Ortho-surgical treatment in skeletal CLII patients with temporomandibular dysfunction: Case report

Tratamento orto-cirurgico em paciente CLII esquelética e com disfunção temporomandibular: Relato de caso

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ABSTRACT
The study reports the ortho-surgical treatment of a patient with class II dentofacial deformity and temporomandibular dysfunction. Patient R.C, 29 years old, mixed race, female, sought the Orthodontics course at Christus University Center, complaining of orofacial pain and reporting other types of pain treatments, but without success. After facial analysis, intraoral and extraoral clinical examination, analysis of panoramic radiography and teleradiographs, it was concluded that in addition to temporomandibular dysfunction the patient had a class II deformity, with anteroposterior deficiency, and occlusal instability. The proposed treatment was ortho-surgical and evaluation of painful symptoms before and after surgery through the TMD Research Diagnostic Criteria questionnaire (RDC / TMD). The patient received pre-surgical orthodontic preparation and was then referred for surgery, in which Le Fort I osteotomy was performed in the maxilla with 3 mm advancement and bilateral sagittal osteotomy in mandibular branches for 5 mm mandibular advancement, in addition to mentoplasty. with a further 5 mm feed. Fixation was performed with the Dual Side 2.0mm System (screws and plates), followed by physical therapy, speech therapy and orthodontic finishing. The patient did not show an improvement in bone positioning, profile and face were more harmonic, without losing its aesthetic identity and there was a significant reduction in pain sensitivity previously presented.

Keywords: Dentofacial deformity, Orthognathic surgery, temporomandibular dysfunction

RESUMO
O estudo relata o tratamento orto-cirúrgico de um paciente com deformidade dentofacial classe II e disfunção temporomandibular. Paciente R.C, 29 anos, parda, do sexo feminino, procurou o curso de Ortodontia no Christus University Center, queixando-se de dor orofacial e relatando outros tipos de tratamentos para a dor, mas sem sucesso. Após análise facial, exame clínico intraoral e extraoral, análise de radiografia panorâmica e teleradiografias, concluiu-se que, além da disfunção temporomandibular, o paciente apresentava deformidade classe II, com deficiência anteroposterior e instabilidade oclusal. O tratamento proposto foi orto-cirúrgico e avaliação dos sintomas dolorosos antes e após a cirurgia, por meio do questionário de critérios de diagnóstico de pesquisa da DTM (RDC / TMD). O paciente recebeu preparação ortodôntica pré-cirúrgica e foi encaminhado para cirurgia, na qual foi realizada osteotomia Le Fort I na maxila com avanço de 3 mm e osteotomia sagital bilateral nos ramos mandibulares para avanço mandibular de 5 mm, além de mentoplastia. com uma alimentação adicional de 5 mm. A fixação foi realizada com o sistema Dual Side 2.0mm (parafusos e placas), seguido de fisioterapia, fonoaudiologia e acabamento ortodontico. O paciente não apresentou melhora no posicionamento ósseo, perfil e face foram mais harmônicos, sem perder sua identidade estética e houve uma redução significativa na sensibilidade à dor apresentada anteriormente.

Palavras-chave: Deformidade dentofacial, Cirurgia ortognática, disfunção temporomandibular
1 INTRODUCTION

Dentofacial deformities are skeletal and dentoalveolar abnormalities that cause aesthetic and functional changes and can lead to joint and muscle dysfunction⁷².

These abnormal changes in facial development result from differentiated growth of the maxilla and mandible. These deformities can arise due to an underlying predisposition, congenital changes, acquired causes such as trauma and inappropriate reduction of facial fractures in adults, burns, neoplasms, infections, hormonal diseases, surgical resections and iatrogenic radiation.

The masticatory function of the stomatognathic system is the most impaired because there is, in individuals with dentofacial deformities, a loss in occlusion, altering masticatory performance and bite strength.Associated with the presence of dentoocclusal imbalance, we can find cases of temporomandibular dysfunction (TMD).

