

ADVANCEMENT GENIOPLASTY: COMPARISON BETWEEN SLIDING OSTEOTOMY AND ALLOPLASTIC IMPLANTS

MENTOPLASTIA DE AVANÇO: COMPARAÇÃO ENTRE OSTEOTOMIA DESLIZANTE E IMPLANTES ALOPLÁSTICOS

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<https://doi.org/10.56238/sevened2026.021-001>

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ABSTRACT

Advancement genioplasty is a widely used procedure in facial harmonization, aiming to correct chin deformities such as microgenia, thereby contributing to the aesthetic and functional balance of the lower third of the face. Among the available techniques, sliding genioplasty and alloplastic chin implants stand out, each presenting distinct indications, advantages, and complication profiles. This study aimed to perform a narrative literature review with a qualitative approach, comparing these two techniques regarding their indications, outcomes, and complications. The literature search was conducted in PubMed, SciELO, and ScienceDirect databases, including articles published within the last ten years. A total of 15 relevant studies were selected, comprising systematic reviews, clinical studies, and literature reviews. The findings demonstrated that both techniques provide high patient satisfaction rates and satisfactory aesthetic outcomes. However, sliding genioplasty showed greater predictability and long-term stability, being more suitable for moderate to severe deformities and cases requiring three-dimensional correction. In contrast, alloplastic implants were associated with lower invasiveness, shorter operative time, and faster recovery, being more appropriate for mild to moderate cases. Regarding complications, implants were more frequently associated with infections, extrusion, and bone resorption, whereas sliding genioplasty was mainly related to neurosensory alterations, which are generally transient. It can be concluded that both techniques are effective, with no absolute superiority between them, and the choice should be based on individualized patient assessment and careful surgical planning.

Keywords: Genioplasty. Chin Augmentation. Sliding Genioplasty. Alloplastic Implants. Microgenia. Facial Aesthetics.

RESUMO

A mentoplastia de avanço é um procedimento amplamente utilizado na harmonização facial, com o objetivo de corrigir deformidades do mento, como a microgenia, contribuindo para o equilíbrio estético e funcional do terço inferior da face. Dentre as técnicas disponíveis, destacam-se a genioplastia por osteotomia deslizante e a utilização de implantes aloplásticos, que apresentam diferentes indicações, vantagens e perfis de complicações. O

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presente estudo teve como objetivo realizar uma revisão narrativa da literatura, de abordagem qualitativa, a fim de comparar essas duas técnicas quanto às suas indicações, resultados e complicações. A busca bibliográfica foi realizada nas bases de dados PubMed, SciELO e ScienceDirect, incluindo artigos publicados nos últimos dez anos. Foram selecionados 15 estudos relevantes, entre revisões sistemáticas, estudos clínicos e revisões de literatura. Os resultados evidenciaram que ambas as técnicas apresentam elevada taxa de satisfação dos pacientes e resultados estéticos satisfatórios. No entanto, a osteotomia deslizante demonstrou maior previsibilidade e estabilidade a longo prazo, sendo mais indicada em casos de deformidades moderadas a severas e alterações tridimensionais. Em contrapartida, os implantes aloplásticos destacaram-se pela menor invasividade, menor tempo cirúrgico e recuperação mais rápida, sendo mais indicados em casos leves a moderados. Em relação às complicações, os implantes apresentaram maior associação com eventos infecciosos, extrusão e reabsorção óssea, enquanto a osteotomia esteve mais relacionada a alterações neurosensoriais, geralmente transitórias. Conclui-se que ambas as técnicas são eficazes, não havendo superioridade absoluta entre elas, sendo a escolha dependente da avaliação individualizada do paciente e do adequado planejamento cirúrgico.

Palavras-chave: Mentoplastia. Genioplastia. Osteotomia Deslizante. Implantes Aloplásticos. Microgenia. Harmonização Facial.

