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REVIEW

A Review: Causes, Consequences, and Management Strategies of Facial Overfilling

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Abstract: In recent years, Overfilled Syndrome and the associated "Bread Bun" phenomenon have garnered significant attention in the field of aesthetic medicine, particularly among younger populations. This article systematically reviews the causes, consequences, and management strategies of facial overfilling, aiming to provide a scientific basis for the prevention and correction of this phenomenon. The causes of overfilling involve technical, patient, and physician-related factors: technical factors include improper injection dosage, depth, and point design; patient factors primarily stem from the excessive pursuit of "perfect" facial features and unrealistic expectations; while physician factors are related to insufficient experience, lack of technical proficiency, and misinterpretation of aesthetic standards. The consequences of overfilling include aesthetic imbalance, health risks, and psychological issues. To effectively prevent and manage overfilling, this article proposes detailed preventive strategies, including preoperative assessment and design, patient education, intraoperative layered injection techniques, and regular postoperative follow-ups. For cases where overfilling has already occurred, non-surgical correction and surgical correction are the primary treatment methods. Additionally, psychological support and the application of portable ultrasound technology play important roles in the correction process. Future research directions include the development of quantitative assessment tools, optimization of prevention and management strategies, and the development of new filler materials and technologies. Through scientific preventive strategies, precise treatment plans, and ongoing research and innovation, the occurrence of overfilling can be effectively reduced, advancing facial filler procedures toward greater safety and naturalness.

Keywords: overfilled syndrome, bread bun, hyaluronic acid, hyaluronidase, portable ultrasound

Introduction

Overfilled Syndrome and the "Bread Bun" phenomenon have become hot topics in the field of aesthetic medicine in recent years, particularly among younger individuals. The emergence of these phenomena is associated with multiple factors. Firstly, the widespread use of social media and the popularity of influencer-driven beauty standards have led many to pursue "perfect" facial features, such as full apple cheeks, a pointed chin, and a high nasal bridge. This has driven an increased demand for excessive filler treatments.[1] Secondly, some unregulated institutions or practitioners, driven by profit motives, may recommend excessive filler use, including the injection of large volumes of fillers in a single session.[1] Additionally, some practitioners lack a comprehensive understanding of facial aesthetics and proportions, overemphasizing localized filler injections while neglecting overall facial harmony.[2] Improper selection and application of fillers also play a significant role.[2] Different facial regions require specific types of fillers (eg, hyaluronic acid, collagen), and inappropriate choices or incorrect injection techniques can easily lead to the "Bread Bun" phenomenon. Another common cause of overfilling is repeated filler application within a short time-span.[3] Some patients, after partial absorption of the initial filler, frequently undergo additional injections to maintain an extreme level of fullness, resulting in the accumulation of fillers and eventual overfilling. Alternatively, an impatience for immediate results may lead to multiple injections within a short period, causing the face to appear excessively full.[4] Moreover, overfilling often overlooks dynamic facial aesthetics, leading to stiff

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expressions, a loss of natural beauty, and even disruption of overall facial proportions, resulting in an unnatural appearance.[4] The term "Bread Bun" is derived from the traditional Chinese food, mantou (steamed bun), which is characterized by its smooth, plump, and wrinkle-free surface, resembling the overfilled facial features seen in Overfilled Syndrome. This may explain why, in China, both patients and practitioners refer to the facial changes associated with Overfilled Syndrome as "Bread Bun" transformation. By reviewing the causes, outcomes, and current treatment approaches for overfilling in the Chinese population, this study aims to provide guidance for the prevention of overfilling and the management of the "Bread Bun" phenomenon (Table 1).

