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Temporal Filling and Facial Lifting: Rethinking Expectations

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ABSTRACT

Temporal lifting using injectable fillers has gained considerable attention in facial esthetics, based on the anatomical principle that strategic volumization can produce lifting effects through mechanical transmission of forces. However, there is a significant gap between anatomical plausibility and clinical evidence. To conduct a scoping review of the literature examining the evidence supporting temporal lifting and to explore the discrepancy between anatomical theory and measurable clinical results. A search of the PubMed and MEDLINE databases was conducted using terms such as "temporal lifting," "temporal filler," and "fascial lifting." Clinical studies and case series that evaluated the mechanical or clinical effects of injections in the temporal region were included. Although cadaveric studies provide robust theoretical support for force transmission through fascial continuity, clinical validation reveals substantial limitations. Prospective studies demonstrated minimal tissue displacement (0.13 mm) despite high patient satisfaction, suggesting expectation bias. A recent randomized clinical trial employing automated stereophotogrammetry found insignificant displacement (< 0.7 mm) and null GAIS scores. In contrast, another RCT reported more pronounced lifting effects using extended techniques and combined injections, although methodological and volume differences may justify the divergent results. The primary outcome of temporal injections is local volumetric restoration rather than true lifting. Clinicians should emphasize the predictable benefits of volumization, presenting any lifting effect as a possible secondary benefit of variable magnitude. Although temporal lifting possesses anatomical plausibility, clinical evidence does not always support lifting effects when standard volumes are used. The persistent gap between subjective clinical impressions and objective measurements underscores the importance of methodological rigor in validating anatomical concepts.

1 | Introduction

Over the past 5 years, the concept of "temporal lifting" has gained remarkable attention in the field of facial esthetics. The premise is simple and anatomically appealing: strategic volumization of the temporal region (anterior and posterior) using injectable fillers may produce lifting effects in facial areas distant from the injection site through mechanical transmission of forces across anatomical structures. This idea has been widely promoted in courses, congresses, and scientific publications, becoming increasingly integrated into clinical practice and shaping patient expectations. However, a critical analysis of the evidence supporting this concept suggests the need for greater investigation to fully validate anatomical plausibility with measurable clinical results.

Currently, the literature describes six main injection techniques in the temporal region, which vary according to the anatomical plane addressed and the main clinical objective (Cotofana et al. 2020). These techniques are divided into two main groups according to their clinical objective. For volumization of the anterior region, four approaches are used: the subdermal technique (Layer 2), ideal for minimal volume; the interfascial technique (Layer 4), for moderate volume; and the low and high supraperiosteal techniques (Layer 9), for moderate to severe volume cases. Each varies its access point to optimize results according

to the depth of the depression to be treated. For lifting effects in the posterior region, two strategies are employed: the supra-auricular lifting technique and the temporal lifting technique, both in the subdermal plane (Layer 2). (Figure 1 and Supporting Information).

Volumetry in the anterior region is widely established in the region; however, the evidence supporting temporal lifting is expanding considerably, encompassing cadaveric investigations, clinical case series, and more recently, randomized controlled trials. However, this body of evidence is marked by substantial methodological heterogeneity, small sample sizes, and reliance on predominantly subjective outcome measures. These limitations raise fundamental questions about the magnitude and clinical relevance of temporal lifting effects and the responsibility we bear in accurately communicating these findings to patients and colleagues.

2 | Methodology

To address this issue, we conducted a scoping review of the literature. A search was conducted in the PubMed and MEDLINE databases, without restriction on initial publication date, using the search terms "temporal lifting," "temporal filler," and "fascial lifting."

Inclusion criteria required clinical studies (randomized or not) and case series that included interventions in the temporal region with fillers (hyaluronic acid, calcium hydroxyapatite, PLLA, or polycaprolactone) and that used objective quantitative measurement tools or instruments of subjective patient satisfaction. Case reports with only one patient, systematic reviews, studies without evaluation tools, and studies without clinical intervention in living patients were excluded. It is important to note that cadaveric studies were excluded from the clinical efficacy table because they do not involve interventions in living patients, serving strictly to support theoretical anatomical plausibility.

The initial search key returned eight articles. Of these, two were included in the review based on established screening criteria, while six were excluded (Table 1). Another six studies were included manually to complement the analysis of this review, resulting in a total of eight articles analyzed for clinical efficacy (Table 2).

