

Case Series

Forehead Augmentation with Hyaluronic Acid

Mohannad A Alsufyani*, Maram Alzain, M. D., Mohammed Alsufyani, M. D

Prince Sultan Military Medical City, Riyadh, Saudi Arabia

*Corresponding author: Dr. Mohammed Alsufyani, Prince Sultan Military Medical City, Riyadh, Saudi Arabia, Tel: 00966505203746;

Email: malsufyani@psmmc.med.sa

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Abstract

An integral part of the face, the forehead region constitutes the upper one-third of the countenance. When soft tissue resorption occurs, the beautiful bossing shape of the forehead that conveys the beauty of a female is lost. As the exaggeration of the supraorbital bones becomes more apparent, more masculine features are reflected. Various methods have been used for the augmentation of the forehead, including autologous fat grafts, alloplastic materials and methylacrylate. Hyaluronic acids are most commonly used material for soft tissue augmentation. We demonstrate herein the effectiveness and safety of restoring the soft tissue deflation of the forehead region when seeking to retain the beautiful convex female shape by using hyaluronic acid.

Keywords: Cosmetic Surgery; Augmentation; Hyaluronic Acid

Introduction

Soft tissue augmentation ranks second amongst the most popular non-invasive cosmetic procedures [1]. The forehead region constitutes the upper one-third of the face and is a major determinant of the facial aesthetics. A forehead that is broad, convex and smooth is considered feminine and more attractive than one that is flat or sunken [2].

Hyaluronic acid (also called hyaluronan, hyaluronate, or HA) is an anionic, nonsulfated glycosaminoglycan that is distributed widely throughout connective, epithelial, and neural tissues [3]. Being one of the chief components of the extracellular matrix, hyaluronan contributes significantly to cell proliferation and migration.

In 2003, the FDA approved hyaluronic acid injections for soft-tissue augmentation defects such as nasolabial folds, it has been generally accepted by patients and physicians alike.

Multiple types of hyaluronic acid products exist; their main application is intended to restore volume loss that results from the atrophy of soft tissue. The forehead is no exception.

We have been using hyaluronic acid for the augmentation of the forehead because it has many favorable characteristics: HA is non-allergenic, non-thermo-conductive, and inexpensive. Further, it induces minimal inflammatory reactions, gives a predictable result, and has an antidote (i.e., hyaluronidase) that is readily available in the event of unsatisfactory outcomes [4,5].

Our patients show satisfactory outcomes with HA injections on long-term follow-up.

Description of the technique

A lidocaine premixed 1-ml hyaluronic acid syringe (Restylane-L; Q-Med, Uppsala, Sweden) is further mixed with 0.2 ml of 1% plain lidocaine to further decrease its viscosity

and increase its malleability by using a leur-leur lock to connect the hyaluronic acid syringe with the 3-ml syringe containing the 0.2ml lidocaine. The mixing is done with a back-and-forth swishing technique for approximately 10 times to assure proper blending.

The patient is positioned in an upright setting manner. With 70% isopropyl-alcohol swabs, the forehead region is disinfected and prepped for injection. An overhead light is used to exaggerate the volume deficiency (Figure 1) for a better visualization of the region. A 25-G needle is used to create the entry point by introducing the whole of the bevel of the needle. The syringe of the hyaluronic acid is mounted with a 1 & 1/2-inch-long 27-G cannula.



Figure 1. Overhead lighting exaggerates the volume deficiency of the forehead region. Anterior view.



Figure 2. Immediately post treatment, anterior view.



Figure 3. Patient after nine months of treatment.

The cannula is then inserted down to the periosteum and the HA is injected and massaged afterwards to mold it to the desired end point (Figure 2,3). Extreme care should be taken when working around regions that contain major vessels (i.e., supratrochlear and supraorbital vessels).

Discussion

A number of methods have been developed for forehead contouring, which can be categorized as soft tissue augmentation and skeletal augmentation [4].

Skeletal augmentation can be defined as forehead augmentation with alloplastic materials, such as silicone, bone cement, and expanded polytetrafluoroethylene. Ideal implants for facial skeletal augmentation have some prerequisites, such as: 1) the rigidity of the implant should be similar to bone so that the external surface of the augmented forehead can mimic the shape of the bone; 2) the inner surface of the implant should be able to fit closely to the bone to minimize the dead space between the implant and the bone; 3) the edges of the implant should be tapered so that they are not visible or palpable; 4) immobilization and 5) safety of the implant should be insured.

Various methods for forehead contouring have been described in the literature [6-8].

Silicone is one of the most widely used implant materials for the skeletal augmentation of the forehead. Most surgeons mold the silicone implants, trying to exactly fit the patient's forehead contour, which may turn out to be difficult. Indeed, gaps between the forehead and the implant may result. In addition, if the patient has a thin skin texture, the borders of the silicone implant can be perceptible [9].

Fat injection or autologous fat grafting for facial contouring is one other most frequently used methods because it is easy and is a relatively minimally invasive procedure. However, it has the critical risk of unpredictable resorption over time and the additional concern of uneven distribution of the fat throughout the treated area [10]. Autologous fat may also be associated with swelling and lumps in the eyelid, despite it being a very rare complication of autologous fat injection for cosmetic forehead augmentation. Goretox implants have been used for forehead augmentation, but they carry the disadvantage of volume shrinkage over time [9].

