

TMJ disc repositioning associated with orthognathic surgery for the treatment of severe retrognathism

Felipe Gomes Gonçalves Peres Lima, Mirlany Mendes Maciel Oliveira, Larissa Gonçalves Cunha Rios, Marcelo Caetano Parreira da Silva, Darceny Zanetta-Barbosa

ABSTRACT

Introduction: Orthognathic surgery associated with temporomandibular disc reposition is a modality of surgical treatment for dentofacial deformities associated with temporomandibular disorders that has been shown to be a stable and predictable alternative for such situations. However, there is still no consensus in the literature regarding the treatment modality in these cases. Several studies have been developed looking for more stable and predictable results in favor of the best patient treatment.

Case Report: Patient with a class II facial pattern and temporomandibular dysfunction, submitted to bilateral repositioning of the articular disc and orthognathic surgery with counterclockwise rotation of the maxillomandibular complex, with improvement of the symptoms and of the functionality of the stomatognathic system, and satisfaction with facial aesthetics.

Conclusion: Although there are controversies about the surgical repositioning of chronic articular disc displacements in retrognathism, this treatment modality has demonstrated long-term stability and reduction or resolution of joint symptoms.

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INTRODUCTION

Dentofacial deformities are characterized by significant changes in the stomatognathic system that includes phonetic, masticatory, and respiratory changes. Such deformities are usually treated through orthodontics treatment associated with orthognathic surgery [1].

The temporomandibular joint (TMJ) is the basis for the stability of orthognathic surgery. Therefore, in patients with a pathological TMJ, the orthognathic results, including esthetics, functional, symptomatic, and stability, may be unsatisfactory over time [2–4].

Orthognathic surgery, especially in mandibular advancement, may worsen TMJ dysfunction if pre-existing temporomandibular disorder (TMD) is not surgically treated. Hence those patients should always be submitted to a careful preoperative evaluation and planning treatment, including the analyses of possible surgical intervention in TMJ.

The most common TMD symptoms include sounds/noises, TMJ pain, headaches, movement limitation, occlusion changes, chewing difficulties, earache, tinnitus,

vertigo, and others. However, there may be asymptomatic patients or innocuous clinical symptoms [3].

Currently, the diagnosis of internal TMJ disorders can be performed using various methods and devices, such as radiographic, arthrography, tomography, and magnetic resonance. The last one has gained importance in the diagnosis of internal TMJ disorders because it presents high diagnostic precision in determining the position of the articular disc [2].

When TMDs are not diagnosed or untreated they can lead to unfavorable and low-quality results, in addition to postoperative complications [3, 5]. Some of these intra-articular pathologies may also be the direct cause of a dentofacial deformity, such as active condylar hyperplasia, idiopathic condylar resorption, chronic anterior disc displacement, osteochondromas, and others [2, 4, 6, 7].

Treatment of dentofacial deformities and temporomandibular disorders by orthognathic and TMJ surgery is still controversial, there are surgeons who advocate that this combined treatment will reduce or eliminate the TMD signals and symptoms, and others who postulate this treatment will cause further damage to TMJ, worsening symptoms and dysfunction [2, 3, 6, 8].

This is a clinical case report of a class II facial pattern patient, who underwent bilateral disc repositioning and orthognathic surgery with advancement and counterclockwise rotation of the maxillomandibular complex without the need of any kind of bone graft.

CASE REPORT

A female patient, 24 years old, attended the Oral and Maxillofacial Surgery Service of Uberlandia Clinical Hospital (Faculty of Odontology – Federal University of Uberlandia) presenting aesthetic and functional complaint, such as chewing difficult and painful symptoms while performing mandibular movements. The patient also reported breathing difficulties during the sleep period and the presence of snoring, in addition to being a mouth breather.

During the clinical evaluation, the patient presented diffuse pain during palpation of the bilateral joint region with increased intensity when performing full mouth opening, without sounds/noises. She presented a retrognathic profile, long vertical face with high mandibular plane angle (Figure 1). Temporomandibular joint magnetic resonance imaging (MRI) showed anterior displacement of the articular disc without reduction (Figure 2), compatible with stage 3 of Wilkes. Thereby, it was decided to perform bilateral replacement of articular disc with mini anchors in the first surgical moment and to perform the bimaxillary orthognathic surgery in the second moment, 45 days after the first surgery, due to the logistics of the service.