Causes of Overfilling

Technical Factors

Firstly, injection dosage is one of the key factors contributing to overfilling. Excessive injection of fillers (eg, hyaluronic acid) can cause overexpansion of local tissues, disrupting the natural facial contours.[5] Overfilling in dynamic facial areas, such as the apple cheeks and nasolabial folds, is particularly prone to inducing the "Bread Bun" phenomenon.[5] This may be related to the excessive volume of the material itself, which restricts the movement of facial expression muscles. Secondly, the choice of injection depth is critical. With the continuous advancement of facial filler materials, the selection of appropriate materials has become an essential skill for practitioners.[6] Fillers must be precisely injected into different layers (eg, supraperiosteal, subcutaneous, or dermal) based on facial anatomy.[6] For instance, materials such as poly-L-Lactic acid (PLLA), polycaprolactone (PCL), or hyaluronic acid, if injected superficially in the subcutaneous layer around the orbit, may lead to surface irregularities or visible filler contours.[7] Conversely, materials like collagen or non-cross-linked hyaluronic acid, if injected too deeply, may fail to achieve the desired shaping effect. Lastly, the rationality of injection point design directly impacts the filler outcome.[8] The design of injection points must consider facial aesthetic proportions and muscle dynamics.[8] Uneven or overly concentrated distribution of injection points may result in localized over-protrusion, disrupting overall facial harmony. Therefore, precise control of injection dosage, appropriate selection of materials and injection depths, and scientifically designed injection points are key technical considerations to avoid overfilling.

Patient Factors

Excessive aesthetic demands are a significant contributor to overfilling.[9] Influenced by social media and internet celebrity culture, many patients pursue extreme "fullness" or "youthful" appearances, such as overfilled apple cheeks, a high nasal bridge, or a pointed chin.[10] This homogenized aesthetic trend drives patients to request excessive filler injections, often neglecting natural facial proportions and dynamic beauty. Secondly, patients often hold unrealistic expectations for facial filler treatments, hoping to achieve dramatic and long-lasting changes in a single session, or even striving for a "flawless" appearance.[11] Such unrealistic expectations may lead patients to frequently request touch-up injections or one-time

Table 1 Summary of Causes, Consequences, and Management Strategies for Facial Overfilling

Category	Key Elements	Supporting Evidence (References)	Clinical Implications
Technical Causes	- Excessive injection volume	[5,6]	Disrupts natural facial contours
	-Improper injection depth/point design	[7,8]	May cause visible filler lumps or asymmetry
Patient Factors	- Unrealistic aesthetic expectations	[9,10]	Requires preoperative education
	- Frequent touch-up requests	[11]	Risks cumulative overfilling
Aesthetic Impacts	"Pillow Face" appearance	[12,13]	Loss of natural facial dynamics
	Disproportionate facial features	[14]	Patient dissatisfaction
Health Risks	Vascular embolism	[15,16]	Tissue necrosis, vision loss (if untreated)
	Nodule formation	[17]	May require surgical intervention
Prevention	Layered injection techniques	[18,19]	Ensures even filler distribution
	Preoperative 3D assessment	[20,21]	Personalizes treatment plans
Correction	Hyaluronidase for HA dissolution	[22]	Rapid volume reduction
	Portable ultrasound-guided removal	[23,24]	Improves precision in filler localization

excessive filling, resulting in facial swelling, stiffness, and other signs of overfilling. Therefore, it is essential for practitioners to engage in thorough communication with patients before treatment, guiding them to adopt a rational aesthetic perspective and clarifying the limitations of filler treatments as well as the goal of achieving natural beauty.[11] This approach helps prevent overfilling. Additionally, when faced with patients who clearly do not meet the indications for treatment, practitioners should decisively decline to perform the procedure.

Physician Factors

Insufficient experience or lack of technical proficiency among physicians is a significant cause of overfilling.[25] Facial filler procedures require precise control over injection dosage, depth, and point design. Inexperienced practitioners may inadvertently distribute fillers unevenly or administer excessive amounts due to improper technique, leading to complications such as facial swelling, irregularities, or asymmetry.[25] Secondly, a physician's misinterpretation or misapplication of aesthetic standards can adversely affect filler outcomes. Some practitioners may overemphasize localized fullness (eg, apple cheeks or nasolabial folds) while neglecting overall facial proportions and dynamic aesthetics, resulting in an unnatural appearance post-treatment.[26] Additionally, failure to tailor filler plans to the patient's individual characteristics may also contribute to overfilling. Therefore, it is imperative for physicians to continuously refine their technical skills, deepen their understanding of facial aesthetic principles, and develop personalized treatment plans based on the patient's unique features.[27] These measures are essential to minimize the risk of overfilling.

