

Orthosurgical treatment to obtain facial aesthetics

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CASE REPORT

ABSTRACT

In the present case report, a 24-year-old male underwent a combined surgical and orthodontic treatment to enhance facial aesthetics. The treatment consisted of the use of an Edgewise fixed appliance (0.022 x 0.028-in), and was complemented by a mini Wing osteotomy. The results of the treatment improved facial contours, defining and elongating the submental area, and eliminating the adipose tissue. Orthodontically, the preservation of the canines and molars Class I relationship, and the maintenance of the compensatory projection of the lower incisors were observed. Satisfactory overbite and overjet were achieved, along with a levelled curve of Spee. The combined treatment modalities led to the achievement of functional occlusion and facial aesthetics.

Keywords: Chin wing, Orthognathic surgery, Orthosurgical treatment

Tratamento orto-cirúrgico para obter uma estética facial

RESUMO

No presente relato de caso, um homem de 24 anos foi submetido a um tratamento combinado de ortodontia e cirurgia para melhorar a estética facial. O tratamento consistiu na utilização de um aparelho fixo Edgewise (0,022" x 0,028"), e foi complementado por uma técnica cirúrgica (mini Wing osteotomy). Os resultados do tratamento melhoraram os contornos faciais, definindo e alongando a região submentoniana, e eliminando o tecido adiposo. Ortodonticamente, observou-se a preservação da relação de Classe I dos caninos e molares e a manutenção da projeção compensatória dos incisivos inferiores. Obteve-se sobremordida e sobressaliência satisfatórias, além de uma curva de Spee nivelada. As modalidades de tratamento combinadas levaram à obtenção de uma oclusão funcional e uma estética facial.

Palavras-chave: Chin wing, Cirurgia ortognática, Tratamento orto-cirúrgico

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INTRODUCTION

Facial disharmony can lead to substantial psychosocial impacts, affecting an individual's self-esteem and interpersonal relationships [1,2].

In patients with rheumatoid arthritis, a condition that affects the joints [3], there is greater concern when there is a need for orthodontic and/or surgical treatment, as this condition can affect the temporomandibular joint in particular.

In patients with Class II skeletal malocclusion, with compensatory occlusal patterns and anteroposterior deficiency of the mandible, with consequent facial disharmony, it is possible to opt for less invasive surgical procedures, such as mini Wing osteotomy (mWo), which proposes a change restricted to the anterior morphology of the mandible while maintaining static occlusion [4].

This study reports a clinical case of pre-existing dental compensations which, with minimal orthodontic refinements, benefited significantly from the mWo, choosing it as the surgical technique for correcting existing facial disharmony and achieving facial aesthetics.

CASE REPORT

A 24-year-old male patient who had been undergoing orthodontic treatment for 2 years requested a new orthodontic assessment. The patient's main complaint was his facial aesthetics. The patient presented with rheumatoid arthritis, which caused articular hypomobility.

The extraoral photographs, left and right profile and frontal, showed a convex profile, deficient anteroposterior growth of the mandible (retrognathia), and an undefined submentonian region, with the presence of adipose tissue and absence of passive lip seal [Fig-1]. In the frontal and lateral intraoral photographs, the patient had a Class I molar and canine relationship, an overbite of 1 mm, an overjet of 2 mm, an upper midline deviated 1 mm to the right, and an inferior midline coinciding with the face [Fig-2].



Fig-1: Pretreatment extraoral photographs. a: Right-side, b: Frontal, c: Left-side.



Fig-2: Pretreatment intraoral photographs. a: Frontal, b: Right-side, c: Left-side, d: Upper occlusal, e: Lower occlusal.

