

## Facial Volume Replacement with Poly-L-Lactic Acid: A Case Report

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### Abstract

**Introduction:** Poly-l-lactic acid has been used for cosmetic purposes in the United States, since 2004, for the treatment of human immunodeficiency virus lipodystrophy. This paper aims to present one case report and our experience with the use of poly-l-lactic acid for the cosmetic purpose of restoring facial volume lost due to the aging process.

**Methods:** Case report of female patient, seventy years old, were treated in private practice between 2020 and 2021. The product was reconstituted in 16 ml of distilled water and mixed with 2 ml of xylocaine 2% without epinephrine at the time of injection. Individualized treatment was performed according to each patient facial size and contour. The result was analyzed through photographs taken before and after surgery as well as subjective evaluations made by the surgeon and patients.

**Results:** The patient was satisfied with the results. Adverse effects included of ecchymosis at the injection site, swelling and nothing nodules in the regions.

**Conclusion:** Poly-l-lactic acid can be used safely for restoring, correcting, and smoothing facial deformities arising from aging.

**Keywords:** *Cosmetic Techniques; Face; Skin Aging; Lactic Acid*

### Abbreviations

PLLA: Poly-L-Lactic Acid; FDA: Food and Drug Administration

### Introduction

In the twentieth century, autologous fat became the most used material. However, removing the fat and transporting it is a very invasive procedure, time-consuming and does not have a lasting effect [1].

Poly-L-lactic acid (PLLA) has been approved by the Food and Drug Administration (FDA), of the United States, in August 2004, to use lipodystrophy caused by HIV (from English, human immunodeficiency virus). However, a trend of increasing use for aesthetic purposes, in addition to the correction of lipodystrophy associated with immunodeficiency [2,3]. This substance is approved for cosmetic purposes in Europe, Canada, Australia and Brazil.

Minimally invasive procedures have revolutionized the treatment paradigm for facial rejuvenation and may very well be one of the most significant changes in the recent history for facial plastic surgery. Orofacial Harmonization is a very important Odontology specialty in

Brazil, governed by ethical principles, which aims to provide patients with aesthetic/functional treatments, without having counterpoints between these two principles for the finalization of the treatment in a harmonious and balanced way in the facial aesthetics. It is a synthetic polymer produced from fermentation of sugar from corn [6]. It is composed of PLLA microparticles, which measure between 40 - 63  $\mu\text{m}$  in diameter; being the active ingredient of the product; carboxymethylcellulose of sodium, which acts as an emulsifier to improve rehydration and non-pyrogenic mannitol, which helps in the lyophilization of the particles [7,8].

This study aims to present the experience of the authors with the use of poly-L-lactic acid for cosmetics, aiming at restoring the facial volume lost with increasing age, especially of the thirds middle and lower face.

### Case Presentation

A 70-year-old female was treated in March 2020 for injection of a dermal filler (Figure 1). The injection with Poly-L-lactic acid 210 mg (RENNOVA ELLEVA<sup>®</sup>; GANA R&D CO LTD) was performed by an experienced dental surgeon and given percutaneous into the face on both sides. The PLLA used in this study is supplied in a powder form containing PLLA, carboxymethylcellulose, and non-pyrogenic manitol (Figure 2). It is intended to be mixed with 14-16 cc of sterile water before injection. In this study, PLLA was gently mixed with 16 cc of sterile water using an 18-gauge needle.



**Figure 1:** A 70-year-old white woman, areas of volume loss to be treated in this patient include: global fat loss in the temple, malar, lateral, and mid-cheek, as well as the lower face.



**Figure 2:** The poly-l-lactic acid 210 mg (RENNOVA ELLEVA<sup>®</sup>), which provides rapid reconstitution and homogeneous suspension in 1 hour.

Topical anesthesia was applied before treatment in the points of insertions cannulas. We use a lidocaine 2% 1:100.000 ephinefrine. The antiseptic technique is very important. we use a chlorhexidine wash immediately before injection. Surgical gloves should be changed if suspected of any contamination during the procedure.

