

Genioplasty surgery - A Review

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Abstract: Genioplasty results in aesthetic and functional changes to the jawline/chin and perioral areas. Genioplasty is a widely used surgical technique used to correct chin deformity. It consists of an osteotomy of the inferior border of the mandible allowing movement of the chin in three dimensions and positioning it in its new desired position. With the jaw having a fundamental influence in facial congruity, genioplasty can emphatically affect patients' confidence and personal satisfaction. Partner patient's condition with the careful procedures that can be applied for amendment of jaw disfigurements. Genioplasty is a procedure that presents excellent stability and has a relatively low risk of complications. Although it is a technically simple surgical maneuver, it presents in some situations the need for technique variation. This article will focus on the versatility of the surgical genioplasty.

Keywords: Genioplasty, chin, mandible, facial harmony, osseous.

Introduction:

The perception of beauty is profoundly subjective; however, the chin is without doubt the strongest anatomical feature that plays a 'pivotal' role in three-dimensional facial harmony. Any deformity of the chin will unfavourably influence facial aesthetics which may add to a patient's brought down confidence and eventually in the drawn out low quality of life [1]. As detailed by Posnick and partners [2], the negative impacts of facial disharmony and the resultant constructive outcomes following fruitful jaw surgery are all around reported in the writing. Genioplasty is a central careful method that is principally proceeded as one or the other either 1) an osseous or 2) an alloplastic procedure [3]

Genioplasty is a generally utilized careful method used to address jaw deformation. It comprises of an osteotomy of the inferior border of the mandible permitting positioning of the jawline in three measurements and situating it in its new wanted position. The principal specialist who had played out a jaw progression osteotomy by an extra-oral methodology was Otto Hofer (4) on a body. Gillies and Millard (5) applied a similar method on a living patient, likewise utilizing an outside approach. Trauner and Obwegeser (6) were the principal specialists to play out a chin advancement osteotomy via an intraoral approach and called it genioplasty. This method was then altered by a few others and used to move the jaw altogether in all three dimensions of space: setback genioplasty, impaction genioplasty, vertical height augmentation genioplasty, narrowing genioplasty and widening genioplasty (7). To obtain the best results in genioplasty, it is essential to make an optimal surgical plan. The osteotomy location and the movement of the bony segment directly impacts the surgical outcome. Traditionally, genioplasty is performed based on surgeon's intraoperative assessment (8).

Right now, the improvement of style and capacity are significant subjects in medical procedures to treat facial disfigurements. In this sense, the convexity of the facial profile inside ordinary cephalometric estimations is viewed as more symphonious and alluring (19); then again, patients with a concave profile added to maxillary hypoplasia and mandibular prognathism are considered by laypeople as "less appealing and smart" (20). In a large portion of cases, consolidated surgery (maxilla and mandibular osteotomy) is prescribed to create better facial agreement attributes. Notwithstanding, we ought not just consider cephalometric measures and maxillary and mandible profiles, since the jaw is viewed as a focal anatomical point for the concordance and convexity of the face (21).

Anatomy of chin:

The most important muscle encountered during an osseous genioplasty is the mentalis muscle. This is a paired central muscle of the lower lip that originates within the incisive fossa just beneath the attached gingiva of the mandibular incisors and inserts into the dermis of the skin overlying the chin. The action of this muscle is to elevate and protrude the lower lip. . The motor supply of mentalis muscle is the marginal mandibular branch of the facial nerve. The mental nerve is the terminal branch of the inferior alveolar nerve which supplies sensation to the overlying skin of the chin and lower lip, as well as the labial gingivae of the mandibular incisor and premolar teeth. The blood supply to the chin region follows the corresponding nerve supply, namely mental and inferior alveolar arteries, in addition to a rich vascular supply from the labial branches of the facial artery [9]

Patient assessment:

It is of paramount importance to take a thorough medical history and perform an in-depth clinical assessment of the facial skeleton and overlying soft tissues to assess patient suitability for treatment. During the consultation process, the clinician must also clearly identify if the patient's concerns and expectations are both realistic and achievable. In addition it is important to pay careful attention to exclude any psychological conditions or symptoms such as body dysmorphic disorder (BDD) that might preclude osseous genioplasty.