Cephalometric analysis identified a skeletal Class II malocclusion (ANB, 7.5o), well-positioned maxilla (SNA, 79.8o), retrusion of the mandible (SNB, 72.3o), dolichofacial growth pattern (SN.GoGn, 45.2o; FMA, 35. 1o), compensatorily retroclined upper incisors (1.NA, 12.8o), compensatorily vestibularized lower incisors (1.NB, 41.2o; 1-NB, 15.0 mm) and a reduced interincisor angle (1.1, 118.3o), predominantly due to the projection of the lower incisors [Fig-3].

Cephalometric measurements	Measurement	Norm	Pretreatment	Posttreatment
Skeletal pattern	SNA(°)	82	79.8	79.8
	SNB (°)	80	72.3	72.3
	ANB (°)	2	7.5	7.5
	Go-Gn.SN (°)	32	45.2	43.8
	FMA (°)	25	35.1	36.5
	U1.NA (°)	22	12.8	20
	L1.NB (°)	25	41.2	41.7
	L1-NB (mm)	4	15.0	13.7
	1.1 (°)	131	118.3	103.1

Fig-3: Cephalometric measurements. ANB: Angle between point-A, Nasion (N) and point-B; FMA: Frankfort-Mandibular plane Angle; Go-Gn.SN: Gonial-Gnathion Sella-Nasion; SNA: Sella-Nasion-point-A; SNB: Sella-Nasion-point-B; U1.NA (o): Angle (in degrees) between Upper Incisor and Nasion point-A; L1.NB (o): Angle (in degrees) between Lower Incisor and Nasion point-B; L1.NB (mm): Distance (in millimeters) between Lower Incisor and Nasion point-B; 1:1 (o): Angle between Lower Incisor and Upper incisor.

Treatment Objectives

Obtain a functional occlusion and facial aesthetics.

Treatment Alternatives

1) Orthodontic treatment. This alternative was already being carried out, without satisfactory facial aesthetic results.

2) Orthodontic treatment + orthognathic surgery with mandibular advancement. This alternative would imply the pre-surgical need to increase the overjet by decompensating the upper and lower incisors. It would also probably require the removal of two lower premolars or the use of temporary anchorage devices (miniplates or extra-alveolar minimplants) to distalize the lower arch bilaterally. Because of

rheumatoid arthritis, major orthognathic surgery could lead to a significant increase in morbidity and treatment time.

3) Orthodontic treatment + mini Wing osteotomy (mWo). This alternative would be the most conservative in surgical terms, achieving functional occlusal and facial aesthetic results, and would be the patient's option of choice.

Treatment Process

The patient came to the office wearing Edgewise polycrystalline ceramic orthodontic brackets (GAC Orthomax, Allure, 0.022 x 0.028-in, Matão, São Paulo, Brazil) and Edgewise Standard metal orthodontic brackets (Abzil Standard 0.022 x 0.028-in, Sumaré, São Paulo, Brazil). Sequential and coordinated upper and lower steel archwires were made in sizes 0.014", 0.016", 0.018", 0.020", and 0.019"x 0.025".

Pre-surgical orthodontic treatment resulted in: alignment and leveling of the arches; maintenance of the Class I relationship of the canines and molars; closure of the anterior open bite; and maintenance of the compensatory projection of the lower incisors. To close the open bite, sequential step-up bends were made for the upper posterior teeth and step-down bends for the upper anterior teeth. For the lower arch, antagonistic sequential bends were made, step down for the lower posterior teeth and step up for the lower anterior teeth. As a result, the residual anterior open bite was corrected [Fig-4].



Fig-4: Intertreatment intraoral photographs. a: Frontal, b: Right-side, c: Left-side, d: Upper occlusal, e: Lower occlusal.

