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RESEARCH ARTICLE

Facial Adipostructuring in Post-Traumatic Functional Impairment: A Pilot Study

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ABSTRACT

The article reports a prospective, longitudinal pilot study evaluating facial adipostructuring as a pre-reconstructive strategy in patients with severe post-traumatic maxillofacial sequelae caused by firearm injuries. Three adults with complex scarring, soft-tissue disorganisation, functional impairment, and marked psychosocial impact were treated at the Oral and Maxillofacial Surgery Service of Pérez de León II Hospital in Caracas, Venezuela. All had failed previous reconstructive attempts and presented fibrosis, volume loss or distortion, and functional deficits such as facial paralysis, microstomia, dysphagia, and altered facial contours.

Facial adipostructuring is described as a structured redistribution of facial adipose compartments using cannulas of different calibres, guided by the natural insertions and vectors of the panniculus system and complemented by a cocktail of natural senolytic and anti-inflammatory agents. High-frequency ultrasound (16–20 MHz) was used to quantify epidermal, SLEB, dermal, and hypodermal thickness in multiple regions before treatment and three months afterwards, together with Powell facial angle measurements, pain and satisfaction visual analogue scales, and standardised photographic documentation.

Across all cases, six sessions of adipostructuring produced decompression of overloaded fat compartments (infraorbital, preauricular, chin, submental) and selective augmentation of key structural areas (malar region, nasolabial fold, labiomental fold, lips, nasal tip), with convergence of right–left asymmetries and improved cervicomental definition. Ultrasound documented a reduction in inflammatory SLEB/dermal thickening and a more organised hypodermis, supporting a model of deflammation, compaction, and three-dimensional re-architecturing rather than simple debulking or gross filling. Powell angles showed preservation of the nasion–frontal and gonial angles, with favourable changes in nasofacial, mentocervical, and nasolabial angles, indicating harmonisation of the soft-tissue profile while respecting the bony framework.

Pain scores decreased from high to low between baseline and follow-up, whereas satisfaction increased inversely, suggesting a favourable risk–benefit profile and good medium-term tolerance. The authors conclude that facial adipostructuring may be an effective adjunct in the management of compressive fibrosis and soft-tissue disorganisation in ballistic trauma, improving both aesthetics and function, and they justify larger controlled studies to confirm these promising preliminary results.

Keywords: facial adipostructuring, post-treatment pain, craniofacial trauma, SLEB (subepidermal low-echogenic band), ultrasonography, Powell measurements o Powell angle measurements

Introduction

Facial trauma is one of the main causes of structural and functional alterations of the maxillofacial complex, generating sequelae that can significantly compromise both the anatomy and the function of the facial tissues. In adults, facial trauma usually involves the midface and mandible, with frequent fractures of the nasal, orbital, zygomatic, maxillary, and mandibular regions[1,2].

The clinical consequences depend on the injured region, the energy of the trauma, and the speed of diagnosis. The most common sequelae include facial deformity, paresthesia, diplopia, nasal obstruction, functional limitation, and, in severe cases, visual or occlusal disturbances[3].

In the long term, functional, neurological, painful, aesthetic, and psychological consequences may persist even after the initial repair. In maxillofacial reconstructive surgery, the quality of the soft tissues is often compromised by fibrosis, irregular scarring, volume loss, or alterations in tissue vascularization. These conditions hinder the planning and execution of definitive reconstructive procedures, since the integrity and elasticity of the soft tissues play a decisive role in the success of surgical interventions[4].

There is a growing need to implement therapeutic strategies that optimise soft-tissue conditions before undertaking complex reconstructive procedures. The most useful approaches can be grouped into optimisation of wound healing, control of inflammation and fibroplasia, and volumetric/regenerative preparation of the recipient bed prior to definitive reconstruction; these are applied in a stepwise manner according to the phase (acute, subacute, sequelae) and the quality of the tissues[5].

Pre-reconstructive tissue rehabilitation may help improve soft-tissue quality, elasticity, and volume, creating a more suitable anatomical environment for future surgical interventions. For this reason, we propose facial adipostructuring as an alternative technique aimed at reorganising the facial fat compartments in order to restore tissue architecture, improve facial biomechanics, and promote tissue restoration[6]. This technique is based on the principle of redistribution and structuring of adipose tissues to recover support, volume, and functionality of the affected facial structures. Unlike exclusively volumetric procedures, adipostructuring seeks to re-establish the anatomical arrangement of the fat compartments and their interaction with the surrounding tissues[6].

This study aims to demonstrate the safety and efficacy of facial adipostructuring for the treatment of scars secondary to craniofacial trauma. The use of this technique in patients with complex maxillofacial post-traumatic sequelae may represent a relevant therapeutic alternative to improve the condition of compromised soft tissues, promoting restoration of tissue volume, enhancement of elasticity, and reorganisation of facial structures. In this way, it may contribute not only to aesthetic recovery but also to functional improvement of the stomatognathic and facial system.

Accordingly, the objective of this study is to analyse the impact of facial adipostructuring on soft-tissue restoration and functional improvement in patients with complex post-traumatic maxillofacial sequelae caused by firearm injury, treated at the Oral and Maxillofacial Surgery Service of Pérez de León II Hospital in Caracas, Venezuela. Through the clinical evaluation of a three-case series, we sought to describe the changes observed in soft-tissue quality using ultrasound and functional assessments (angular measurements)[6,7,8].

Facial adipostructuring is a clinical technique aimed at the systematic and organised restoration of the facial panniculus system in accordance with the support vectors of the adipose tissue, combined with the application of natural senolytic active principles whose cocktail provides an effective set of anti-inflammatory and reparative tools [6,7]. The technique is performed using cannulas of different calibres directed to the adipose panniculi and interseptal spaces according to the patient's diagnostic needs.

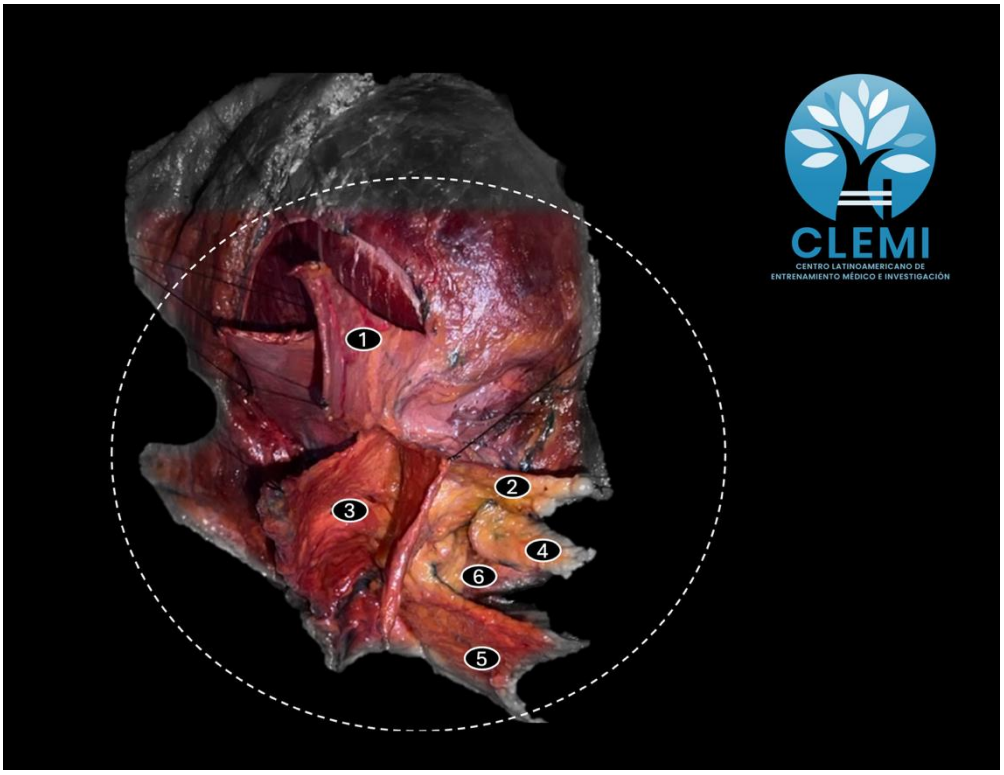

Figure 1. Layered dissection of the facial fat pads to be treated using the facial adipo-structuring technique: 1. Temporal fat pad, 2. Malar fat pad, 3. Supra-parotid fat pad, 4. Nasolabial fat pad, 5. Goniac fat pad, 6. Anterior mandibular fat pad (jowls). Latin American Center for Medical Training and Research (CLEMI). Bogotá, Colombia, November 2025

The vector distribution achieved using the cannulas depends on the initial placement of the fat panicles in the facial area, and these vectors must be activated through repeated movements over them to achieve the expected mechanoreceptor effect resulting from the activation of the system, as shown in Figure 2.

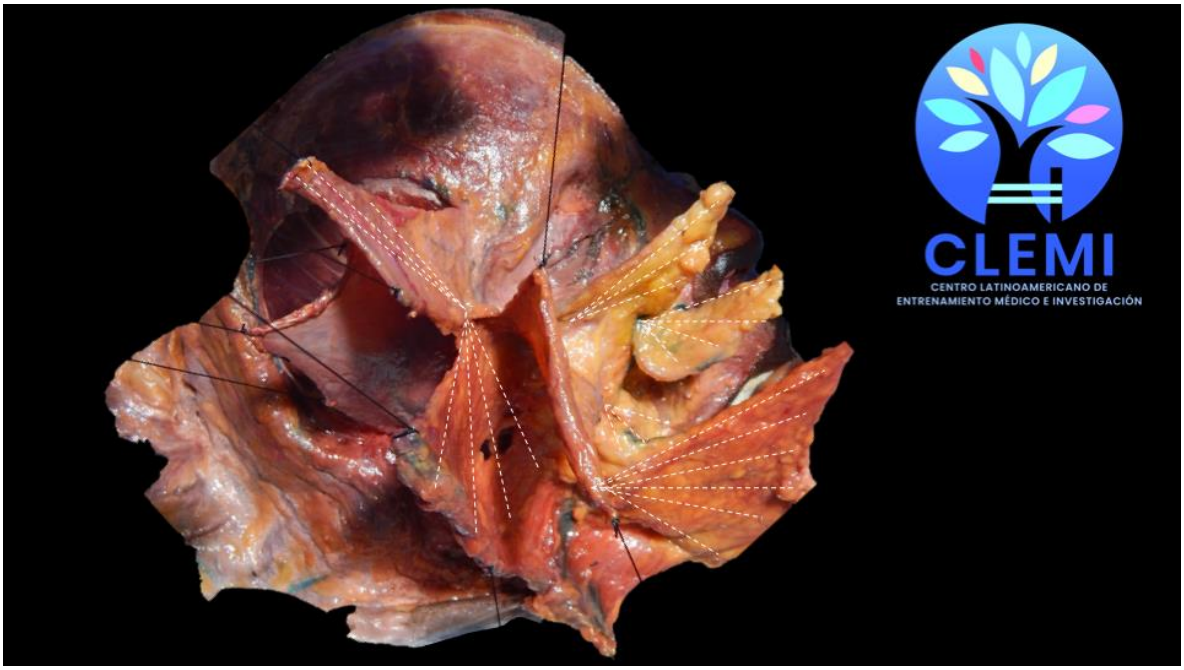

Figure 2. Dissection of the superficial panniculus system showing the natural insertions of the system, which correspond to the entry points for the vector network designed in the facial adipostructuring technique. Latin American Center for Medical Training and Research (CLEMI), Bogotá, Colombia, November 2025

The vectorial distribution performed with the cannulas depends on the original insertion of the facial adipose panniculi, and these vectors must be activated by repeated movements along them to achieve the expected mechanoreceptor effect through system activation, as shown in Figure 2.