The temporomandibular joint (TMJ) is responsible for the masticatory movements and functional activities, in addition to parafunctional activities, which are actions performed without a specific objective and unconsciously⁰¹. The TMJ is a structure that continuously undergoes structural changes that occur through bone remodeling and are responsible for adapting the joint tissue to the continuous forces that act on it. The forces acting on this tissue exceed the limit of the TMJ and become insulting, promoting the appearance of TMD, which consists of a clinical set of signs and symptoms involving the masticatory muscles, the joint itself and associated structures.

Until recently it was believed that malocclusion was the main etiological factor in TMD, but studies have shown that these dysfunctions are diverse and often have multifactorial etiologies. Stress, anxiety and depression; parafunctional habits; traumas and microtraumas; sleep disorders; postural changes are also important etiological factors of TMD.

Several therapeutic approaches have been proposed to control or resolve symptoms through conservative therapies such as counseling, occlusal plaques, mandibular exercises, pharmacotherapy and physiotherapy or, in more severe cases, orthosurgical treatment has been suggested in the search for skeletal, dental, muscular and functional harmonization⁰¹.

The orthodontist plays a key role in planning orthognathic surgery, acting before, during and after surgery. The orthodontic preparation, pre-surgical, will vary depending on the type of bone deformity, severity and age of the patient. Orthodontists and surgeons should work closely on the diagnosis and treatment planning of these patients.
Orthodontic preparation seeks to level teeth in the three planes of space, correcting maxillary and dental disharmonies. From then on, the patient will be able to perform orthognathic surgery.

Orthognathic surgery consists of osteotomy techniques performed in the masticatory system with the aim of correcting relational maxillary discrepancies and, consequently, establishing a balance between the face and skull20, it allows the conditioning of large skeletal changes in a short period of time, leading to changes in appearance, function, respiration, diction and mastication19.

Orthodontic treatment is resumed approximately 6 to 8 weeks soon after the intermaxillary blockade has been completed. It should begin by documenting the case radiographically and photographically. The goals of this phase are to achieve good intercuspation by eliminating interdental spaces, interferences, and premature breaks. At the end of the treatment, the containment should be placed, which should be studied for each case13.

This study reports a case of a TMD patient with a Class II dentofacial deformity whose treatment option was orthosurgical. For the collection of the results, the cephalometric analyses of Downs, Steiner, Mcnamara and J. Rodrigues and Tweed were performed before and after surgery and the Diagnostic Criteria for TMD Research (RDC/TMD) questionnaire was completed and before and six months after surgery to assess whether there was any reduction in TMD pain sensitivity.

2 CASE REPORT

Patient R.C., 29 years old, normosystemic, brown, female, complaining of orofacial pain, having already performed physiotherapy and use of myorelaxing occlusal plaque, but without success in pain relief.

After facial analysis, intraoral and extraoral clinical examination, analysis of panoramic radiographs and lateral cephalometric radiographs, it was concluded that the patient had a class II dentofacial deformity with vertical maxillary excess and anteroposterior mandibular deficiency.

The frontal facial analysis showed a mesocephalic facial symmetry, hypotonic lips and no passive seal. Convex profile, anteriorized maxilla, retracted mandible. Harmonic smile, however, slightly deviated midline (Figure 1).
The intraoral examination showed parabolic arches without dental absence and a slight crowding of teeth 11 (figure 2) and 31 (figure 3). Canines and molars in class II (figure 5) and a huge maxillary-mandibular stop (figure 4).

No changes were observed in the imaging exams, neither in the face radiographs nor in the TMJ tomography.

Cephalometric analyses were performed on Downs, Steiner, McNamara and J. Rodrigues and Tweed.

According to J. Rodrigues' analysis, it was found that point A of the maxilla was 6 mm ahead of the N-PERP line (a line that forms a 90° angle with the Frankfurad plane), forming a 13 mm maxillary-mandibular stop. Characterizing a Class II patient, standard II, i.e., protuberated maxilla and retracted mandible.

Tweed's analysis detected a cephalometric discrepancy of -14.4 mm and a total discrepancy of -16.4 mm in the upper arch and -16.6 mm in the lower arch, which would lead to a prognosis considered unfavorable.

To assess temporomandibular dysfunction a clinical diagnosis of TMD muscle and joint was performed according to the TMD Diagnostic Criteria Questionnaire (RDC/TMD), which evaluates the presence of headache; pain in the facial muscles and/or TMJ; auditory and vestibular aspects and range of motion.