The patient was then referred for mWo surgery. The patient's dental arches were CBCT scanned and the resulting DICOM files were reconstructed using Dolphin software (Dolphin Imaging and Management Solutions, California, USA). After surgical planning, the 3D model was converted into an STL file format to facilitate the preparation of the osteotomies and the fabrication of the surgical guides. Under general anesthesia, the surgical procedure consisted of three incisions in the anterior region of the mandible, made with an electric scalpel. The bone segmentation process was carried out using reciprocating micro-saws (Stryker-CORE System, Michigan, USA). After completion of the osteotomies, a trio of plates (System 2.0, KLS Martin, Germany) was strategically placed in the anterior region of the mandible to ensure internal fixation. The result after surgery can be seen in Fig. 5 and 6.



Fig-5: Face result after surgery.



Fig-6: Intermediate panoramic radiograph.

During post-surgical orthodontic movement, tip-back bends were made on tooth 23 to better "seat" the Class I canine relationship on the left side and centralize the dental midlines [Fig.7].

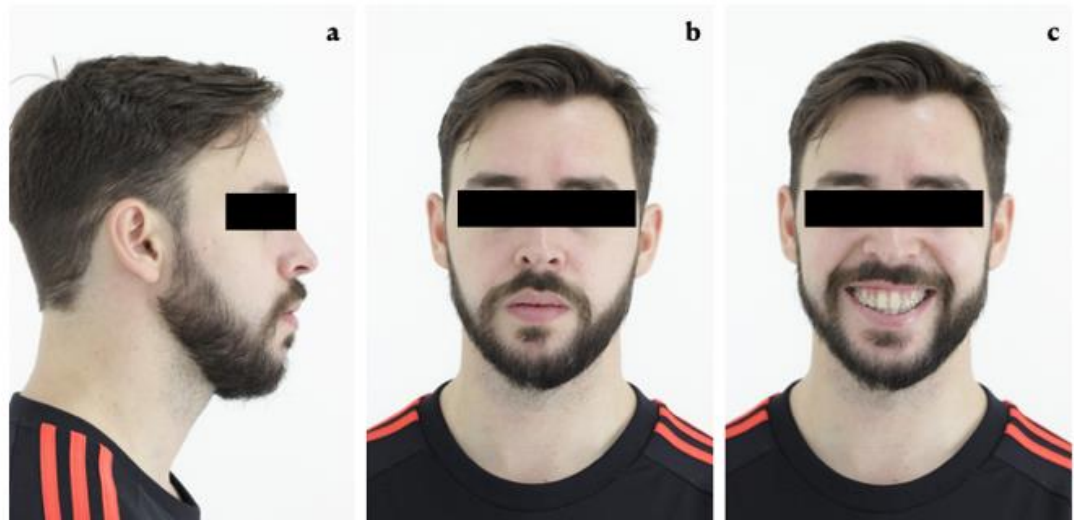


Fig-7: Intertreatment extraoral photographs. a: Right-side, b: Frontal, c: Smile.

After removing the appliance, a fixed retainer was bonded with 0.020" steel wire from teeth 33 to 43. A removable wraparound retainer was also made for the upper arch.

Treatment Results

Class I canine and molar relationships were maintained. The arches were aligned and leveled, the overbite was 1.5 mm, the overjet was 1.5 mm, the midlines coincided with the face, and the open bite was closed. There was an improvement in facial harmony, associated with the definition and lengthening of the submentonian region, elimination of adipose tissue, and passive lip sealing [Fig-8 and 9].

