Original article

Effectiveness of filler injection after thread lifting procedure of severe midface volume loss: a preliminary study

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Abstract. *Objective:* There are many methods used to rejuvenate the skin and improve its quality. Our study evaluated the effectiveness of filler injections after a thread lifting procedure. *Methods:* In the study, there were two groups of patients treated with PLA/CL alone (n=5) and a combination of PLA/CL and hyaluronic acid filler (n=5). The treatment covered a period of one month. Differences before and after treatment were evaluated through photographic demonstrations and a statistical program. *Results:* These results were evaluated by both the patient and the doctor. When the survey data was evaluated, only 27% improvement was observed in the PLLA group and 45% improvement in the combined treatment group. A combined treatment was also found to be more effective in evaluating skin moisture, colour, fine lines, jawline, perioral wrinkles, and skin elasticity. *Conclusion:* Results shows that PLA/CL and hyaluronic acid filler application is more effective than only PLA/CL application.

Key words: Skin, filler, injection

Introduction

Dermal fillers have become popular in recent years. Dermal fillers provide aesthetic improvements with less cost and a short recovery time without the need for surgery. According to the data of the American Society of Aesthetic Plastic Surgery (ASAPS), more than 1.6 million dermal filler treatments were performed in 2011[1].

Dermal fillers are indicated for the correction of wrinkles and folds and for restoring soft-tissue volume lost due to ageing or disease. These procedures used for cheek and chin augmentation, nose reshaping, lip augmentation, midface volume and correction of facial asymmetry. The number of complications increases depending on the indication and the increase in the number of procedures performed[2].

Dermal fillers are categorized as biodegradable (medium and long term) or non-biodegradable fillers and particulate or non-particulate fillers. Medium-term biodegradable fillers such as collagen and hyaluronic acid (HA) fillers are reabsorbed by the body rather quickly. HA derivatives are biodegradable, and their effect lasts for 6-18 months depending on the properties of the product[3]. Hyaluronic acid consists of linear polymeric chains of repeating N-acetylglucosamine and glucuronic acid disaccharide units, which may be cross-linked. Increased crosslinking and a higher concentration concentration enhance viscosity and elasticity as well as resistance to degradation by endogenous hyaluronidase. The hydrophilic nature of HA means that more concentrated and/or large particulate products will tend to absorb more water and therefore produce more tissue swelling after injection. HA products are also characterized by the size of their microspheres. Products with a higher degree of cross-linking last longer, increasing reactivity in the body and therefore the risk of inflammation and granuloma formation[4].

Calcium hydroxylapatite (CaHA) and PLLA substances have biodegradable particles that stimulate

the body to produce collagen. Injection provides immediate visual improvement with the prolonged deposition of new collagen surrounding the microspheres, which contributes to an average duration of action of approximately 15 months[5]. Each injection session with PLLA produces a gradual treatment effect and limited correction. Three injection sessions are typically required, however once the final correction is achieved, results last up to 2 years. Non-biodegradable fillers trigger a foreign body reaction that stimulates fibroblastic collagen deposition around non-absorbable microspheres[6]. Products in this category include polymethylmethacrylate (PMMA), polyacrylamide hydrogel Aquamid, and Silicone. PMMA is composed of bovine dermal collagen and PMMA microspheres. Aquamid is a hydrophilic polyacrylamide gel composed of 97.5% sterile water bonded to a 2.5% cross-linked acrylamide polymer[7]. Silicone 1000 is injected in very small quantities using the microdroplet technique. The persistent nature of non-biodegradable fillers can make their complications longer-lasting and more difficult to manage[8].

Methods

Patients

The study included patients aged 35–58 years, both with and without prior medical aesthetic treatments. Participants were divided into 2 groups. There were 5 participants in each group.

Group 1: Midface suspension was performed with only PLA/CL threads in 5 patients in this group (Figure 1).

Group 2: After the application with PLA/CL thread, 5 patients were treated with high cross-linked hyaluronic acid filler with high cohesiveness, viscosity, and volumetric effect (Figure 2). Filler applications were made with a bolus needle in the supraperiosteal region and an average of 2-3 cc fillers were used. During face lifting, the zygomatic ligament and the parotidomasseteric fascia anterior to the tragus were used as insertion points, while the nasolabial fold, marionette line, and prejowl area were selected as target sites.

Figure 1. Patient view PLA/CL application. a) Pre-treatment b) immediately after treatment c) after 1-month treatment.

