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Correction of Brassiere Strap Grooving with Injectable Poly-L-Lactic Acid in Plastic Surgery Resident Filler and Neuromodulator Clinic

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Summary: Poly-L-lactic acid (PLLA) is a biocompatible synthetic polymer that induces neocollagenesis by fibroblasts after placement into the reticular dermis and subcutaneous plane. We present an innovative use of this product to treat brassiere strap grooves. The size and weight of hypertrophied breasts can cause physical and psychological problems that can be corrected with reduction mammaplasty. However, bra strap grooving remains an unsightly consequence of brassiere use with large and heavy breasts. PLLA provides an innovative way to treat this deformity in a minimally invasive way, while maintaining relatively long-term results of two years or more. We studied 10 patients who presented to resident filler and neuromodulator clinic to help improve the bra strap groove deformity. The average number of clinic visits was 3.1. The average total number of vials injected was 2.58 on the right and 2.92 on the left. There were no complications or side effects, apart from one patient who reported injection site bruising. Patient surveys demonstrated 70% satisfied with the results and 30% very satisfied. We also discuss resident filler and neuromodulator clinic as an opportunity for resident research.
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INTRODUCTION

Poly-L-lactic acid has been used for decades in various applications to treat soft tissue deficiencies. PLLA is Food & Drug Administration approved for use to treat HIV associated lipoatrophy as well as fine lines and wrinkles of the cheeks. Multiple studies describe off-label use for use in the hands, chest, extremities, and buttocks.[1–4] We present an additional use of PLLA in the correction of brassiere strap grooving.

PATIENTS AND METHODS

Ten patients with brassiere strap grooving within the senior author's practice were identified. None of the patients had undergone breast reduction surgery. Written consent was obtained from each participant before participation in our study, which was designed in accordance with the Declaration of Helsinki. The severity of each participant's deformity was documented as defined by Ergün et al, with type 1 being mild, type 2 being moderate, and type 3 being severe. Part of their description includes an imaginary line between the insertion of the trapezius and deltoid muscles, crossing the spine of the scapula and clavicle. According to their definitions, with type 1 "there is minimal indentation and the contour appears almost natural. Although most patients do not notice the indentation, physicians do." With type 2, there is "increased depth and width of the depression, contour irregularity is easily noticeable. The depth of the depression can extend to 0.5 cm below the imaginary line, whereas its width can reach up to 2 cm." With type 3 "The depth and width of the depression are increased significantly and the deformity is very evident. The depth of the depression can extend to 1 cm below the imaginary line, while its width can reach up to 4 cm."[5] Each vial of PLLA was mixed with 5 mL of sterile water and 2 mL of 2% lidocaine with epinephrine. Each vial was reconstituted 24

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hours before injection, with the lidocaine added the day of injection. Sculptra (Galderma, Dallas, Tex.) injectable PLLA was the product injected in all 10 patients. After preparing the skin, the solution was injected in a subcutaneous plane into the area of greatest deformity by residents in the filler and neuromodulator clinic. Initial injections tended to be more of a bolus injection, while subsequent injections tended to feather the solution around the groove. Injections were placed with 19-gauge needles or cannula per resident preference. Patients then returned for follow-up and additional injections 8 weeks later. Most patients (seven of 10) elected to return for additional injections 16 weeks after the second injection to help improve their result. Pre-injection photographs were taken at each visit. Each injection was performed by a plastic surgery resident under the supervision of the senior author. The degree of shoulder grooving and the total number of vials injected into each patient is listed in Supplemental Digital Content 1 and Supplemental Digital Content 2. (**See table 1, Supplemental Digital Content 1,** which shows age, degree of grooving of each shoulder before injections, number of visits, total number of vials injected into each shoulder, and degree of grooving in each shoulder after injections. **http://links.lww.com/PRSGO/D52**.) (**See table 2, Supplemental Digital Content 2,** which shows average number of vials used to treat each degree of deformity. **http://links.lww.com/PRSGO/D53**.)

DISCUSSION

Injectable poly-L-Lactic acid has been used for decades to aid in improving contour in areas of volume loss. We present an additional use of PLLA to aid in improving the appearance of brassiere strap grooves, specifically in the context of plastic surgery resident filler and neuromodulator clinics. This innovative idea provides plastic surgeons with a relatively noninvasive technique to treat this issue. Fat grafting at the time of breast reduction surgery has been described to treat this deformity, but there remain issues with variable graft take, need for an autologous donor site, and need for anesthesia, given the more invasive nature of the procedure.[4] An additional complicating factor with fat grafting is that brassiere straps place unwanted pressure on the fat grafts, which can interfere with the healing process and cause variable graft take. When compared with fat grafting, the use of PLLA has several advantages, including the less-invasive nature of PLLA injection and the ability to continue to wear a brassiere without interfering with the end result. In fact, postprocedure massage of the treated area is recommended with PLLA, and we believe the brassiere strap essentially offers the same effect, but this is conjecture. There are several disadvantages of PLLA as well. These include the risk of irregularities and granulomas after injection, inability to reverse its effect (when compared with hyaluronic acid fillers), and the amount of product required to achieve the desired effect. When compared with other types of fillers, PLLA also tends to last longer (24 months or longer), with hyaluronic acid filler lasting 9–12 months and calcium hydroxyapatite lasting about 15 months. There is also increased volume per injection with typical hyaluronic acid fillers providing 1 mL and calcium hydroxyapatite up to 1.5 mL. Calcium hydroxyapatite also can occasionally cause a white discoloration of the skin not seen with PLLA. Our patients had a mean of 2.75 vials of PLLA injected into each shoulder. This amount can be cost prohibitive for some patients, but it is not unusual to need this amount, especially when used to treat contour irregularities of the body as compared with the face. Shridharani et al described using PLLA for body contouring treatment.[3] They treated several areas, including the buttocks, which, in their series, required an average of 3.7 visits with an average of 6.4 vials of product injected per visit. With regard to brassiere strap grooves, future studies with larger numbers of patients would be useful to better predict the amount of product needed to treat different levels of groove severity. Our patients were able to receive the injection free of

Takeaways

Question: Is poly-L-lactic acid effective in treating brassiere strap grooves?