The initial questionnaire detected the presence of pain on both sides of the face in all the palpated muscles except the upper masseter. The mouth opening without assistance and without pain was 18 mm, while the maximum opening was 53 mm with joint and muscle pain on both sides. As for the presence of joint noises, only one click was noticed on the right side of the face during the opening. Presence of muscle pain on the right side during the right lateral movement, and on the left side during the left lateral movement and on both sides during the protrusion movement.

The patient was suggested to perform ortho-surgical treatment in the search for better harmonization of the facial bones, occlusion and better functioning of the stomach system. These benefits of surgery might or might not reflect in an improvement in TMD clinical status, since it is already known that not only occlusal factors are responsible for the appearance of these dysfunctions.

Treatment began with orthodontic preparation, fixed appliance mounting, straight wire prescription, Roth type, banding on all molars, with triple tubes on teeth 16 and 26, double tubes on teeth 36 and 46 and single tubes on teeth 17, 27, 37 and 47. The NITI wire sequence was
used: 0.12, 0.14, 0.16, 0.18, 0.20, then the 0.18 steel and 19x25 steel wires. The wires were developed every month. In this way it was possible to dissolve the slight crowding and perform the dental decompensation.

Once the orthodontic preparation was completed she received the wires specifically for orthognathic surgery. These wires were 19x25 steel wires with Morelli ball type hooks welded between each tooth, both on the upper and lower arches, in order to perform the maxillomandibular block and assist in bone fixation during trans and postoperative periods. These wires were attached to the brackets with 0.20-tapered wires.

The surgery was performed under general anesthesia. Le Fort I type maxillary osteotomy was performed with a 3 mm maxillary advancement. Mandibular osteotomy was a bilateral Sagittal type with 5 mm advancement. Mentoplasty was also performed, with a further 5 mm advancement, totaling 10 mm of mandibular advancement. Bone fixation was performed using a 2.0 mm Dual Side System (screws and plates), MDT® brand.

At the end of the surgical procedure, heavy 5/16 alloys were placed from the upper canine hooks to the lower molar hooks. These alloys were changed weekly and 21 days after surgery were removed.

Forty-five days after surgery, the patient resumed orthodontic finishing movements. A new orthodontic kit was requested, containing teleradiography, photos and a model for replanning the final orthodontic adjustments (figure 10).

The finishing was done using NITI 19x25 wire for 3 months in a row and finally steel 19x25 wire for another month.

Seven months after surgery, treatment was completed with removal of the device and installation of the upper removable (figure 14) and lower fixed (figure 15).

A comparative analysis of the cephalometric measurements before and after treatment was performed to measure whether the new bone and dental position meets normal standards. These analyses were all done manually without and expressed by means of tables.

Six months after surgery, the second RDC/TMD Questionnaire was performed to assess whether there had been a reduction in TMD pain symptoms.

The present study was sent through the Brazil Platform to the ethics committee of Chistus University Center and approved by it with the number of opinion 3,258,324.
3 RESULTS AND DISCUSSION

The new post-surgery measurements obtained in cephalometric analysis showed a significant improvement in the relationship between the jaws, according to DOWNS' analysis, which evaluates hard tissue measurements to analyze the profile unbalance in order to differentiate good and bad dentofacial profiles,24 the convexity angle, which mainly determines the position of the maxilla, decreased from 22° to 12° and is closer to a normal pattern of 8.5° to 10°. As well as the AB plane angle which fell from -24° to -10° showing the improved relationship between mandible and maxilla. There was also a decrease in the angle of the y-axis, reaching the normality pattern. As for the dental pattern, there was not only a slight reduction in tooth inclination with respect to the bone, mandibular and maxillary bases. As shown in Table 1.

