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An aesthetic amalgamation of conventional genioplasties - Reduction and sliding genioplasty.

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Abstract

When evaluating a patient's profile, the chin is usually the last consideration due to its complete aesthetic persona and little or no function in usual settings. Most commonly the chin remedies offered are chin augmentation to increase the projection of the chin and seldom is an over projected chin discussed. Chin reduction is an important part of reducing oversized chins to normal aesthetically pleasant forms, but is rarely practiced due to lack of technology, technique or knowledge of the same. Ours is a technique that combines both sliding and reduction genioplasty as a simple but effective measure of reducing over projected chins.

Keywords: Excessive Chin, Damage, Mental Nerve

Introduction

Facial aesthetics play an important role in the personality and beauty of a person. One of the most dominating features in the face is the chin. Symmetry and harmonious proportion of the chin to the upper and middle third of the face are very important. Significant deformity in the chin can give an unaesthetic look in an otherwise aesthetically pleasant facial profile. Chin deformities can be defined as (a) excessive chin, (b) deficient chin, (c) asymmetrical chin, or a combination of these. Surgical alteration of the chin has been used for many years to achieve proportional lower third of the face to the upper and middle third of the face. A

common surgical procedure used by maxillofacial surgeons is genioplasty. There are different types such as advancement, rotational, set back, alloplastic, and re duction genioplasty. Genioplasty can be done alone or in conjunction with other osteotomies to attain better chin symmetry [1]. The first chin advancement osteotomy was performed by Otto Hofer with an extra-oral approach on a cadaver, but the first official 'genioplasty' with an intraoral approach was executed by Trauner and Obwegeser in 1957.

Figure 1: pre-operative profile

Afterward, especially in the last ten years, several types of genioplasty were introduced to improve esthetical results, reduce recovery time and complications (facial nerve damage, mental nerve paresis, swelling, and bleeding), and improve the surgical technique.

The standard genioplasty is the sliding genioplasty, based on an oblique osteotomy of the symphysis with chin repositioning, as described by Trauner and Obwegeser. An improved genioplasty design to reduce aesthetic com plications of this conventional approach (decreasing in vertical height and deepening of the mentolabialfold) is the sagittal split genioplasty by Schendel [2].

Our technique combines both approaches into one step to achieve the best of both worlds and create a newer aesthetic profile more customized for the patient.

Case report

A 20-year-old woman presented to the Department of Oral and Maxillofacial Surgery, DAPM RV Dental College, Bangalore with a chief complaint of a rotated chin which made her feel uncomfortable aesthethically. On looking at the preoperative profile, the chin appeared protruded and rotated to the left of the midline (Figure 1).

On intra oral examination, Angle's class III Malocclusi on bilaterally was present with orthognathic maxilla and mildly macro gnathic mandible with midline having shifted to the left (Figure 3).

The patient was currently undergoing orthodontic treatment for the past 11 years. Patient had no relevant medical or personal history. Subsequently radiographs were taken to confirm the diagnosis and the patient was taken up for surgery (Figure 2)

Figure 2: radiographs procedure

The procedure planned was the combined approach of sliding and reduction genioplasty. General anaesthesia

was achieved via right nasal intubation. Painting and draping done following standard protocols. 2% lignocaine with 1:80000 adrenaline was injected to the proposed surgical site.

Incision is made on the labial mucosa on the lower lip extending from the 34 to 43 teeth region.

The incision was taken to the periosteum, which was reflected to expose the bone. Subperiosteal dissection was done to expose the inferior border of the mandible. Mental nerve was identified and protected (Figure 4). Surgical marking of the osteotomy sites was done using a surgical marker. The initial osteotomies were per formed using carbide burs.

Bony cut was made on the chin about 4.5 mm below the apices of the teeth. The posterior end of the cut was tapered to the inferior border, behind and below the mental foramen. (This prevents step defects at the site which may be manifested in the soft tissue also.) Chisel and mallet were used to complete the buccal and lingual cortical cuts. Final osteotomy cuts were performed using a surgical saw to provide room for rotating the chin back into its normal aesthetic position. After completion of the 6.5 mm cut, the inferior fragment was repositioned 2mm to the right of the facial midline to correct the facial asymmetry.

Figure 3: intra oral angle's class 3 malocclusion.

The segmented portion was freed from the rest of the mandible but remained pedicled to the digastric and geniohyoid to ensure that the inferior segment is not stripped off from the periosteum (which causes an intense inflammatory reaction and subsequent necrosis).

For vertical reduction, another horizontal cut was made below the original cut measuring approximately 2 – 3 cm, and the measured segment of bone between the two cuts was removed. This facilitated repositioning of the jaw. It was then stabilized using two 1.5mm two holed with gap plate which was secured using 1.5mm x 8mm screws and a 1.5mm 4 holed L – shaped plate secured using 1.5mm x 8mm screws (Figure 5).