The PLLA was hydrated with 16 mL of sterile water to 1 minute before injection and 2 mL of 2% lidocaine is added just before injection. a suspension is stirred and mixed evenly in a suitable machine (Figure 3), then placed in four 3 mL syringes, each containing around 2.7 mL of the product. The product can precipitate in individual syringes before use and can then be mixed again immediately before injection just shaking the same. The cannula is placed in the plane just below the skin (above the vessels), subcutaneously, and injected as a series of fine strands (0.1 to 0.2 ml/cm<sup>2</sup>) in a fan pattern on removal of the cannula. gentle massage is done after implantation. Depot injections of 0.5 to 1.0 mL were done on the temple area, the chin, along the jawline, maxilla and zygomatic arch. We prefer to inject PLLA with a 22-gauge cannula (Figure 4). Postprocedural care is fairly similar after any injectable filler.



**Figure 3:** An oscillating machine who accelerating plla acid Elleva and provides for both thin and homogeneous suspensions. This new method only takes 60 seconds.



**Figure 4:** Cannula with rounded tip that minimizes the risk of damage tissue and vessel trauma blood; The markings on the body of the cannula allow to control the injection depth, providing more accuracy and wide inside and output diameter for better fluidity and a smoother injection.

A transient fill as a result of the mechanical distention of the tissues and the water quantit. used is seen immediately after injection, but this resorbs over the next several days (Figure 5). The true mechanism of action of PLLA begins with a subclinical inflammatory tissue response after administration, followed by encapsulation of the particles and subsequent fibroplasia. The collagen made by this fibroplasia volumizes the tissues and produces the desired cosmetic result. This mechanism of action enables the product to gradually and progressively restore the volume yielding a subtle and natural-looking result.



**Figure 5:** The patient with age-related the face loses volume, the skin loses elasticity and is no longer able to accommodate the underlying volume loss, causing it to fall and fold (A) and immediately after 14 mL PLLA (ELLEVA), total of 7 mL was used on each side of the face; 3 mL was used along the zygomatic arch and 4 mL was used along the mandible, prejowl sulcus, and chin on each side of the face (B).

The patient needed more than one retreatment session after 1 month. This was expected because he had initially required three treatment sessions to obtain complete correction. In our clinical experience, most patients presenting with his degree of aging requires two to three retreatments for full correction (Figure 6).





**Figure 6:** The patient is pictured here after 3 injections sections. This product has been done to be a safe and effective product with predictable and reproducible results. Subtle, natural, and pleasing results of long duration can be obtained. fillers are treatment effective choice for the patient after of collagen bioestimulating. Remember that very empty and very elastotic faces are very difficult to fill.

## Discussion

Collagen biostimulators are a great option in the treatment for facial rejuvenation, given its ability to stimulate the formation of a new collagen through an inflammatory process local [9]. PLLA is a synthetic, biocompatible and resorbable lactic acid polymer that was safely used in various medical applications by over 3 decades [4]. Following injection, the microspheres are slowly degraded and induce collagen synthesis and fibroblast proliferation through an inflammatory response. As a result, there is a progressive increase in dermal thickness and volume enhancement [13].

As with dermal fillers, all collagen biostimulating products are good tolerated, however, it is common after the application of the discomfort, bruises, erythema or local edema, mild and transient, with spontaneous resolution. At systemic complications are rarer.

The cannula should not be pushed forcefully through resistance because this can cause cannulas to enter blood vessels. Some articles discuss the possibility of a small cannula producing an effect of penetration similar to a needle. To reduce the chance of arterial injuries, a large cannula (22G) is recommended as a safer device than a small one (27G) for filler injections [5]. Pavicic T demonstrate that with decreasing size of both needles and cannulas, the force needed to penetrate the facial arterial vasculature diminishes significantly [11].

Considering that more nodule formation occurs when PLLA is injected intradermally, sonication may help in safe intradermal use of PLLA through the proper size and even distribution. Altogether, sonication can help reduce the size of PLLA particles and achieve more even distribution [12].

The injected areas should be thoroughly massaged after. Massage must be done during the treatment session, immediately post-treatment, and afterwards five times a day for 5 minutes by the patient for 1 week. Massage improves product distribution and is reported to decrease the incidence of post-injection papules and nodules [14].

## Conclusion

Poly-L-lactic acid is a safe and effective product for face volumization, correction of unsightly scars and treatment of flaccidity, with pleasant and predictable results since that is properly prepared and used. It is important for both the dentist and the patient to note that the final result is not accomplished by the product, but by the skin's patient reaction to the product, and that this process takes 4 weeks.

### Conflict of Interest

The authors received no financial support for the research, authorship, and publication of this article.

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