| Skeletal pattern               | Pre-surgical | Post-surgical | Ideal Value         |
|-------------------------------|--------------|---------------|---------------------|
| Facial Plan                   | 84°          | 90°           | (82°) - (95°)       |
| Convexity Angle               | 22°          | 12°           | (10°) - (8.5°)      |
| Angle of Plan AB              | 24°          | -10°          | (-9°) - (0°)        |
| Angle of mandibular plane     | 42°          | 35°           | (28°) - (17°)       |
| Y-axis Angle                  | 78°          | 62°           | (66°) - (53°)       |
| **Dental pattern**            |              |               |                     |
| Angle of the Occlusal Plan    | 6°           | 5°            | (14°) - (1,5°)      |
| Interincisal Angle            | 116°         | 117°          | (130°)-(150,5°)     |
| Lower incisor angle with occlusal plane | 37° | 33° | (20°) - (3,5°) |
| Lower incisor angle with mandibular plane | 0 ° | 5 ° | (7°) - (-8,5°) |
| Protrusion of the upper incisor | 12 mm       | 10mm          | (5mm)- (-1mm)       |

The second table (chart 2) shows Mcnamara’s analysis, which confirmed the improvement in jaw positioning, although the jaw is still slightly protuberant even after surgery. The new positioning of the mandible allowed its relationship with the base of the skull to reach the idea value, for females, and also decreased the inclination of the mandibular plane from 43° to 35°, which is closer to the ideal value of 32°. Another positive point of this repositioning was with respect to the angle of the facial axis, which went from -12° to 90°, the ideal value. When the dental pattern was observed, there was no significant change.
Table 2: Macnamara cephalometric analysis data

|                          | Pre-surgical | Post-surgical | Ideal Value   |
|--------------------------|--------------|---------------|---------------|
| **Skeletal pattern**     |              |               |               |
| Relationship of the jaw to the base of the skull | 5 mm | 6 mm | 1 mm |
| Relation of mandible to the base of the skull | -11 mm | 0 mm | -4 to 0 (female) |
| Maxilla and mandibular relationship | 23 mm | 30 mm | 27 to 30 mm |
| **Dental pattern**       |              |               |               |
| Vertical relationship II with the mandible | 1 mm | 1 mm | 1.3 mm |
| Anteroposterior relationship of the upper incisor to the maxilla | 10 mm | 10 mm | 4 to 6 mm |
| Anteroposterior relationship II with the mandible | 6 mm | 6 mm | 1 to 3 mm |
| Vertical relationship of the upper incisor to the resting maxilla and lip | 3 mm | 3 mm | 2-3 mm |

The third table (Table 3) shows the results of Steiner's cephalometric analysis, which uses the SN line instead of the Frankfurt plane and relates the jaws with the cranial base and teeth with their basal bones. When analyzing the dental position with its respective fixation bone bases, it was concluded that the upper incisor reached the positioning in which Steiner thought it was ideal, but with the lower incisor this was not the case. He increased the degree of vestibularization and extrusion with respect to the mandibular bone base.

It is important to underline what Steiner himself said that these values that he thought were ideal, are in fact estimates that are useful as a guide, but should be modified for each individual. For him, a data set cannot be applied to all ages and races. The diagnosis, therapeutic outcome and final stability of orthodontic correction depend on the limitations imposed by the patient's facial type, which may vary according to the morphogenetic pattern of his racial or ethnic group.
Table 3: Steiner cephalometric analysis data

| Skeletal pattern | Pre-surgical | Post-surgical | Ideal Value |
|------------------|--------------|---------------|-------------|
| SNA              | 84°          | 87°           | 82°         |
| SNB              | 73°          | 80°           | 80°         |
| SND              | 69°          | 80°           | 76°-77°     |
| ANB              | 12°          | 7°            | 2°          |
| Inclination of the mandibular plane | 55° | 30° | 32° |
| Inclination of the occlusal plane | 16° | 14° | 14° |
| NB-pog           | 0 mm         | 1mm           | 1.5mm       |
| 1.NA             | 16°          | 22°           | 22°         |
| 1-NA             | 0 mm         | 4 mm          | 4mm         |
| 1.NB             | 36°          | 39°           | 25°         |
| 1-NB             | 11 mm        | 12 mm         | 4mm         |

The fourth table (table 4) shows the results of J. Rodrigues’ cephalometric analysis, whose main function is to determine a profile for the maxilla and a skeletal pattern for the mandible. The results showed that point A of the maxilla remained 6 mm ahead of the N-PERP line, i.e., even after surgery the patient remained with the maxilla in Class II. When the mandibular pattern was observed, the 13 mm maxillary-mandibular stop, which was characteristic of a pattern II, became -1 mm and consequently the pattern became type I. There was also a decrease in the angles formed by the soft tissues of the face, which made the profile noticeably more harmonious.

