

CLINICAL COMMENTARY

Exploring facial overfilled syndrome from the perspective of anatomy and the mismatched delivery of fillers

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Abstract

Introduction: Facial fillers and injectables have transformed the landscape of cosmetic procedures, offering rejuvenation possibilities. However, the emergence of “Facial Overfilled Syndrome (FOS)” presents a concerning trend attributed to excessive filler use and suboptimal injection techniques. Understanding the interplay between facial aging and augmentation techniques is crucial in addressing and preventing FOS.

Material and Methods: Facial overfilled syndrome is characterized by the excessive use of fillers, resulting in a distorted and heavy appearance. It manifests in various forms, including ‘flowerhorn’ foreheads, ‘sunset’ eyes, ‘chipmunk’ cheeks, ‘witch’ chins, and ‘pillow’ faces. The syndrome arises from attempts to combat anatomical aging with dramatic filler treatments, causing rapid volume changes and skin tightening. Skeletal structures and soft tissue distribution across different ethnicities play a significant role in FOS development.

Results: Understanding the aging process across facial tissues is essential, as fillers cannot entirely reverse aging manifestations. Tailored assessment and treatment plans should precede filler injections, involving muscle assessment, observation of facial movements during injection, and ultrasound imaging of fat layers. Attention should be given to filler pressure and migration risks, particularly in areas with elevated pressure. Additionally, alternative approaches like energy-based devices and polymer reinforcement of facial ligaments should be considered to minimize filler use. Ethnic variations in facial anatomy require careful consideration to avoid overcorrection.

Conclusion: FOS predominantly affects individuals of East Asian descent due to specific facial characteristics. Prevention strategies involve minimizing filler use, addressing underlying bone changes, and considering ethnic and gender differences in facial anatomy. Recent MRI and ultrasound studies challenge the notion of filler breakdown, emphasizing the importance of filler selection and injection techniques. Education, individualized treatments, and a holistic understanding of facial anatomy are key to preventing and managing FOS and ensuring natural and harmonious facial aesthetics.

KEYWORDS

facial aging, facial anatomy, facial fillers, injection techniques, overfilled syndrome

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The pursuit of rejuvenation through facial fillers and injectables has revolutionized cosmetic procedures. However, within this landscape, a phenomenon known as “Facial Overfilled Syndrome (FOS)” is starting to emerge due to over-emphasis on volume replenishment and poor technique in delivering fillers. Understanding the interplay between the aging process and the intricate technique of facial augmentation is crucial to prevent and address this perplexing issue.

Facial overfilled syndrome, characterized by excessive filler leading to a heavy, distorted appearance, is not a one-time event but a progressive condition. This syndrome exhibits various manifestations, from ‘flowerhorn’ foreheads to ‘sunset’ eyes, ‘chipmunk’ cheeks, ‘witch’ chins, and ‘pillow’ faces (Figure 1).¹ While previously assumed to predominantly affect women, it’s crucial to note that FOS can impact males as well. Poor understanding of the skeletal structures and soft tissues distribution in different ethnicities and subtypes is one of the main culprits to FOS. The attempt to “westernized the face” or following certain mathematical proportions of the face without respecting the bone frame of a person, is like building a tower in the sand, waiting for disaster to happen.

The FOS arises from attempts to address anatomical aging by using dramatic filler treatments, which tighten the skin and rapidly increase volume, causing dramatic changes. From an anatomical perspective, all structures within the facial layers undergo the aging process. This includes fat sagging and atrophy, contractures in muscles such as the frontalis and corrugator, laxity or elongation in lip elevator muscles, and contracture in lip depressor muscles—all of which are outcomes of the aging process.

Moreover, bone volume experiences minimal degradation, and collagen fiber content changes in the reticular layer of the skin, leading to thinning of the skin. While fillers cannot entirely rectify these aging processes, it’s crucial to acknowledge that many physicians and patients may mistakenly believe in the complete correction

through fillers or fail to recognize that continual filler treatments can exacerbate these aging manifestations.