RESUMEN

La mentoplastia de avance es un procedimiento ampliamente utilizado en la armonización facial, cuyo objetivo es corregir deformidades del mentón, como la microgenia, contribuyendo al equilibrio estético y funcional del tercio inferior del rostro. Entre las técnicas disponibles, destacan la genioplastia con osteotomía deslizante y el uso de implantes aloplásticos, que presentan diferentes indicaciones, ventajas y perfiles de complicaciones. Este estudio tuvo como objetivo realizar una revisión narrativa de la literatura, con un enfoque cualitativo, para comparar estas dos técnicas en cuanto a sus indicaciones, resultados y complicaciones. La búsqueda bibliográfica se realizó en las bases de datos PubMed, SciELO y ScienceDirect, incluyendo artículos publicados en los últimos diez años. Se seleccionaron quince estudios relevantes, entre ellos revisiones sistemáticas, estudios clínicos y revisiones de la literatura. Los resultados mostraron que ambas técnicas presentan un alto índice de satisfacción del paciente y resultados estéticos satisfactorios. Sin embargo, la osteotomía deslizante demostró mayor predictibilidad y estabilidad a largo plazo, estando más indicada en casos de deformidades moderadas a severas y alteraciones tridimensionales. En contraste, los implantes aloplásticos destacaron por su menor invasividad, menor tiempo quirúrgico y recuperación más rápida, lo que los hace más adecuados para casos leves a moderados. En cuanto a las complicaciones, los implantes mostraron una mayor asociación con infecciones, extrusión y reabsorción ósea, mientras que la osteotomía se relacionó más con alteraciones neurosensoriales, generalmente transitorias. Se concluye que ambas técnicas son efectivas, sin que exista una superioridad absoluta entre ellas; la elección depende de la evaluación individualizada del paciente y de una planificación quirúrgica adecuada.

Palabras clave: Mentoplastia. Genioplastia. Osteotomía Deslizante. Implantes Aloplásticos. Microgenia. Armonización Facial.

1 INTRODUCTION

Facial harmony is the result of the adequate proportion between the anatomical structures of the face, and the chin is one of the main determinants of the aesthetic balance of the lower third of the face. Changes in the projection, shape, or position of the chin can significantly compromise the facial profile, leading to the indication of corrective surgical procedures, such as advance mentoplasty (genioplasty) (SHOKRI et al., 2021). In this context, genioplasty allows three-dimensional modifications of the chin, and is widely used for both aesthetic and functional purposes, especially in cases of microgeny and dentofacial deformities (FERRETTI; REYNEKE, 2016).

Among the main techniques available for chin augmentation, bone genioplasty by sliding osteotomy and the use of alloplastic implants stand out. Sliding osteotomy enables the mobilization of the mandibular bone segment, allowing corrections in multiple spatial planes, while alloplastic implants promote volume increase through the insertion of synthetic materials, such as silicone or porous polyethylene (KAUKE-NAVARRO et al., 2025; SHOKRI et al., 2021). The choice of technique depends on factors such as the magnitude of the deformity, the patient's anatomical characteristics, and aesthetic expectations.

Recent literature shows that both techniques are effective in correcting microgeny, presenting high rates of patient satisfaction. However, important differences are observed in terms of the predictability of the results and the profile of complications. Studies indicate that bone genioplasty has greater predictability in soft tissue response and greater long-term stability when compared to alloplastic implants (KAUKE-NAVARRO et al., 2025; BERTOSSI et al., 2015). On the other hand, alloplastic implants stand out for being less invasive procedures and simpler to perform, with less surgical time.

With regard to complications, it is observed that alloplastic implants are more frequently associated with events such as infection, extrusion, displacement, and adjacent bone resorption, although they generally have low morbidity (LIAO et al., 2023; SCIARAFFIA et al., 2018). On the other hand, osteotomy genioplasty is more related to neurosensory changes in the chin nerve, which are usually transitory, in addition to possible bone irregularities and recurrence in a smaller proportion (KAUKE-NAVARRO et al., 2025; ORANGES et al., 2022). Thus, each technique has specific advantages and limitations, which must be carefully considered in surgical planning.

Given these differences, the choice between sliding osteotomy and alloplastic implants must be individualized, considering not only the anatomical and functional aspects, but also the risks, benefits, and expectations of the patient. Thus, the present study aims to review the literature on advancement mentoplasty, comparing sliding osteotomy and alloplastic

implants regarding their indications, results, and complications, contributing to clinical decision-making based on up-to-date scientific evidence.

2 METHODOLOGY

The present study is characterized as a narrative review of the literature, with a qualitative approach, with the objective of analyzing and comparing the techniques of advancement mentoplasty by means of sliding osteotomy and alloplastic implants, considering their indications, results and complications.