Consequences of Overfilling

Aesthetic Impact

The most common manifestation of overfilling is the loss of natural facial aesthetics, often referred to as "Overfilled Face" or "Pillow Face."[12] This phenomenon typically occurs when excessive filler material is used, causing certain facial areas to become overly inflated, resulting in a bloated, stiff appearance that lacks natural lines and dynamic beauty.[13] This unnatural look not only compromises overall aesthetics but may also make patients appear older or more disproportionate than they actually are.[13] Facial aesthetics emphasize harmony and balance among different facial features, which can be disrupted by overfilling.[14] For example, overfilling the cheeks may cause the midface to protrude excessively, making other areas (eg, chin or forehead) appear relatively recessed, leading to facial disproportion. This imbalance not only makes the face appear disharmonious but may also lead to patient dissatisfaction and even psychological stress.[14] This loss of beauty further exacerbates the unnatural appearance and may affect the patient's social confidence.

Health Risks

Overfilling can lead to significant health risks, with vascular embolism being the most dangerous.[15] When filler material is accidentally injected into blood vessels or compresses surrounding vessels, it can obstruct blood supply, leading to local tissue ischemia and hypoxia, which may result in tissue necrosis.[15] This is particularly common in high-risk facial areas (eg, glabella, nose, nasolabial folds). If not promptly addressed, it can cause permanent damage, including vision loss or extensive skin necrosis.[16] Additionally, vascular embolism may trigger thrombosis, further increasing the risk of systemic complications.[16] Overfilling can also cause skin surface irregularities or the formation of nodules. When excessive filler material is injected or unevenly distributed, it may accumulate locally under the skin, leading to uneven surfaces and a stiff texture.[17] These nodules not only compromise aesthetic appearance but may also be accompanied by pain or discomfort, especially during facial movements.[17] Furthermore, the formation of nodules may be related to the properties of the filler material, improper injection techniques, or inadequate postoperative care.[17] In severe cases, surgical or pharmacological intervention may be required for correction.

Psychological Impact

Overfilling may lead to patient dissatisfaction with their appearance, subsequently triggering a range of psychological issues. When patients find that the results of facial fillers do not meet their expectations, particularly when unnatural

outcomes, they may experience intense anxiety and depression.[28] Additionally, some patients may develop low self-esteem due to complications from overfilling (eg, nodules, surface irregularities) and may even avoid social situations, significantly impacting their mental health.[28] The adverse effects of overfilling not only affect individual patients but may also undermine their overall trust in the cosmetic industry. When patients experience aesthetic or health issues resulting from overfilling, they may question the professional competence of their physicians and even doubt the safety of the entire cosmetic industry.[29] This decline in trust not only influences patients' decisions regarding future treatments but may also, through word of mouth, affect the choices of other potential patients, thereby negatively impacting the reputation of the cosmetic industry.

Management Strategies for Overfilling

Preventive Strategies

Preoperative Assessment and Design

Before the procedure, physicians should conduct a thorough evaluation of the patient's facial structure, including bone contours, soft tissue distribution, skin elasticity, and signs of aging.[20] Additionally, understanding the patient's aesthetic expectations and goals is crucial to ensure alignment with achievable outcomes.[20] Through detailed assessment, physicians can develop personalized treatment plans, reducing the risk of overfilling due to improper design. Based on the preoperative evaluation, physicians should create individualized treatment plans for each patient, specifying the type and amount of filler material, injection depth, and precise injection points.[21,30] Personalized planning not only meets the patient's aesthetic desires but also minimizes the risk of overfilling, ensuring natural and harmonious results.

Patient Education

Physicians should engage in thorough preoperative discussions with patients to help them develop realistic expectations and avoid excessive pursuit of facial fullness or exaggerated results.[30] Through education, patients can better appreciate the importance of natural aesthetics, thereby reducing the demand for overfilling. Physicians must clearly explain the potential risks associated with overfilling, including unnatural appearance, health complications, and psychological impacts.[30] Transparent communication enables patients to make informed decisions and reduces the likelihood of postoperative dissatisfaction.