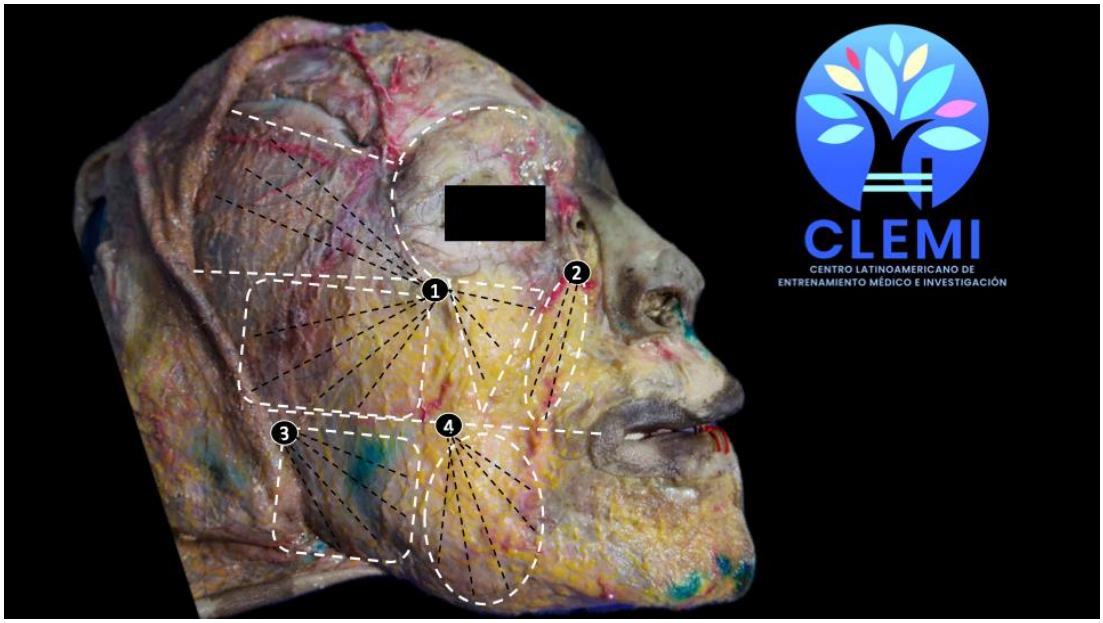

Figure 3. Vectorial distribution of the fat system according to its natural insertions, designed for the treatment protocol of facial adipostructuring. Dissection performed at the Latin American Center for Medical Training and Research (CLEMI), Bogotá, Colombia, November 2025.

Methodology

STUDY DESIGN.
Descriptive study with a prospective, longitudinal design, implying patient follow-up over time to evaluate clinical evolution.

POPULATION AND SAMPLE.
Population: Patients with sequelae of facial trauma treated at the Maxillofacial Surgery Service of Francisca Pérez de León Hospital.

Sample: Non-probabilistic, purposive sampling. Patients who meet the inclusion criteria during the study period will be consecutively included.

INCLUSION CRITERIA.
Temporal stability: Consolidated post-traumatic sequelae (minimum 6 months of evolution after firearm injury).

Specific defects: Presence of facial scars, volume loss, or limiting fibrotic tissue.

Sex: Both males and females.

Consent: Signing of informed consent after receiving a detailed explanation of the facial adipostructuring technique.

DATA COLLECTION TECHNIQUES AND INSTRUMENTS.
To ensure the scientific validity of the application of adipostructuring, three main data-collection tools are used: ultrasound, photography, and measurements.

A. Direct clinical observation
A qualitative and quantitative diagnosis of the baseline status and subsequent evolution of each patient was performed. Facial volume was assessed by ultrasound mapping of areas of fat atrophy (malar hypoplasia, deep folds, loss of the mandibular line). Standardised photographic documentation was obtained in frontal, profile (right/left), and oblique views to allow "before-and-after" comparison.

B. Functional assessment
Profile angles were measured according to Powell using a calliper (Vernier caliper), expressed in millimetres, together with a Visual Analogue Scale (VAS) for pain, which is considered the gold standard for quantifying postoperative sensory experience.

Format: A 10-cm horizontal line in which the left end (0) represents "no pain" and the right end (10) "the worst pain imaginable".

Use in the protocol: Employed to monitor facial inflammation and sensitivity during the first 72 hours and at day 7 post-procedure.

In addition, facial thirds were measured in millimetres using a high-frequency linear ultrasound transducer (16–20 MHz, China), which was used to obtain the required scans for pre- and post-treatment evaluation.

ETHICAL CONSIDERATIONS
The study is based on national and international ethical principles for research in human subjects.

Declaration of Helsinki: The research is conducted in accordance with the principles of beneficence, non-maleficence, autonomy, and justice.

Informed consent: All patients must sign a consent form after receiving a detailed explanation of the risks, benefits, and voluntary nature of their participation.

Confidentiality: Strict protection of the identity of study participants is ensured by using codes instead of names.

Use of images: Photographic material is used exclusively for academic and scientific purposes, guaranteeing patient anonymity through the use of eye shields or digital editing when required.

A 49-year-old female nurse and general physician with no relevant medical comorbidities (ASA I). The chief complaint was scarring sequelae from a transfixing wound that completely crossed the midface, with an entry and exit orifice, involving all soft-tissue planes along its trajectory (skin, subcutaneous tissue, musculature, mucosa and other structures according to the region) caused by a firearm, perforating the face from side to side with involvement of the facial nerve and subsequent paralysis. Informed consent was obtained from the patient, and the procedure was explained to her in detail.

ULTRASOUND ANALYSIS

For the ultrasound assessment, a high-frequency linear Suresult ultrasound probe (16–20 MHz, China) was used. The ultrasound data allowed a zonal analysis, comparing laterality and relative thickness of each cutaneous and subcutaneous layer. Before treatment, the following findings were observed:

Infraorbital region. Very thin epidermis on both sides (0.2 vs 0.1 mm), within the expected range for this area. The SLEB and dermis were slightly thicker on the left side (SLEB 0.5 vs 0.3 mm; dermis 1.1 vs 0.7 mm), suggesting greater matrix density and a possible component of photoaging or asymmetric chronic oedema; in this particular case, the findings are clearly attributable to chronic oedema. The hypodermis was more developed on the right (6.3 vs 4.3 mm), translating into greater infraorbital fat volume on that side and potentially correlating with a more pronounced clinical "bag" or protrusion. The resulting total thickness (7.5 vs 6.0 mm) confirms this right–left volumetric asymmetry in the infraorbital compartment. This is a region of high interest for adipostructuring treatments, where the objective may be to balance volume and dermal quality between both sides before any deep filler placement.

Malar region. Epidermis and SLEB showed slight differences (0.3/0.5 mm on the right vs 0.2/0.6 mm on the left), without major asymmetries. The dermis was slightly thicker on the left (1.4 vs 1.1 mm), compatible with greater mechanical load or photoexposure. The hypodermis was clearly thicker on the left (8.1 vs 6.6 mm), and consequently total malar thickness was also greater on that side (10.3 vs 8.5 mm). There was a predominance of malar volume on the left, which may explain perceived facial asymmetries in the midface. In an adipostructuring context, this pattern guides strategies of volume redistribution or compensation (e.g. adding more volume to the right side or refining the left).

Nasolabial fold. Epidermis with minimal differences (0.3 vs 0.2 mm). SLEB was comparable (0.5 vs 0.4 mm), suggesting a similar superficial dermal component. The dermis was somewhat thicker on the left (2.3 vs 1.9 mm), as was the hypodermis (4.5 vs 3.0 mm), so total fold thickness was greater on the left (7.4 vs 5.7 mm). The left side therefore presented a more "structured" and deeper fold in terms of overall thickness, correlating clinically with greater prominence of the crease. This makes it a target area for support interventions, aiming to rebalance the depth of the fold and its transition with the cheek.

Lips. The upper lip showed a total thickness of 7.3 mm and the lower lip 9.2 mm, consistent with the greater musculomucosal and adipose mass of the lower lip. These values serve as an objective baseline reference to evaluate subsequent changes after volume or contour procedures (adipostructuring, biostimulators, hyaluronic acid) and to document stability or variation over time.

Labiomental fold. Symmetric and very thin epidermis (0.2 vs 0.1 mm). SLEB and dermis were uniform (0.6/0.9 mm on the right vs 0.5/0.9 mm on the left), with no striking changes in dermal quality. The hypodermis was slightly thicker on the left (2.3 vs 1.6 mm), increasing total thickness on that side (3.8 vs 3.3 mm). This is a mild asymmetry, but relevant if the case presents a deviated chin or asymmetry of the labiomental fold. Ultrasound provides an anatomical correlate that can guide the amount of fat graft and the injection plane.

Preauricular region. Symmetric epidermis (0.2 mm). Marked differences in SLEB (0.7 vs 0.2 mm) and dermis (1.1 vs 0.6 mm), with a more "dense" dermal pattern on the right side. The right preauricular hypodermis was more than twice as thick as the left (7.5 vs 3.1 mm), and total thickness reflected this as well (9.5 vs 4.1 mm). The pronounced asymmetry in the preauricular compartment likely influences the lateral facial contour and mandibular line. This is particularly relevant for adipostructuring and vector lifting designs, where volume and vector direction should be adapted to these objective differences.