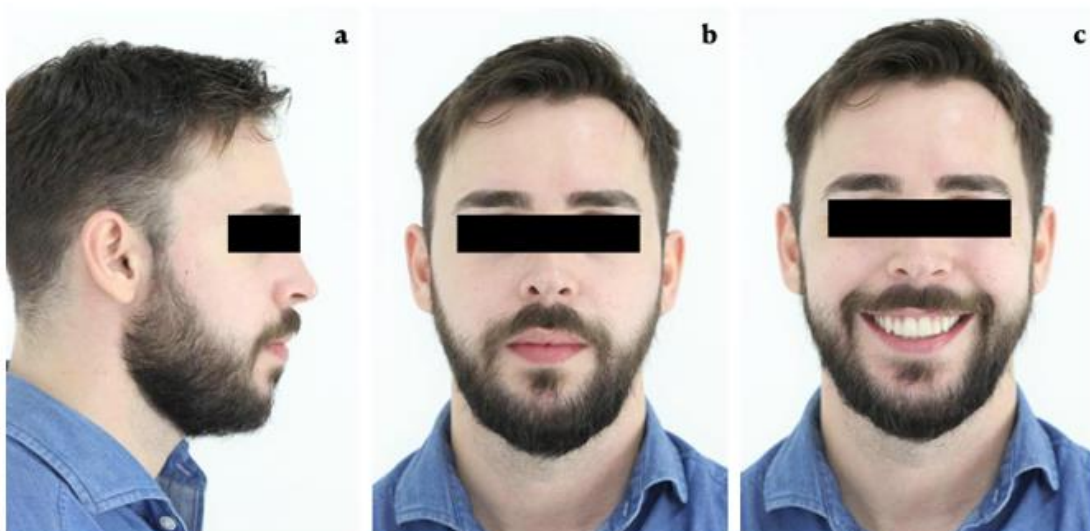


Fig-8: Posttreatment extraoral photographs. a: Right-side, b: Frontal, c: Smile.



Fig-9: Posttreatment intraoral photographs. a: Frontal, b: Right-side, c: Left-side, d: Upper occlusal, e: Lower occlusal.

The panoramic radiograph revealed root parallelism with apical root rounding in some teeth, the presence of a fixed retainer, and three mini titanium plates in the anteroinferior region of the mandible. The cephalometric analysis showed a skeletal Class II malocclusion (ANB, 7.5°), a dolichofacial facial pattern (SN.GoGn, 43.8°; FMA, 36.5°), compensatory projection of the lower incisors (1.NB, 41.7°; 1-NB, 13.7 mm), and a reduced interincisor angle (1.1: 103.1°) [Fig.10].

