



Facial deformity correction and genioplasty; a case report and literature review

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ABSTRACT

Introduction: dentofacial deformities are mainly congenital problems that distort the face structure. However, they have many adverse effects on adolescents' quality of life and self-esteem.

Case presentation: We report a case of an 18-year-old female with no family history or previous surgical method. She presented to our hospital with a facial deformity, including a midline shift of 1.5 teeth to the left side and a malalignment of dentation. Orthopantomography (OPG) X-ray and cephalometric X-ray assessed the deformity extent and determined the appropriate surgical procedure. As a result, the patient underwent genioplasty and bimaxillary (BiMax) surgery to correct the problem.

Discussion: Facial deformities occur during the normal embryonic phase and develop clearly when the patient reaches puberty due to a growth spurt. Some researchers encourage early correction, while others recommend the surgery only after completing the growth. However, the perfect age for this surgery is 19 years old for boys and 17 for girls after the cessation of facial growth. Therefore, our patient underwent surgery at 18 years old, which is the desirable age.

Conclusion: Genioplasty and BiMax are reasonable procedures to treat facial deformities and correct malalignment of dentation in an 18-year-old patient without major complications.

1. Introduction

Dentofacial deformities are a general term that includes mainly significant deviations of the maxillo-mandibular complex from the normal relation by altering the relationship between the teeth of one arch to another. That could also affect other facial parts such as the cheek, nose, and ear. Severe cases can even lead to breathing difficulties due to compression of the upper respiratory airways. Previous reports demonstrated that these deformities were associated with lower self-esteem and quality of life [1]. However, genioplasty is one of the possible treatments for dentofacial deformity. It should be indicated for

the following cases: a midline asymmetry of the chin, abnormal chin prominence, retrogenia, pseudoretrogenia, macrogenia, and microgenia [2,3]. Other surgical procedures may be combined with genioplasty if any associated deformities should be prepared simultaneously.

On the other hand, BiMax surgery is another surgical method that intends to bring the upper and lower jaw forward by LeFort and BSSO, respectively. This procedure can be done in combination with a genioplasty. This report has been written in accordance with the SCARE criteria guidelines for case reports [4].

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1.1. Patient information

An 18-year-old young female presented to our hospital with facial deformity (asymmetrical) complaints with her face midline shifted to the lower jaw toward the left side, about 1.5 teeth from the midline. She also had an external cheek deformity because of the migration of a small part of the left ear cartilage and chin deformity toward the left side. She was classified as a Class I with deformity, with negative family for genetic abnormality and psychological history, also no previous surgical history.

1.2. Clinical finding

The clinical examination showed a midline of the face shift of 1.5 teeth to the left side of the mandible (Fig. 1), the external surface of the cheek present transmission of some part of cartilage from the left ear, and malalignment of dentation.

1.3. Diagnostic assessment

OPG Xray (Fig. 2), cephalometric X-ray to confirm the need for genioplasty and BiMax to correct both jaws in addition, to shifting the lower jaw Medline to the left side and preparing the cast for them.

1.4. Therapeutic intervention

As a result, two maxillofacial surgeon with 8 years experience performed the flap reflection and exposed the upper and lower jaws at the private Baxshin Hospital under general anesthesia for 6 hours, both jaws were bound using an Arch-bar. Then, In the upper jaw, all upper arch was distinguished by the help of ingesting device, straight handpiece, and surgical saw. After that, we splinted both sides of the lower jaw from its angled side. Thus, both arches were fixed with the help of an arch bar and wires in class I malocclusion. Later, two L-shape and four-hole titanium plates were reduced and fixed to the upper and lower jaw (Fig. 3). These plates were fixed with the help of gauge titanium screws. Also, both right and left sides of the lower jaw were fixed with two four-hole plates by gauge five screws. After that, we started genioplasty on the lower jaw using one four-hole straight titanium plate, x-shape titanium plates with gauge five to be fixed later by five screws. All screws and plates were checked in both jaws to prevent any luxation or movement. Additionally, we maintained good irrigation and debridement of all sites of surgical fields. However, reflected flaps were sutured with 3\0 Vicryl (absorbable suture). On the other hand, the prescription