Nasal tip. Total thickness of 3.1 mm, with an epidermis of 0.3 mm, dermis of 0.5 mm and hypodermis of 2.3 mm; SLEB was not visible, a frequent finding in areas with relatively thin dermis. These values provide a baseline reference for any nasal refinement manoeuvre (adipostructuring, biostimulators, micrografts) and help control the risk of over-correction in a vascularly sensitive area.

Overall, clear lateral asymmetries were observed in the infraorbital, malar, nasolabial, labiomental and preauricular regions, mainly due to variations in hypodermal thickness and, to a lesser extent, dermal thickness. There was a pattern of greater right-sided volume in the infraorbital and preauricular areas and greater left-sided volume in the malar region and nasolabial fold, which clinically explains asymmetries of the mid and lower face. High-resolution ultrasound makes it possible to decompose total thickness into layers (epidermis, SLEB, dermis, hypodermis), distinguishing changes in dermal quality (SLEB/dermis) from purely volumetric changes (hypodermis), which is crucial to decide whether to prioritise biostimulation, adipostructuring or a combination of both in each region.

The patient underwent six sessions of facial adipostructuring. Infiltrative anaesthesia was used (no nerve blocks were performed due to lack of reliable

anatomical landmarks). Cannulas of 18 G, 20 G, 22 G, 23 G and 25 G were used for the adipose panniculi and 27 G cannulas for the interseptal spaces. Initially, given her condition, cannula insertion to perform the technique was very challenging because the cicatricial bands did not allow adequate displacement of the cannula for proper tissue sculpting. However, after the third session the procedure became much easier, and the patient reported increased sensitivity in areas that initially presented with paraesthesia. Clinical follow-up time was 3 months.

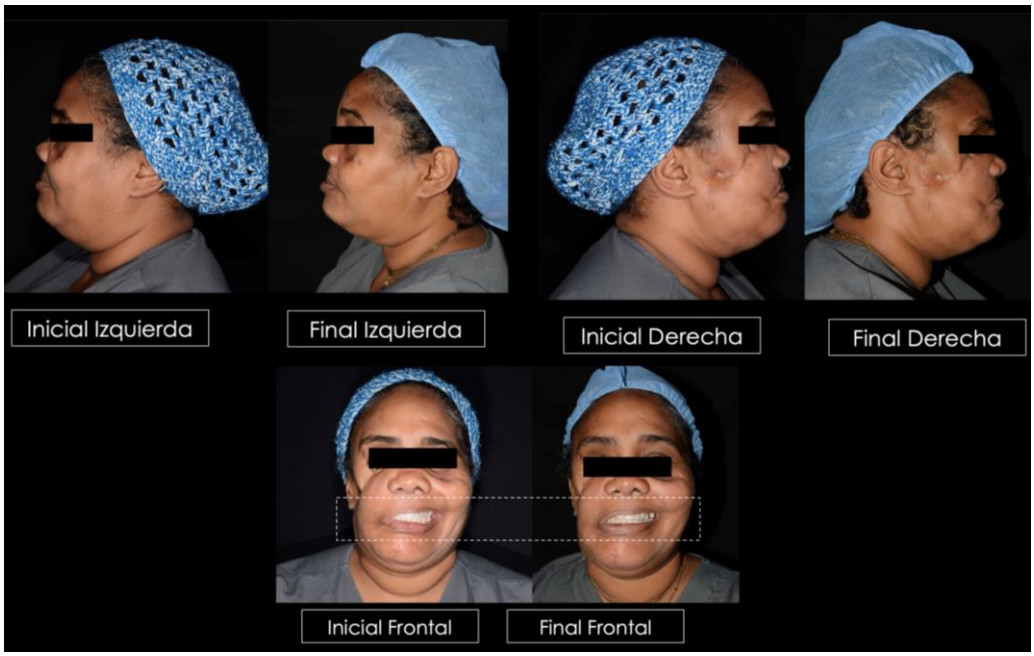

Figure 4. Photographic analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

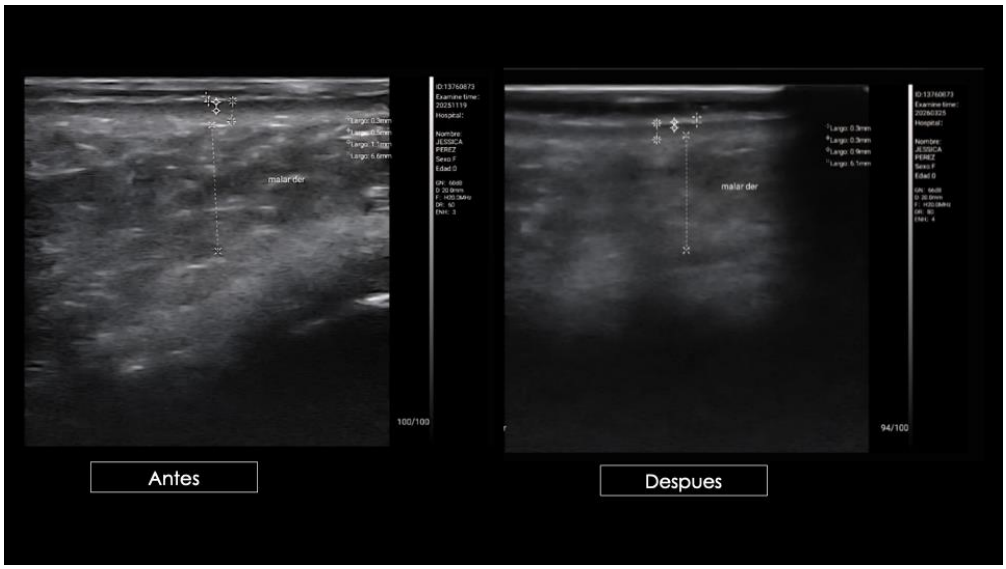

Figure 5. Ultrasound analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

Case 2

A 53-year-old male labourer with no relevant medical comorbidities (ASA I). The chief complaint was scarring sequelae from a transfixing wound that completely crossed from the midface to the upper third, with an entry and exit orifice, involving all soft-tissue planes along its trajectory (skin, subcutaneous tissue, musculature, mucosa and other structures according to the region) caused by a firearm, perforating the face from inferior to superior, with involvement and loss of the eyeball, maxillary damage, tongue loss, tinnitus and mouth breathing. He had undergone two previous surgical interventions without favourable results due to the marked fibrosis and disorganisation of the tissues.

BASELINE ULTRASOUND ANALYSIS

Lower eyelid. Epidermis: 0.2 mm (right) versus 0.4 mm / 0.2 mm (left), initially suggesting epidermal thickening on the left compared with the right. SLEB and dermis: on the right side, SLEB measured 1.4 mm with a thick dermis (2.5 mm); on the left, SLEB was not visible and the dermis was

only 0.6 mm on the second measurement. This indicates a more robust and organised dermal architecture on the right, versus a thinner dermis on the left, probably more photoaged or thinned by trauma. Hypodermis: greater on the right (3.5 mm vs 2.4/2.2 mm on the left), indicating increased infraorbital fat volume on the right. Total thickness: 7.6 mm on the right versus 2.8/3.0 mm on the left, a marked asymmetry largely explained by differences in dermis and hypodermis. There is therefore a significant infraorbital asymmetry, with greater thickness and volume on the right side (heavier eyelid) and complex thinning (dermis + fat) on the left. This supports a differentiated intervention approach (e.g. more volumetric correction on the left and refinement/volume control techniques on the right).

Malar region. Epidermis: very similar values (0.3/0.3 mm right vs 0.2/0.3 mm left), without relevant changes. SLEB: right 0.6/0.4 mm; left 0.9/0.2 mm. The reduction of SLEB, especially on the left, can be interpreted as reorganisation of papillary collagen and reduction of subdermal oedema or blur. Dermis: right 1.1/1.4 mm; left 2.1/1.3 mm. The pattern is interesting: the right dermis thickens slightly, while the left decreases from higher values to an intermediate thickness. Hypodermis: right 6.7/5.1 mm; left 5.8/5.3 mm. There is hypodermal reduction, more evident on the right, consistent with redistribution of fat volume or post-treatment remodelling. Total thickness: right 8.7/7.2 mm; left 9.0/7.1 mm, with both sides converging towards similar values on the second measurement.

Zygomatic region. Epidermis: stable and comparable between sides. SLEB: visible on the right (0.4/0.2 mm) and absent/minimal on the left (not visible / 0.2 mm). There is a trend towards a more symmetric pattern, with a thin SLEB on both sides on the second measurement. Dermis: right 1.0/1.2 mm; left 0.9/0.7 mm, showing a slight gain on the right and a slight reduction on the left, bringing values closer together. Hypodermis: right 2.2/3.4 mm versus left 1.3/3.3 mm; subcutaneous fat volume increased on both sides, with a larger increment on the left, so both sides equalise around 3.3–3.4 mm. Total thickness: right 3.9 → 5.1 mm; left 2.4 → 4.5 mm.

Nasolabial fold. Epidermis and SLEB: small fluctuations that are unlikely to be clinically critical (epidermis 0.1–0.2 mm; SLEB 0.7/0.2 mm on the right and 0.8/0.3 mm on the left). Dermis: slight reduction on both sides (right 1.8/1.1 mm; left 1.7/0.4 mm). Hypodermis: marked increase on both sides (right 1.7/7.2 mm; left 2.2/7.7 mm). Total thickness: right 4.3/8.8 mm; left 4.9/8.5 mm.

Lips. Upper lip: 9.8/10.9 mm. Lower lip: 12.0/12.8 mm.

Philtrum. Total thickness 3.1 mm, with epidermis 0.2 mm, dermis 1.2 mm and hypodermis 1.7 mm. SLEB not visible, which is a common finding in the philtrum.

Nasal tip. Epidermis 0.2/0.3 mm; dermis 0.7/0.5 mm; hypodermis 1.8/2.0 mm; total thickness 2.7/2.8 mm. SLEB not visible on either measurement.

Chin. Epidermis 0.2/0.3 mm, without major clinical relevance. SLEB 0.5/not visible; dermis 1.2/0.3 mm (marked decrease); hypodermis 2.3/4.9 mm; total thickness 4.2/5.5 mm.

Submental region. Epidermis 0.2/0.3 mm. SLEB from not visible to 0.2 mm; dermis from 0.5 → 1.1 mm; hypodermis from 2.6/3.9 mm; total thickness from 3.3/5.5 mm.

SCIENTIFIC INTEGRATION.