3 | Terminology: Projection, Contour Change, Repositioning, and Volumization

Since terminology in facial esthetics is often confusing, it is fundamental to define and differentiate the terms frequently used to describe the effects of injections in the temporal region:

- Volumization: Refers to the direct restoration of volume lost in a depressed area (such as the temporal fossa), filling the empty space created by bone aging and fat pad atrophy.
- Contour Change (Contouring): Is the visual alteration of facial silhouette, smoothing transitions between adjacent esthetic units (e.g., the transition between the forehead and zygomatic arch), creating a more harmonious appearance.
- Projection: Involves increasing the anterior or lateral prominence of a specific structure, pushing the overlying tissues outward.

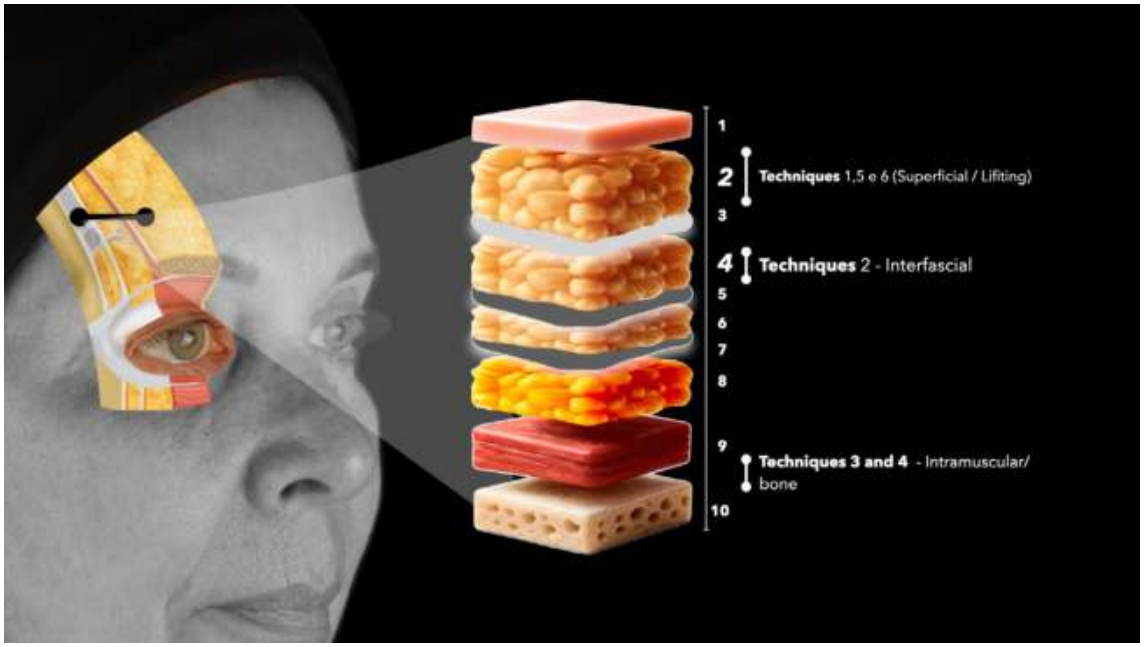

FIGURE 1 | The temporal region is composed of sequential anatomical layers: (1) skin, (2) superficial fat, (3) superficial temporal fascia, (4) deep temporal fat, (5) superficial layer of the deep temporal fascia, (6) superficial temporal fat pad, (7) deep layer of the deep temporal fascia, (8) deep temporal fat pad, (9) temporalis muscle, and (10) periosteum. Based on these planes, six main injection techniques have been described. Anterior approaches are primarily volumizing and include subdermal (Layer 2), interfascial (Layer 4), and supraperiosteal (Layer 9) techniques. Posterior approaches, performed in the subdermal plane (Layer 2), aim to induce indirect lifting through fascial continuity and force transmission.

TABLE 1 | Summary of articles returned in the initial search key.

Study	Study design	Status	Reason for exclusion/Observation
Cotofana et al. (2020)	Review/Anatomy	Not included	No intervention in living patients
Yi et al. (2025)	Case Report	Not included	Case report (only one patient)
Friedmann et al. (2025)	Systematic Review	Not included	Systematic review design
Hernandez et al. (2020)	Prospective Cohort	Included	Meets inclusion criteria
Hong et al. (2024)	Clinical Study	Included	Meets inclusion criteria
Suwanchinda et al. (2018)	Interventional Study	Not included	Lacks adequate quantitative/subjective evaluation tools
Oh et al. (2019)	Clinical Study	Included	Uses facial threads
Bravo et al. (2025)	Clinical Study	Not included	Meets inclusion criteria

TABLE 2 | Articles included in the review (search + manual inclusion).