The chin must be assessed for size, symmetry and position in all three planes (antero-posterior, transverse and vertical) in relationship to the maxillomandibular complex and other facial proportions such as the nose [10,11].

Pre-operative imaging:

Plain radiographs such as the orthopantomogram (OPG) and / or lateral cephalogram are invaluable in accurately assessing chin deficiency or excess. Furthermore, the lateral cephalogram will allow for 2D cephalometric analysis as part of the surgical treatment plan should an additional orthognathic procedure be indicated [12]. In these present times, there is a surge of 3D printing technology in surgical techniques especially in the area of maxillo-facial surgery. 3D printing is also known as rapid prototyping, additive manufacturing and CAD/CAM technique. These new technologies are revolutionary steps in our way of working as maxillo-facial surgeon [13].

Surgical procedure:

The osseous genioplasty is a versatile surgical technique that allows one to correct many chin deformities in all three planes (horizontal, vertical and transverse dimensions) [14,15]. Worldwide, the technique is highly favoured by surgeons due to its stability, predictability, low rates of complications and most importantly it is associated with high levels of patient satisfaction [16]. Over the years, there have been numerous modifications to the classical osteotomy described for osseous genioplasty, in order to further improve aesthetics (lower mandibular border / cervicomental angle) and minimise inadvertent damage to the mental nerve [17]. Following surgical osteotomy, the resultant distal bone segment can be freely manipulated into its final position determined by the findings of the preoperative facial evaluation.

According to the specific movements of the distal segment, the genioplasty can be described as Sliding (the distal segment is advanced anteriorly, in a 'double step' sliding genioplasty two separate distal segments are advanced), Jumping (the distal segment is 'jumped' over the superior segment as an onlay), Reduction (the distal segment is moved to produce vertical reduction of the chin), Centralising (the distal segment is manipulated to correct horizontal deficiencies) [18]. To further improve the final aesthetic outcome of genioplasty, the technique can be combined with the use of an interpositional bone graft (for extreme / complex deficiencies), submental liposuction / lipectomy and other orthognathic procedures [11]. The osseous genioplasty is a simple and effective surgical technique to learn and is associated with few complications.

Complications:

As with all surgical procedures, the genioplasty technique is associated with intercurrents such as nerve damage, wound dehiscence, infection, swelling, pain, dental complications, ptosis of the lips, bone resorption and nonesthetic results (22). Some authors have related the negative impact on the quality of life of patients with facial aesthetic changes involving the lower third when combined orthognathic surgeries were performed without manipulation of the chin (21). In this context, it is important to state that only mandibular setback through BSSO in prognathic patients is not responsible for leaving the facial profile and thinner (23) besides the possibility of having harmful consequences for the patency of the superior airway.

Conclusion:

Facial harmony is the result of a legitimate harmony between every facial construction. The identification and classification of morphologic characteristics that detract from facial harmony is most effectively accomplished by clinical examination. The maintenance of the ratios between the facial thirds, correct spatial bone position and soft tissues accommodation are all factors that directly contribute in a balanced facial profile. The chin, likewise, contributes significantly in facial balance, mainly in the profile view. Expressive changes on chin position are associated with the perception of strong or delicate characters. Thus, over the years, a series of studies has been constructed focusing on mandibular osteotomies techniques that enable changes in chin position: advances, setback, extrusion, intrusion, widening, narrowing and asymmetry. This review aims to address historical and technical aspects of genioplasty; associating patient's condition with the surgical techniques that can be applied for correction of chin deformities. Genioplasty is a procedure that presents excellent stability and has a relatively low risk of complications. Although it is a technically simple surgical maneuver, it presents in some situations the need for technique variation, and can be applied in the correction of deformities of the lower third in patients with different facial characteristics. Genioplasty can be proceeded as a

separated technique or related with other surgeries in bone and soft tissue, making possible satisfactory results in the facial balance, improving the aesthetics and function of the patients.

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