A pattern of major baseline asymmetries in the infraorbital, malar, zygomatic, nasolabial, and pre-mental regions, with convergence of thickness between sides after intervention. There were pronounced changes in the hypodermis of the nasolabial fold, zygomatic region, chin, and submental area. Informed consent was obtained from the patient, and the procedure was explained in detail.

APPLIED PROCEDURE

Adipostructuring protocols were initiated with modification of the planning to adapt it to the patient's current physical condition. Infiltrative anaesthesia was used (no nerve blocks were performed due to lack of reliable anatomical landmarks). An 18 G cannula was initially selected for the mid and lower thirds; subsequently, 22 G and 25 G cannulas were used for adipose panniculi and 27 G cannulas for interseptal spaces. Six adipostructuring sessions were performed on the affected hemiface and two sessions on the entire face. During the first sessions the patient reported feeling less pressure in the face, greater fluency when speaking, and a visible improvement in self-esteem, noting that friends perceived his facial appearance as improved. By the fifth session, the patient reported regained sensitivity in areas that previously had neither pain nor sensation

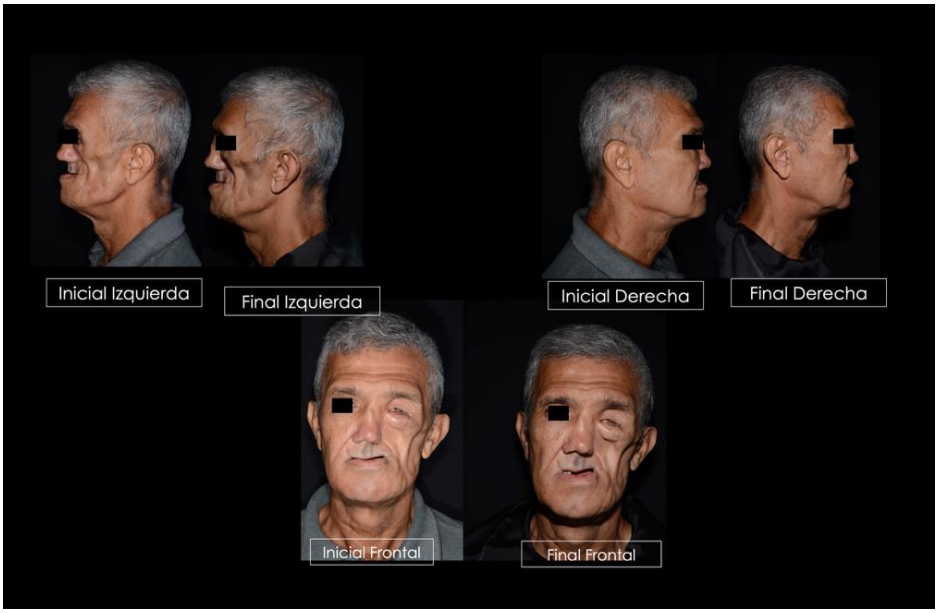

Figure 6. Photographic analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

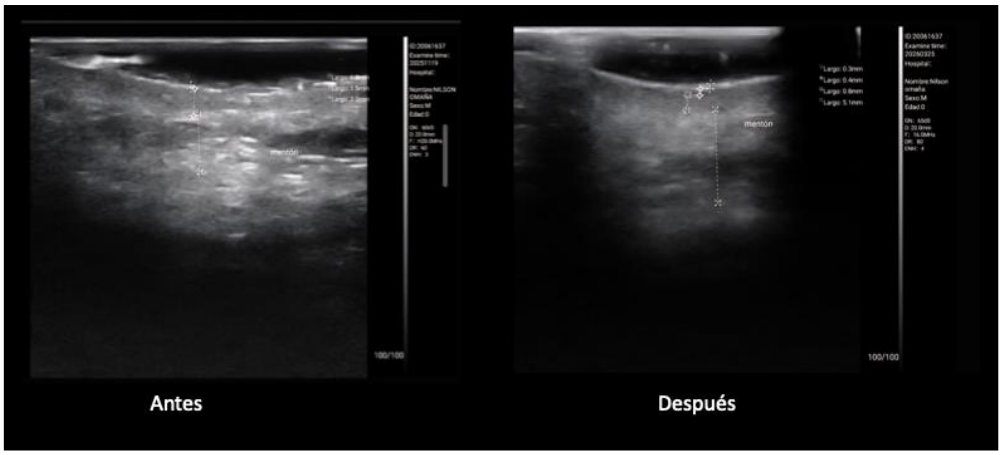

Figure 7. Ultrasound analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

Case 3

A 30-year-old male labourer with no relevant medical comorbidities (ASA I). The chief complaint was scarring sequelae from a transfixing wound that completely crossed the lower third of the face, with an entry and exit orifice, involving all soft-tissue planes along its trajectory (skin, subcutaneous tissue, musculature, mucosa and other structures according to the region) caused by a firearm. He had undergone two previous surgical interventions without favourable results due to marked fibrosis and disorganisation of the tissues. In addition, he presented with severe limitation of mouth opening (functional microstomia), difficulty with phonation and feeding, persistent sensation of tightness due to fibrosis, significant aesthetic alteration with psychosocial impact, and marked hyperaesthesia in the reconstructed area.

An additional relevant finding was the presence of tongue adherence to the fibular bone graft, which significantly contributed to functional restriction of mouth opening, limited tongue mobility, and worsened difficulties in speech articulation and swallowing. These measurements accurately describe the baseline status of the tissues before adipostructuring and allow identification of zones dominated by excess fat, dermal thinning, and clinically relevant asymmetries.

Ultrasound analysis

Malar region. Symmetric, thin epidermis (0.2 mm on both sides), with no pathological findings. SLEB and dermis showed high and very similar values (SLEB 0.9 vs 0.8 mm; dermis 1.8 vs 1.9 mm), suggesting a relatively thick and homogeneous dermis, compatible with a certain degree of photoaging but without marked thinning. Hypodermis measured 4.8 mm on the right vs 5.1–5.5 mm on the left, indicating slightly greater malar fat volume on the left. Total thickness was 7.7 mm on the right and 8.0/7.1 mm on the left, with a mild predominance of thickness on the left side. Overall, the cheeks displayed good dermal support and a slight left malar volumetric predominance, which may explain mid- and lower-third asymmetries that could affect the facial fascia.

Nasolabial fold. Uniform epidermis (0.2 mm in all scans). SLEB was relatively thick at baseline (1 mm right, 0.7 mm

left) and appeared thinner on the second pre-treatment measurement (0.3 and 0.2 mm), which may reflect section-plane variability or a reduction of pre-existing oedema. The dermis was thick and slightly greater on the left (2.3 vs 1.9 mm; later 1.5 vs 1.4 mm), consistent with a fold region subjected to chronic mechanical tension. Hypodermis was around 4–4.9 mm bilaterally, tending to be slightly greater on the second measurement, particularly on the left (5.9 mm). Total thickness showed very similar ranges between sides (7.2–7.8 mm), without major baseline asymmetry. The nasolabial folds were therefore accentuated by the combination of a thick dermis and moderate subcutaneous fat, with a slight left predominance. Adipose tissue is present but can be redistributed and reinforced in deeper planes to soften the cheek–lip transition and improve the patient's appearance.

Philtrum. Initial total thickness was 4.9 mm, with an epidermis of 0.3 mm, dermis 1.2 mm and hypodermis 3.4 mm; in the second pre-treatment measurement it increased to 6.9 mm, mainly at the expense of the hypodermis (5.3 mm), with the appearance of a small SLEB (0.2 mm). This indicates that the philtrum has a significant adipose component and is sensitive to volume variations, directly influencing upper-lip projection and the subnasal profile. The increase in thickness already observed on the second measurement suggests that any additional volume augmentation in this area must be carefully controlled to avoid an over-projected appearance.

Lips. Upper lip thickness increased from 5.6 to 8.9 mm; lower lip from 5.8 to 7.2 mm. Although both values correspond to the "pre-treatment" assessments of interest, they already show that the upper lip was initially thinner and later approached or exceeded the lower lip, which aligns with the classic indication of preferentially augmenting the upper lip.

Chin. Stable epidermis (0.2/0.1 mm). SLEB was visible (0.5/0.3 mm), indicating an active dermis with extracellular matrix component. The dermis was relatively thick initially (1.6 mm), then recorded as 0.7 mm, likely due to differences in the section plane. The hypodermis was very voluminous at first (12.9 mm), decreasing to 7.5 mm on the second measurement; total thickness dropped from 15.2 to 8.6 mm. This profile corresponds to a chin with substantial subcutaneous fat accumulation (anterior double chin and/or blunt chin). It supports the need for a combined approach: reduction or redistribution of fat in some planes and, possibly, structural augmentation in others (e.g. over the periosteum).

Submental region. Thin epidermis (0.1/0.4 mm). SLEB and dermis were relatively preserved (SLEB 0.4/0.3 mm; dermis 1.3/1.2 mm). The hypodermis was markedly thick (12.9/10.1 mm), with total thickness of 14.7/12 mm. This confirms a significant submental fat deposit, typical of a full double chin, over a well-preserved dermal framework.

Nasal tip. Stable epidermis of 0.2 mm; thin dermis (0.3/0.4 mm); hypodermis 1.3/1.7 mm; total thickness 1.8/3.0 mm. SLEB was not visible on either measurement, which is usual in this region. The nasal tip was therefore fine, without excessive thickness.

The midface (malar region and nasolabial fold) showed good dermal quality and a moderate fat cushion, with slight left-sided malar asymmetry and a somewhat more pronounced left nasolabial fold. The lower third (chin and submental region) presented markedly increased hypodermal thickness, compatible with excess fat volume and isolated structural bone deficit. Philtrum and lips had relatively low thickness at baseline, explaining the desire for greater lip projection and subnasal support. From a scientific standpoint, these baseline measurements are essential because they quantify the initial status of each compartment (epidermis, SLEB, dermis, hypodermis), distinguish areas where the main issue is dermal quality (thickened or thinned SLEB/dermis) from those dominated by fat excess or deficit, and guide the design of adipostructuring. They also enable objective assessment of treatment impact by subsequently comparing changes in absolute millimetres and percentages for each region.

