

Orofacial Harmonization versus Facial Deformities: A Literature Review

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Abstract: In the current context, orofacial harmonization can serve as a complementary means to treat deformities, whether from an aesthetic or functional perspective. In this scope, the present study aims to evaluate the use of hyaluronic acid fillers and botulinum toxin in correcting facial defects. This study consists of a literature review based on the determination of the theme, using the databases PubMed, EBSCO, SciELO, and Google Scholar. The temporal delimitation was established from 2018 to the present. The MeSH descriptors used in the research were: "hyaluronic acid filler," "facial abnormalities," and "augmentation," adding respective descriptors for each topic (ocular, nasal, ear, and lip palate oral). Data were collected between March and April 2023. A final sample of eight articles was obtained, based on the inclusion criteria adopted, with the highest number of publications identified in 2021 (n=3; 37.5%). All the results were in English, predominantly from the PubMed and Google Scholar databases. Regarding the type of facial deformity, it was observed that cleft lip and palate and chin deformity were the majority of the studies analyzed. In terms of the type of orofacial harmonization approach, hyaluronic acid injection was the most used method. Therefore, it was concluded that orofacial harmonization can assist in the rehabilitation of patients with some facial deformity, whether congenital or acquired, thus being a viable treatment option for patients with facial deformities.

Keywords: Hyaluronic acid filler; Facial abnormalities; Augmentation.

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1. Introduction

Facial deformities have a multifactorial etiology and can be either acquired or congenital. The face is a significant factor in individual differentiation, and in contemporary society, beauty standards are subjectively defined, directly influencing a person's expression and communication, as humans are social beings who constantly interact with others. Various aspects are correlated with facial deformities, which, based on their cause, are subdivided into two groups: congenital and acquired etiology. Congenital defects are structural and functional abnormalities that can appear during the gestational period, at birth, or in more advanced stages of development, potentially leading to significant aesthetic and functional impairment or minor disharmony [1].

Acquired defects include facial trauma and partial removals of facial segments, often resulting from head and neck cancer treatments. In a dynamic and globalized world, there is an increasing need for speed in daily life through motor vehicles that enable shorter travel times. However, these advancements can lead to traffic accidents that cause facial trauma and other injuries, accounting for 40% of all facial traumas.

In light of this, the scenario of craniofacial anomalies is diverse, and individuals with such deformities experience skeletal sequelae, chromosomal abnormalities, and significant psychosocial impacts that require societal attention. Conditions such as Pierre-Robin Sequence, Treacher Collins Syndrome, Apert Syndrome, Crouzon Syndrome,

Down Syndrome, and Stickler Syndrome have repercussions on facial structure, such as zygomatic bone hypoplasia and micrognathia, often associated with cleft lip and palate. Consequently, orofacial deformities like cleft lip and palate are the most common within the craniofacial malformation group, accounting for approximately 65% of all head and neck anomalies, affecting the upper lip, nasal cavity floor, hard palate, and other facial regions. Individuals with some degree of morphofunctional alteration of the orofacial components, even after surgical corrections that enable the initiation of anatomical reconstruction of the affected base structures, may still present residual deformities from surgical scar contraction and seek alternatives to improve or fully correct the anatomical discontinuity [2].

Patients with cleft lip and palate undergo various phases in their aesthetic and functional rehabilitation process, starting with the first surgical phase involving cheiloplasty and palatoplasty, followed by the second surgical phase involving bone grafts for alveolar arch continuity reconstruction, secondary lip and nose corrections, orthognathic surgery, and closure of oronasal fistulas. In this context, orofacial harmonization serves as a complementary means to improve lip defect correction and scar contraction.

Orofacial harmonization offers versatility for filling the lips and perioral region, contributing to the complementary aesthetic rehabilitation of individuals with facial deformities. Historically, orofacial harmonization emerged in the early 2000s, with the use of botulinum toxin in dentistry for cases like gummy smiles and bruxism. The advent of hyaluronic acid fillers further expanded procedural possibilities beyond surgical correction, offering less invasiveness and lower morbidity for patients [3]. The most commonly used orofacial harmonization tools in the context of facial deformities are hyaluronic acid and botulinum toxin (Botox). Hyaluronic acid stimulates collagen production, helps reduce wrinkles, and achieves facial rejuvenation, providing greater symmetry, immediate results, and less invasiveness [4].