Table 4: Data from J. Rodrigues’ cephalometric analysis

| Dental analysis                        | Pre-surgical | Post-surgical | Ideal Value |
|----------------------------------------|--------------|---------------|-------------|
| Roots Angulation (Upper Molar)         | 90°          | 90°           | 90°         |
| Roots Angulation (Lower Molar)         | 104          | 78°           | 90°         |
| Vertical crossing                      | 3 mm         | 2 mm          | 2.5mm       |
| Horizontal crossing                    | 6 mm         | 2 mm          | 2.5mm       |
| Superior incisor in relation to the palatal plane | 110° | 117° | 110° |
| II. Mandibular plane                   | 94°          | 90°           | 90°         |
| Nasolabial angle                       | 89°          | 80°           | 90° to 110° |
| Lower face angle                       | 122°         | 109°          | 100°        |
| Chin line neck                         | 72mm         | 80% of AFAI = 57.6 mm |
| Frankfurt Plan x Occlusal Plan         | 5°           | 4°            | 8th +/- 4th |

Finally, Tweed’s Cephalometric Analysis, whose main function is to evaluate the inclination of mandibular incisors in relation to the mandibular edge, using the fixed FMA
angle as a reference, showed a reduction in the FMA of 44° to 35°, an increase in the FMIA angle from 47° to 50° and in IMPA from 89° to 95°. Although the patient did not reach the angles considered by Tweed, who considers the FMA between 20° and 30°, the FMIA at 68°, with an acceptable variation between 65° and 70°, we can state that the new bone positions are closer to these values than those measured before surgery.

The use of any cephalometric analysis as a definitive formula, disregarding age, gender, biotype, anatomical limitations and especially ethnic differences, will result in frustration and failure. It is necessary that professionals, in orthodontic treatment or orthognathic surgery, preserve the ethnic and racial characteristics of each patient so as not to alter facial harmony and, consequently, keep the individual consistent with his or her phenotypic pattern. Another factor that should also be considered in cephalometric standards is the presence of sexual dimorphism.

When analyzing the temporomandibular dysfunction, the following tables show painful sensitivity, mandibular movements and the occurrence of noise before and 6 months after surgery.

| Table 05: Presence of painful muscle and joint sensitivity before and after treatment. |
|-----------------------------------------------|--------------|--------------|--------------|--------------|
|                                | BEFORE       |              | AFTER        |              |
|                                | Law | Left       | Direct | Left       |
| Subsequent storm               | 3   | 3          | 0      | 0          |
| Average time                   | 2   | 3          | 0      | 0          |
| Previous storm                 | 3   | 3          | 0      | 0          |
| Superior Masseter              | 0   | 0          | 1      | 0          |
| Medium Masseter                | 2   | 1          | 2      | 3          |
| Lower Masseter                 | 2   | 3          | 2      | 3          |
| Posterior mandibular region    | 2   | 1          | 1      | 1          |
| Subandibular region            | 3   | 3          | 1      | 0          |
| Side Pole                      | 3   | 3          | 0      | 0          |
| Rear Ligament                  | 2   | 3          | 0      | 0          |
| Lateral pterygoid area         | 3   | 3          | 1      | 1          |
| Storm trend                    | 2   | 3          | 0      | 0          |

0 = only pressure (no pain); 1 = mild pain; 2 = moderate pain; 3 = severe pain

When evaluated for muscle and joint pain sensitivity, there was a reduction in pain in virtually all points evaluated, with the exception of the right middle masseter, right and left lower masseter and left posterior mandibular region, which remained with the same level of pain and the upper right and left middle masseter, where there was an increase in pain (chart 5). In studies that observed pain on palpation of the TMJ, and the musculature involved, as a
diagnostic parameter after orthognathic surgery, Yamada et al. ²⁹ (2001), Al-Riyami² (2009) and Abrahamsson et al. ¹ (2013) had positive results for pain improvement, unlike Nebojsa et al. ¹⁷ (2012) who had worsened pain.