Figure 1. pre-surgical OPG



Figure 2. pre-surgical

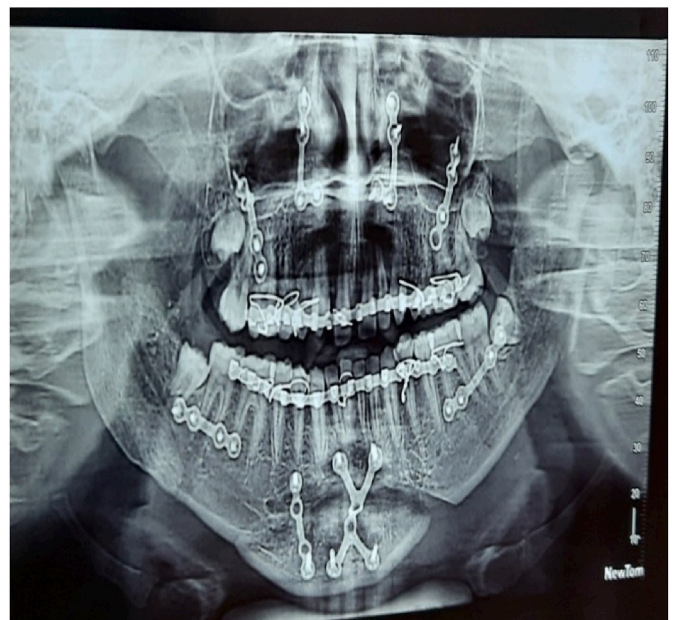


Figure 3. Post-surgical OPG

after the surgery was as follows; amoxicillin 1mg vial for 4 days, paracetamol 600 mg ampule for 4 days, doliprane tablet 1g for 5 days, and rodogyl 4 tablet/day for 5 days. After 4 days, the patient was discharged from the hospital.

1.5. Follow-up and outcomes

Prescribed drugs and good instruction prevented excessive swelling at the surgical site during the recovery period. However, we advised the patient to be away from excessive force or movement, which can lead to forborne fracture, especially in the first six weeks after the surgery. On the other hand, healing and fixation of both arches were maintained for about six weeks by elastics with an arch bar. Finally, arch bars were removed after six weeks. Now the patient is more comfortable and happier with her new facial status appearance (Fig. 4).



Figure 4. Post-surgical

2. Discussion

This case was about simultaneously conducting the genioplasty and BiMax procedures to correct dentofacial deformities in an 18-year-old female. Facial deformities occur during the normal embryonic phase and develop clearly when the patient reaches puberty due to a growth spurt [5]. The previous paper has classified the deformities into 6 significant patterns, including asymmetric mandibular excess growth patterns, which is one of the common patterns. However, according to British standard incisor classification, mandibular asymmetry was classified into 4 classes [6]. It is also reported that it may be associated with a mandibular shift [7,8]. Our patient was classified as class I, where lower incisal edges occlude with or lie immediately below the cingulum of the upper incisors. Class I is considered the most common type; however, in combination with mandibular asymmetry indicates surgical correction [9].

The main triggers for treatment include awareness about the treatment, reaching the right age, experience, or event that triggers the patient to treatment and the deformity is unbearable [10]. However, while some researchers found that esthetics is the main motivation, others support the functional issues [11,12].

Some researchers encourage early correction, while others recommend the surgery only after completing the growth [13,14]. However, the perfect age for this surgery is 19 years old for boys and 17 for girls after the cessation of facial growth [2]. Therefore, our patient underwent surgery at 18 years old, which is the desirable age.

In our case, genioplasty was done as a treatment to fix the midline shift of the chin, which was 1.5 teeth to the left side. However, that was not enough because the patient has a concomitant malalignment of dentation, which cannot be fixed with genioplasty alone. Therefore, we did the BiMax procedure to correct the associated deformity, which, in combination with genioplasty, demonstrated better quality of life [15]. A previous study reported a patient with mandibular functional shift with facial asymmetry [16]. However, the treatment plan includes Michigan splint treatment, alignment of the maxillary and mandibular teeth without referring to BiMax or genioplasty. Another case reported a

21 years-old patient with mandibular asymmetry with moderate rotation [17]. The treatment plan consisted of Double-jaw surgery for clockwise rotation and Mandibular setback surgery, which is different from our case. Another 17 years-old Japanese woman was treated with Le Fort I osteotomy to fix the asymmetry of the maxilla in addition to bilateral sagittal split ramus osteotomy (SSRO) for the mandibular deviation [18]. From above, each case has special characteristics, which implies different surgical procedures.

On the other hand, our study did not follow the patient for a long period, but the initial examination six weeks after the surgery was optimistic without any major complications. That may be due to the prescribed drugs, which reduce the probable infection and associated swelling. Moreover, the patient's adherence to the medical instruction guaranteed an eventful recovery period. In the recovery period, we prescribed amoxicillin as an antibiotic for our patient to prevent any possible infection. Though, one systematic review showed that the percentage of infection in those patients after the surgery is not over (0.4%). On the other hand, patients with class 1 did not show temporomandibular (TM) disorders after two years of treatment [19]. After completing the recovery period, the patient's features improved, and she was comfortable and happier with her new facial status.

3. Conclusion

Genioplasty and BiMax are reasonable procedures to treat facial deformities and correct malalignment of dentation in an 18-year-old patient without major complications.