Intraoperative Management

During the procedure, physicians should employ layered injection techniques, targeting different tissue layers of the face to ensure even distribution of the filler material.[18] This approach prevents localized accumulation or excessive filling. Physicians should follow the principle of "less is more", avoiding the injection of excessive filler material in a single session.[19] By administering fillers in multiple stages, physicians can better control the outcome, make necessary adjustments, and ensure a natural appearance. Physicians should choose suitable filler materials based on the patient's facial characteristics and aesthetic goals.[19] The injection technique and dosage should be tailored to the properties of the selected material to achieve results that align with the patient's expectations.

Postoperative Management

Postoperatively, physicians should schedule regular follow-up appointments to evaluate the results and patient satisfaction. If overfilling or suboptimal outcomes are detected, timely adjustments to the treatment plan should be made to ensure natural and harmonious results.[31] For cases where overfilling has already occurred, physicians should implement appropriate corrective measures. For example, hyaluronidase can be used to dissolve excess hyaluronic acid, or other non-surgical or surgical methods can be employed to restore facial contours and natural aesthetics.[31]

Correction and Treatment of Overfilling

Non-Surgical Correction

For cases of overfilling caused by excessive hyaluronic acid injections, hyaluronidase serves as an effective corrective tool.[22] Hyaluronidase specifically degrades hyaluronic acid and hyaluronic acid related filler, rapidly reducing the volume in the overfilled area and restoring natural facial contours. Physicians should calculate the precise dosage of hyaluronidase based on the extent and location of overfilling and administer it in stages to avoid over-dissolution or localized depressions.[22] Close monitoring of the patient's response post-injection is essential to ensure optimal results and prevent complications.[22] For skin surface irregularities caused by uneven distribution of filler materials, massage and physical therapy can serve as adjunctive corrective measures.[32] Gentle massage techniques can help promote even distribution of the filler material, reducing localized accumulation. Additionally, physical therapies such as radiofrequency or ultrasound can stimulate collagen regeneration, improve skin texture, and further address surface irregularities. However, these methods have limited efficacy and are typically suitable for mild cases of overfilling.[32]

Surgical Correction

For overfilling caused by non-hyaluronic acid fillers (eg, poly-L-lactic acid or permanent fillers), surgical removal may be necessary. Through minimally invasive procedures, physicians can precisely locate and remove excess filler material, restoring natural facial contours.[33] Surgical correction is particularly suitable for cases where the filler material is difficult to degrade or has formed nodules. However, careful management of surgical trauma and postoperative recovery is required.[33] For facial proportion imbalances caused by overfilling, liposuction or contour surgery can serve as effective corrective methods. Liposuction can reduce localized excess fat or filler material to some extent.[33] Surgical approaches are suitable for severe cases of overfilling or when non-surgical methods are insufficient for correction.

Psychological Support

Overfilling not only affects a patient's appearance but may also lead to psychological issues such as anxiety and depression.[34] Therefore, physicians should offer psychological support throughout the correction process to help patients cope with the procedure and its potential outcomes.[35] Through counseling, patients can better understand the necessity of correction, alleviate psychological stress, and actively participate in their treatment.[36] Additionally, physicians should maintain open communication with patients, promptly address their concerns, and build their confidence in the corrective outcomes.[36]

The Application of Portable Ultrasound

Portable ultrasound technology has emerged as a significant tool in the correction of facial overfilling, offering notable advantages in the field of plastic and reconstructive surgery.[23] Its high-resolution real-time imaging capability allows for precise localization of subcutaneous filler distribution, enabling physicians to avoid blind procedures and enhance the accuracy of corrective interventions.[24] During the correction process, portable ultrasound can assist in the injection of hyaluronidase by guiding the injection points and dosage, while simultaneously monitoring the dissolution of hyaluronic acid in real time.[37] This ensures even and natural corrective outcomes. Additionally, ultrasound can evaluate the distribution of filler materials, guide massage or physical therapy protocols to promote uniform distribution, and dynamically monitor the progress of correction, allowing for timely adjustments to the treatment plan.[38] The non-invasive nature and safety of portable ultrasound reduce the risk of trauma and infection for patients, optimizing the overall treatment experience. Its application not only improves the precision of corrections but also facilitates the development of personalized treatment plans, aligning with the goals of precision medicine.[39] Despite challenges such as high equipment costs and the need for advanced technical skills, the future integration of artificial intelligence with ultrasound imaging systems holds promise for further enhancing the accuracy and efficiency of overfilling corrections.[40]

