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Surgical Management of Laterognathia with Bilateral Sagittal Split Osteotomy: A Serial Case Report

Christo Billy Simanjuntak[1], Abel Tasman Yuza[2], Seto Adiantoro[3], Saptiadi Oktora[4]

[1]Resident, Department of Oral and Maxillofacial Surgery, RSUP Dr. Hasan Sadikin, Faculty of Dentistry, Padjadjaran University, Bandung 40161, Indonesia

[2]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Padjadjaran, Bandung 40161, Indonesia

[3]Head of Department of Oral and Maxillofacial Surgery, RSUP Dr. Hasan Sadikin, Universitas Padjadjaran, Bandung 40161, Indonesia

[4]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Padjadjaran, Bandung 40161, Indonesia.

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Corresponding author: Christo Billy Simanjuntak
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Abstract

Introduction: Laterognathia is characterized by the mandibular deviation to one of the sides affected which often caused by unilateral overgrowth of the mandible and age-related adaptive remodeling changes in the temporomandibular joint (TMJ) that affected masticatory function and aesthetics. The aim of this serial case report is to discuss the surgical management for laterognathia with bilateral sagittal split osteotomy (BSSO) on a clinical case of asymmetrical dentofacial deformity due to an excessive mandibular unilateral laterognathia.

Case Report: This case report contains two cases of mandibular laterognathia. Both of our patients underwent a corrective procedure with bilateral sagittal split ramus osteotomy (BSSO) that performed mandibular setback and rotation. Post-operative follow-up showed the patient was in good condition and no complications were noted.

Conclusion: The mandibular setback and rotation procedure can be performed with a bilateral sagittal split ramus osteotomy (BSSO). Significant improvement of laterognathia in occlusion, masticatory function, and facial appearance was achieved by surgical management with BSSO procedure.

Keywords: *laterognathia, bilateral sagittal split osteotomy, mandibular setback.*

Introduction

One of the most desired beauty concepts is facial symmetry, which is commonly associated with aesthetically pleasing. Patients with some type of dentofacial deformity correspond to approximately 20% of the population and form a considerable portion of dental patients who seek the symmetrical pattern.[1] Among the dentofacial deformities, latherognatia may be mentioned, which is characterized by the mandibular deviation to one of the sides affected.[2] The diagnosis is performed mainly by extraoral examination, which shows the existent degree of asymmetry by assessing the proportion of facial thirds using cephalometric examinations or 3D images.[3]

Patients with this condition are commonly associated with low self-esteem and aesthetic dissatisfaction, thus seeking corrective procedures.[4]

Facial asymmetry is one of the most difficult and challenging dentofacial deformities to correct in orthodontics. Skeletal asymmetry is often caused by unilateral overgrowth of the mandible and age-related adaptive remodeling changes in the temporomandibular joint (TMJ), thus commonly observed in mandible which forms the skeletal support for soft tissues of the lower face. Conversely, since the maxilla provides minimal soft tissue support, most maxillary asymmetry usually develops secondary to asymmetric mandibular growth.[2] Isolated excessive unilateral anteroposterior mandibular growth or anteroposterior maxillary deficiency, or a combination of the two usually result in the development of asymmetrical dentofacial deformities. Studies have shown that the presence of temporomandibular disorder (TMD) symptoms, such as joint sounds and pain, and articular disk displacement is higher in patients exhibiting mandibular asymmetry.[2,5] Optimal correction of such asymmetries requires an interdisciplinary approach involving cooperation of both orthodontist and oral surgeon right from the planning through the completion of treatment.[1]

Asymmetry cases require careful workup and planning, but can be easily addressed with a BSSO. Cases requiring large advancements, patients with poor soft tissue envelopes, and skeletally immature mandibles are better addressed with mandibular distraction osteogenesis. The bilateral sagittal split osteotomy is an indispensable surgical procedure for the correction of mandibular deformities. Undertaking the correction of these deformities requires a thorough knowledge of the indications, technique, and complications of the sagittal split osteotomy. [7] The aim of this serial case report is to discuss the surgical management for laterognathia with bilateral sagittal split osteotomy (BSSO) on a clinical case of asymmetrical dentofacial deformity due to an excessive mandibular unilateral laterognathia.

CASE REPORT

Case 1

A 27-year-old woman came with chief complaints of facial asymmetry and chewing difficulty. The patient complained of asymmetrical jaw with ‘clicking’ sound when opening her mouth. At the time, orthodontic treatment with a fix orthodontic appliances had been used since 1,5 years ago. Then she was consulted to Oral and Maxillofacial Surgery Department – Padjadjaran University Dental Hospital for consideration of orthognathic surgery correction for her condition. History of injury to her heard or jaw, bad habits possibility, or any underlying and systemic diseases of the patient was denied.