|                      | BEFORE |            | AFTER |            |
|----------------------|--------|------------|-------|------------|
|                      | m.m    | Pain       | m.m   | Pain       |
| Painless opening     | 18     | Painless   | 32    | Painless   |
| Maximum opening      | 53     | A and M both sides | 37 | M left |
| without pain relief  |        |            |       |            |
| Maximum opening      | 55     | A and M both sides | 40 | M both sides |
| with assistance      |        |            |       |            |
| Right Laterality     | 4      | M right    | 8     | Painless   |
| Left Laterality      | 4      | M left     | 8     | Painless   |
| Protrusion           | 3      | M both sides | 5 | M both sides |

A = joint; M = muscular

Regarding the opening, lateral and protrusion movements, there was an increase in the painless opening limit, from 18 mm to 32 mm. At the maximum opening with pain there was a decrease in the opening limit from 53 mm to 37 mm and the pain that used to be muscular on both sides started to occur only on the left side, and the maximum forced opening, with assistance, went from 55 mm to 40 mm, keeping the muscular pain on both sides, but there were no more painful joint symptoms (chart 6).

Zarrinkel et al. ³⁰ (1995) and Miloservic et al. ¹⁶ (1997) observed in their works a significant reduction of mouth opening in the post-surgical period. According to the literature, after surgery, mandibular movements tend to be reduced, assuming normal values in the three- to 14-month postoperative period. Left and right laterality measurements increased from 4 mm to 8 mm, without pain. Finally, the protrusion increased from 3 mm to 5 mm with painful muscle sensitivity on both sides maintained.

The presence of noise detected in the initial examination was only a click on the right side during the opening movement, already in the second examination, no joint noise was felt or informed by the patient. The result corroborates previous studies by Yamada et al. ²⁹ (2001) who also observed improvements in TMJ crackling. When observed the existence of clicks, Onizava et al. ¹⁸ (2009), Al-Riyami² et al. (2009) observed in their studies improvements in patients who underwent orthognathic surgery.

Yamada et al. ²⁹ (2001), Onizava et al. ¹⁸ (2010), Al-Riyami et al. ² (2009), Abrahamsson et al. ¹ (2013), after surveys concluded that TMD signs and symptoms mostly improved or
disappeared after surgery, while Wolford et al. 28 (2003) observed a worsening in the signs and symptoms of TMD patients.

4 CONCLUSION

The case report showed an improvement in bone position, especially in the mandible, bringing to the patient a more harmonic profile and face, although in some cephalometric points the new bone position has not reached the value whose author considers ideal. This leads us to conclude that all existing cephalometric analyses should serve only as a guide and not as a goal to be achieved, since the skeletal pattern of an individual varies according to race and ethnicity.

As for the painful sensitivity felt as a result of TMD, there has been a reduction in most symptoms; however, this should not be advocated exclusively for TMD treatment. Surgery is indicated in cases of occlusion correction as well as facial aesthetics; as for treatments indicated for TMD, the patient should initially be offered less invasive treatments, such as self-management, behavioral intervention, use of drugs, interocclusal plaques, physical therapies, postural training and removal of parafunctional habits.

REFERENCES

1. Abrahamsson C, Ekberg C, Henrikson T, Bondemark L. Alterações de desordens temporomandibulares, antes e após a cirurgia ortognática: uma revisão sistemática. Ângulo Orthod, v. 77, n. 6, p. 729, Jun./ 2013.

2. Al-riyami S, Moles DR, Cunningham SJ. Tratamento ortognática e desordens temporomandibulares: uma revisão sistemática. Parte I. A nova técnica de qualidade de avaliação e análise das características do estudo e classificações. Am J Orthod Dentofacial Orthop; v. 136, n. 1, p. 624-15, Jan./ 2009.

3. Barbosa NAM. O sorriso em doentes submetidos a cirurgia ortognática. Mestrado em cirurgia ortognática e ortodontia, FMUP, 2009.