Informed consent was obtained from the patient, and the procedure was explained in detail. An 18 G cannula was selected for the midface; in the lower third, 25 G cannulas were initially used, later switching to 22 G cannulas for adipose panniculi and 27 G cannulas for interseptal spaces. A total of six adipostructuring sessions were performe

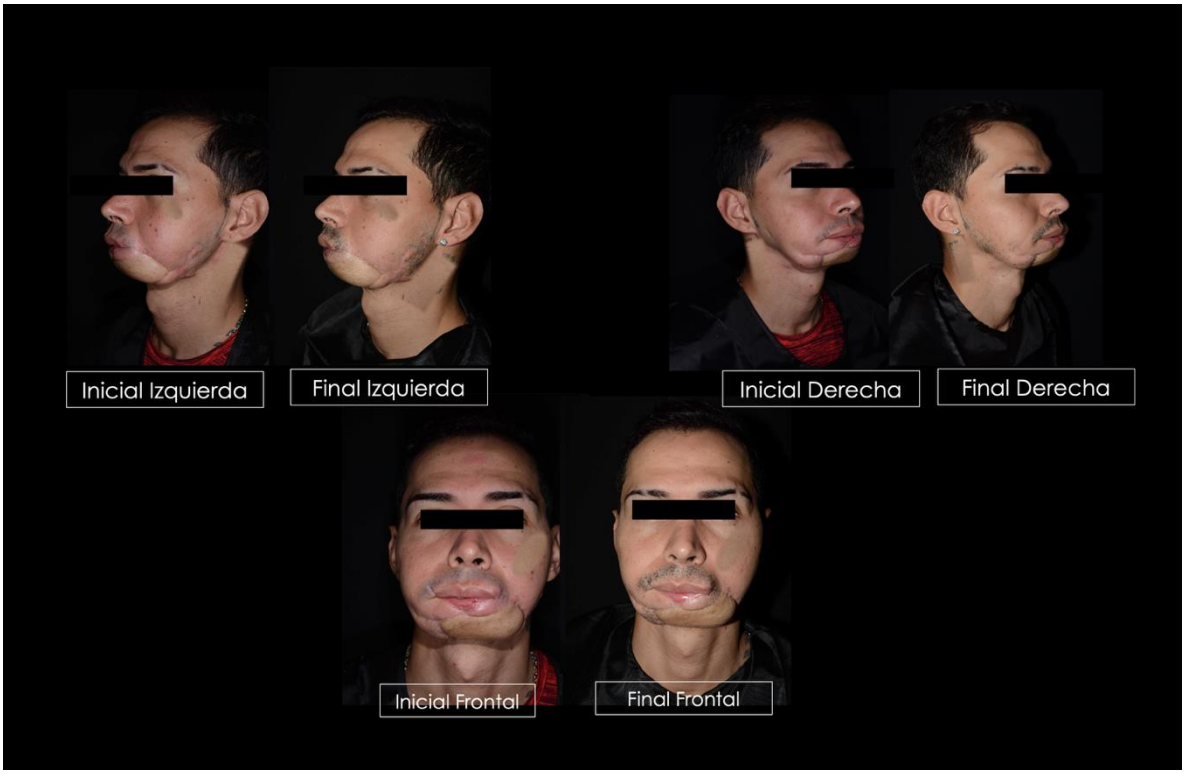

Figure 8. Photographic analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

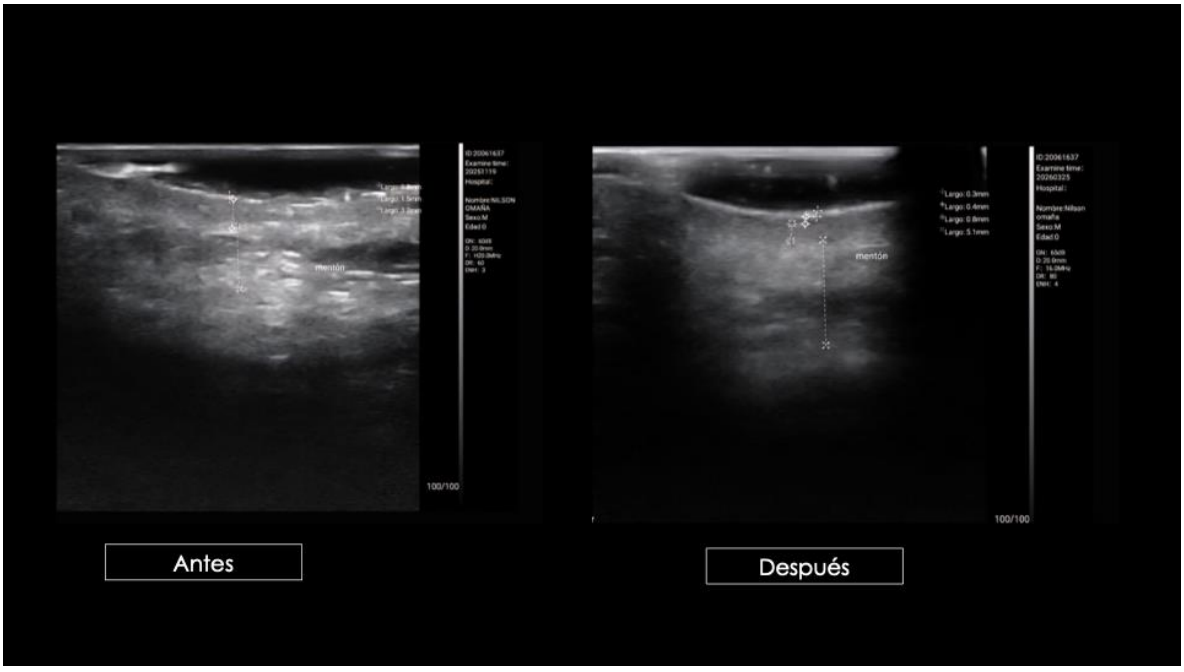

Figure 9. Ultrasound analysis before and after six sessions of adipostructuring at three months of follow-up. Oral and Maxillofacial Surgery Service, Pérez de León II Hospital, Caracas, Venezuela.

Results

In the three Powell-angle graphs, we show that adipostructuring produced subtle yet consistent adjustments in the relationship between bony structures and soft tissues, bringing several parameters closer to favourable aesthetic ranges without generating decompensations. Angles that remain stable—nasion–frontal and gonial—practically do not change between the initial and final measurements, indicating that the intervention respects the global craniofacial axis and the mandibular base. This is important because it confirms that the technique does not introduce hyper- or hypoorrections that alter the bony framework of the face, but instead acts primarily on the positioning and support of the soft tissues figure 10.

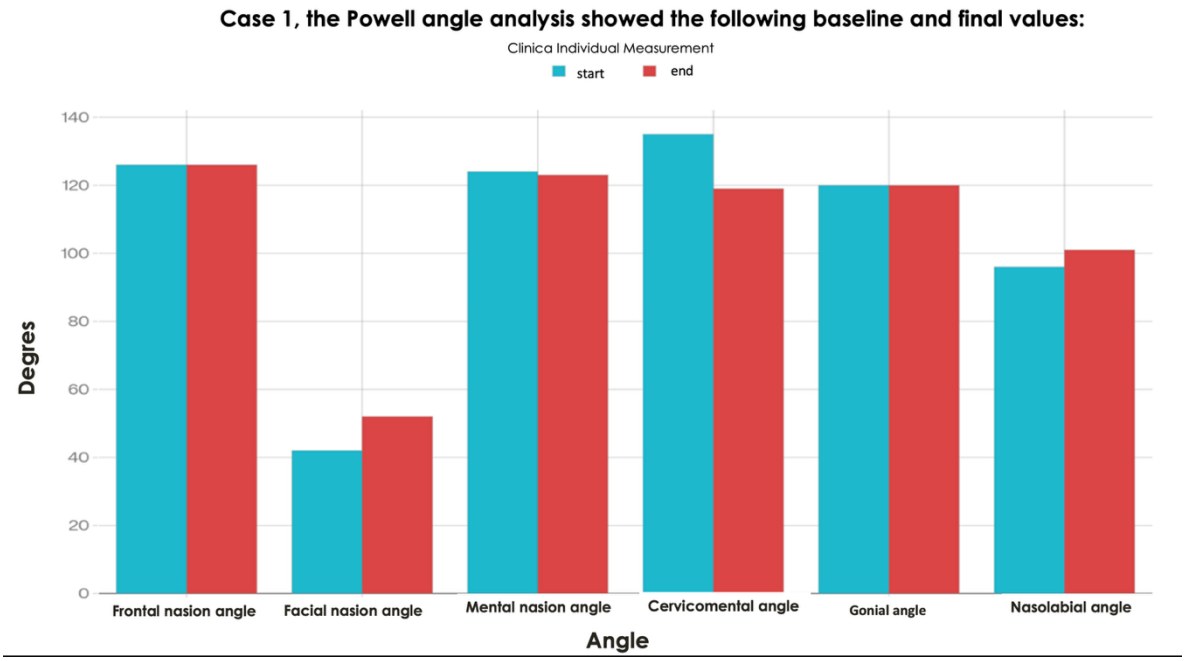

Figure 10. Case 1: Comparative analysis of measurements taken before and after facial fat restructuring treatment using Powell's angulation scheme.

Changes in the midface: the nasofacial angle increases in two of the three cases compared with baseline, suggesting better relative projection of the dorsum and midface in relation to the forehead; in the second case it decreases due to the existing bone loss in the maxilla. The nasomental angle changes minimally, remaining within a harmonious range, which implies that the harmonisation has been achieved more through volume redistribution than through drastic changes in the overall profile, with the exception of the second case precisely because of the maxillary defect. Figure 11.