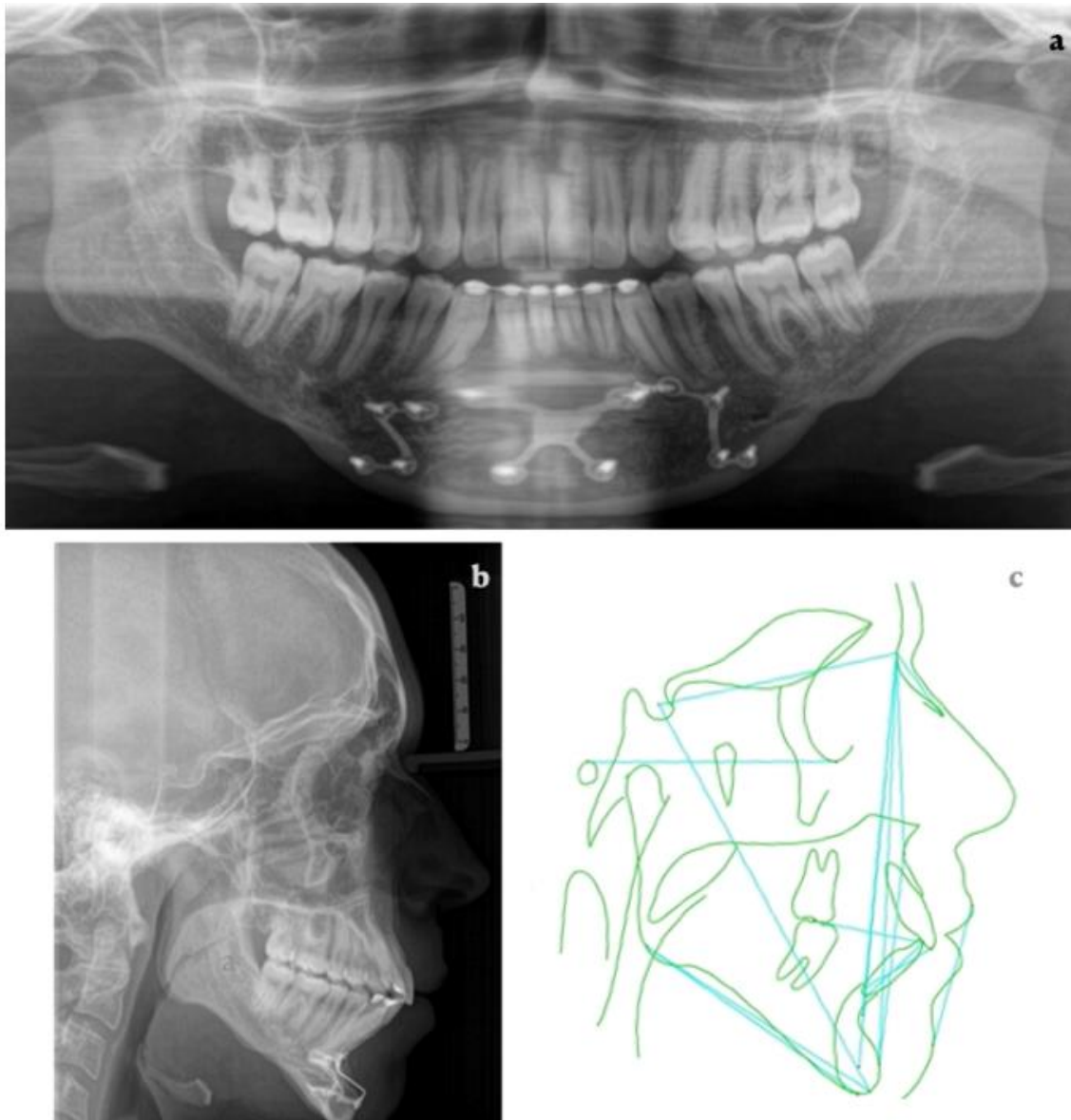


Fig-10: a: Final panoramic radiograph; b: Final lateral cephalometric radiograph; c: Final cephalometric tracing.

DISCUSSION

Patients with disharmonious face can suffer psychological and social impacts, causing problems in their interpersonal relationships [1,2]. This statement corroborates the case described, in which the patient had a deficiency in the anteroposterior growth of the mandible and reported having problems socializing due to his retrognathic appearance.

In addition, patients with rheumatoid arthritis usually have involvement of some joints, especially those of the hands, feet and knees [3]. Thus, the patient in this case was accompanied by an interdisciplinary team, and throughout the treatment, no

involvement of the temporomandibular joint was identified, which was a concern, given the length of time he had been wearing orthodontic braces, and also due to the risks of him undergoing a surgical procedure, even though the technique of choice was not very invasive when compared to other orthognathic techniques [4,5,6].

Low-invasive surgical procedures can be considered when orthodontic dental compensation is present in patients with Class II skeletal malocclusion. These patients, despite having the unsightly facial effects of malocclusion, have, thanks to natural dental compensation, occlusal patterns compatible with Class I patients. Among the surgical techniques that could be used in these cases, mini Wing osteotomy (mWo), characterized by altering only the anterior morphology of the mandible while maintaining static occlusion, may be one of the options [4]. Although mWo is rarely reported in the scientific literature, two similar cases have been described [4,7]. The present case already had dental compensations and only required minor orthodontic refinements. As such, mWo was the technique of choice for improving facial aesthetics, as it is a low-invasive surgical intervention capable of correcting existing facial disharmony.

CONCLUSION

In conclusion, after the patient underwent orthodontic treatment associated with mWo surgery, good functional occlusal and facial esthetic results were achieved. It is therefore believed that mWo should be considered as a form of treatment for patients with skeletal Class II malocclusion and facial deformities who have a compensatory satisfactory occlusion.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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