Botulinum toxin, commonly known as Botox, blocks the release of acetylcholine. This protein is used to paralyze muscle fibers, reducing static and dynamic wrinkles. Dynamic wrinkles result from facial movements and muscle contractions, while static wrinkles are finer and related to the natural aging process. In the case of facial deformities, these procedures help with aesthetic and functional corrections, providing more support, stability, and prevention of tissue damage. Hyaluronic acid can improve the appearance of scars by increasing volume, elasticity, and flexibility in scar tissue, for example, in cleft patients. It addresses details not achieved in surgeries, offering quick application and accessible cost, enhancing self-esteem and social interaction [5].

This study comprised a literature review on orofacial harmonization tools for correcting oral, perioral, and facial deformities, gaining necessary knowledge about the efficacy of botulinum toxin and hyaluronic acid in such deformities. This work aimed to analyze the impact of orofacial harmonization as a complementary means in correcting dentofacial deformities of different etiologies.

2. Review

Facial deformities have a multifactorial etiology and can be either acquired or congenital. The face is a significant factor in individual differentiation, and in contemporary society, beauty standards are subjectively defined, directly influencing a person's expression and communication, as humans are social beings who constantly interact with others. Various aspects are correlated with facial deformities, which, based on their cause, are subdivided into two groups: congenital and acquired etiology. Congenital defects are structural and functional abnormalities that can appear during the gestational period, at birth, or in more advanced stages of development, potentially leading to significant aesthetic and functional impairment or minor disharmony [1].

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trauma and other injuries, accounting for 40% of all facial traumas. In light of this, the scenario of craniofacial anomalies is diverse, and individuals with such deformities experience skeletal sequelae, chromosomal abnormalities, and significant psychosocial impacts that require societal attention. Conditions such as Pierre-Robin Sequence, Treacher Collins Syndrome, Apert Syndrome, Crouzon Syndrome, Down Syndrome, and Stickler Syndrome have repercussions on facial structure, such as zygomatic bone hypoplasia and micrognathia, often associated with cleft lip and palate. Consequently, orofacial deformities like cleft lip and palate are the most common within the craniofacial malformation group, accounting for approximately 65% of all head and neck anomalies, affecting the upper lip, nasal cavity floor, hard palate, and other facial regions. Individuals with some degree of morphofunctional alteration of the orofacial components, even after surgical corrections that enable the initiation of anatomical reconstruction of the affected base structures, may still present residual deformities from surgical scar contraction and seek alternatives to improve or fully correct the anatomical discontinuity [2].

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This study comprised a literature review on orofacial harmonization tools for correcting oral, perioral, and facial deformities, gaining necessary knowledge about the efficacy of botulinum toxin and hyaluronic acid in such deformities. This work aimed to analyze the impact of orofacial harmonization as a complementary means in correcting dentofacial deformities of different etiologies. Knowing that orofacial harmonization can bring satisfactory aesthetic-functional results in patients with some type of facial deformity through its applications, such as botulinum toxin and hyaluronic acid, it was also observed that the proposed treatment by orofacial harmonization, against facial deformities, is considered minimally invasive and allows for short treatment times, providing another complementary treatment option for facial deformities. Based on data analysis, it was found that due to its properties and predictable results, the use of dermal fillers has become recurrent as a means of treating facial deformities. The literature has seen an increase in studies aiming to enhance the durability of hyaluronic acid fillers [6].

In this realm, hyaluronic acid promotes lifting and projection of the midface, as well as projection and volumization of the lower face, contributing to defect correction in the region. A good facial projection, with balanced facial thirds, provides individuals with a sense of psychosocial well-being in line with contemporary beauty standards [7]. The

study by Shekariz and Shojae [8] analyzed a case of facial prognathism and class III malocclusion due to premaxillary deficiency, where the participant opted against surgical correction of the maxillomandibular discrepancy and instead chose an ultrasound-assisted treatment with hyaluronic acid filler in two points for greater premaxillary gain and better nasal projection. The study concluded that for patients with class III malocclusion or mandibular prognathism, non-surgical aesthetic treatment with hyaluronic acid filler assisted by ultrasound can effectively and safely increase deeper tissue layers in the targeted region.