The bibliographic search was carried out in the PubMed, SciELO and ScienceDirect databases, recognized for their relevance in the health area, from January to March 2026. English descriptors were used, combined by Boolean operators (AND and OR), according to the following search strategy: ("genioplasty" OR "chin augmentation") AND ("sliding genioplasty" OR "alloplastic implants" OR "chin implants" OR "microgenia"). Articles published in the last ten years, in English and Portuguese, were considered in order to ensure the updating of scientific evidence.

As inclusion criteria, we selected articles available in full, published in indexed journals, that directly addressed advancement mentoplasty and presented data related to the comparison between sliding osteotomy and alloplastic implants, including clinical studies, systematic reviews, and literature reviews. Duplicate articles, studies unrelated to the proposed theme, and publications that did not present relevant data for the comparative analysis of the techniques were excluded.

After applying the eligibility criteria, the titles and abstracts were read for the initial screening of the studies, followed by the complete reading of the selected articles. At the end of the process, 15 articles considered relevant to the construction of this review were included. The selected studies were analyzed descriptively, focusing on the identification of the main characteristics of the techniques addressed, their clinical indications, advantages, limitations, and associated complications.

The data analysis was conducted in a qualitative, descriptive and comparative manner, seeking to critically synthesize the evidence available in the literature and establish a reasoned discussion about the differences between sliding osteotomy techniques and alloplastic implants. As this was a narrative review, no formal assessment of the risk of bias of the included studies was performed, nor was there a statistical analysis of the data.

3 RESULTS AND DISCUSSION

3.1 INDICATIONS OF TECHNIQUES

The choice of the technique for advancement mentoplasty should consider the complexity of the deformity and the need for three-dimensional correction of the chin. The literature shows that sliding osteotomy genioplasty is more versatile, being indicated mainly in cases of moderate to severe microgeny, asymmetries, and associated vertical changes, since it allows precise bone repositioning in multiple planes (BERTOSSl et al., 2015; KAUKE-NAVARRO et al., 2025).

On the other hand, alloplastic implants are more indicated for mild to moderate deformities, in which the main objective is volumetric increase without the need for significant structural repositioning. Studies have shown that this technique has less operative complexity and shorter surgical time, and is often chosen in isolated aesthetic contexts (SHOKRI et al., 2021; O'REILLY et al., 2022).

In addition, contemporary approaches suggest that the therapeutic choice can also be influenced by the magnitude of the desired advancement, with advances greater than 6 mm tending to present better results when performed by means of osteotomies, while smaller increases can be adequately treated with implants (SELAMIOĞLU; KÜÇÜKER, 2024). Thus, there is a trend in the literature towards individualization of indications, based on anatomical and functional criteria.

3.2 AESTHETIC RESULTS AND PREDICTABILITY

The aesthetic results of advancement mentoplasty are largely satisfactory regardless of the technique employed, with high acceptance rates reported in the literature. However, important differences are observed in relation to the predictability and stability of the results. Bone genioplasty has a higher correlation between bone displacement and soft tissue response, with conversion rates that can reach approximately 85%, indicating greater aesthetic predictability (KAUKE-NAVARRO et al., 2025).

In addition, studies have shown that sliding osteotomy provides greater long-term stability, since it promotes definitive structural repositioning of the chin, reducing the dependence on the integration of alloplastic materials (BERTOSSl et al., 2015). In a complementary analysis, systematic reviews indicate that the soft tissue response after genioplasty has a proportional relationship with bone displacement, although slight recurrence may occur, especially in vertical movements (GEORGE et al., 2021).

On the other hand, alloplastic implants present good immediate aesthetic results, but with less predictability in the adaptation of soft tissues, since they depend on the interface

between the biomaterial and the bone bed. Even so, recent advances, such as the use of personalized implants, have shown improvement in adaptation and aesthetic results (GUO et al., 2024).

3.3 COMPLICATIONS

The complication profile represents one of the main distinguishing factors between the techniques. Alloplastic implants are most often associated with infectious and mechanical complications, including infection, extrusion, displacement, and the need for surgical reintervention (LIAO et al., 2023). In addition, bone resorption under the implant is a relatively frequent, although usually asymptomatic, phenomenon, and can reach different degrees of depth over time (SCIARAFFIA et al., 2018).