The articular disc repositioning surgery (discopepy) was performed through the endaural access, after

accessing the articular capsule, the articular disc was captured and all adhesions between the disc and the articular fossa were removed. After this, an incision was made in the region of the joint capsule in the condyle head for its exposure, the retrodiscal tissue was removed, and a 1.7 mm screwed mini anchor was inserted 8 mm below the condyle head and sutured to the disc, resulting in an ideal position between the condyle and articular fossa.

After a period of 45 days, bimaxillary orthognathic surgery was performed, starting at the mandible, consisting of mandibular advancement and counterclockwise rotation of the mandibular plane in 14°, associated with 8 mm of maxillary impaction and 5 mm of maxillary advancement, and to 5 mm impaction and 8 mm advancement of chin, totaling a total Pg' (soft tissue pogonion point) advancement of 32 mm.

In the postoperative period, teleradiograph image shown a higher airway space and a more harmonic occlusal relation (Figure 3). The patient evolved with improvement of facial aesthetics, masticatory and breathing function, and absence of painful symptoms of temporomandibular joints, besides social behavior improvement and self-esteem increasing for a period of five years (Figure 4).



Figure 1: Patient's facial profile before the surgery. (A) Frontal clinical appearance, (B) Clinical aspect smile, and (C) Clinical aspect profile.

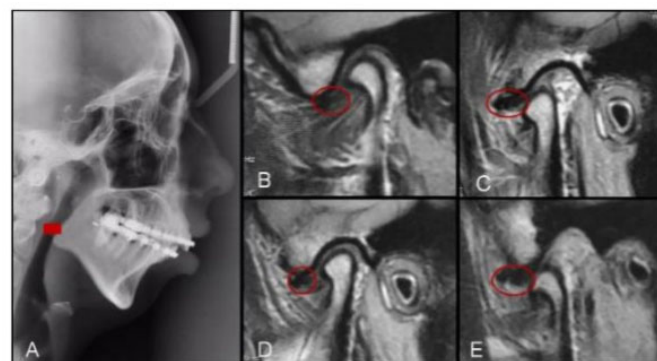


Figure 2: (A) Teleradiograph, presence of reduced oropharyngeal airspace. (B) and (D) Right and left sides, respectively, with closed mouth. Circle showing dislocated articular disc. (C) and (E) Right and left sides, respectively, with open mouth. Circle showing dislocated articular disc, without reduction.

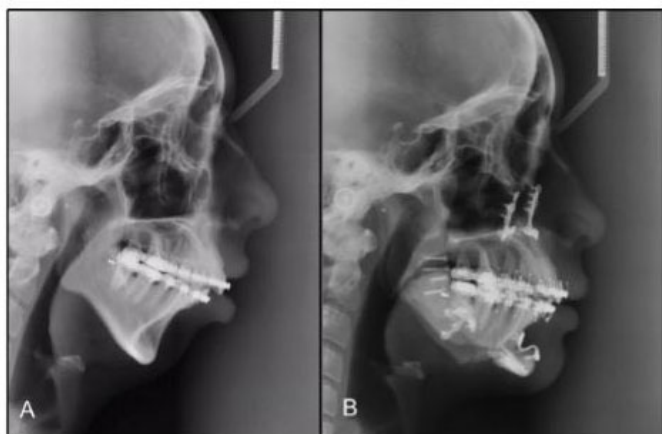


Figure 3: Teleradiograph. (A) Preoperative, note the high occlusal plane and the reduced airway. (B) Postoperative, occlusal plane correction and airway increased.



Figure 4: Patient's facial profile after surgery, five years. (A) Frontal clinical appearance, (B) Clinical aspect smile, (C) Clinical aspect profile.

DISCUSSION

Currently, the exact role of malocclusion performance related to the development of temporomandibular disorder is still uncertain. Riolo et al. (1987) [9] and Abrahamsson (2013) [10] reported that the prevalence of TMD in patients with severe malocclusion, especially associated with dentofacial malocclusions is higher than in the general population.

The orthognathic surgery may cause complications during and after surgery. According to Zaroni et al. (2019) [11], the most frequent complications occurred in mandibular procedures and included poor postoperative occlusion, hemorrhage, inferior alveolar nerve injury, bad split, and infection. These authors also reported two cases of TMJ disorders after orthognathic surgery.

In cases where there is the presence of dentofacial deformities and active joint diseases, such as condylar hyperplasias, idiopathic resorption, and osteochondroma, orthognathic and TMJ surgery become complementary to provide more predictable results since only intervention in the joint is able to reduce, interrupt, or eliminate TMD processes. In cases of joint dysfunction such as chronic articular disc displacement, orthognathic surgery can aggravate the present symptoms, in addition to initiating degenerative processes [2, 4, 7].

