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REVIEW ARTICLE

Clinical evaluation for chin augmentation: literature review and algorithm proposal☆

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Abstract
Introduction: The esthetic balance of the face results from harmonic and symmetrical facial proportions. The literature describes several methods for lower-third facial analysis, but lacks a simple and practical method.
Objective: To review the methods of analysis of the ideal projections of the chin based on soft tissues, showing the advantages and disadvantages of each.
Methods: Literature review through the PubMed database.
Results: The following methods for chin analysis based on soft tissues were reviewed: Gonzalles-Ulloa, Goode, Merrifield, Silver, Legan, Gibson & Calhoun, cervicomentual angle, and mentocervical angle.
Conclusion: An adequate analysis of the proportions of the face and facial disharmony is essential for the correct indication of the necessary procedures and good surgical outcome. The authors propose an algorithm to facilitate the indication for chin augmentation surgery.

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PALAVRAS-CHAVE
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Avaliação clínica para avanço de mento: revisão da literatura e proposta de um algoritmo

Resumo
Introdução: O equilíbrio estético da face resulta de proporções faciais harmônicas e simétricas. A literatura descreve vários métodos de análise do terço inferior da face, mas carece de um método simples e prático.
Objetivo: Revisar os métodos de análise da projeção ideal do mento baseadas em tecidos moles, mostrando as vantagens e desvantagens de cada um.
Método: Revisão da literatura através da base de dados Pubmed.
Resultados: Os seguintes métodos para análise do mento baseada em partes moles são revisados: Gonzalles-Ulloa, Goode, Merrifield, Silver, Legan, Gibson & Calhoun, ângulo cervicomentual e ângulo mentocervical.
Conclusão: A análise adequada das proporções da face e desarmonia facial faz-se essencial para a correta indicação dos procedimentos necessários e bom resultado cirúrgico. Propomos um algoritmo para facilitar indicação de avanço de mento.

Introduction

Facial harmony has been studied for centuries; by the ancient Greek philosophers who tried to uncover the beauty of the elements, by the Egyptian sculptors with their complex facial harmony, and by the Renaissance artists, such as Michelangelo and Leonardo Da Vinci, who sought concrete measures for facial proportions.[1,2] These legacies have contributed to our current knowledge of applied facial esthetics. Surgeons must know the ideal proportions of the face to correctly indicate procedures to their patients, as an incorrect analysis leads to inappropriate conclusions.[2,3]

The mid-third, especially the nose, receives greater attention as it is the most prominent part of the face. On the other hand, the lower third should be taken into account, since a small or retracted chin results in facial disharmony, especially when analyzing the profile.[3] Such disproportion can cause the patient to misinterpret the nose projection, believing it to be larger than it actually is, and to seek a rhinoplasty procedure to repair the facial disharmony.[4,5] It is the responsibility of the surgeons to esthetically evaluate the face as a whole, analyzing the facial proportions and to decide what procedure or procedures can benefit their patients.[3,6,7]

In this context, the lower third (lips and chin) should not be overlooked, as it can have a significant impact on the profile, postoperatively.[7] The initial evaluation of the lower third of the face must identify a retropositioned chin and rule out mandibular dimorphism – such as micrognathia (vertical and horizontal mandibular hypoplasia) and retrognathia (retracted mandible relative to the maxilla) – that are associated with dental occlusion abnormalities, most commonly Angle class II dental malocclusion. These cases require cephalometric analysis for possible programming of orthognathic surgery.[8]

Patients with such deformities who refuse more extensive procedures may be submitted to chin augmentation; however, they should be aware of its limitations in improving facial profile and occlusion.[3,7,9] Nonetheless, it is not unusual for candidates for chin augmentation to have underdevelopment of the mandibular symphysis (horizontal microgenia – the presence of normal vertical height, with retracted bone portion), but with normal occlusion (Angle class I). These patients may benefit from this procedure alone.[8,9]

There are several described methods to analyze the ideal chin projection based on soft tissue, each with its particularities, but none of them complete or ideal.[7] This article aims to systematically review such methods, showing the advantages and disadvantages of each method in a simple and practical manner. Subsequently, the authors propose a clinical evaluation algorithm for chin augmentation indication.

Methods

A literature review was conducted using the PubMed database, from 1992 to April 2015. The authors selected articles in English and Spanish related to clinical evaluation for chin augmentation using the following words: analysis and augmentation mentoplasty (four articles), clinical analysis and genioplasty (22 articles), clinical analysis and chin augmentation (21 articles), chin position and profile analysis (46 articles).

This review included only articles that mentioned the methods used to analyze the lower third of the adult face based on photographic documentation of patients (19 articles). It excluded those that exclusively discussed cephalometric analysis through radiography; discussions on Angle class III; analyses of patients with sleep apnea or malformations; articles related to dental extractions and orthodontic devices; evaluations through computed tomography; ethnic studies or studies in children; and descriptions of surgical techniques.