Findings: Ten patients received an average of 2.75 vials of poly-L-lactic acid into each shoulder with improvement in the contour caused by brassiere straps.

Meaning: Poly-L-lactic acid provides an effective relatively noninvasive way to treat contour irregularity caused by brassiere straps.

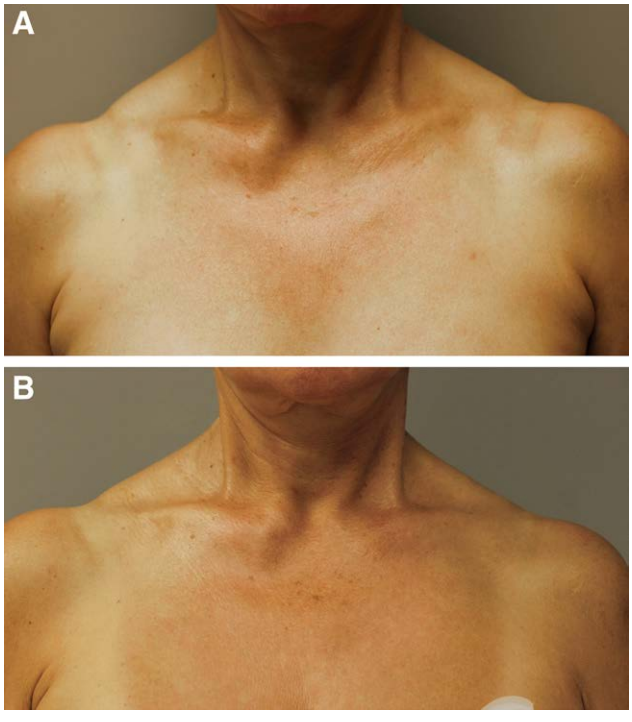

Fig. 1. A 69-year-old woman who received four vials into the right shoulder and 3.5 vials into the left shoulder. A, Photograph taken before treatment with PLLA. B, Photograph 10 months after starting injections.

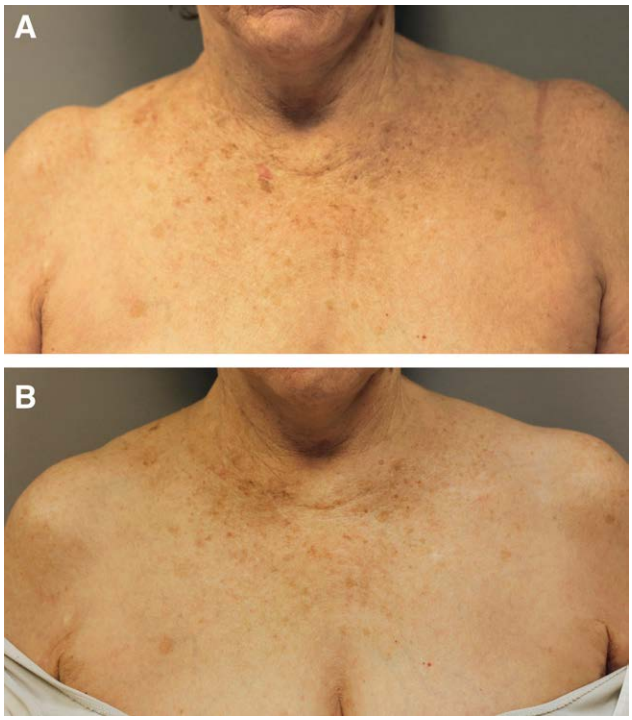

Fig. 2. A 72-year-old woman with five vials into the right shoulder and 2.5 vials into the left shoulder. A, Photograph taken before treatment with PLLA. B, Photograph taken 10 months after starting injections.

charge due to their participation in the plastic surgery resident injection clinic. These types of clinics offer several advantages to both the patients and the resident surgeons. We believe that patients are more likely to be willing to try new innovative types of injections due to the fact that they are not being charged. We also believe that they are more likely to follow up, so that they can receive other types of fillers or neuromodulators offered by resident injectors. We do recognize that there may be some positive bias when it comes to patient satisfaction due to the fact that they are not being charged for the injection. An additional benefit is the introduction of PLLA to residents who are novice injectors and lack experience with PLLA as a filler. As discussed earlier, PLLA can cause bumps and irregularity; the shoulders offer a relatively low stakes area to gain experience with injection of the product. When surveyed, the majority of residents who performed the injections noted that they were satisfied or very satisfied with the experience they obtained.

The use of injectable PLLA offers an innovative, noninvasive way to treat brassiere strap grooves with several advantages when compared with other techniques. Resident filler and neuromodulator clinics offer a great way to benefit patients while simultaneously offering a valuable experience to resident surgeon injector as well as a great opportunity for clinical research (Figs. 1 and 2).

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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