Autologous bone grafts have been used as well. However, they are not the ideal choice for forehead augmentation because such large amounts of bone are required that the donor site is left with consequence morbidity. This method is also prone to the risk of resorption of the graft [11].

Alloplastic forehead augmentation using soft expanded polytetrafluoroethylene (ePTFE) has a limited degree of forehead augmentation and higher chance of infection [11].

Soft tissue augmentation with DermaLive (hyaluronic acid with acrylic hydrogel particle) led to a series of severe delayed adverse reactions. Sclerosing DermaLive granulomas

demonstrated low success rates with conservative measures, whereas early radical surgical excision achieved good results [12].

An intimate knowledge of the anatomy of the forehead region is crucial to avoid complications arising from insulting major vascular structures [13].



Figure 4. Horizontal forehead rhytides prior to treatment.



Figure 5. Decrease in the severity of the rhytides after two weeks of augmenting the forehead, without having to use botulinum toxin injections.

In our practice, the method by which we use the hyaluronic acid for the soft tissue augmentation of the forehead yielded very satisfactory and reproducible results. We have been using this approach to forehead augmentation since 2012, and we have treated twelve very satisfied patients. All patients were females with ages ranging from 27-63 years. All cases treated with no more than 1-ml of product. The satisfaction was rated using The Global Aesthetic Improvement Scale (GAIS) which is a 5-point scale rating global aesthetic improvement in appearance, compared to pretreatment, as judged by the investigator. The rating categories were "worse," "no change," "improved," "much improved," and "very much improved." GAIS was measured for each case at baseline and during follow-up, with results compared to the baseline pretreatment photographs. Nine of the twelve

patients rated their improvement as "very much improved", while three out of them rated it as "much improved". Five out of the twelve had mild bruises, and ten out of the twelve had mild edema. All side effects resolved within 10-14 days. We also observed that the longevity of the product lasted an average of 12 to 18 months. Serendipitously, we noticed that some of our patient that had the procedure done, to have their horizontal forehead rhytides improves significantly (Figures 4 & 5). We postulate that this is a kinetic effect of the filler on the frontalis muscle in which the space occupied by the filler stretches the region resulting in decreasing laxity of the forehead and increases the tension of the skin, making it less adaptable to contraction and movement of the underlying frontalis muscle.

Conclusion

An integral part of the face, the forehead region constitutes the upper one-third of the countenance. When soft tissue resorption occurs, the beautiful bossing shape of the forehead that confers the beauty of a female is lost; as the exaggeration of the supraorbital bones becomes more apparent, masculine features are reflected. Various methods have been used for the augmentation of the forehead, including autologous fat grafts, alloplastic materials, or methylacrylate. Hyaluronic acids are the most frequently used material for soft tissue augmentation. They have demonstrated a high level of efficacy and an excellent safety profile when used to augment the soft tissue of the forehead region. We believe that the soft tissue augmentation of the face should be three-dimensional. Atrophy of the soft tissue of the face occurs in all areas, and the forehead is no exception.

References

1. American Society of Plastic Surgeons. 2013 statistics.
2. Altman K. Facial feminization surgery: current state of the art. *Int J Oral maxillofac Surg.* 2012, 41(8): 885-894.
3. Stern R. Hyaluronan catabolism: a new metabolic pathway. *Eur J Cell Biol.* 2004, 83(7): 317-325.
4. Blum KS, Schneider SJ, Rosenthal AD. Methylmethacrylatecranioplasty in children: long-term results. *Pediatr Neurosurg.* 1997, 26(1): 33-35.
5. Gosain AK, Persing JA. Biomaterials in the face: benefits and risks. *J Craniofac Surg.* 1999, 10(5): 404-414.
6. Gonzalez Ulloa M, Stevens E. Implants in the face; a review of our experience in the subcutaneous use of methylmethacrylate. *Plast Reconstr Surg.* 1964, (33):532-542.
7. Kang JH, Jung SW, Lee YH, Kook KS. Contouring of the forehead and temple area with auto-fat injection. *J Korean Soc Plast Reconstr Surg.* 2011,38(2):166-172.
8. Park CS, Hyon WS, Park YJ, et. Al. Correction of facial depression using precisely-shaped silicone implants. *J*

- koreanSocplastReconstr Surg. 2000, 27(1):87-91.
9. Park CS, Hyon WS, Park YJ, Kim JJ, Ha BJ, et al. Facial fat injection; long-term follow-up results. J Korean Soc Aesthetic Plast Surg. 2010,16(1): 35-40.
 10. Park JS, Cho WK, Park GS, Yang SW. Eyelid-associated complications after autologous fat injection for cosmetic forehead augmentation. BMC Ophthalmol. 2013, 10:13-32.
 11. Wong JK. Forehead augmentation with alloplastic implants. Facial Plast Surg Clin North Am. 2010, 18(1):71-77.
 12. Demir E, Perez-bouza A, Pallua N. Adverse late reactions after cosmetic implantation of hydroxymethacrylate particles suspended in hyaluronic acid; clinics and complication management. Aesthetic Plast Surg. 2013, 37(3):576-586.
 13. Sykes JM. Applied anatomy of the temporal region and forehead for injectable fillers. J Drugs Dermatol. 2009, 8(10 Suppl): s24-27.