



Pretarsal roll augmentation with dermal hyaluronic acid filler injection

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Abstract

Pretarsal roll augmentation with dermal hyaluronic acid filler injection focuses on restoring pretarsal fullness. This study aimed to introduce a method of pretarsal roll augmentation with dermal hyaluronic acid filler injection and establish the level of difficulty, safety, and effectiveness of this method. Eighty female patients were enrolled in this study. Hyaluronic acid filler was used to perform pretarsal roll augmentation. Physician and patient satisfaction at 1 month and 4 months after surgery was investigated. The level of satisfaction was graded from points 1 to 5. The patient satisfaction and physician scores were 4.7 ± 1.1 (mean \pm standard deviation) points at 1 month and 4.8 ± 0.9 points at 4 months and 4.6 ± 0.9 points at 1 month and 4.8 ± 1.0 points at 4 months, respectively. No major complications were observed. Our technique provided a natural and younger appearance with pretarsal fullness. This technique was easy to perform for the restoration of pretarsal fullness, and it improved periorbital contouring, rejuvenated the pretarsal roll, and provided excellent esthetic results.
Level of Evidence: Level V, therapeutic study.

Keywords Hyaluronic acid filler · Pretarsal · Filler injection · Esthetics

Introduction

Although it is not a mandatory medical term defined in clinical anatomy, the area below the lower eyelid, which was formed by contraction of the orbicularis oculi muscle, is called the pretarsal roll [1]. Patients with lower eyelid aging may frequently have a dull appearance with no facial expression rather than a younger, healthy, and sweet image. Pretarsal fullness is a characteristic of attractiveness and youthfulness, and pretarsal augmentation has gained popularity in Asia. In the West, procedures that increase pretarsal fullness have not received much attention. Instead, pretarsal fullness is diagnosed as hypertrophic orbicularis or blepharospasm and treated with either excision of the thickened orbicularis or botulinum toxin type A injections [2]. In contrast, pretarsal fullness is perceived as a characteristic of youthful look in Asia, and various methods of obtaining pretarsal fullness have been performed [1]. Therefore, our pretarsal roll augmentation with dermal hyaluronic acid filler injection focuses on restoring pretarsal

fullness of youth [2]. The goal of this study was to introduce a method of pretarsal roll augmentation with dermal hyaluronic acid filler injection and show that this method is simple, safe, and effective.

Method

A total of 80 female patients were enrolled in the study. The age range of patients was from 21 to 54 years. All patients provided written informed consent. Patients who underwent lower blepharoplasty or surgery of the lower eyelid, received filler injections, and had severely saggy skin or large eye bags, orbital fat, protruding eyes, or almost no eyelid roll muscle were excluded from the study. Patient and physician satisfaction was evaluated at 1 month and 4 months after surgery. The level of satisfaction was graded from points 1 to 5 (point 1, very unsatisfied; point 2, unsatisfied; point 3, neither satisfied nor unsatisfied; point 4, satisfied; point 5, very satisfied).

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Surgical procedure

Skin anesthesia using local anesthetics is induced. For patients sensitive to pain, infraorbital and zygomaticofacial nerve

blocks may be used [3]. Following a consultation with the patient, the target site to be augmented is designed with a thickness of 3–5 mm from the subciliary line. The insertion site is designed 3–5 mm outside and 3–5 mm below the lateral canthus. A 25-G or 23-G needle is used to puncture the insertion site. A 27-G or 30-G cannula is then inserted. A total of 0.1–0.4 cc of hyaluronic acid filler (YVOIRE® Y Solution 360°, LG Chem, Republic of Korea) is injected into each pretarsal roll under both eyes. The filler is injected such that it is placed immediately in the subcutaneous layer directly above the orbicularis oculi muscle. It must be injected as close to the eyelash line as possible. A resting hand or cotton swab is used to support the bottom of the filler injection site to make sure the filler does not spread below. The pretarsal roll is shaped by injecting a single bolus from the inner to outer corner of the eye using a cannula. The same amount of filler must be injected in both eyes, and symmetry must be achieved (Fig. 1).

Result

All 80 patients completed the treatment session. The mean age of patients was 37.5 years. No serious adverse events developed during the course of treatment. One patient experienced temporary, mild erythema and one patient developed mild

ecchymosis after treatment, which subsided 3 days later and healed without any sequelae. The patient satisfaction and physician scores were 4.7 ± 1.1 (mean \pm standard deviation) points at 1 month and 4.8 ± 0.9 points at 4 months and 4.6 ± 0.9 points at 1 month and 4.8 ± 1.0 points at 4 months, respectively (Figs. 2 and 3).

Discussion

In literature, a roll in the subciliary area when smiling is considered a characteristic of beauty in women. Thousands of years ago, the Chinese described this effect as “a silkworm lying inferior to the eyes” [4]. It is a narrow characteristic of attractiveness and youthfulness. However, the pretarsal roll increases in vertical height and decreases in projection with age.