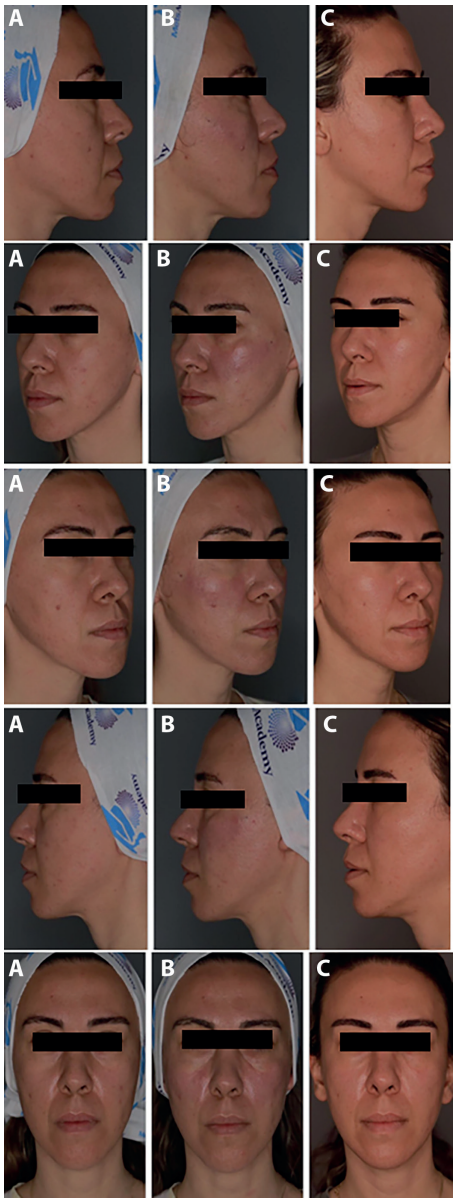

Figure 2. Patient view PLA/CL and hyaluronic acid filler application. a) Pre-treatment b) immediately after treatment c) after 1-month treatment.

Evaluation

Each participant was evaluated with a Visual Analog Scale (VAS) questionnaire scored from 0 to 10 points after the applications. The questionnaire was answered by both the patient and the physician before, after and 1 month after the application. The skin color and stains, skin moisture, fine lines, elasticity, and sag (especially in the jaw line) were evaluated in the participants. A statistical program and photographic documentation were used to evaluate the results.

Statistical analyses

Statistical analyses were performed using the SPSS software (version 26.0). Basic descriptive statistics were assessed to describe the sample; numerical data are expressed as the means ± standard deviations.

Results

The total VAS score is shown in Table 1. In the first group of patients undergoing PLA/CL, the total VAS score of the patients was 31.4±4.09 before the treatment, 43.2±3.42 after the treatment and 47.2±1.92 1 month post-treatment. These results indicate an improvement of 50% after 1 month post-treatment, according to patient evaluation. The total VAS score was found to be 37.2±3.96 before the treatment, 43.8±2.94 after the treatment and 47.4±1.81 1 month post-treatment, indicating an improvement of 27% 1 month post-treatment, according to patient evaluation. In the second group with PLA/CL and the hyaluronic acid filler combined application, the total VAS score was found to be 32.2±3.89 before treatment, 44.0±2.34 after treatment, and 49.0±2.23 1 month post-treatment. The rate of recovery was 52% 1-month treatment according to patient. The total VAS score was found to be 34.4 ± 2.50 before the treatment and 50.0 ± 1.22 1 month post-treatment and the recovery rate was found to be 45% based on physician evaluation.

Table 2 shows the skin characteristics according to the patients. According to Table 2, skin moisture increased by 47% in the PLA/CL group and 12% in the PLA/CL and hyaluronic acid filler combined group. Skin color was observed to improve by 12% in the PLA/CL group and 40% in the PLA/CL and hyaluronic acid filler combined group. Midface volume loss decreased by 88% in the PLA/CL group and 126% in the PLA/CL and hyaluronic acid filler

Table 1. Evaluation of groups according to total VAS score.

	Group 1 Patient	Group 1 Doctor	Group 2 Patient	Group 1 Doctor
	Mean±Std	Mean±Std	Mean±Std	Mean±Std
Before treatment	31.4±4.09	37.2±3.96	32.2±3.89	34.4±2.50
After treatment	43.2±3.42	43.8±2.94	44.0±2.34	45.0±1.58
After 1 month	47.2±1.92	47.4±1.81	49.0±2.23	50.0±1.22

Table 2. Skin characteristics according to the patients.

	Before Treatment		After Treatment		After 1 Month	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
	Mean±Std	Mean±Std	Mean±Std	Mean±Std	Mean±Std	Mean±Std
Evaluate skin moisture	4,2±1,48	6,4±1,14	4,2±1,48	6,4±1,14	6,2±1,30	7,2±0,83
Your satisfaction with skin color	6,4±1,67	5±1,58	6,4±1,67	6,2±1,30	7,2±0,44	7±1,22
Midface volume loss	3,6±1,14	3,8±1,30	6,4±0,89	6,2±0,83	6,8±1,09	8,6±0,89
Sagging of the skin jawline	4,6±1,14	4,6±1,14	7,8±0,83	6,6±1,14	6,8±0,83	5,6±1,14
Lines around the mouth	4,6±1,51	4,2±0,83	7±0,70	6,4±0,54	7±1,00	7,4±0,54
Appearance of the zygomatic ligament	3,2±0,83	3,2±0,83	6,4±1,14	6,2±0,83	6,8±1,48	6,4±0,54
Evaluate the skin tension	4,8±1,48	5±1,00	5±1,41	6±0,70	6,4±1,14	6,8±0,44

Table 3. Skin characteristics according to the physicians.

