

# Directional Tension Line Protocol (DTLP): an anatomy-guided injection technique for next-generation Poly-L-Lactic Acid (PLLA) in facial aesthetics

## Abstract

**Background:** Poly-L-lactic acid (PLLA) is a well-established biostimulatory filler, but earlier formulations were associated with granulomas and irregular outcomes. Next-generation PLLA (e.g., Infini V10) offers improved safety due to its uniformly spherical microparticle morphology.

**Objective:** To describe the Directional Tension Line Protocol (DTLP), a novel anatomy-guided injection technique that aligns PLLA deposition with Langer's lines, enhancing both safety and predictability.

**Methods:** Infini V10 was reconstituted to 10 mL (8 mL sterile water, 2 mL lidocaine). And rested for > 12 hours prior to injection. Using 22 G blunt cannulas, injections were administered through defined facial entry points, with approximately 0.75 mL delivered per site. Greater deposition was directed to static regions. With specific adjustments for zygomatic and perioral vectors.

**Results:** Preliminary clinical observations demonstrated homogeneous collagen distribution, improved skin elasticity, subtle volumization, and a low incidence of papules or nodules. Patients reported high satisfaction with natural outcomes and minimal downtime.

**Conclusion:** The DTLP integrates the safety of modern PLLA formulations with anatomical principles. By orienting collagen induction along Langer's lines, this protocol enhances reproducibility and reduces complications. Controlled studies are warranted to validate its efficacy.

**Keywords:** poly-L-lactic acid, collagen biostimulation, injection protocol, Langer's lines, granuloma prevention

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## Introduction

PLLA has been used in aesthetic medicine for nearly two decades as a collagen stimulator to restore facial volume and improve skin quality. Although effective, first-generation formulations were frequently associated with granuloma formation and irregular results due to particle irregularity and variable injection techniques.<sup>1,2</sup>

Advances in manufacturing, such as Polysmooth Micro-Molding Technology (PSMMT), have led to second generation PLLA products with uniformly spherical microparticles, exemplified by Infini V10. This morphology reduces inflammatory risk and improves particle dispersion. Nevertheless, there remains a need for standardized anatomy-based protocols.<sup>3</sup>

The Directional Tension Line Protocol (DTLP) was developed to combine the safety of next generation PLLA with the biomechanical logic of Langer's lines -natural vectors of skin tension- aiming to optimize outcomes and minimize complications. Other biostimulators as Calcium hydroxyapatite also have been injected in this way.<sup>4</sup>

## Materials and methods

### Product

- I. Infini V10 (second-generation PLLA).
- II. Reconstitution: 10 mL (8 mL sterile water + 2 mL 2% lidocaine).

- III. Resting time: at least 12 hours prior to injection.

### Injection technique

- I. Instruments: 22G blunt cannula; pre-hole with 21G needle; local anesthesia with 30G infiltration.
- II. Injection Plane: Superficial to mid dermis at the subdermal junction.
- III. Entry points: Four per hemiface, mapped along tension vectors.
- IV. Volume distribution: approximately 0.75 mL per entry point, with modifications:
  - a. Vector 3 (zygomatic) – evenly distributed.
  - b. Vector 6 up to 1.0 mL.
  - c. Vector 7: 0.25 mL, injected superficially, avoiding DAO area.
- V. Technique: Linear threading and fanning aligned with Langer's lines.

### Anatomical rationale

Injection alignment with Langer's lines:

1. Promotes natural collagen fiber orientation.
2. Reduces biomechanical stress on neocollagen.

3. Avoids high-mobility regions, lowering papule and granuloma risk.<sup>5</sup>

## Results

Preliminary clinical experience with the DTLP suggests:

- I. Homogeneous neocollagenesis and improved dermal elasticity.
- II. Subtle, natural volumization rather than overt augmentation.
- III. Lower complication rates compared to traditional PLLA techniques.
- IV. High Patient satisfaction, attributed to natural outcomes and minimal downtime.

## Discussion

The DTLP represents a paradigm shift toward anatomy-guided biostimulation with PLLA in contrast to empirical techniques such as cross-hatching or fanning, the DTLP:

- I. Enhances safety by avoiding injection in highly dynamic zones.
- II. Improves efficacy by aligning neocollagen with natural vectors of skin tension.
- III. Increases reproducibility through standardized entry points and dosing.
- IV. Leverages the favorable properties of second generation PLLA for optimal tissue integration.

Limitations include the absence of large scale controlled trials, the need for histological and imaging based validation of collagen orientation, and potential learning curve for practitioners.

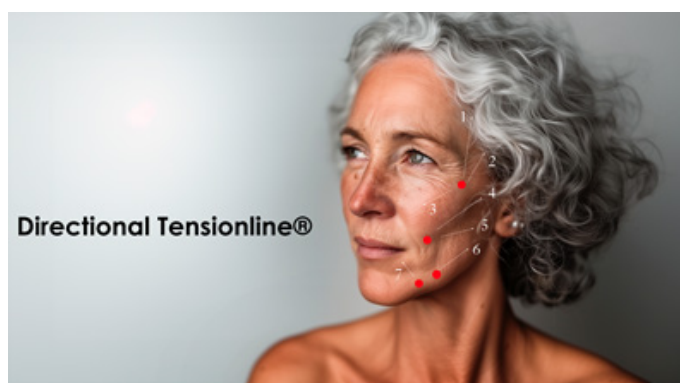
## Conclusion

The directional tension line protocol (DTLP) is an innovative, anatomy guided approach for the application of next generation PLLA. By integrating biomechanical principles with improved PLLA morphology, this protocol offers a safer, more reproducible, and natural method for collagen biostimulation. Future clinical studies are necessary to further validate its efficacy and extend its application to extra facial areas such as the neck, décolleté, and body.

## Future directions

- I. Randomized controlled trials comparing DTLP to conventional injection methods.
- II. Histological and imaging studies evaluating neo collagen orientation.

- III. Adaptation of DTLP for neck, décolleté, and body biostimulation.



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## Conflict of interests

The authors declare there is no conflict of interest.

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