4. Bello LC, Rodriguez FJS. Frecuencia de deformidades dentofaciales en relación al sexo, y en base al análisis clínico facial fronta y de perfil. Adm XLIII, v. 2, 1986. Citado em Leite PCC, Camarini ET, Filho LI, Pavan AJ, Farah GJ, Silva MB. Estudo epidemiológico das deformidades dentofaciais de Maringá. Pesquisa Brasileira em Odontopediatria e Clínica Integrada, v. 4, n. 3, pp. 217-220, 2004.
5. Bello LC, Rodriguez FJS. Frecuencia de deformidades dentofaciales en relación al sexo, y en base al análisis clínico facial fronta y de perfil. Adm XLIII, v. 2, 1986. Citado em Leite PCC, Camarini ET, Filho LI, Pavan AJ, Farah GJ, Silva MB. Estudo epidemiológico das deformidades dentofaciais de Maringá. Pesquisa Brasileira em Odontopediatria e Clínica Integrada, v. 4, n. 3, pp. 217-220, 2004.

6. Ben-bassat Y, Dinte A, Brin I, Koyoumdjisky-kaye E. Cephalometric pattern of Jeswigh East European adolescents with clinically acceptable occlusion. Am J Orthodontics Dentofac Orthopedics, St. Louis, 102(5):443-448, 1992.

7. Bishara SE, Abdalla EM, Hoppens BJ. Cephalometric comparisons of dentofacial parameters between Egyptian and North American adolescents. Am J Orthodontics Dentofac Orthopedics, St. Louis, 7(5):413-421, 1990.

8. Boeck EM, Gimenez CMM, Coleta KED. Prevalência dos tipos de más oclusões esqueléticas avaliadas em pacientes portadores de deformidades dentofaciais. Revista Dental Press Ortodontia e Ortopedia Facial, Maringá, v. 8, n. 4, p. 73-78, jul./ago.2003.

9. Costa YM, Porporatti AL, Stuginski BJ, Bonjardim LR, Conti PC. Additional effect of occlusal splints on the improvement of psychological aspects in temporomandibular disorder subjects: A randomized controlled trial. Arch Oral Biol. 2015; 60(5):738-44.

10. De freitas RF, Ferreira MÂ, Barbosa GA, Calderon PS. Counselling and self-management therapies for temporomandibular disorders: a systematic review. J Oral Rehabil. 2013;40(11):864-74.

11. De oliveira AS, Dias EM, Contato RG, Berzin F. Prevalence study of signs and symptoms of temporomandibular disorder in Brazilian college students. Braz Oral Res. 2006;20(1):3-7.

12. Faber J, Salles F. Tratamento ortodôntico-cirúrgico de deformidade dentofacial de Classe II: relato de um caso.Rev. Clín. Ortodon. Dental Press, Maringá, v. 5, n. 2 - abr./maio 2006.

13. Ferreira AP et al; Ortodontia e tratamento multidisciplinar. Sociedade portuguesa de ortodontia dento-facial. Póvoa de Varzim: Ed. Poveira, pp.19-68, 1994.

14. Gregoret J, Tuber E, Escobar LHP, Fonseca AM. Ortodocia y cirurgia ortognática, diagnóstico y planificación. Madrid: NMediciones, pp:457-572, 2008.
15. Matheus RA, et al. A relação entre os hábitos parafuncionais e a posição do disco articular em pacientes sintomáticos para disfunção temporomandibular. Rev Bras Odont 2005; 62(1/2):9-12.

16. Milosevic A, Samuels RH. Mandibular mobility and occlusal relationships after orthognathic surgery. Int J Adult Orthodont Orthognath Surg. 1997;12(2):122-8.

17. Nebojsa J, Mladenovi I, Cutovi T, Mladenovi G, Kozomara R. Disfunção temporomandibular após cirurgia ortognática em pacientes com prognatismo mandibular com a depressão como um fator de risco. v. 23, n. 2, p. 455-234, Feb./ 2012.

18. Onizawa K, Schmelzeisen R, Vogt S. Alteração dos sintomas da articulação temporomandibular após cirurgia ortognática: Comparação com voluntários saudáveis. J Oral Maxillofac Surg. v. 53, n. 2, p. 89-117, Feb./ 2009.