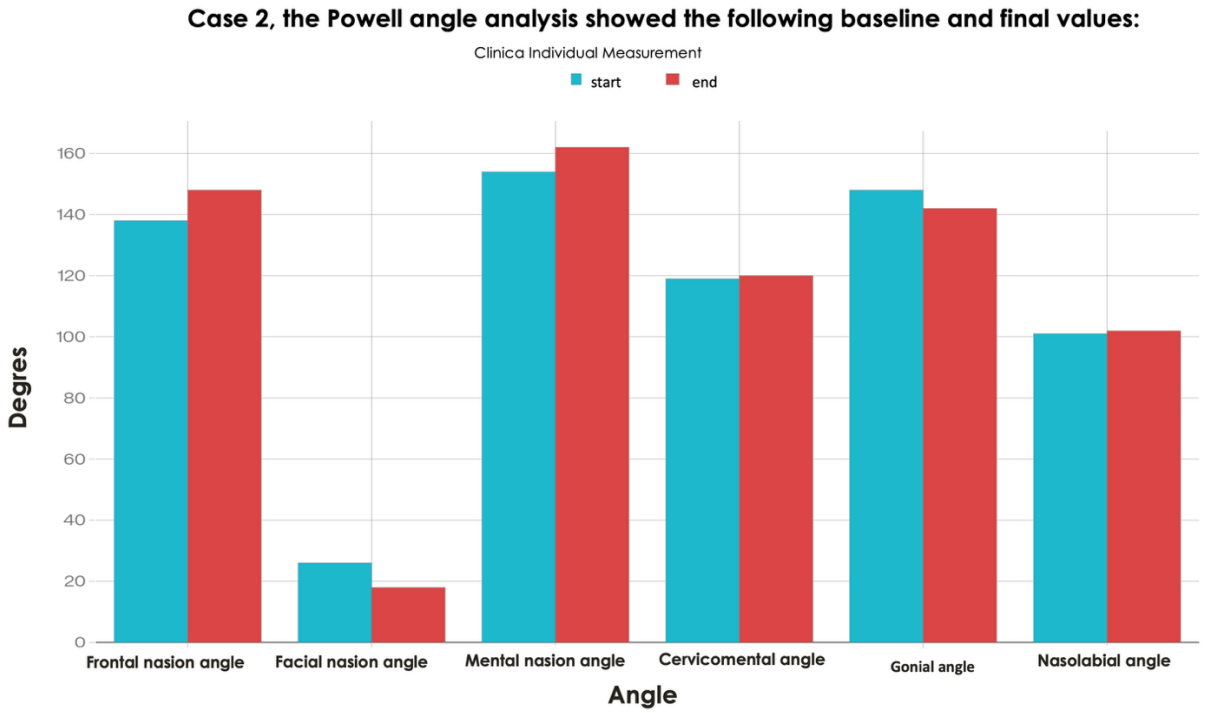

Figure 11. Case 2. Comparative analysis of measurements taken before and after facial fat restructuring treatment using Powell's angulation scheme

Lower third and cervicomental transition: the mentocervical angle decreases appreciably from a very open value to a more acute one, approaching the normal window described by Powell (80–95°). This change is consistent with the reduction/control of submental volume and the reinforcement of chin support described in your ultrasound measurements, and translates clinically into a more favourable cervicomental angle with a perception of a more defined neck.

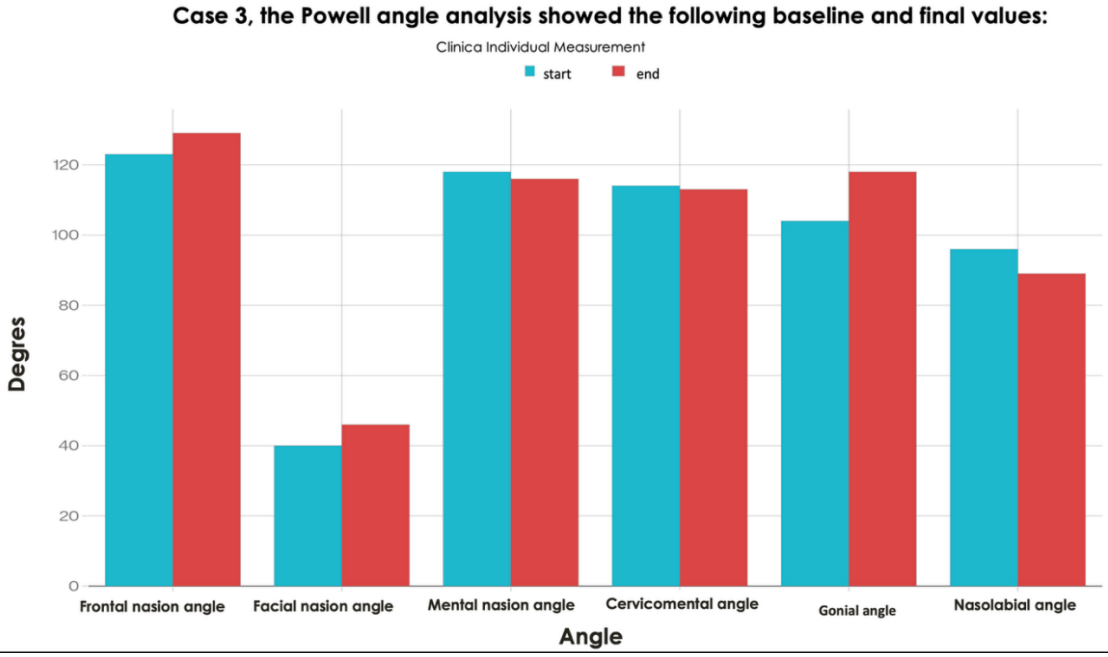

Figure 13 Case 3: Comparative analysis of measurements taken before and after facial fat restructuring treatment using Powell's angulation scheme.

In the three graphs, a comparative analysis of the different measurements obtained from the patients is performed, with the aim of statistically evaluating the changes achieved.Nasolabial complex: the nasolabial angle increases slightly, moving within the expected aesthetic range, indicating a more favourable rotation and support of the upper lip and columella. This is consistent with the ultrasound and volume findings: there is no overprojection of the lip, but rather a fine adjustment that improves the nose–lip relationship without compromising natural appearance.

Taken together, the measurement graphs support that adipostructuring has achieved facial profile harmonisation while keeping Powell's angular skeletal framework within the margins considered ideal. The changes are concentrated in the angles most sensitive to soft-tissue management (nasofacial, mentocervical, nasolabial), whereas the angles that depend mainly on the bony skeleton (nasion–frontal, gonial) remain stable. This reinforces the concept that the technique works by reorganising volumes and support vectors rather than altering the basic craniofacial architecture, in line with reported studies in which similar measurements were evaluated.

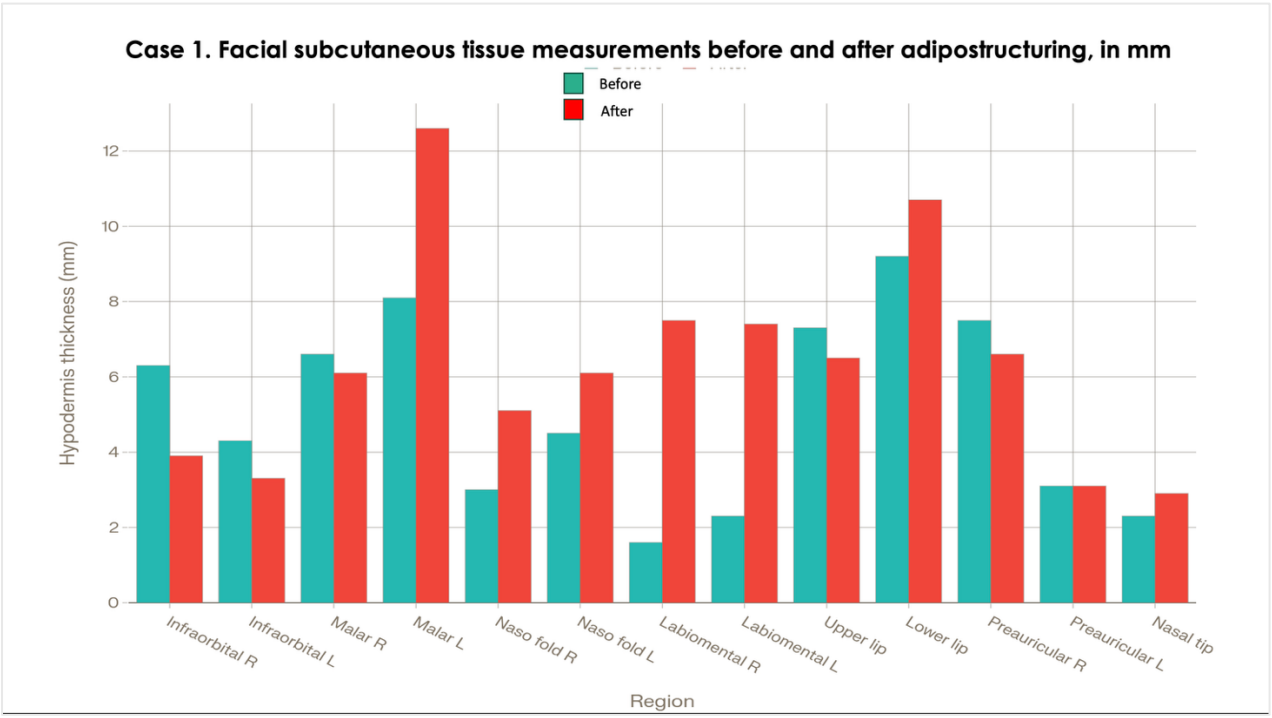

Figure 14. Facial hypodermis thickness (mm): before vs after adipostructuring". Before y After regiones como Infraorbital R/L, Malar R/L, Naso fold R/L, Labiomental R/L, Upper lip, Lower lip, Preauricular R/L, Nasal tip. "Hypodermis thickness (mm)".

Decompression of overloaded areas is clearly demonstrated in the analysis.

Infraorbital region (right/left): On both sides there is a clear reduction in hypodermal thickness, especially on the right, consistent with controlled deflation of the infraorbital fat pads rather than pathological lipoatrophy. This supports clinical improvement of the "eyelid bags" and a smoother lid–cheek transition. Preauricular region (right, and left low but stable): The slight reduction on the right suggests that the lateral fat compartments acted partially as "donor" zones, with volume mobilised towards more structurally relevant anterior areas. The upper lip shows a slight decrease in thickness, indicating that the technique avoided overcorrection of the upper lip, helping to preserve natural proportions.

Reinforcement of structural pillars. Left malar region: This is the most prominent unilateral increase, indicating targeted volumisation of the left malar pillar. This suggests that adipostructuring was used to correct a pre-existing asymmetry and restore superolateral support of the midface. Nasolabial folds (right/left): Hypodermal thickness increases bilaterally, showing that fat was directed to the nasolabial compartment. This pattern is typical of structural fat grafting, providing soft but stable support without synthetic fillers. Labiomental region (right/left): The marked increases transform a previously thin, collapsed fold into a compartment capable of bearing load. This likely improves lower-third support and, indirectly, chin projection and the labiomental angle. The lower lip and nasal tip: The lower lip gains volume, enhancing dynamic support for perioral function and aesthetics, while the nasal tip shows a subtle increase, consistent with a very conservative reinforcement of tip support.

Taken together, the graph supports the concept that facial adipostructuring functions as a three-dimensional volume-redistribution procedure rather than a simple massive augmentation. Overloaded compartments (infraorbital, preauricular) are decompressed, while key structural areas (malar region, nasolabial folds, labiomental region, lower lip, nasal tip) are selectively reinforced. This redistribution pattern aligns with a more youthful superolateral facial vector in the midface and better support in the lower third, while maintaining or even enhancing natural proportions.

