Correction of Facial Asymmetry Resulting From Hemimandibular Hyperplasia: Surgical Steps to the Esthetic Result

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Abstract: Hemimandibular hyperplasia is a facial deformity in which there is an increase in the condyle, neck of the condyle or ramus, and an occlusal cant. Different surgical treatments are proposed in the literature, from simple low or high condylectomy to more complex procedures combining osteotomies in different sites of the mandible. Surgical procedure is defined by the scintigraphic diagnosis of activity or inactivity in the center of condylar growth. The case report describes a 35-year-old female patient with hemimandibular hyperplasia on the left side with inactivity of condylar growth, successfully treated with bilateral sagittal split ramus osteotomy associated with a basilar osteotomy in form of "L" on the affected side. The surgical technique was easily executed, with an improvement in function, aesthetics, and patient satisfaction. Correction of facial asymmetry caused by excessive growth of the mandible using this basilar osteotomy in the form of "L" combined with bilateral sagittal split ramus osteotomy proved to be a relatively simple technique of easy execution with a low risk of nerve damage.

Key Words: Hemimandibular hyperplasia, facial asymmetry, mandibular condyle, orthognathic surgery

Hemimandibular hyperplasia is a facial deformity in which there is a 3-dimensional increase in the mandible, characterized by different degrees of asymmetry because of an increase in the condyle, neck of the condyle or ramus, and an occlusal cant caused by the deviation in the mandibular symphysis as well as a prominence of the lower edge of the body of the mandible.[1–5] The maxilla accompanies the excessive growth of the mandible with a tilting of the lips and occlusal plane.[1–4] There is a tendency toward Class III malocclusion or crossbite on the affected side.[5,6]

Different forms of treatment are proposed, depending by the scintigraphic diagnosis of activity or inactivity in the center of condylar growth. Surgical procedures can be used like simple low or high condylectomy to more complex procedures combining osteotomies in different sites of the mandible.[1] This paper proposes a basilars osteotomies combined with bilateral sagittal split ramus osteotomy to correct the facial asymmetry.

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MATERIALS AND METHODS

Clinical Report

A 35-year-old female patient visited the Oral and Maxillofacial Surgery service of the Pontifícia Universidade Católica from Rio Grande do Sul (Porto Alegre, Brazil) complaining of a deviated mandible larger on the left side and that this condition affects her social life since adolescence. The patient reported that the left side of the jaw had grown more than the opposite side at the beginning of puberty, and the stabilization of the growth occurred after 25 years of age. There was no history of trauma or inflammation in the jaw and in the temporomandibular joint. The clinical examination revealed significant facial asymmetry, with deviation of the mandible to the right side of the face (Fig. 1). The patient did not exhibit deviation from the occlusal plane because of the use of complete upper dentures, and there was no significant impairment to the mandible movement or joint pain.

Panoramic radiography revealed elongation of the condyle neck, increasing the length of the condyle, with a downward projection of the angle and body of the left mandible. Computed tomography revealed deformity of the left side of the mandible. Scintigraphy revealed no increase in condyle activity in comparison to the contralateral side. The diagnosis of hemimandibular hyperplasia was established after the clinical and imaging examinations.

Technical Note

The height of the cuts was planned through panoramic radiography and computed tomography (Fig. 2). Intraoral approach was performed to make the bilateral sagittal split ramus osteotomy for correction of the deviation of the mandibular midline, associated with a basilar osteotomy in the left side of the mandible, extending from the ramus to the symphysis region, passing with a 5-mm margin below the mental foramen. In the mandibular angle, a basilar osteotomy in the form of "L" was performed in the ascending direction to correct the extra projection of the mandibular angle on the left side (10 mm). Eight millimeters of the body of the mandible were removed to the lowermost region of the mandible without affecting the inferior alveolar nerve. In the anterior region, osteotomy was performed to the midline of the symphysis region. Internal rigid fixation with miniplates and monocortical screws was used in the mandibular body; furthermore, bicortical screws were used in the mandibular ascending ramus. Maxillomandibular block was released, and the suture was performed (Fig. 3).

Panoramic radiography and posteroanterior skull radiograph shows the correction of the previous asymmetry after surgery (Fig. 4). The patient has been in postoperative follow-up for 12 months and satisfied with her appearance (Fig. 5; Table 1). There have been no relapses. The occlusion and mandible movements remain preserved in relation to the preoperative period, with no joint symptoms.

