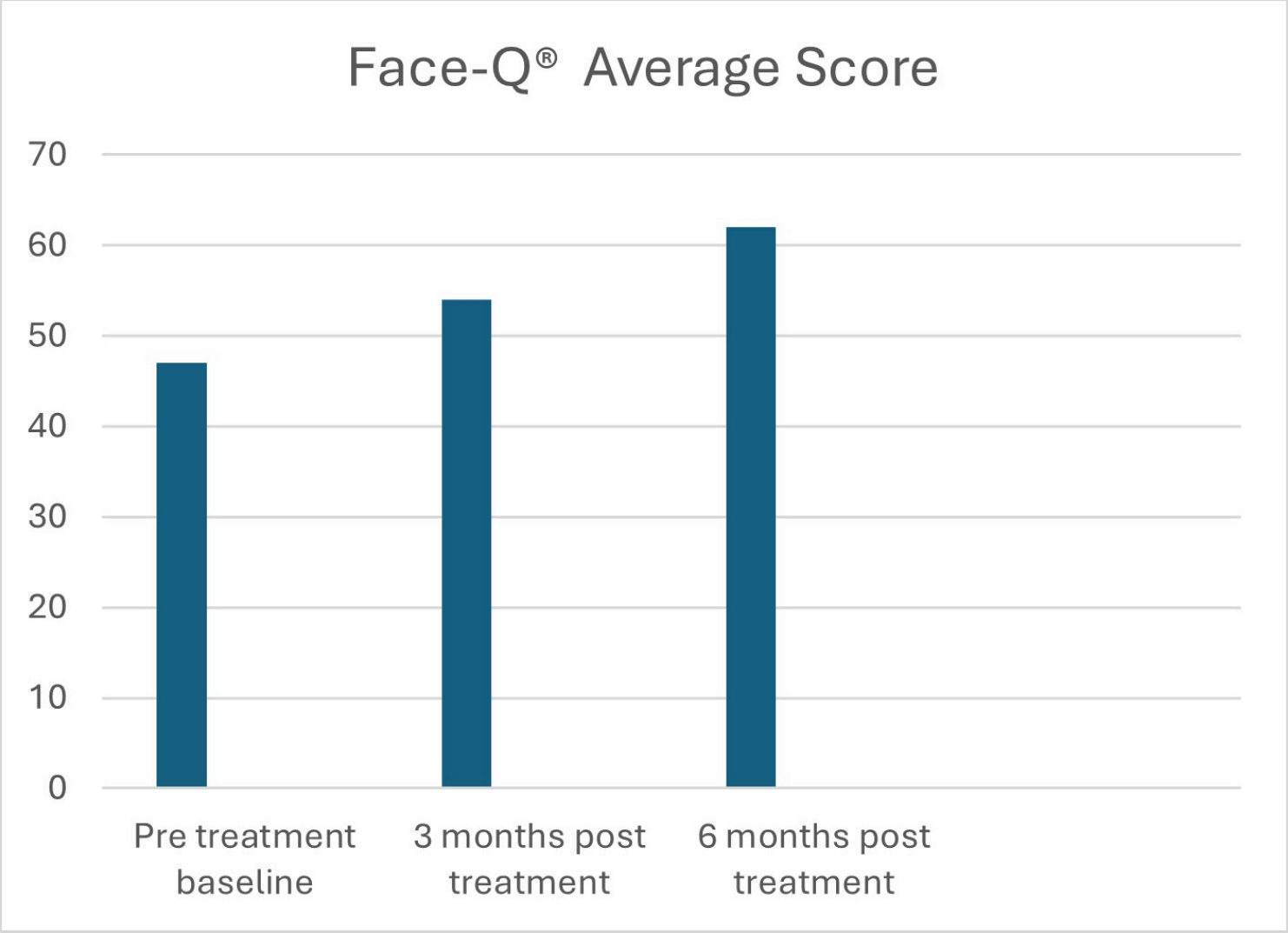

Figure 5

The average FACE-Q® scores for facial appearance demonstrated a progressive improvement at pre-treatment, 3 months post-treatment, and 6 months post-treatment