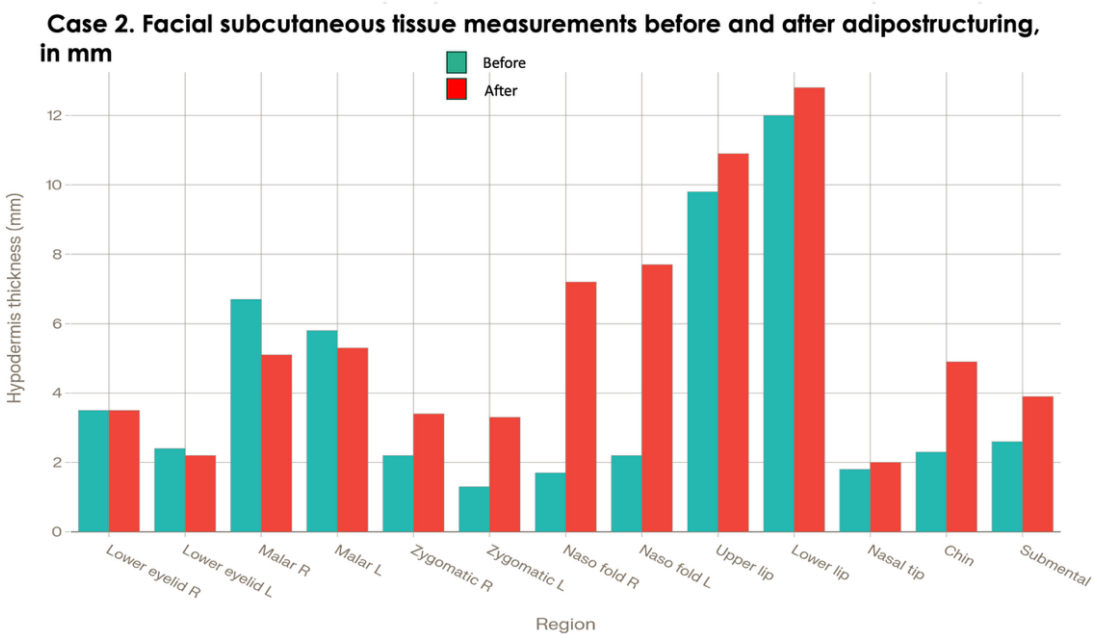

Figure: 15. Hypodermis thickness (mm): before vs after adipostructuring" Lower eyelid R/L, Malar R/L, Zygomatic R/L, Naso fold R/L, Upper lip, Lower lip, Nasal tip, Chin, Submental), y el eje Y "Hypodermis thickness (mm)".

The lower eyelids (right/left) show a stable or slightly reduced hypodermis, indicating controlled decompression of the infraorbital fat pads rather than aggressive resection. This results in a smoother lid–cheek transition without hollowing. The malar compartments exhibit mild bilateral reduction, consistent with a shift from an "expanded" volume to a more compact and functional one, rather than a true loss of volume.

Creation of new structural support: the zygomatic regions (right/left) show clear increases in hypodermal thickness, reflecting laterosuperior projection of volume along the zygomatic arch. This behaves like simulated bony support, reinforcing the lifting vector of the midface. The nasolabial folds (right/left) display the most striking increases, transforming thin, collapsed creases into robust adipose compartments. This pattern is typical of vectorial redistribution of the panniculus, which effectively fills the fold without the need for synthetic fillers.

Lower third and cervical contour: the upper and lower lips show moderate thickening, increasing perioral volume and dynamic support while remaining within physiological ranges. The chin and submental region both increase their hypodermal thickness, suggesting reinforcement of the central lower third and submental area rather than

lipolysis. This favours better chin projection and a more coherent cervicomental contour.

Tissue quality: inflammation versus organisation. Although the graph focuses on hypodermal thickness, it must be interpreted together with the overall documented decrease in SLEB and dermal thickness. This pattern indicates a reduction in inflammatory/oedematous components and dermal distension, with consequent compaction and reorganisation of the soft tissues rather than atrophy.

Taken together, these results support a model in which adipostructuring produces decompression of chaotic, inflamed compartments and expansion of structurally relevant compartments (zygomatic, nasolabial, chin, submental). The face is neither "defatted" nor simply filled; it is three-dimensionally re-architected, redirecting hypodermal volume towards functional support points that restore youthful vectors and harmony.

Case 3. Facial subcutaneous tissue measurements before and after adipostructuring, in mm

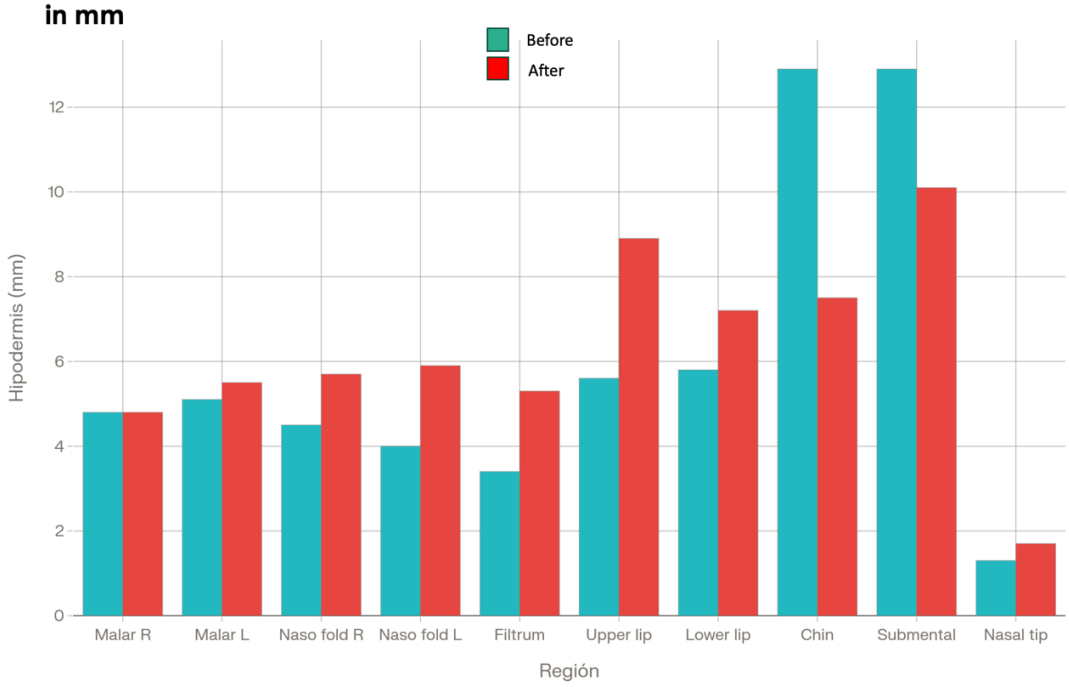

Figure 16. The figure shows that adipostructuring does not act as simple lipolysis or nonspecific filling, but rather as a targeted redistribution of subcutaneous volume between support regions and overload regions

The graph shows that adipostructuring does not act as a simple lipolytic procedure or a nonspecific filler, but rather as a targeted redistribution of hypodermal volume between support regions and overloaded regions

Reinforcement of mid-third support: in the malar region, the right side remains stable and the left shows a slight increase, indicating preservation and optimisation of volume rather than fat loss. In the nasolabial folds, the clear bilateral increase in hypodermal thickness converts an initially poorly supported fold into a more robust adipose compartment, typical of vectorial redistribution of fat towards fold zones instead of artificial filling.

Central axis and perioral region: the philtrum and upper/lower lips show significant thickness increases within a physiological range, suggesting deep structural gain and improved anchorage of the labial complex. This hypodermal expansion is interpreted as reinforcement of the central axis and enhancement of dynamic perioral support, consistent with the clinical changes in lip projection without signs of oedema or superficial overcorrection.

Lower third and cervicomental contour: the chin shows a marked reduction in hypodermal thickness, while the submental region decreases more moderately, reflecting deflation and compaction of a previously expanded panniculus rather than true adipocyte loss. This pattern supports better definition of the cervicomental contour, with less sagging volume in the lower third and greater coherence between chin and neck, without collapse or a skeletal appearance.

Fine-tuning zones: the nasal tip undergoes a discreet increase in hypodermal thickness, consistent with a very conservative reinforcement of nasal support without risk of deformity.

Taken together, the results are consistent with a model of deflammation and compaction of disorganised lower compartments (chin/submental) and structural augmentation in key support areas (nasolabial fold, philtrum, lips, left malar region, nasal tip). The face is neither "emptied" nor indiscriminately filled; it is three-dimensionally re-architected, with hypodermal volume redirected towards strategic points that restore youthful facial vectors and a more stable global harmony.

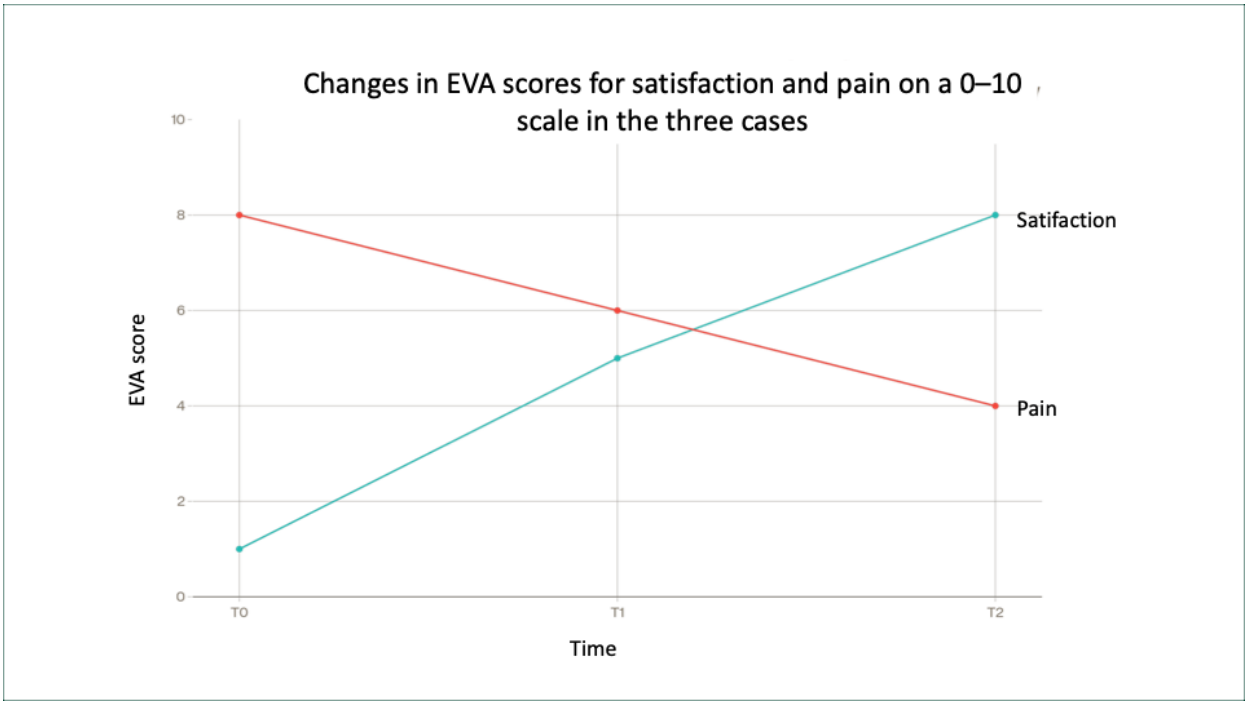

Figure 17. The figure shows the inversely proportional relationship between perceived pain and patient satisfaction following adipo-sculpting, measured using a VAS (0–10) at three time points (T0, T1, T2).