DISCUSSION

Surgical treatment depends on the skeletal evolution of the malformation. Surgery should be guided by the results of scintigraphy for the

FIGURE 1. Preoperative photograph. Facial asymmetry with deviation of the mandible to the right side of the face.

TABLE 1. Surgical Steps in Order of Execution and Technical Note for Each Surgical Procedure

Surgical Step	Technical Note
Intraoral approach	Ascending ramus until first molar tooth in the buccal groove region. On the left side was extended to the mandibular midline to better visualize the basilar bone.
Mental nerve dissection	This procedure facilitates the manipulation of soft tissue without damage to the nerve.
Basilar osteotomy of the mandible	Oscillatory saw was used to perform a linear osteotomy from the ramus to the symphysis region. Special care should be taken to achieve bicortical osteotomy without damage to soft tissues.
Basilar osteotomy in form of "L"	Oscillatory saw was used to perform an "L" osteotomy in the ascending direction to correct the greater projection of the mandibular angle. Special care should be taken to achieve bicortical osteotomy without damage to soft tissues.
Bilateral sagittal split *ramus osteotomy*	Classical technique was used. Using this technique, it was possible to create a new occlusal plane and to correct the prognathism.
Maxillomandibular block	Maxillary denture was placed to establish the oclusal plane with the help of a surgical guide brought to bite. Then, it used 3 screws in the maxilla and 3 screws in the mandible for the maxillomandibular block with rubber band in chain.
Rigid internal fixation	Miniplate associated with bicortical screw is the preferred type of fixation in the bilateral sagittal split ramus osteotomy because of the excellent postoperative stability. When using this type of fixation, the maxillomandibular block can be removed in the early postoperative.
Suture	It was preferable to use absorbable sutures to avoid the discomfort of removal in the postoperative of 1 week.

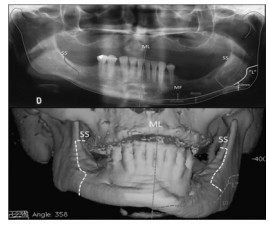

FIGURE 2. Surgical planning in panoramic radiography and computed tomography.

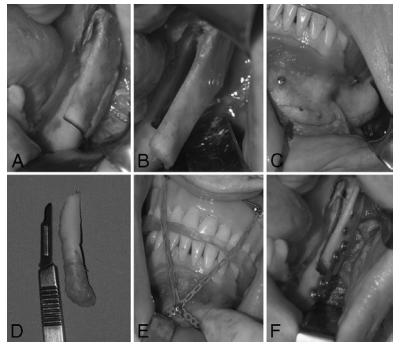

FIGURE 3. A, Osteotomy in for of ''L'' in the angle of the mandible. B, Sagittal split ramus osteotomy. C, Osteotomy in the basilar of the mandible. D, Cortical bone resected of the basilar. E, Maxillomandibular block. F, Rigid fixation of the sagittal split ramus osteotomy.

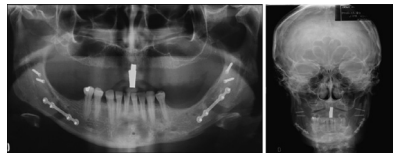

FIGURE 4. Panoramic radiography and posteroanterior skull radiograph in the immediate postoperative.

FIGURE 5. One-year postoperative photograph. Facial asymmetry was corrected without recurrence.

assessment of any center of bone growth because higher Technetium-99 concentration in areas of increased osteoblastic activity.[6,7] Most studies indicate condyle resection when condyle growth is active, associated to orthosurgical treatment; when growth is inactive, follow-up or orthosurgical treatment with no intervention in the condyle is indicated,[4–8] which was followed in this case. Furthermore, the patient had no joint symptoms, complaining only of aesthetic.

Intraoral approach was used in this case to avoid undesirable scars and damage to the facial nerve. However, this technique is more difficult to perform than the extraoral approach and requires training because of restricted access to the bone.

Bilateral sagittal split ramus osteotomy was performed because of the versatility of the method in relation to the correction of the midline and the possibility of rigid internal fixation for the return of function in a shorter period. Another important characteristic of the rigid internal fixation with miniplates and screws is to prevent relapses.[9] All these features were important in this case because the patient had upper dentures, which prevents the use of braces; therefore, the patient was unable to be blocked in the postoperative.