Study	Study design	Intervention/Region	Main findings/Outcomes
Hernandez et al. (2020)	Prospective Cohort	Fillers in the temporal region	Minimal objective displacement (0.13 mm); high subjective satisfaction.
Hong et al. (2024)	Clinical Study	HA in the interfascial layer	Ultrasound and 3D assessment demonstrating safety and correction of temporal depression.
Bravo et al. (2025)	Clinical Study	Fillers in the temporal region	Demonstrated safe separation of superficial temporal fascia during manipulation.
Germani et al. (2026)	RCT Split-Face	HA vs. PLLA in posterior temporal region	Insignificant displacement (<0.7 mm) automated; GAIS scores = 0.
Nikolis et al. (2025)	RCT	PLLA traditional vs. extended technique	Reported lifting effect with extended technique (larger volumes); manual vector assessment.
Casabona et al. (2020)	Clinical Guide	Filler placement	Established recommendations for application posterior to the ligament line.
Hernandez et al. (2021)	Prospective Study	Extended applications	Suggested synergistic effects of injections at multiple facial sites.
Munia et al. (2022)	Case Series	PLLA vector technique	Report of favorable morphological changes (subjective assessment).

- Repositioning (or Lifting): Implies true mechanical elevation and traction of ptotic tissues against gravity. Although the term "temporal lifting" is widely promoted, the literature suggests that the clinical effect obtained is predominantly a combination of volumization and contour change, with true vertical repositioning of very small magnitude.

4 | Anatomical Plausibility

The anatomical justification for temporal lifting is intellectually attractive. The superficial temporal fascia, the deep temporal fascia, and their connections with the superficial musculoaponeurotic system (SMAS) form a continuous network of fibrous structures capable of transmitting mechanical forces. Cadaveric studies demonstrated this principle using three-dimensional vector analysis (Suwanchinda et al. 2018; Fan et al. 2025). These investigations provided a robust theoretical basis for the concept and sparked considerable clinical interest.

However, there is a critical distinction between demonstrating a mechanism in cadaveric models and proving clinical efficacy in living patients. Cadavers lack the dynamic properties of living tissue, such as active muscle tone, skin elasticity, and viscoelastic properties that change with age. Direct extrapolation of cadaveric findings to clinical practice requires validation through rigorous clinical studies.

5 | The Evolution of Evidence: From Anatomical Principles to Clinical Validation

The progression of research on temporal lifting exemplifies the importance of methodological rigor. Initial clinical guidance was established by Casabona et al. (2020), who demonstrated that

strategic placement of filler posterior to the facial ligament line could optimize tissue displacement. Based on this, Hernandez et al. (2020) conducted a prospective study employing 3D stereophotogrammetry to objectively quantify tissue displacement. Results demonstrated horizontal displacement of approximately 0.13 mm. Notably, this small objective displacement contrasted sharply with high patient satisfaction scores, highlighting the possible influence of expectation bias.

Subsequently, Hernandez et al. (2021) expanded their protocol to include applications in multiple facial regions. This evolution reflected an emerging hypothesis: that the esthetic benefits frequently attributed to temporal lifting could result from the combined action of treatments in different areas, rather than exclusively from the temporal region.

Case series also documented clinical observations of temporal lifting procedures (Munia et al. 2022). Recently, approaches focused on anatomical safety and efficacy have gained prominence. Bravo et al. (2025) described an interfascial technique using hyaluronic acid in a series of 20 patients. The injection, guided by ultrasound, was performed in the loose connective tissue space between the superficial and deep temporal fascia. The study demonstrated favorable results in correcting temporal depression and improving lateral forehead contour, without serious adverse events. This research reinforces that precise volumization in safe anatomical planes can provide an esthetic elevation effect ("apparent lifting") through contour change, minimizing the vascular risks inherent to other techniques. It is important to note that although the study reports favorable clinical results in terms of volumization and lifting perception, the assessment was predominantly qualitative and based on photographic records. The investigation focused primarily on the safety and technical feasibility of the ultrasound-guided interfascial approach, without employing objective quantification tools (such as 3D stereophotogrammetry) to numerically measure the magnitude of tissue displacement established.