The surgical site was then closed using 3 - 0 vicrylin layers. As the patient was currently undergoing orthodontic treatment, space management was a necessity and hence we decided to extract all the third molars to augment the jaws for orthodontic purposes and the surgical site was sutured using 3 – 0 silk.

Intra oral pressure pack placed and secured with dynaplast. Patient was then extubated and shifted to recovery.

Figure 4: Intra operative picture showing the horizontal cut made for vertical reduction.

Figure 5: Reduction and sliding genioplasty done and bone necrosis.

With the standardization and modification of the Horizontal sliding osteotomy, the incidence of com plications has declined. The cause of nerve injury during the operation is mostly due to the restraint of the soft tissue around the mental nerve. Since the horizontal sliding

Discussion

The chin is defined by Riedel's lines or facial harmony lines which connect the most prominent points of the upper and lower lip with the chin point above the pogonion and define the preferable projection of the chin. Any alteration of these proportions affects the balance and harmony of the face. [3]

The expression of the chin is equated with character traits, and thus, it is an important component of the profile forms. Two main therapeutic approaches can be used to address chin deformities, alloplastic implants and basal osteotomy of the chin or genioplasty.

The latter is the most widely used because of its great versatility to correct three-dimensional chin deformities through osteotomy angle variation with lower rates of post operative complications.

Genioplasty provides functional and aesthetic improve ments, and that is why it is a procedure of choice by many surgeons. Genioplasty is one of the significant surgical procedures when asymmetry due to excess, or deficiency of the chin is mainly corrected. Thus, for any surgeon, it is mandatory to be well versed in the surgical technique of genioplasty, and she/he should be aware of complications that might occur in this surgery. Understanding of complications and management of those complications are mainstay of any surgical treatment. [4]

Perhaps the most frequently employed of these procedures is the horizontal sliding genioplasty, a procedure that often presents technical difficulties in accurate repositioning of the distal segment and in intra operative stabilization and fixation with the traditional intraosseous wiring. Common problems experienced during the application of the horizontal sliding osteotomy include neuropraxia and neurotmesis of the nerve.

The horizontal sliding osteotomy is widely used for genioplasty because of its versatility. First, it can be used to treat microgenia as well as macrogenia. Second, it is simple to perform. Third, the amount of bone resorption is small, and the aesthetic result is stable. However, it presents complications as well: for example, neuro sensory deficiency, hematoma, infection, fractures of the mandibular body, grounds as well.

osteotomy line usually extends to points corresponding to the first molars, it needs a larger operative field to accomplish the surgery and because of this the restraint on the soft tissue becomes heavy.

Based on the anatomy, the sagittal curving osteotomy line is designed between the points of the lower mandibular margin corresponding to the first premolars, the most prominent points of the outer face. Thus, the

operative field is smaller, the manipulations of operation are far from the mental nerve, and the restraint of the soft tissue was slight. In addition, the distances between the sagittal curving osteotomy line and the mental foramina were larger than the distances between a sagittal rectangular osteotomy line and mental holes devised by Thomson. [5]

In our patient the immediate post operative profile versus the 1 year post operative profile did not show any expected complications usually seen in the first-year post genioplasty.

One would expect some relapse or neurosensory deficits, but the ideology followed equips the surgeon to prevent the incision extending into any regions deemed unnecessary for extension. Normally the combination of genioplasties leads to an increase in the common complications being presented with a higher probability. However this combination seems to remove similar complications encountered in our case, which explains the restriction of the techniques to a more conservative cut as compared to the conventional.

What this essentially means is that combining two approaches restricts our rationale of finishing the conventional cuts and hence limits our operative field and locality of surgery which ultimately reduces common com plications encountered when boundaries explored are more in conventional surgeries.

The 1 year follow up of the patient shows significant aesthetic change as compared to the pre operative profile (Figure 6)

Hence, if we decide on fixing the profile of the patient in all three dimensions, a single technique of genioplasty may not always be sufficient. Combining two techniques will invariably achieve the same goal anatomically but with an added bonus of alleviating the patient's fears of poor results on aesthetic.

Figure 6: Post operative records.

Conclusion

As conventional genioplasties go, the effort involved in providing aesthetically pleasant forms requires precision and a good understanding of the different genioplasties and the arsenal available. Each conventional genioplasty has a purpose and so an amalgamation of them can solve a horde of problems provided it meets all the requirements.

The chin can be aberrant to some and normal to others and hence a surgery cannot be customized; but rather can be generalized to a similar group of population usually based on some crude similarities. This leaves room for more customization as the generations prod along a more aesthetically fit profile. Our technique amalgamates two conventional techniques while providing a simple yet effective means of delivering a treatment objective that is as close to the custom-ability a patient desires, whilst providing room for a rational single step surgery to alleviate the deformity at one go.

Hence, we would like to conclude by saying that the overall profile of the patient although leaves less room for introspection of the chin; is as equally important to the surgical literature and its use in daily figures to provide the next generation the confidence to go ahead with what was once considered a surgery of the riches.

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