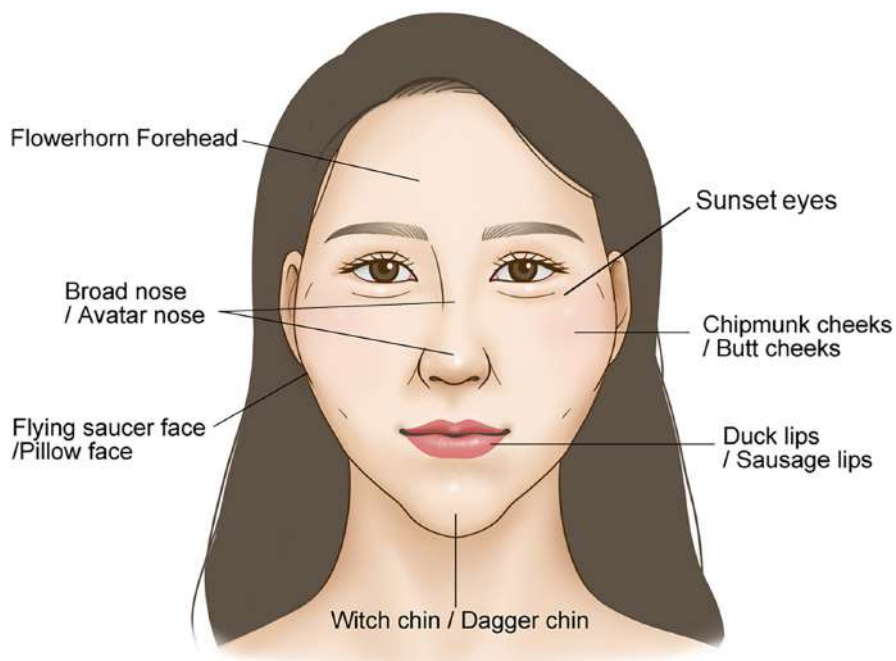
To address this, a tailored assessment and treatment plan should be established for each patient prior to administering filler injections. For instance, during anterior cheek augmentation, it is essential to assess the degree of contraction in the zygomaticus major muscle. While administering fillers, careful observation of the patient’s active facial movements should be maintained. This vigilance ensures a more precise injection process and helps in monitoring the effects of fillers in relation to the patient’s muscle activity.²

Additionally, precise consideration should be given to the thickness of both superficial and deep fat layers using ultrasound imaging.³ Furthermore, it is imperative to consider the directional force or pressure that the filler undergoes upon injection as it is placed. This can be attributed to the movement of facial muscles and might occur at points of puncture where the filler is injected. Additionally, it’s crucial to consider that in the case of superficial fat, the reticular cutis is densely structured, resulting in higher pressure compared to the deeper fat layers.

When fillers are situated in areas with elevated pressure, there is a risk of migration. Hence, it is essential to implement procedures such as subcision or botulinum neurotoxin to lower the pressure and ensure proper pressure control. It’s important to note that despite these measures, some areas, like the subzygomatic arch depression, can still present challenges and may not be easily addressed.⁴

Moreover, since the aging process occurs simultaneously across all tissues, it is prudent to minimize the use of fillers. Alternative approaches may involve utilizing energy-based devices for skin treatment or employing polymers to reinforce facial ligaments. It’s essential to consider that relying solely on filler-based monotherapy can be a contributing factor to the development of the FOS.

FIGURE 1 The overfilled syndrome can manifest in various ways: excessive filling in the forehead can result in the flowerhorn forehead appearance; over-injection around the cheeks causing an upward displacement of the eyes leads to sunset eyes; excessive nose injections can create a broad or Avatar-like nose; an overblown mid-face can contribute to the flying saucer face or pillow face appearance. Additionally, an overfilled chin can give rise to the witch chin or dagger chin. It’s important to note that while there’s a misconception that this syndrome primarily affects women, it is not exclusive to females, as males can also experience the overfilled syndrome.



Additionally, other considerations should include analyzing skeletal structures, volume distribution, symmetry, gender, ethnicity, cultural preferences, and whether the approach is focused on specific areas or takes a global perspective. Notably, in Asians, the zygomatic protrusion extends more forward compared to Caucasians, where it is typically larger and more recessed. This implies that excessive volume injected into the prezygomatic space, particularly on the anterior cheek, could lead to an exaggerated effect, resulting in an overblown or chipmunk-like face. Furthermore, in Asians, the wider and more prominent zygomatic arch can contribute to what is described as a “flying saucer” face when there is an excess of volume injected in this region.

The FOS tends to affect individuals of East Asian descent more prominently due to facial skeletal structure and anatomical characteristics. This vulnerability stems from a protrusion of the zygomatic arch and maxillary protrusion and a lower position of modiolus, resulting in a broader cheek area compared to other ethnicities.