Similarly, the study by Mossaad et al. [9] evaluated the degree of lip correction in surgically treated cleft lip and palate patients after hyaluronic acid filler application and its effectiveness in concealing lip abnormalities post-cheiloplasty. The study included sixteen female patients with unilateral lip scars, aged 15 to 20, who received hyaluronic acid filler injections in the upper lip scar area. Using a Visual Analog Scale (0-10), the satisfaction rate was high, ranging from 7 to 9, with a mean of 8.0 ± 0.9 . All patients noticed significant improvements in their lip scars, contributing to psychological well-being and highlighting that hyaluronic acid filler is a temporary, non-invasive method that masks cleft lip scars and restores lip volume.

Fillers must be versatile in treating dentofacial deformities, as surgical intervention can often result in high morbidity with unpredictable aesthetic outcomes. Hyaluronic acid, as observed in the study by Jo et al. [10], offers predictable results and is an alternative treatment for facial deformities in Parry-Romberg Syndrome. Localized facial deformities, such as localized scleroderma (morphea), were addressed in the study by Sharad et al. [11], where hyaluronic acid fillers were used as a treatment modality. The study, through a case report, demonstrated that hyaluronic acid filler is an effective and safe minimally invasive treatment for localized morphea, although it is limited to stable cases of localized scleroderma.

The study by Beer et al. [7] evaluated hyaluronic acid filler in patients with chin defects. The study included 192 participants, with 144 in the treatment group and 48 in the control group. Using the Allergan Chin Retrusion Scale, the efficacy of hyaluronic acid in chin deformities was demonstrated by the proportion of participants with improved scores, showing a response rate of 56.3% in the treatment group versus 27.5% in the control group ($p = .0019$). Nikolis et al. [12] compared the efficacy and safety of hyaluronic acid injections using a cannula versus a needle for infraorbital defect corrections. This prospective study included forty-two randomized, controlled patients: 18 received cannula injections, 18 received needle injections, and 6 acted as their own control. The study found that hyaluronic acid injections, whether using a cannula or a needle, resulted in equally high efficacy and safety proportions. The results indicate that orofacial harmonization tools are used according to the treatment needs of patients with facial deformities, promoting aesthetic-functional restoration. For instance, botulinum toxin can non-invasively correct exaggerated scar distortions in patients with cleft lip and palate after primary cheiloplasty. Re-establishing a more harmonious lip in surgically treated cleft patients also aids aesthetic-functional restoration.

Orofacial harmonization is also an adjunctive treatment option for patients with extensive, hypertrophic, or atrophic scars with sharp edges, compared to more invasive procedures. Botulinum toxin can prevent hypertrophic scars by negatively transforming fibroblasts and temporarily paralyzing facial muscles, promoting an antagonistic force against wound healing and reducing unwanted scars [13]. Some facial deformities, such as cleft lip and palate, require surgical intervention to approximate the lip and palate cleft edges and anatomize the oral region surgically. Surgical approaches can cause scar contraction and post-operative dissatisfaction. Lu et al. [14] evaluated botulinum toxin application in nasolabial points of the orbicularis oris muscle in cleft lip and palate patients after cheiloplasty, showing improved cleft lip scar appearance.

Facial deformities like facial paralysis (e.g., Bell's palsy, skull base injury, Ramsey Hunt Syndrome) cause functional failures directly affecting aesthetics. Orofacial harmonization with botulinum toxin can help restore facial symmetry at rest and during movement by addressing secondary muscular dysfunction [15].

Facial deformities demand greater societal attention due to their aesthetic, functional, and psychosocial impacts, regardless of etiology, whether acquired or congenital. Exploring and optimizing diagnosis and treatment options, including orofacial harmonization, is essential [16]. Despite its limitations, orofacial harmonization offers adjunctive treatment possibilities for facial deformities, promoting greater opportunities for individuals with facial deformities and contributing to aesthetic and functional rehabilitation, directly improving self-esteem and social life for those with facial malformations.

3. Conclusion

Given these considerations, through the use of hyaluronic acid and botulinum toxin, it is evident that orofacial harmonization can assist in the rehabilitation of patients with facial deformities, whether congenital or acquired, through a minimally invasive treatment with predictable results. Therefore, it stands as a viable treatment option for patients with facial deformities.

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