Basilar osteotomy in the form of "L" was performed to simulate the curvature of the mandibular angle, removing the extraprojection and maintaining its anatomical feature. This technique is different from inverted L-shaped osteotomy, which is performed in the mandibular ramus and aims to reposition the jaw and establish a new occlusion.[10]

Basilar osteotomy in the form of "L" for the correction of asymmetry caused by excessive growth in the region of the angle and body of the mandible proved to be a relatively simple technique of easy execution and with a low risk of nerve damage. In the present study, the inferior alveolar nerve was in a favorable position, and it was demonstrated that corrections with excellent results may be obtained through cephalometric planning. When the principles described for the correction of hemimandibular hyperplasia are followed, good cosmetic results are obtained, with minimal complications in the transoperative and in the postoperative.

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Superficial Skin Sensitivity Impairment and Skeletal Stability After Sagittal Split Ramus Osteotomy

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Abstract: Adjustable osteosynthesis miniplates are used to facilitate positioning of the mandible after bilateral sagittal split osteotomy (BSSO) to avoid skeletal relapse and occlusal discrepancies. The short Obwegeser BSSO reduces neurosensory disturbances. Adjustable osteosynthesis plates suited for the Obwegeser BSSO are not commercially available. This study tested adjustable miniplates for the short Obwegeser BSSO in advancement of the mandible and correction of facial asymmetry, assessing (1) sensitivity impairment of the lower lip and (2) skeletal stability.

A prototype of L-shaped, 6-hole, 2.0-mm miniplate with 2 sliding holes was used. Five patients with facial asymmetry (group 1) and 10 patients with mandibular hypoplasia (group 2) were operated on. Sensitivity of the lower lip was quantified using the pain and thermal sensitivity test before the surgery (T_0), 1 week after the surgery (T_1), and 12 months after the surgery (T_2). The length of the ascending ramus (group 1) and the corpus (group 2) was determined at T_1 and T_2 using cone beam computed tomographic scans and lateral skull radiographs, respectively.

After the surgery, occlusion was adequate. There was no need for revisional surgery. At T_2, no patient showed a pathologically reduced sensitivity of the lower lip. The length of the ascending ramus in group 1 and the length of the corpus in group 2 did not have statistically significant changes between T_1 and T_2.

The current study revealed that the adjustable osteosynthesis plates especially designed for the short Obwegeser BSSO can be safely used for the advancement of the mandible and the correction of facial asymmetry, with a minimum risk for neurosensory disturbance and a high skeletal stability.

Key Words: Adjustable osteosynthesis system, bilateral sagittal split osteotomy (BSSO), Obwegeser method, pain and thermal sensitivity (PATH) test, skeletal stability

Orthognathic surgical procedures have been described extensively since the 1950s.[1–3] A number of modifications have been designed to minimize morbidity and to maximize the stability of the procedure.[4] Bilateral sagittal split osteotomy (BSSO) is performed near the inferior alveolar nerve (IAN) and may therefore result in a postoperative neurosensory disturbance. A number of different studies reported up to 100% incidence of IAN damage immediately after the surgery and up to 66% after 1 year.[5]

Cosmetic improvement is a matter of great concern to patients with maxillofacial deformities.[6] This fact seems to be especially true for patients with facial asymmetry (Figs. 1 and 2).[7] In such patients, esthetics often competes with function as a reason for surgery. This pronounced elective aspect of orthognathic surgery prompts the surgeon to take every possible measure to reduce complications to a minimum. It has been previously shown that the Obwegeser method leads to less hypoesthesia of the lower lip than competing techniques.[8] Therefore, it seems adequate to use this kind of BSSO wherever possible.

Another major concern after orthognathic surgery is prevention of relapse.[9] Although the type of fixation has been identified as an important factor in the multifactorial etiology of relapse after orthognathic surgery, miniplates are considered safe and reliable.[4] In an effort to prevent an immediate relapse at the time of surgery and to correct occlusal discrepancies, adjustable bone fixation systems have been introduced.[10] Conceptually, occlusion can be checked at the time of surgery and easily adjusted if it is deemed inadequate before the final fixation. So far, there is no adjustable osteosynthesis system available commercially that can be used for fixation after a short Obwegeser BSSO. Therefore, the current prospective study aimed at introducing an adjustable miniplate for

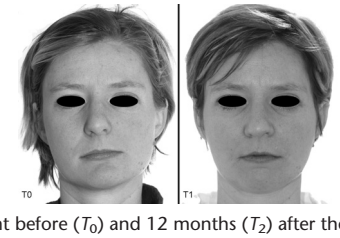

FIGURE 1. Patient before (T_0) and 12 months (T_2) after the correction of facial asymmetry.

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