The width of the margin of the lower eyelid with the tarsal plate is around 2 mm. The angular inner corner of the eye allows the tarsal plate to attach to the eyeball, and the outer corner with cilia appears round and thick [5]. This area is called the pretarsal roll. Pretarsal fullness refers to the characteristic when the tarsal portion, one of the orbicular muscles below the eye and in front of the tarsal plate, becomes more evident as one smiles, and the top of the subtarsal line bulges out like a cake roll. The subcutaneous fat above and below the orbicular muscles in this area is very thin or almost nonexistent. A well-defined pretarsal roll is popular among Asians as it can create a lovely and youthful look and make the eyes appear larger [5, 6].

Therefore, various techniques for pretarsal augmentation have become popular in Asia, and these techniques often use hyaluronic acid, acellular dermal matrix, or tensor fasciae latae. Moreover, chubby pretarsal fullness is considered

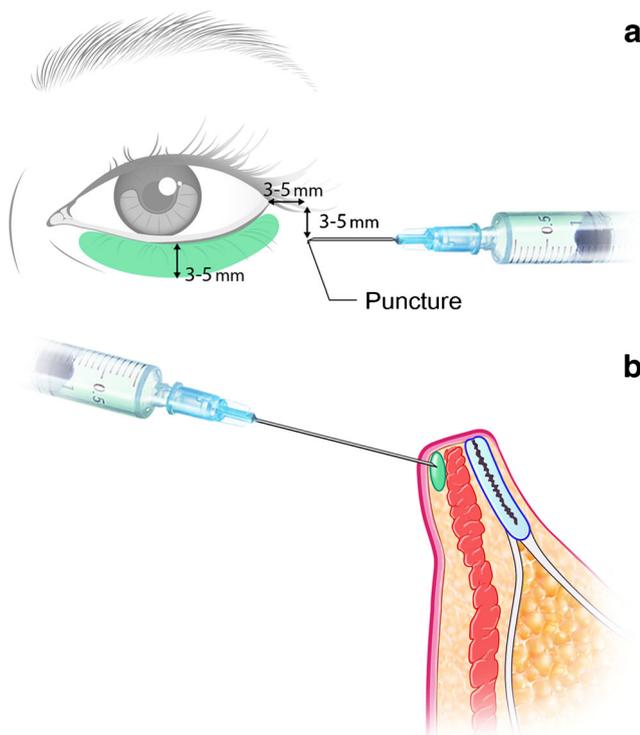


Fig. 1 **a** Appropriate injection site of pretarsal roll augmentation. **b** Dermal fillers (green) should be placed above the pretarsal part of the orbicularis oculi muscle

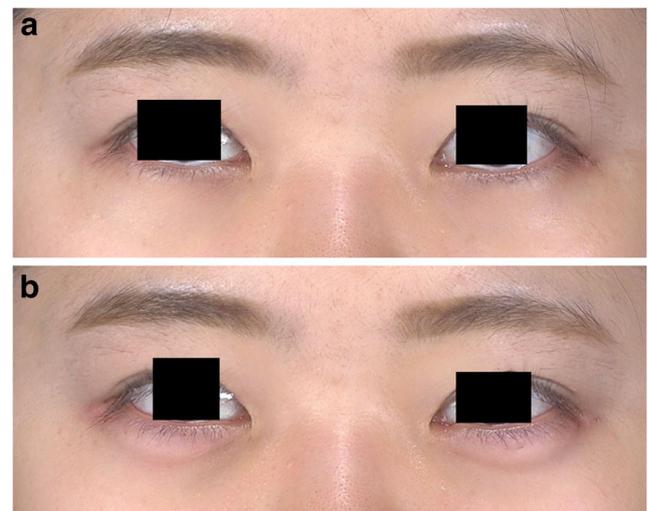


Fig. 2 Photographs of a 27-year-old woman. **a** Preoperatively. **b** 1 month postoperatively

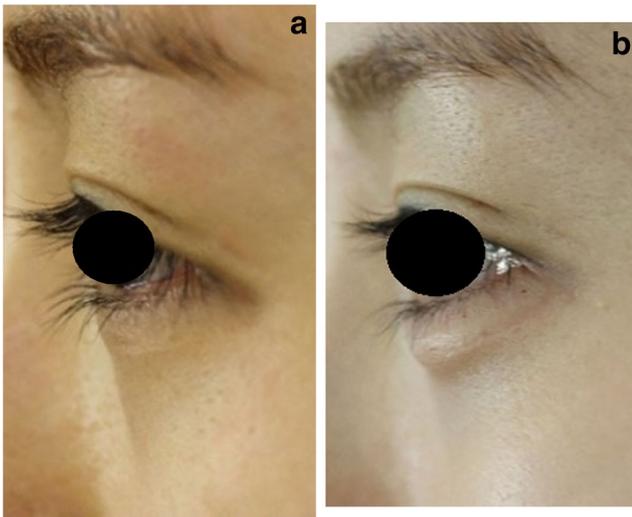


Fig. 3 Photographs of a 36-year-old woman. **a** Preoperatively. **b** 3 months postoperatively