6 | The Turning Point: Objective Evidence Challenges the Narrative

Recent evidence has begun to more directly challenge the traditional narrative. A randomized split-face clinical trial conducted by Germani et al. (2026) employed fully automated 3D stereophotogrammetry. Results demonstrated minimal tissue displacement without statistical significance. Furthermore, patient-reported outcomes revealed GAIS scores of zero at 90 and 180 days, suggesting that the minimal displacement identified did not translate into clinically perceptible esthetic improvement.

In contrast, the randomized study by Nikolis et al. (2025) reported more pronounced lifting effects using an extended PLLA technique. An interesting finding between these two publications is that, despite differences in their final conclusions, the absolute numbers of displacement are not so distant. Germani et al. reported maximum mean horizontal displacements of 0.685 mm for PLLA and 0.410 mm for HA, and vertical displacements of up to 0.526 mm. On the other hand, Nikolis et al. observed mean volumetric changes in the range of 0.67–0.85 mm and vector displacements also on a submicrometric to low micrometric scale.

However, the analysis methodologies differed significantly: Germani et al. used fully automated software for displacement tracking, minimizing bias, while Nikolis et al. employed manual vector counting based on colors, which can introduce some subjectivity in visual interpretation. Another crucial point to be observed is that the subjects evaluated by Nikolis et al. showed high satisfaction scored through the GAIS scale (100% improvement reported). This positive perception may have been strongly influenced by direct volumetry of the temple in the anterior region (3 mL of product per side), a visible filling intervention that was not performed by Germani and colleagues, who focused exclusively on injection of the posterior temporal region with smaller volumes (0.5 mL of HA and 4.5 mL of PLLA dilution). This suggests that the apparent "lifting" perceived by patients may be more associated with filling of depressed areas (volumization) than with true mechanical traction at a distance.

7 | What Is the Magnitude of Clinically Perceptible Displacement?

The discrepancy between objective findings and patient satisfaction raises the question: what magnitude of tissue displacement is necessary to be clinically perceptible? Studies with 3D stereophotogrammetry demonstrate that millimetric displacements (often less than 1 mm, such as the 0.13–0.7 mm reported in the literature) are detectable by high-precision instruments, but do not necessarily translate into visible elevation to the naked eye. The perception of improvement (the "apparent lifting") reported by patients and evaluators often stems from improvement in facial contour and the play of light and shadow provided by volumization, and not, probably, from significant vertical repositioning of tissues against gravity.

8 | Limitations of Current Literature

A critical analysis of the limitations of current literature is necessary. There is substantial heterogeneity in the injection techniques described, ranging from subdermal and interfascial planes to supraperiosteal, which makes direct comparison of results difficult. Furthermore, there is a lack of standardization in the injection volumes used in different studies; larger volumes tend to produce greater tissue distension, confounding the purely volumetric effect with true lifting. The reliance on subjective scales (such as GAIS) in many studies and the inherent expectation bias of patients also limit the validity of conclusions about the efficacy of tissue repositioning alone. Finally, many studies lack adequate control groups or long-term follow-up to verify the durability of reported effects.

9 | Implications for Clinical Practice and Patient Communication

The evidence suggests the need to recalibrate how the concept of temporal lifting is communicated. The primary expected outcome of injections in the temporal region is local volumetric

restoration. During preprocedure counseling, clinicians should emphasize the predictable benefits of temporal volumization, including volume restoration, improvement in facial contour, and harmonization of the region. Any potential lifting effect should be presented as a possible secondary benefit, whose magnitude may vary significantly among patients.

10 | Conclusion

The concept of temporal lifting possesses strong anatomical plausibility but requires more robust clinical validation. Although fascial continuity supports the theoretical basis for mechanical force transmission, the clinical magnitude of this effect appears highly dependent on volume and technique, and may be minimal when standard volumes are used. We advocate for a more objective and transparent approach in clinical practice. Professionals should emphasize the proven benefits of temporal volumization, maintaining realistic expectations regarding lifting effects.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Demonstration of different injection strategies in the temporal region. PLLA application in the posterior temple, within the subdermal plane (Layer 2), aiming to induce facial lifting through fascial force transmission. Sequential bolus injections of hyaluronic acid in the anterior temple for volumization purposes. Additionally, intramuscular hyaluronic acid injection targeting deep volumetric restoration.