19. Panula K. Correction of dentofacial deformities with orthognathic surgery. Oulu: University Library, 2005

20. Ribas MO, Reis LFG, França HSF, De lima AAS. Cirurgia ortognática: orientações legais aos ortodontistas e cirurgiões bucofaciais. Rev. Dent. Press Ortodon. Ortop. Facial vol.10 no.6 Maringá Nov./Dec. 2005.

21. Sebastiani AM, Baratto-filho F, Bonotto D, Kluppel LE, Rebellato NL, Costa DJ et al. Influence of orthognathic surgery for symptoms of temporomandibular dysfunction. Oral Surg Oral Med Oral Pathol Oral Radiol. 2016;121(2):119-25

22. Silva MM, Ferreira AT, Filho HN, Migliorucci R, Felix GB. Influência dotratamento ortodontico-cirúrgico nos sinais e sintomas de disfunção temporomandibular em indivíduos com deformidades dentofaciais. Rev. soc. bras. fonoaudiol. vol.16 no.1 São Paulo Jan./Mar. 2011.

23. Souza DBM DE, Soares EA, Sales RD, Cruz HN, Caldas JRA. Estudo comparativo entre os padrões cefalométricos dentários da análise de Steiner e Tweed em brasileiros nordestinos com oclusão normal. J Bras Ortodon Ortop Facial 2003; 8(48):462-8.

24. Suguino R, Ramos AL, Terada HH, Furquim LZ, Maeda L, Silva filho OG. Análise facial. R Dental Press Ortodon Ortop Maxilar. 1996;1(1):86-107
25. Teixeira SA, Almeida FM. A influência do tratamento ortodôntico nas disfunções temporomandibulares. Arq Bras Odontol. 2007; 2:129-36

26. Trawitzki LVV, Dantas RO, Mello-filho FV, Marques JRW. Masticatory muscle function three years after surgical correction of class III dentofacial deformity. Int J Oral Maxillofac Surg. 2010;39(9):853-6.

27. Uesato G, Kinoshita Z, Kawamoto T, Koyama I, Nakanishi Y. Steiner cephalometric norms for Japanese and Japanese-Americans. Am J Orthodontics, St.Louis, 73(3):321-327, 1978.

28. Wolford LM, Reiche-fischel O, Mehra P. Alterações na disfunção da articulação temporomandibular após cirurgia ortognática, incluindo comentários de Cottrell DA. J Oral Maxillofac Surg. v. 61, n. 2, p. 69-655, Fev./ 2003.

29. Yamada K, Hanada K, Hayashi T, Ito T. Condilar alteração óssea, deslocamento de disco, e sinais e sintomas de distúrbios da ATM em pacientes de cirurgia ortognática. Oral Surg Pathol Oral Med Oral Oral Radiol Endod, v. 91, n. 5, p. 603-10, Mai./ 2001.

30. Zarrinkelk HM, Throckmorton G, Ellis E, Sinn DP. A longitudinal study of changes in masticatory performance of patients undergoing orthognathic surgery. J Oral Maxillofac Surg. 1995;53(7):777-82; discussion 782-3. 27.

ATTACHMENTS

Figure 1: Initial photos. A) Anterior view; B)profile; C) smile and D) lips at pre-surgical rest

SOURCE: author himself.
Figure 2: upper arch

SOURCE: own author

Figure 3: lower arch

SOURCE: author himself

Figure 4: maxillary stop

SOURCE: own author

Figure 5: preoperative intraoral. A) Left and B) Right

SOURCE: author himself.

Figure 6: panoramic radiography.

SOURCE: own author

Figure 7: tomography cephalometric ATM

SOURCE: author himself
Figure 8: teleradiography

SOURCE: own author

Figure 9: Arcs for surgery

SOURCE: author himself.
Figure 10: Images of the post-surgical orthodontic kit. A) Smile; B) Anterior view; C) Profile; D) Arcs-post-surgical; E) Lower arch; F) Upper arch; G) Left; H) Right.

SOURCE: author himself.

Figure 11: Panoramic radiography after surgery.

SOURCE: author himself.

Figure 12: Teleradiography after surgery.

SOURCE: author himself.

Figure 13: Intraoral finishing images. A) Right; B) Left and C) Arcs post-surgical.

SOURCE: author himself.
Figure 14: Upper removable containment

Figure 15: Lower fixed containment

SOURCE: own author