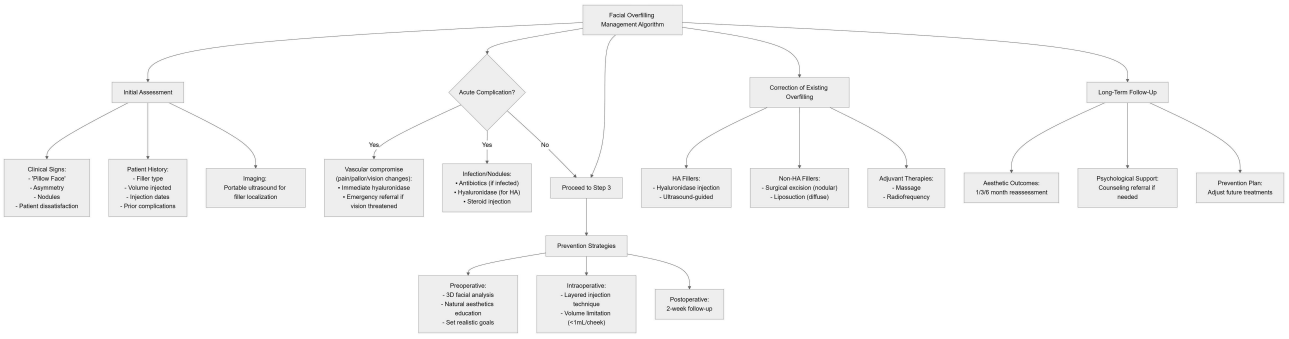

Figure 1 Stepwise algorithm for managing facial overfilling in clinical practice.

Future Research Directions

Quantitative Assessment of Overfilling

Currently, the assessment of overfilling primarily relies on the subjective judgment of physicians, lacking objective quantitative standards. Future research should focus on developing facial aesthetic assessment tools based on artificial intelligence or three-dimensional imaging technologies.[41] These tools should be capable of precisely measuring the volume and distribution of filler materials, as well as their impact on facial contours. Through quantitative assessment, physicians can diagnose overfilling more scientifically and develop personalized correction plans, thereby improving treatment outcomes and patient satisfaction.

Optimization of Prevention and Management Strategies

Preventing overfilling is a critical issue in the field of plastic and reconstructive surgery. Future studies should prioritize the improvement of injection techniques, such as the development of smart injection devices or assisted navigation systems, to enhance the precision and safety of injections.[42] Additionally, patient education should be strengthened through scientific communication tools and educational materials to help patients develop realistic aesthetic expectations and reduce the demand for overfilling.[43] Furthermore, research should explore standardized preoperative assessment protocols to ensure that each patient receives a personalized treatment plan.[44]

Development of New Materials and Technologies

Future research should focus on developing new filler materials, such as those with reversible properties, better biocompatibility, or smart materials that can automatically adjust their volume based on the tissue environment.[45] Additionally, research should investigate complementary degradation technologies to enable rapid and safe correction in cases of overfilling.[46] These innovations will significantly reduce the risk of overfilling and enhance the overall safety and efficacy of facial filler procedures.

Conclusion

Overfilling is a common complication in facial filler procedures, with complex causes involving technical, patient, and physician-related factors. This article systematically summarizes the causes, consequences, and management strategies of overfilling, highlighting its multifaceted negative impacts on aesthetics, health, and psychological well-being. Through detailed preoperative assessment, personalized treatment plans, precise intraoperative techniques, and diligent post-operative management, physicians can effectively prevent and correct overfilling, ensuring natural and harmonious aesthetic outcomes for patients (Figure 1). Prevention is key to reducing the incidence of overfilling. Physicians should enhance patient education, helping them develop realistic aesthetic expectations and avoid excessive pursuit of facial fullness. In conclusion, the management of overfilling requires the joint efforts of physicians and patients. By implementing scientific preventive strategies, precise treatment plans, and ongoing research and innovation, we can minimize the occurrence of overfilling and advance facial filler procedures toward greater safety and naturalness.

Disclosure

The authors report no conflicts of interest in this work.

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