Comparative studies also indicate that the rate of complications related to implants may vary according to the material used, and porous biomaterials have better tissue integration, but with an increased risk of paresthesia compared to silicone (LIAO et al., 2022; ABDELMABOOD et al., 2022).

In contrast, osteotomy genioplasty has a higher incidence of sensorineural alterations resulting from the manipulation of the chin nerve, which can occur in most patients in the immediate postoperative period, with progressive resolution in most cases (KAUKE-NAVARRO et al., 2025). Other complications include irregularities in the mandibular contour and recurrence, although less frequently when compared to implant complications (ORANGES et al., 2022).

Thus, it is observed that, while implants present a higher risk of infectious and structural complications, osteotomy is more associated with transient sensorineural complications.

3.4 ADVANTAGES AND LIMITATIONS

The comparative analysis of the techniques shows that sliding osteotomy genioplasty has advantages related to its versatility, predictability, and long-term stability. This technique allows three-dimensional corrections and precise adaptation to the patient's anatomical needs, and is considered the most complete approach for complex deformities (BERTOSSO et al., 2015; BAUS et al., 2017).

However, it is a more invasive procedure, with longer surgical time and greater dependence on technical skill, in addition to the risk of neurosensory alterations. On the other hand, alloplastic implants stand out for their technical simplicity, shorter operative time, and faster recovery, and are widely used in isolated aesthetic procedures (SHOKRI et al., 2021).

However, its limitations include lower three-dimensional correction capacity, dependence on biomaterial, and higher risk of late complications, such as infection and extrusion (LIAO et al., 2023). Thus, none of the techniques can be considered superior in all aspects, and the choice depends on the clinical context.

3.5 CLINICAL SELECTION CRITERIA

The contemporary literature emphasizes the importance of individualizing the therapeutic choice, considering factors such as the degree of chin deficiency, the presence of asymmetries, the thickness of the soft tissues, and the patient's expectations. In cases of more complex deformities or significant advances, bone genioplasty is generally preferred due to its greater predictability and stability (BERTOSSO et al., 2015; KAUIKE-NAVARRO et al., 2025).

On the other hand, alloplastic implants are an effective alternative in selected cases, especially when there is a need for less invasive procedures or when the objective is predominantly aesthetic (O'REILLY et al., 2022).

In addition, new hybrid approaches, associating grafts or complementary techniques, have been proposed as a way to optimize results, demonstrating the continuous evolution of mentoplasty techniques (GUYURON et al., 2023).

Thus, the clinical decision should be based on a careful and individualized evaluation, considering the patient's characteristics and the available scientific evidence.

4 CONCLUSION

Advancement mentoplasty is a fundamental procedure in the harmonization of the lower third of the face, with high efficacy in the correction of chin deformities. The analysis of the literature shows that both genioplasty by sliding osteotomy and alloplastic implants are capable of providing satisfactory aesthetic results, with high rates of acceptance by patients. However, significant differences are observed between the techniques with regard to the predictability of the results, long-term stability, and complication profile.

Sliding osteotomy genioplasty demonstrates greater versatility and predictability, since it allows precise three-dimensional corrections and has greater structural stability over time. In addition, it is more indicated in cases of moderate to severe deformities, asymmetries and vertical alterations, configuring itself as the technique of choice in more complex situations. On the other hand, alloplastic implants stand out for their lower invasiveness, shorter surgical time, and faster recovery, being an effective alternative in mild to moderate cases, especially when the objective is predominantly aesthetic.

With regard to complications, it is observed that alloplastic implants are more frequently associated with infectious and mechanical events, such as extrusion, displacement, and bone resorption, while sliding osteotomy has a higher incidence of neurosensory alterations, usually transitory. Thus, each technique has a specific profile of risks and benefits, and it is not possible to establish absolute superiority between them.

In view of the available evidence, the choice of technique should be individualized, considering the magnitude of the deformity, the anatomical characteristics of the patient, the aesthetic expectations, and the risk profile of each procedure. Adequate surgical planning and the correct therapeutic indication are crucial for obtaining predictable and satisfactory results.

Finally, the need for additional studies with greater methodological standardization and long-term follow-up is highlighted, in order to improve the understanding of the results and complications associated with the different techniques, reinforcing the fundamental role of therapeutic individualization in obtaining safe, predictable, and long-lasting aesthetic results.

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