The TMJs are an essential component of the stomatognathic system, which unfortunately are often ignored in the preparation of patient to orthognathic surgery. Failure to diagnose or properly treat can result in unpredictable, low-quality results, relapses, aesthetic and functional dissatisfaction, joint pain, and headache. In cases where the TMJ pathology has not been identified or treated, TMJ surgery and reoperating orthognathic surgery may be necessary to stabilize TMJ and correct the mandible/maxillary position and occlusion [11].

Regarding the effects of orthognathic surgery on TMJ, several authors corroborate the improvement of symptoms after orthognathic procedures [8, 12–14]. In this reported case the patient was with a class II profile and who presented anterior displacement of articular disc with intense painful symptoms that evolved with improved functionality, aesthetics, and painful symptoms after orthognathic surgery and TMJ surgery. This case corroborates the results found in the study by Castro et al. (2021) [15] that evaluated the position of the articular disc by magnetic resonance imaging before and after orthognathic surgery of mandibular advancement with counterclockwise rotation, with and without disc repositioning and concluded that the previous repositioning of articular disc associated with orthognathic surgery can develop stable results and benefit in improving symptoms in individuals with disc displacement and TMJ pain.

According to Gonçalves et al. (2015) [2] pre-existing TMJ pathologies, which include dislocation of articular disc, condylar resorption, condylar hyperplasia, osteochondroma, congenital deformities, reactive arthritis, autoimmune diseases, and others, whether symptomatic or not, can cause unfavorable results when only orthognathic surgery is performed. The most common TMJ pathology is the anterior and/or medial dislocation of the articular disc, which can lead to several events including the evolution of arthritis or other symptoms related to the TMJ.

Regarding postoperative stability, Al-Moraissi and Wolford (2017) [6] did a systematic review with meta-analysis and found that postoperative stability of the occlusal plane and point B suffered a relapse when the chronic disc displacement was not treated, due to the change in condylar load, leading to changes in its morphology and movement relapse.

According to Dolwick and Widmer (2018) [16], a mandibular advancement greater than 7 mm combined with a counterclockwise rotation can promote an increased risk of postoperative relapse and pain in TMJ and masticatory muscles, while smaller advances with a counterclockwise rotation has a predominant effect on increasing muscle symptoms. Orthognathic surgery cannot be used as a predictable treatment for TMJ disorders alone. Temporomandibular disorder symptoms should be treated regardless of dentofacial deformities [17].

The postoperative management of the patient is an important aspect of treatment to provide optimal results for the patient. Orthognathic surgery with excessive trauma can damage the joints or overload the TMJs by creating an open bite later in the surgery [11].

Regarding risk factors for the presence of TMD symptoms, bruxism and dysfunctional oral habits were shown to be risk factors for the presence of TMD symptoms, also after combined orthodontic and surgical treatment. The treatment of these habits prior to orthognathic surgery can help prevent TMD [18].

CONCLUSION

Active pathologies of the temporomandibular joint in patients who have dentofacial deformity and will undergo orthognathic surgery procedure may compromise the predictability and stability of orthognathic surgery if the diagnosis and treatment of joint disorders have not been carried out properly. Although there are controversies about the surgical repositioning of chronic articular disc displacements, this treatment modality has demonstrated pain relief, long-term stability, restoration of the mandibular movement, and improvement of the condyle morphology.

REFERENCES

1. Te Veldhuis EC, Te Veldhuis AH, Bramer WM, Wolvius EB, Koudstaal MJ. The effect of orthognathic surgery on the temporomandibular joint and oral function: A systematic review. *Int J Oral Maxillofac Surg* 2017;46(5):554–63.
2. Gonçalves JR, Cassano DS, Rezende L, Wolford LM. Disc repositioning: Does it really work? *Oral Maxillofac Surg Clin North Am* 2015;27(1):85–107.
3. Wolford LM, Karras S, Mehra P. Concomitant temporomandibular joint and orthognathic surgery: A preliminary report. *J Oral Maxillofac Surg* 2002;60(4):356–62.
4. Wolford LM, Dhameja A. Planning for combined TMJ arthroplasty and orthognathic surgery. *Atlas Oral Maxillofac Surg Clin North Am* 2011;19(2):243–70.
5. Nadershah M, Mehra P. Orthognathic surgery in the presence of temporomandibular dysfunction: What happens next? *Oral Maxillofac Surg Clin North Am* 2015;27(1):11–26.
6. Al-Moraissi EA, Wolford LM. Does temporomandibular joint pathology with or without surgical management affect the stability of counterclockwise rotation of the maxillomandibular complex in orthognathic surgery? A systematic review and meta-analysis. *J Oral Maxillofac Surg* 2017;75(4):805–21.
7. Perez DE, Liddell A. Controversies in orthognathic surgery. *Oral Maxillofac Surg Clin North Am* 2017;29(4):425–40.
8. Sebastiani AM, Baratto-Filho F, Bonotto D, et al. Influence of orthognathic surgery for symptoms of