Pain behaviour: the red curve for VAS-pain starts at a high value at T0 (≈8), decreases to a moderate level at T1 (≈6), and reaches a low value at T2 (≈4).

This progressive decline suggests that the initial phase of the procedure is associated with relevant but transient discomfort, followed by sustained symptom resolution without rebounds that might suggest late complications (painful fibrosis, nodules, neuropathy, etc.). Satisfaction behaviour: the blue curve for VAS-satisfaction shows the opposite pattern, starting very low at T0 (≈1), rising to an intermediate level at T1 (≈5), and reaching a high value at T2 (≈8).

The crossing of both curves around T1 marks the point at which the benefit perceived by the patient exceeds the discomfort, defining the temporal threshold from which the technique is experienced as clearly satisfactory.

Pain–satisfaction relationship: the progressive divergence between the lines (decreasing pain, increasing satisfaction) is consistent with a procedure that produces growing clinical results over time while undesirable effects (acute pain, inflammation) subside. From a methodological standpoint, this behaviour supports the hypothesis that correctly performed adipostructuring has a favourable risk–benefit profile, in which the initial peak of discomfort is offset by an aesthetic and functional gain perceived as high during follow-up.

Taken together, the graph suggests that the technique produces an adaptation curve typical of regenerative procedures: a brief phase of greater pain with low initial satisfaction, followed by a recovery phase in which pain decreases almost linearly while satisfaction increases steadily. This is consistent with the progressive tissue remodelling documented ultrasonographically and reinforces the clinical validity of adipostructuring as a well-tolerated intervention that is highly rewarding for patients in the medium term .

Discussion

Facial adipostructuring, according to the present results, behaves as a three-dimensional re-architecturing technique of the adipose panniculus that is capable of harmonizing the profile without altering the craniofacial bony base.[6] The combined analysis of Powell's angles, ultrasonographic measurements of the hypodermis, and the pain–satisfaction relationship supports a model in which the procedure primarily acts on support vectors and volumetric redistribution rather than on structural skeletal changes or indiscriminate lipolysis.[14]

In the relationship between the skeletal framework and soft tissues, and in terms of coherence with Powell's model, the analysis of Powell's angles shows that adipostructuring produces discrete but consistent adjustments in those parameters most sensitive to soft-tissue modulation (nasofacial, mentocervical, nasolabial), without significantly modifying the angles linked to the bony framework (nasion–frontal, gonial)[15]. This behaviour suggests that the technique respects the craniofacial axis and the mandibular base, acting mainly on the soft-tissue envelope rather than on perceived bony projection. Clinically, this is relevant because it supports the premise that adipostructuring does not induce hyper- or hypocorrections of the skeletal framework, but instead optimizes the relationship between bone and subcutaneous volume, in line with Powell's ideal for facial profile harmonization[15,16].
Within this framework, the discrete increase in the nasofacial angle in two of the three cases indicates an improvement in the relative projection of the dorsum and midface with respect to the forehead, whereas the minimal variation in the nasomental angle, which remains within ranges considered aesthetic, suggests that

harmonization is achieved through volumetric redistribution rather than through drastic changes in the overall profile.[17] The exception observed in the case with maxillary bone loss reinforces the notion that, when a significant structural defect is present, the ability of the technique to fully normalize the angles may be limited, which is consistent with the literature indicating the need to combine strategies when relevant skeletal deficits coexist.[18]

In the midface, lower third, and cervicomental transition, the reduction of the mentocervical angle from very wide values toward figures approaching Powell's "normal window" (80–95°) indicates an objective improvement in the definition of the cervicomental contour. This finding is consistent with the decrease in submental volume and the reinforcement of chin support described in the ultrasonographic measurements and translates clinically into a more defined neck without a skeletal appearance. The combination of a sharper mentocervical angle and a better-supported labiomental region suggests that the procedure is capable of compacting and redirecting the inferior panniculus to re-establish a more youthful cervicofacial vector[19].

The slight increase in the nasolabial angle, which remains within the expected aesthetic range, indicates a fine-tuning of the rotation and support of the upper lip and columella. The fact that this change is not accompanied by upper-lip overprojection supports the hypothesis that the treatment improves the nose–lip relationship through deep support and volumetric reorganization, rather than by superficial filling that could compromise the natural appearance of perioral expression[20].

With regard to volumetric redistribution—decompression and reinforcement of pillars—ultrasonographic measurements of hypodermal thickness complement the angular findings and provide a three-dimensional understanding of the technique. First, the decompression of overloaded areas is clearly observed in the infraorbital region, where the decrease in hypodermal thickness, particularly on one side, is consistent with controlled "decompression" of the malar bags and a smoother lid–cheek transition, without progressing to lipoatrophy or hollowing. Similarly, the slight reduction in the preauricular region suggests that these lateral compartments act as functional "donor" zones, with volume mobilized toward more anterior areas that are critical for support, an interpretation that is consistent with previous ultrasound-based studies.[11,20].

In contrast, there is clear reinforcement of key structural pillars: a unilateral increase in thickness in the left malar pillar to correct asymmetries, a bilateral increase in the nasolabial folds, and marked thickening in the labiomental region. This pattern is typical of a procedure that directs fat toward strategic compartments, transforming thin, collapsed grooves into structures capable of bearing load.[11] The thickening of the lower lip and nasal tip reinforces the notion of improved dynamic support of the perioral complex and a very conservative enhancement of nasal support, consistent with clinical changes in projection without signs of overcorrection or edema.[11,20]

The three-dimensional re-architecturing and support vectors illustrated by the second series of graphs further develop the concept of tridimensional re-design. The stability or slight reduction of hypodermal thickness in the lower eyelids, together with a moderate decrease in the malar compartments and a clear increase in the zygomatic regions, points to a shift from an "expanded and chaotic" volume toward a more compact and functional one, with displacement of support toward the zygomatic arch. This redistribution reproduces the effect of a "pseudo-prosthetic" bony support, reinforcing the superolateral vector of the midface without resorting to implants or synthetic fillers.[6,7,8,9].

The improvement due to increased thickness of the nasolabial folds on both sides is one of the most consistent findings and fits with the concept of vectorial redistribution of the panniculus toward fold zones, providing a soft yet stable filling characteristic of structured fat.[6,14]

In the lower third and cervical region, the moderate thickening of the lips, chin, and submental area—or the combination of compaction and slight increase, depending on the graph considered—suggests that the technique does not aim for aggressive lipolysis but rather for deflammation and reorganization of disordered compartments, accompanied by reinforcement of key support areas. The result is a more defined cervicomental contour, with less redundant volume and greater coherence between chin and neck, but without collapse or an aged appearance.[21]

Regarding tissue quality—deflammation and reorganization—an important aspect of the ultrasonographic findings is the combination of changes in hypodermal thickness with a documented decrease in the SLEB and dermal thickness, consistent with reduced chronic edema and less inflammatory distension.[22,23,24] This pattern suggests that adipostructuring not only redistributes volume but also promotes decompression and reorganization of the soft tissues.[11,20] The overall interpretation is that of a less inflamed, more compact, and better organized tissue environment, closer to the pattern of youthful tissue than to that of an overloaded or fibrotic one.

This observation is particularly important to distinguish the technique from purely volumizing or lipolytic maneuvers: the face is neither "emptied" nor "filled" in a nonspecific manner; rather, the existing volume is reorganized toward functional support points while the inflammatory component is reduced and tissue texture is optimized.

The tolerability profile and patient experience were key elements in the overall assessment. As a variable, the analysis of the pain–satisfaction relationship using the VAS at three time points provides valuable information about the patient's experience. The progressive decrease in pain from high values at T0 to low values at T2, without

late rebounds, indicates that the phase of greatest discomfort is early and transient, followed by sustained symptom resolution that does not suggest complications such as painful fibrosis or neuropathy. In parallel, the marked increase in satisfaction from minimal values at T0 to high levels at T2 reveals an adaptation curve typical of regenerative procedures, in which the perceived benefit grows as the tissues remodel and consolidate.[7,9,21,25].

The crossing of the curves around T1, from which point satisfaction exceeds pain, practically defines the temporal threshold at which the technique becomes clearly rewarding for the patient. From a methodological standpoint, this dynamic supports a favorable benefit–risk profile: the initial peak of discomfort is offset by an aesthetic and functional gain that the patient perceives as high in the medium term.

Conclusion

Taken together, the results support the concept of adipostructuring as a procedure that respects the skeletal architecture, decompresses overloaded compartments, and selectively expands key support compartments (malar, zygomatic, nasolabial, labiomental, lips, nasal tip). This strategy generates superolateral vectors in the midface and improved definition of the lower third and the cervicomental contour, without resorting to massive volumetric augmentation or external implants. The observed pattern is consistent with the theoretical model underlying the technique: deflammation and decompaction of chaotic regions, reinforcement of structural pillars, and restoration of natural proportions.

Although the sample size is limited and the data derive from clinical cases rather than controlled trials, the convergence of angular measurements, ultrasonographic findings, and patient-reported outcomes provides an objective basis for considering adipostructuring a viable alternative to approaches focused on indiscriminate filling or isolated liposuction in patients with this type of post-traumatic deformity. Future studies with larger cohorts, active comparators, and long-term follow-up will be required to confirm the reproducibility of these findings and to better define selection criteria, vector algorithms, and the long-term impact on facial biomechanics and tissue quality.

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