attractive [6]. Therefore, some of our patients want to have pretarsal fullness not just for beauty but also to regain a youthful appearance. In contrast, Westerners do not prefer pretarsal rolls. Since excessively large pretarsal rolls can make the eyes appear smaller, pretarsal rolls of appropriate size and shape must be created. Young patients undergo pretarsal roll augmentation to create a smiley and lovely look. However, the skin under the eye sags, muscles become modified and relaxed, and the volume of the muscles that create a pretarsal roll decreases, resulting in a reduced volume in the area around the pretarsal roll. This creates a rather dull, tired, and sullen look. At this point, a procedure to restore the tarsal roll volume is necessary. The procedure also improves dark circles and fine wrinkles by skin expansion. When injecting a filler in the pretarsal roll, the crease that forms as the pretarsal roll contracts when the patient smiles must be checked in advance, and the surgeon must avoid increasing the volume below this line during the procedure.

In a cadaver study by Cong et al., the ophthalmic and inferior medial palpebral arteries were located deep in the orbicularis oculi, with the ophthalmic artery positioned on the septal fat as it entered the orbit. An extremely deep filler injection near the tarsal plate using a needle may cause direct intravascular injection through the ophthalmic artery. Therefore, fillers must be injected into the subcutaneous layer above the orbicularis oculi muscle to prevent vascular filler accidents. The tip of the needle must never penetrate below the muscle layers and stay within certain layers. If the injection is too shallow, a Tyndall phenomenon, in which the filler is exposed through the skin, can result, and thus, care must be taken when performing the injection [7]. In addition, fillers must be injected after aspiration, and it is safer to use a cannula than a needle.

The shape or thickness of the pretarsal roll can be adjusted to a certain extent according to the patient's preference. Since hard fillers can cause bumpy pretarsal rolls that excessively protrude, use of soft fillers is recommended. Fillers that can be easily injected and massaged and has cohesiveness and durability are recommended. Fillers that lack cohesiveness or are too heavy are not good. YVOIRE® Y Solution 360° (LG Chem, Republic of Korea) has high particle elasticity, which is a characteristic of biphasic fillers, and high cohesiveness even though it uses a relatively small amount of cross-linking agent compared with monophasic fillers. Its high elasticity and cohesiveness contribute to maximizing lift capability. Therefore, YVOIRE® Y Solution 360° can be considered an appropriate choice for pretarsal roll augmentation.

Dermal fillers are a popular choice among patients who prefer to undergo minimally invasive augmentation or rejuvenation of the face. Treatments with dermal fillers can create a more youthful appearance with immediate and predictable results and a short recovery time. To prevent the risk of excessive protrusion and sinking of the pretarsal roll, fillers must be injected as close to the eyelash line as possible [8]. A resting hand or cotton swab is used to support the bottom of the filler injection site to prevent the filler from spreading below. When the orbital fat under the eye bulges, the pretarsal roll and fat may combine when the patient smiles, causing the whole area under the eye to look swollen. Therefore, it is good to evaluate orbital fat protrusion under the eye in advance. Most patients who have undergone lower eyelid surgery have dull-looking skin under the eyes [9]. For these patients, pretarsal roll augmentation may be a good option. However, care is needed since the procedure may be difficult due to the scars from the previous surgery. Natural pretarsal rolls have the dynamic characteristic of being less visible in the absence of a facial expression and becoming more evident when one smiles. However, artificial pretarsal rolls created by fillers protrude to a certain extent even when one does not smile. Care is especially needed to achieve symmetry between both pretarsal rolls. The same injection site, dose, and direction must be used for both eyes [10].

With a filler injection, the swelling generally subsides during the first couple of weeks after the injection. After the period of shape correction, it is maintained for about 1 year and is then gradually absorbed, with most of the filler being absorbed after 18 months. Therefore, we believed that a 4-month follow-up period would reflect what is maintained for about 1 year; therefore, based on this, we decided on a short follow-up period. In addition, because it is a simple procedure and our goal was to simply introduce the procedure, we discussed a small number of cases in our report.

An adequate depth and amount of injection are important for pretarsal roll fillers. When fillers are injected too close to the skin, a Tyndall phenomenon, in which the fillers are exposed through the skin surface, may occur [11]. Deep injections can lead to unnatural or faulty shapes and have the risk of vascular complications. Therefore, fillers must be injected in an adequate depth above the orbicularis oculi muscle. They must also be injected in appropriate amounts of 0.1–0.4 cc. This study is the first to introduce the method of pretarsal roll augmentation using fillers. Further research is needed.

Pretarsal roll augmentation with dermal hyaluronic acid filler injection is a technique that uses simple methods and focuses on the restoration of pretarsal fullness. This technique improves periorbital contouring, rejuvenates the pretarsal roll, and provides excellent esthetic results.

Compliance with ethical standards

Conflict of interest Gyu Sik Jung declares no conflict of interest.

Research involving human participants and/or animals This study was performed according to the principles of the Declaration of Helsinki. For this type of study, formal consent is not required.

Informed consent All of the patients provided written informed consent before the surgical procedures and outcome analysis. Patients provided written consent for the use of their images.

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