Ethical approval

The authors confirm that this study was prepared in accordance with COPE rules and regulations. The manuscript approved by research ethics committee of Baxshin research centre. (study ID: 4100) dated 10 April 2022.

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Authors contributions

OSH, SWA, and BAH: concept, study design, and patient follow-up. AA, RHK, and RHZ: literature review and write a draft manuscript. JMA and NTH: discussion, conclusions, and finally approved manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Registration of research studies

Not available.

Garanture

Jeza Muhamad Abdul Aziz is the guarantor of the study and accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

Consent

Informed consent was obtained from the patient prior to the preparation of the case report for the purpose of publication (including clinical photographs), and author/s endeavoured to ensure anonymity.

Provenance and peer review

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Declaration of competing interest

The authors have no conflict of interests to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104088>.

References

- [1] M.W. Frejman, et al., Dentofacial deformities are associated with lower degrees of self-esteem and higher impact on oral health-related quality of life: results from an observational study involving adults, *J. Oral Maxillofac. Surg.* 71 (4) (2013) 763–767.
- [2] O.H. Malik, et al., An overview of the surgical correction of dentofacial deformity, *Dent. Update* 43 (6) (2016) 550–552, 555–8, 561–552.
- [3] I.L. Putri, W. Agustina, A breakthrough in Maxillary LeFort II fracture reconstruction: case series of rhinoplasty using diced cartilage fascia graft simultaneously with ORIF, *Ann. Med. Sur.* 66 (2021), 102312.
- [4] R.A. Agha, et al., The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [5] J.C. Posnick, B.E. Kinard, Common Patterns of Developmental Dentofacial Deformities: A Biologic Classification System, *FACE.* 1 (2) (2020) 131–139.
- [6] B.S. Institution, *British standard glossary of dental terms = Glossaire des termes utilisés en art dentaire*. British standard glossary of dental terms = Glossaire des termes utilisés en art dentaire, British Standards Institution, London, 1983.
- [7] S.E. Cassidy, et al., Classification and treatment of Class II subdivision malocclusions, *Am. J. Orthod. Dentofacial Orthop.* 145 (4) (2014) 443–451.
- [8] M. Kusayama, N. Motohashi, T. Kuroda, Relationship between transverse dental anomalies and skeletal asymmetry, *Am. J. Orthod. Dentofacial Orthop.* 123 (3) (2003) 329–337.
- [9] M.S. Alhammadi, et al., Global distribution of malocclusion traits: a systematic review, *Dental Press J Orthod* 23 (6) (2018) 40.e1–40.e10.
- [10] F.S. Ryan, M. Barnard, S.J. Cunningham, Impact of dentofacial deformity and motivation for treatment: a qualitative study, *Am. J. Orthod. Dentofacial Orthop.* 141 (6) (2012) 734–742.
- [11] S.M. Rivera, et al., Patients' own reasons and patient-perceived recommendations for orthognathic surgery, *Am. J. Orthod. Dentofacial Orthop.* 118 (2) (2000) 134–140.
- [12] H.A. Kiyak, Sex differences in motives for and outcomes of orthognathic surgery, *J. Oral Surg.* 39 (1981) 757–764.
- [13] R.C. Solem, et al., Congenital and acquired mandibular asymmetry: mapping growth and remodeling in 3 dimensions, *Am. J. Orthod. Dentofacial Orthop.* 150 (2) (2016) 238–251.
- [14] P.R. Shetye, et al., Long-term stability and growth following unilateral mandibular distraction in growing children with craniofacial microsomia, *Plast. Reconstr. Surg.* 118 (4) (2006).
- [15] J. Rustemeyer, A. Lehmann, Reduction genioplasty enhances quality of life in female patients with prognathism and maxillary hypoplasia undergoing bimaxillary osteotomy, *Int. J. Oral Maxillofac. Surg.* 42 (9) (2013) 1083–1092.
- [16] Y.A. Kook, et al., Sagittal correction of adolescent patients with modified palatal anchorage plate appliances, *Am. J. Orthod. Dentofacial Orthop.* 148 (4) (2015) 674–684.
- [17] M.-S. Kim, et al., Maxillary molar intrusion and transverse decompensation to enable mandibular single-jaw surgery with rotational setback and transverse shift for a patient with mandibular prognathism and asymmetry, *Am. J. Orthod. Dentofacial Orthop.* 157 (6) (2020) 818–831.
- [18] T. Sekiya, et al., Elimination of transverse dental compensation is critical for treatment of patients with severe facial asymmetry, *Am. J. Orthod. Dentofacial Orthop.* 137 (4) (2010) 552–562.
- [19] C. Sadowsky, A.M. Polson, Temporomandibular disorders and functional occlusion after orthodontic treatment: results of two long-term studies, *Am. J. Orthod.* 86 (5) (1984) 386–390.