Indeed, as Caucasians age, they typically exhibit a tendency toward lip inversion rather than prognathism (Figure 2). Consequently, this demographic may require more filler treatments to outwardly evert the lips. Conversely, in Southeast Asians, due to their inherent forward lip extension, the necessity for extensive lip filler treatments may be reduced.⁵ When employing filler treatments, it's crucial to target not just the visible lines or soft tissues but also to consider addressing the underlying bone changes. This approach involves providing support not only to the muscles and soft tissues but also focusing on restoring the bone structure affected by the aging process.⁶

Recent discoveries using MRI and ultrasound have overturned the belief that fillers easily break down within 6–12 months. MRI studies conducted recently have revealed that fillers persist within the fat pads for up to 27 months, albeit spread out in the tissues.⁷

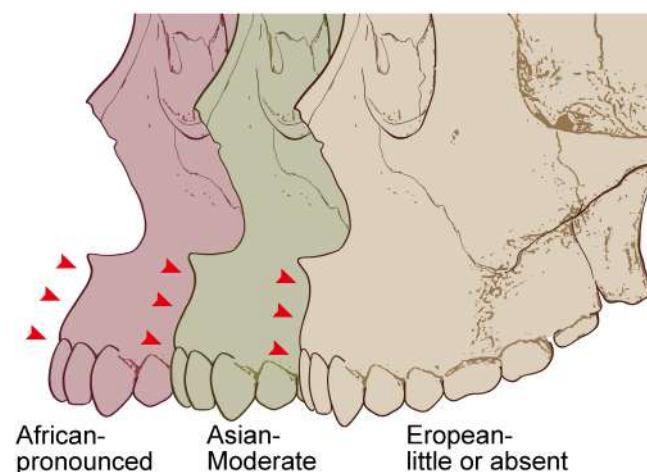


FIGURE 2 As Caucasians age, they commonly show a tendency toward lip inversion rather than prognathism, potentially necessitating increased filler treatments to outwardly evert the lips. In contrast, Southeast Asians, characterized by inherent forward lip extension, might require fewer extensive lip filler treatments due to this natural lip structure.

Additionally, ultrasound studies have demonstrated the continued visibility of fillers, even after being injected over 7 years ago. Yi highlighted through ultrasonographic observation the presence of inactive granulomas superficially located near the orbital rim.⁸ These inactive granulomas pose a challenge in dissolving hyaluronic acid as they are enclosed and encapsulated (Figure 3). While the enduring effects of fillers remain subject to scrutiny, this phenomenon may contribute to the occurrence of FOS.

In injection techniques, it's essential to consider myomodulation, which involves the adjustment of muscle activity. Myomodulation is a crucial factor to contemplate, especially considering the impact of fillers on applying pressure and potentially stiffening facial expressions.⁹ Injecting excessive filler into the anterior cheek area can impose a weight burden on the lip elevator muscles. Fatty tissue has a density of around 0.9 g/mL, whereas hyaluronic acid filler weighs over 1 g/mL. Additionally, the aging process itself can lead to laxity in the lip elevator muscles.^{10,11}

Excessive volume placed in the deeper layers provides support but can also result in muscle lengthening, making it challenging for the muscles to contract effectively. Similarly, in the superficial layers, the tissues become heavier compared to typical fatty tissues. Moreover, the superficial fatty tissues are primarily composed of reticular cutis, which adds to their density. Consequently, it is crucial to apply these fillers considering the anatomical features to avoid disrupting the natural dynamics of the facial tissues.

Finding appropriate products is also considered a method for preventing the FOS. In superficial injections, there is a higher susceptibility to shear stress and compression, particularly from external forces. Shear/Elastic Modulus (G') refers to a gel's ability to resist deformation caused by lateral shear stress (Figure 4). G' essentially signifies the gel's firmness or hardness against such stress, which