On the clinical examination, extra oral analysis revealed a frontal esthetic analysis with concave profile, tapered-shaped face, dolichofacial biotype with protrusive and asymmetrical lower lip, and chin deviation to the right side. Intraoraly showed a fix orthodontic appliances with anterior and right posterior crossbite, and lower dental midline 6 mm deviated to right, molar class I, canine class I.

Figure 1 : Pre-operative clinical examinations: (a) Preoperative profile; (b) Submental view; (c,d,e,f) Lateral and oblique view; (g) Frontal view; (h,I,j) Intraoral view

Cephalometric analysis revealed a skeletal class III jaw base relationship (ANB -1). The maxillary incisors were in normal inclination (U1 to SN, 103°), whereas mandibular incisors had normal inclinations (IMPA, -5.5°). Panoramic radiographic evaluation revealed increased left ramal height and mandibular left body length. An excessive unilateral laterognathia due to excessive unilateral growth of left condyle was observed. We diagnosed the patient with Skeletal class III malocclusion with laterognathia.

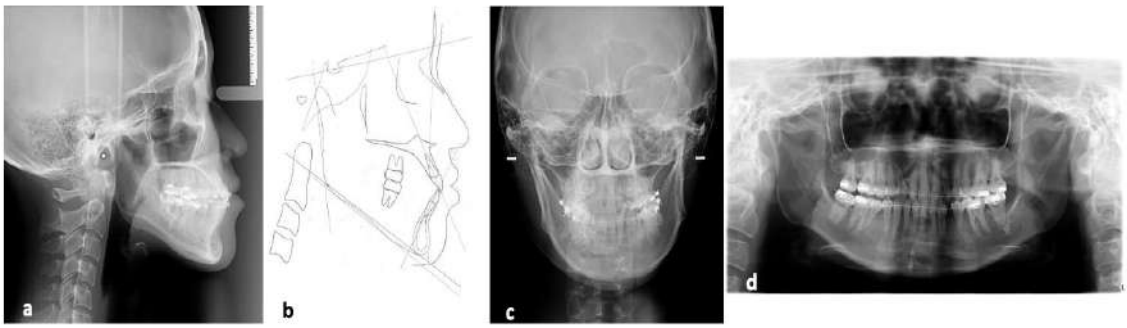

Figure 2 : (a,b,c) Pre operative cephalogram and (d) panoramic x-ray.

According to the assessment of clinical, facial, dental and cephalometric data it was decided to perform a orthodontic-surgical treatment in order to achieve the ideal objectives which were: to improve the profile, to maintain molar and canine class I, anterior guidance (overjet, overbite), and arch coordination. MBT appliances slot 0.022" were used with bands in the first and second molars. The orthognathic surgical procedure was managed with bilateral sagittal split osteotomy (BSSO) technique to correct the laterognathia and match the dental midlines with the facial.

Figure 3: Intraoperative: (a,b,c) Intraoral view of bilateral sagittal split osteotomy

The postsurgical phase was observed for at least six months after the orthognathic surgery because it is the minimum time in which it may be assessed whether there is no relapse after the orthognathic surgery. Satisfactory aesthetic and functional results were achieved for the patient; post-treatment photographs show that there a correct facial symmetry was obtained and molar and canine class I was achieved with a good intercuspation and anterior guidance (overjet, overbite). The maxillary and mandibular midlines were coincident with the facial midline. The anterior crossbite and the bilateral posterior crossbite were corrected. An adequate canine and incisor guidance was obtained as well as a correct exposure of the maxillary incisors during smile and an excellent facial balance.

Figure 4 : Six months post operative follow up: (a) Postoperative profile; (b) Submental view; (c,d,e,f) Lateral and oblique view; (g) Frontal view; (h,I,j) Intraoral view

Upon assessment of the cephalometry X-ray, there is evidence of the plates with 8-millimeter monocortical screws, with good osseointegration. The cephalometric analysis demonstrates the skeletal changes on the mandibular reposition to improve facial aesthetics, which is confirmed with the superimposition.

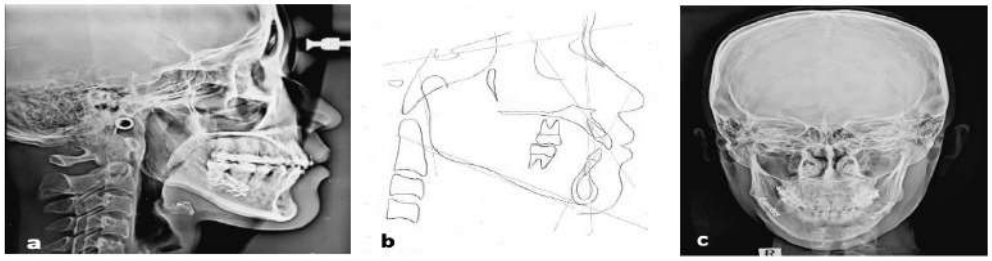

Figure 5 : (a,b,c) Post operative cephalogram.