	Before Treatment		After Treatment		After 1 Month	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
	Mean±Std	Mean±Std	Mean±Std	Mean±Std	Mean±Std	Mean±Std
Evaluate skin moisture	4,6±1,67	6±1,00	4,4±1,34	6,2±1,09	6,4±0,89	7,6±1,14
Your satisfaction with skin color	6,2±1,92	5,4±1,34	6,2±1,92	6,2±1,30	6,8±0,44	7,2±1,30
Midface volume loss	5,6±1,14	5,6±0,89	6,4±1,14	7,6±0,89	6,8±1,30	7,8±0,44
Sagging of the skin jawline	5,2±0,83	4±1,22	7,6±0,54	6,6±1,14	7,4±0,54	6,4±0,89
Lines around the mouth	4,4±0,89	4,2±1,09	7±1,00	6,2±0,44	7±0,70	7,6±0,54
Appearance of the zygomatic ligament	6,2±1,92	4,4±0,54	7±1,58	6,4±0,54	6,4±1,14	6,6±0,54
Evaluate the skin tension	5±1,22	4,8±0,44	5,2±1,48	5,8±0,44	6,6±0,89	6,8±0,44

combined group. Sagging of the skin jawline increased by 48% in the PLA/CL group and 22% in the PLA/CL and hyaluronic acid filler combined group. Perioral wrinkles decreased by 52% in the PLA/CL group and 76% in the PLA/CL and hyaluronic acid filler combined group. Appearance of the zygomatic ligament decreased by 112% in the PLA/CL group and 100% in the PLA/CL and hyaluronic acid filler combined group. Skin tension level increased by 33% in the PLA/CL group and 36% in the PLA/CL and hyaluronic acid filler combined group.

Table 3 shows the skin characteristics as evaluated by the physicians. According to Table 3, skin moisture increased by 39% in the PLA/CL group and 26% in the PLA/CL and hyaluronic acid filler combined group. Skin color was observed to improve 9% in the PLA/CL group and 33% in the PLA/CL and hyaluronic acid filler combined group. Midface volume loss decreased by 21% in the PLA/CL group and 40%

in the PLA/CL and hyaluronic acid filler combined group. Sagging of the skin jawline increased by 42% in the PLA/CL group and 60% in the PLA/CL and hyaluronic acid filler combined group. Perioral wrinkles decreased by 60% in the PLA/CL group and 81% in the PLA/CL and hyaluronic acid filler combined group. Appearance of the zygomatic ligament decreased by 32% in the PLA/CL group and 50% in the PLA/CL and hyaluronic acid filler combined group. Skin tension level increased by 29% in the PLA/CL group and 42% in the PLA/CL and hyaluronic acid filler combined group.

Discussion

Bioabsorbable threads have recently become a popular option for rejuvenating and lifting ptotic facial tissue[9]. Traditionally, the procedure has required the subcutaneous insertion of threads along a planned route through needles or cannulas. This eliminates the need for general anesthesia and large incisions required for traditional surgical facelifts[10]. Because of these advantages and the relative safety of bioabsorbable thread lifts, many patients have sought this treatment recently. PLA/CL degrades more slowly than other copolymers[1].

In the study conducted by Rezaee Khiabanloo et al.[11], 193 patients performed thread lift procedures on the eyebrows, midface, jawline, and neck using PLCL threads together with Silhouette Soft threads. The jawline (46.1%), midface (33.7%), eyebrows (12.4%) and neck (7.8%) were corrected in these patients aged between 25 and 89 years. The level of satisfaction perceived by the patient increased from 94% in the first week to 99% in the sixth months after the application.

Savoia et al.[12] evaluated patient-perceived surgical outcomes following the use of PLA/CL threads in brow lifts, forehead lifts, midface lifts (zygomatic–malar region), maxillary lifts, and high cervical region stretching. Female patients ranging from 37 to 65 years old, with average signs of ageing and requiring a moderate lift, were selected. 89% of patients found the results of thread lift procedures satisfactory. Overall, this study demonstrated the effectiveness of PLA/CL threads when used for facial tissue lift. A microscopic analysis showed that the procedure also stimulated the synthesis of collagen, which contributes to greater skin structure and elasticity. In addition, no acute inflammatory response was elicited by the procedure.

This study revealed that the combined application of PLA/CL threads and hyaluronic acid filler was more effective, as indicated by the total VAS score, according to both patients and practitioners. Application efficacy was not very high after the treatment, but the efficacy increased 1 month after the application. According to patients, PLA/CL alone improved skin moisture, jawline sagging, and the appearance of the zygomatic ligament. The combination of PLA/CL and hyaluronic acid filler was more effective for skin color, midface volume loss, perioral lines, and skin tension. Physicians reported similar findings: PLA/CL alone improved only skin moisture, while the combination was superior for all other criteria. Overall, combined PLA/CL and hyaluronic acid filler demonstrated greater efficacy than PLA/CL alone.

Conflict of Interest: The authors have no financial interests to disclose.

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