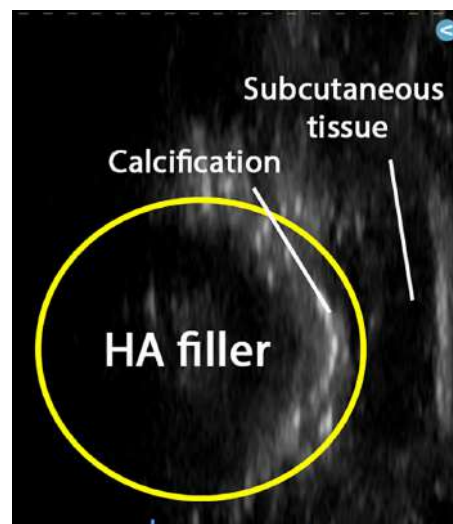
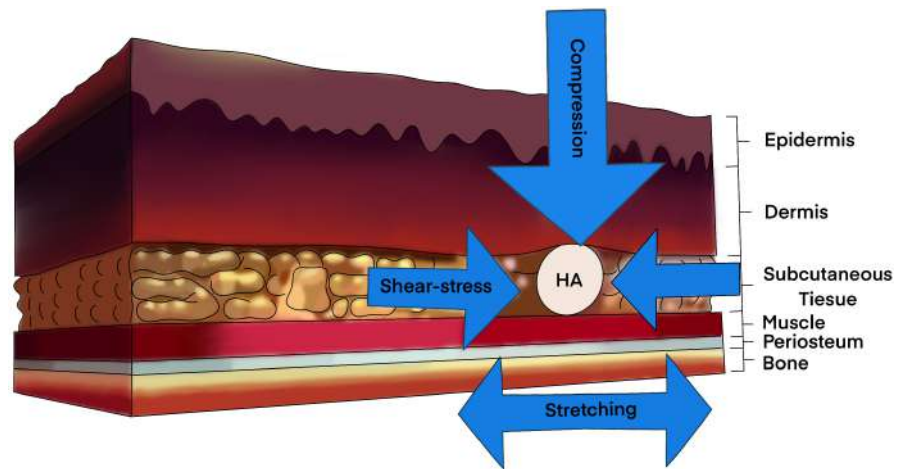


FIGURE 3 The use of ultrasonography revealed the existence of inactive granulomas (highlighted in yellow circles) positioned superficially around the orbital rim. These inactive granulomas present difficulty in dissolving hyaluronic acid due to their encapsulated and enclosed nature.

FIGURE 4 Superficial injections are more prone to shear stress and compression, primarily from external forces, and the Shear/Elastic Modulus (G') characterizes a gel's capacity to withstand deformation induced by lateral shear stress.



is crucial in withstanding movement between skin layers induced by muscle movements. Compression parameters encompass both dynamic and static modes of projection capacity, combining E' and F_n . In the context of dynamic expression, E' represents resistance to dynamic compression, such as muscle movements or pressure from hands or pillows. On the other hand, F_n indicates resistance to static compression, such as skin compression. Selecting products that consider these factors can aid in avoiding the FOS when used appropriately in facial injections.¹²

Both younger and older patients often fail to recognize the FOS by themselves. In younger individuals, their appearance might seem normal when not smiling; however, upon smiling or making facial expressions, their features might appear widened and exaggerated. The lateral protrusion of the cheeks can make the eyes seem smaller or even sunken due to the widened width of the face.

Conversely, in older patients, the effect is often characterized by a heavier appearance. This heaviness results from the weight of the filler, which primarily resides in the most anterior part of the cheeks. This weight pulls down the anterior cheek region, contributing to the development of deeper nasolabial folds.

Previously, it was more common to encounter well-defined and prominently exaggerated cases of FOS, as depicted in Figure 1. However, these days, there is a growing trend of FOS that appears awkward depending on facial expressions. Consequently, younger patients might be unaware of experiencing FOS, while older patients might mistake FOS as a natural part of their aging process. This underscores the importance for physicians to be well-versed in identifying and preventing the occurrence of FOS.

In conclusion, the complexities of FOS stem from a myriad of factors, ranging from anatomical disparities to inadequate treatment approaches. Mitigating this syndrome requires a holistic understanding of facial anatomy, the aging process, and individualized treatment strategies that transcend superficial aesthetics. Understanding, educating, and tailoring treatments to each patient's unique characteristics are pivotal in preventing and addressing FOS, ensuring natural and harmonious outcomes in facial aesthetics.

AUTHOR CONTRIBUTIONS

All authors have reviewed and approved the article for submission. Conceptualization, Ting-Song Lim, Kyu-Ho Yi, Rungsima Wanitphakdeedecha. Writing—Original Draft Preparation, Ting-Song Lim, Kyu-Ho Yi, Rungsima Wanitphakdeedecha. Writing—Review & Editing, Ting-Song Lim, Kyu-Ho Yi, Rungsima Wanitphakdeedecha. Visualization, Ting-Song Lim, Kyu-Ho Yi, Rungsima Wanitphakdeedecha. Supervision, Ting-Song Lim, Kyu-Ho Yi, Rungsima Wanitphakdeedecha.

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CONFLICT OF INTEREST STATEMENT

I acknowledge that I have considered the conflict of interest statement included in the "Author Guidelines." I hereby certify that, to the best of my knowledge, that no aspect of my current personal or professional situation might reasonably be expected to significantly affect my views on the subject I am presenting.


DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

This study was conducted in compliance with the principles of the Declaration of Helsinki.

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