Case 2

A 23-year-old woman came with chief complaints of facial asymmetry and chewing difficulty. The patient complained of asymmetrical jaw and also often complain of headaches and pain around the shoulders and back. At the time, orthodontic treatment with a fix orthodontic appliances had been used since 6 years ago but the patient didn't feel any improvement, Then she was consulted to Oral and Maxillofacial Surgery Department – Padjadjaran University Dental Hospital for consideration of orthognathic surgery. History of injury to her heard or jaw, bad habits possibility, or any underlying and systemic diseases of the patient was denied.

On the clinical examination, extra oral analysis revealed a frontal esthetic analysis with concave profile, tapered-shaped face, dolichofacial biotype with protrusive and asymmetrical lower lip, and chin deviation to the right side. Intraoraly showed a fix orthodontic appliances with anterior and right posterior crossbite, and lower dental midline 5 mm deviated to right, molar class I, canine class I. Cephalometric analysis revealed a skeletal class III jaw base relationship (ANB -3). The maxillary incisors were in normal inclination (U1 to SN, 102°), whereas mandibular incisors had normal inclinations (IMPA, -5°).

Figure 6 : Preoperative: (a) Pre-operative profile; (b) Submental view; (c,d,e,f) Lateral and oblique profile; (g) Frontal view; (h,i,j) Intraoral view

Panoramic radiographic evaluation revealed increased left ramal height and mandibular left body length. An excessive unilateral laterognathia due to excessive unilateral growth of left condyle was observed. We diagnosed the patient with Skeletal class III malocclusion with laterognathia.

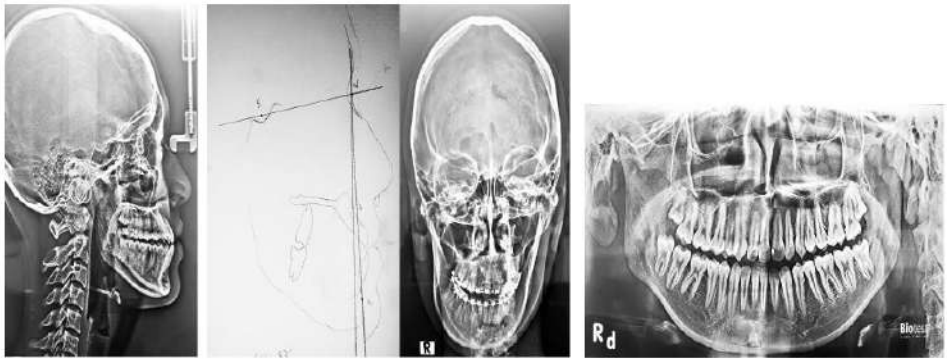

Figure 7: (a,b,c) Pre-operative cephalogram and (d) panoramic x-ray

According to the assessment of clinical, facial, dental and cephalometric data it was decided to perform a orthodontic-surgical treatment in order to achieve the ideal objectives which were: to improve the profile, to maintain molar and canine class I, anterior guidance (overjet, overbite), and arch coordination. The orthognathic surgical procedure was managed with bilateral sagittal split osteotomy (BSSO) technique to correct the laterognathia and match the dental midlines with the facial.

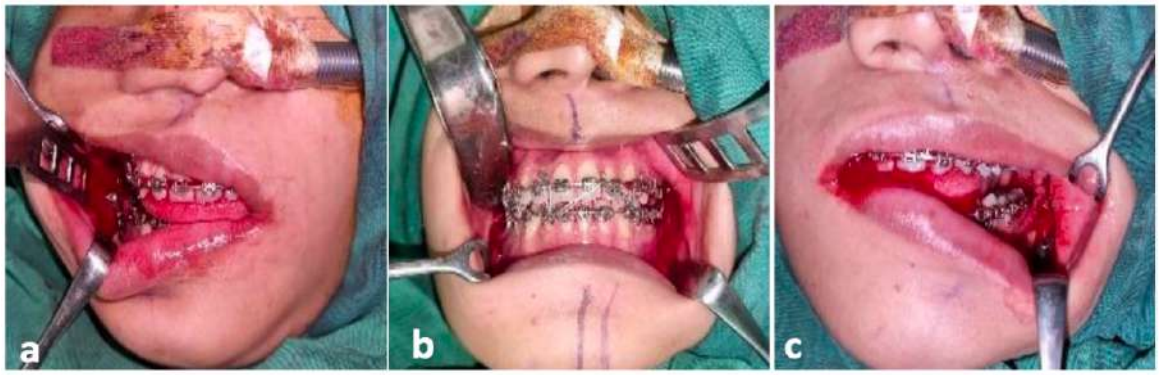

Figure 8: Intraoperative: (a,b,c) Intraoral view of bilateral sagittal split osteotomy