- temporomandibular dysfunction. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2016;121(2):119–25.
9. Riolo ML, Brandt D, TenHave TR. Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults. *Am J Orthod Dentofacial Orthop* 1987;92(6):467–77.
10. Abrahamsson C. Masticatory function and temporomandibular disorders in patients with dentofacial deformities. *Swed Dent J Suppl* 2013;(231):9–85.
11. Zaroni FM, Cavalcante RC, João da Costa D, Kluppel LE, Scariot R, Rebellato NLB. Complications associated with orthognathic surgery: A retrospective study of 485 cases. *J Craniomaxillofac Surg* 2019;47(12):1855–60.
12. Al-Moraissi EA, Wolford LM, Perez D, Laskin DM, Ellis E 3rd. Does orthognathic surgery cause or cure temporomandibular disorders? A systematic review and meta-analysis. *J Oral Maxillofac Surg* 2017;75(9):1835–47.
13. Wolford LM, Rodrigues DB, Limoeiro E. Orthognathic and TMJ surgery: Postsurgical patient management. *J Oral Maxillofac Surg* 2011;69(11):2893–903.
14. Kretschmer WB, Baciut G, Baciut M, Sader R. Effect of bimaxillary orthognathic surgery on dysfunction of the temporomandibular joint: A retrospective study of 500 consecutive cases. *Br J Oral Maxillofac Surg* 2019;57(8):734–9.
15. Castro VA, Pereira RMA, Mascarenhas GM, et al. Magnetic resonance imaging evaluation of articular disk position after orthognathic surgery with or without concomitant disk repositioning: A retrospective study. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2021;131(3):276–85.
16. Dolwick MF, Widmer CG. Orthognathic surgery as a treatment for temporomandibular disorders. *Oral Maxillofac Surg Clin North Am* 2018;30(3):303–23.
17. Nale JC. Orthognathic surgery and the temporomandibular joint patient. *Oral Maxillofac Surg Clin North Am* 2014;26(4):551–64.
18. Bruguere F, Sciote JJ, Roland-Billecart T, et al. Pre-operative parafunctional or dysfunctional oral habits are associated with the temporomandibular disorders after orthognathic surgery: An observational cohort study. *J Oral Rehabil* 2019;46(4):321–9.

Author Contributions

Felipe Gomes Gonçalves Peres Lima – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Mirlany Mendes Maciel Oliveira – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising

the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Larissa Gonçalves Cunha Rios – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Darceny Zanetta-Barbosa – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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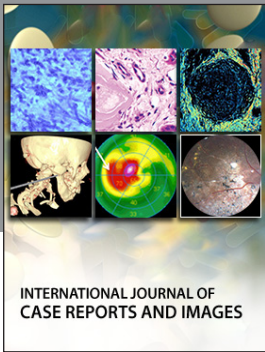
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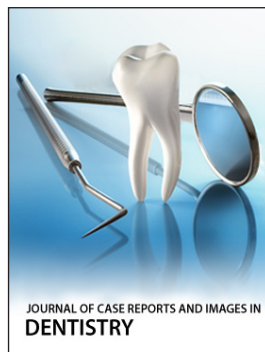
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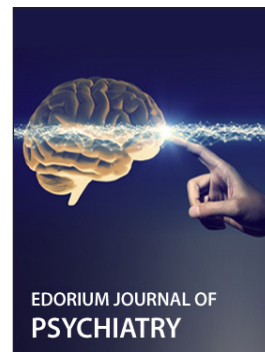
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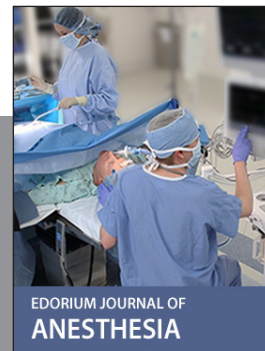
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