The postsurgical phase was observed four months after the orthognathic surgery. Satisfactory aesthetic and functional results were achieved for the patient; post-treatment photographs show that there a correct facial symmetry was obtained and molar and canine class I was achieved with a good intercuspation and anterior guidance (overjet, overbite). The maxillary and mandibular midlines were coincident with the facial midline. The anterior crossbite and the bilateral posterior crossbite were corrected. An adequate canine and incisor guidance was obtained as well as a correct exposure of the maxillary incisors during smile and an excellent facial balance.

Figure 9 : Four months post-operative follow-up: (a) Postoperative profile; (b) Submental view; (c,d,e,f) Lateral and oblique profile; (g) Frontal view; (h,i,j) Intraoral view

The cephalometric analysis demonstrates the skeletal changes on the mandibular reposition to improve facial aesthetics, which is confirmed with the superimposition.

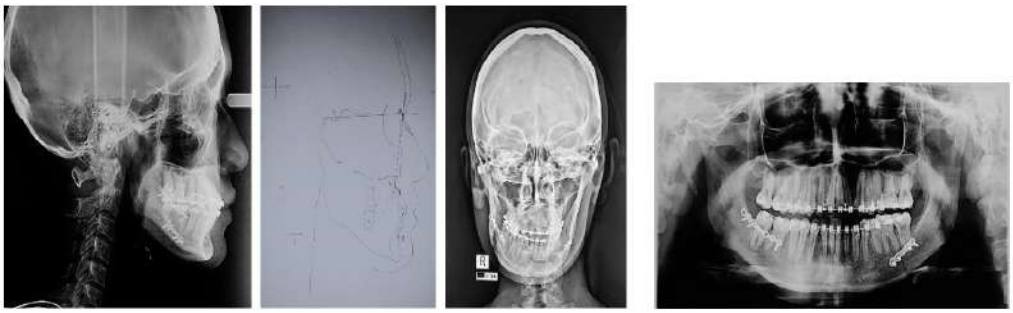

Figure 10 : (a,b,c) Post operative cephalogram was obtained.

Discussion

According to Proffit et al., Only 35% of the population had normal occlusion, while 60% of the population had malocclusion, and 5% had disgnative abnormalities or dentofacial deformities that required orthodontic and surgical treatment.[6] This skeletal class III malocclusion (first case : ANB angle 1, second case : ANB angle - 3) was treated with bilateral sagittal split osteotomy orthognathic surgery with excellent functional and cosmetic results whereas the post operative skeletal analysis is class I for both

patient (first case : ANB angle 1, second case : ANB angle 2). It also secured a class I molar and canine relationship with an excellent occlusal settlement. The combination of orthodontics and maxillofacial surgery produces successful results with a high percentage of long-term stability cases and prevents relapse in the future.

It is of the utmost importance to start with the postsurgical orthodontics three weeks after the surgical intervention to take advantage of the RAP (regional acceleration phenomenon), hence better intercuspation and midline correction movements may be performed in less time and with better results. Changes in soft tissues after the orthognathic surgery vary individually due to biological differences between two patients. These differences include local factors such as (muscle tone, thickness of the soft tissue) and general factors such as age and changes in body weight.

Posterior repositioning of the mandible using the sagittal split osteotomy technique or ramus vertical osteotomy can improve facial aesthetics from the frontal or lateral direction. According to Epker, et al., Repositioning the mandible to the posterior can reduce the angle of the chin, increase the exposure of the upper lip vermilion, and reduce the height of the lower third of the face and in the lateral direction of the face can reduce the protrusion of the chin, reduce eversion of the lower lip, shorten the distance of the neck with the chin, and improve paranasal shape.[2,8]

Complications related to BSSO include bleeding from injury to the inferior alveolar artery or masseteric artery, unanticipated fractures and unfavorable splits, avascular necrosis, condylar resorption, malposition of the proximal segment, and worsening of temporomandibular joint (TMJ) symptoms. [7] In these serial case report, there were almost no complications during and after surgery.

Conclusion

The success of the treatment of skeletal class III malocclusion with latherognatia, crossbite anterior, and unilateral posterior crossbite, using fixed orthodontic appliance followed by orthognathic surgical approach with BSSO technique depends on a good interdisciplinary relation between the orthodontist and the maxillofacial surgeon in order to diagnose and determine the treatment plan, therefore significant improvement in occlusion, masticatory function, and facial appearance can be achieved.

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