
Orthodontic Management of Dentomaxillary Dysharmony and Bimaxillary Protrusion: a Case Report

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Abstract

In orthodontic practice, bimaxillary protrusion constitute a frequent reason for consultation because of its aesthetic implications. It is defined as a proclination of maxillary and mandibular incisors in relation to the skeletal bases, which results in labial biprotrusion and forced closure of the lips.

This case report shows the orthodontic management of a young female patiente, who presented herself to the orthodontics department in Rabat for aesthetic consultation: maxillary protrusion and dental crowding.

Keywords: Bimaxillary protrusion-Dento-maxillary disharmony

Introduction:

Bimaxillary protrusion is an ethnic characteristic frequently encountered in African, North African, Afro-American and Asian populations.

It is characterized by protrusive and proclined upper and lower incisors in relation to the skeletal bases resulting in soft tissue procumbency. This accelerates fatigue and ageing of the facial muscles.

Bimaxillary protrusion is an essential factor in dento-maxillary dysharmony. Its etiology is multifactorial and includes a genetic component as well as environmental factors related to mouth breathing, tongue and lip habits, and tongue volume.

Orthodontic managment of bimaxillary protrusion depends on its severity. The extraction of the maxillary and mandibular first premolars and a maximum anchorage is absolutely recommended.

(1)

Clinical Case:

H.S is a young female patient, 22 years old, in good health, presented herself to the orthodontics department of RABAT, with the chief complaint: lip biprotrusion and dental crowding.

• **Clinical examination:**

Extraoral examination showed oval and symmetrical face, lower anterior facial height was decreased. The naso-labial folds are not marked, and the labial closure is done with contraction of the perioral musculature. She displayed an unsightly smile, objectivizing the totality of the maxillary teeth, maxillary and mandibular dental midlines were centred with the midsagittal plane.

From the lateral view, the patient presented a convex profile, normal nasolabial angle, a slightly marked mento-labial fold, and a receding chin. (Figure 1)



Figure 1: pre-treatment extraoral photographs

Intraoral examination showed a fully erupted permanent dentition, insufficient oral healthcare and a thin periodontal biotype.

Maxillary arch was U-shaped and symmetrical, with moderate anterior crowding. Mandibular arch was lyre-shaped and symmetrical, with crowding in the anterior and middle area.

Inter-arch relationships showed bilateral Class I molar and canine relationships, a normal overjet (2 mm) and insufficient ovebite. Upper and lower dental midlines were centred with the midsagittal plane. (Figure 2)



Figure 2: pre-treatment intraoral photographs

- **Functional examination:**

Functional examination shows that the patient has nasal breathing and atypical swallowing.

No symptoms of temporomandibular joint disorders were observed, the occlusal function was respected.

- **X-ray examination and cephalometric analysis:**

The panoramic radiograph shows a complete dental formula and the inclusion of maxillary and mandibular third molar in horizontal position, with no condylar or sinus pathology. (Figure 3).

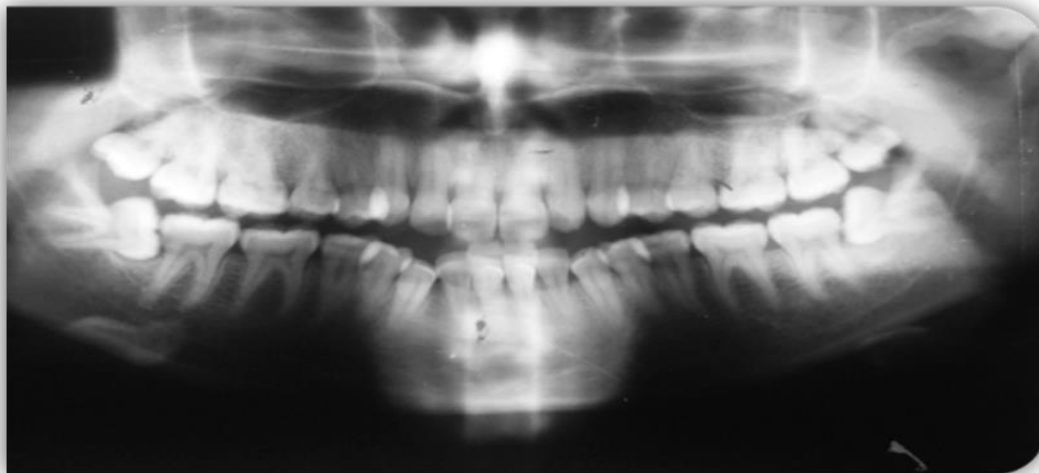


Figure 3: pre-treatment orthopantomography

The lateral cephalometric radiograph (Figure 4), reveals the following cephalometric values: (Table 1).



Figure 4: pre-treatment cephalometric radiograph

FMIA	67° ± 3	52
FMA	25° ± 3	24
IMPA	88° ± 3	104
SNA	82°	83
SNB	80°	77
ANB	2° ± 2	6
Ao-Bo	2mm ± 2	2
Plan d'Occ	10°	8
Angle Z	75° ± 5	65
Upper Lip	/	8
Total Chin	/	12
Ht Faciale Post	45mm	42
Ht Faciale Ant	65mm	59
Index Post Ant	0,69	0,71
Rapport d'évolution	2/1	

Table 1: pre-treatment cephalometric analysis

Diagnosis

Patient presented a skeletal Class I jaw relationship, a normodivergent facial pattern, with bimaxillary protrusion, and lip projection.

Treatment objectives, plan and procedure:

The treatment had the following objectives: elimination of maxillary and mandibular crowding, reduction of biprotrusion and consequently improvement of the profile aesthetics.

The therapeutic decision was oriented towards a multi-bracket appliance treatment with extraction of the first maxillary and mandibular premolars, the therapeutic sequence envisaged was as follows:

- Alignment and levelling of the curve of Spee.
- Extraction of first premolars and third molars.
- Retraction of the canines into the extraction space.
- Retraction of the incisors.
- Orthodontic finishing.
- Retention.

The maxillary and mandibular arches were banded with standard Edgewise braces. Canine retraction in the extraction spaces was achieved by directional forces. The improvement of the maxillary incisal torque, which was insufficient, allowed a normalization of the inter-incisal angle. (Figure 5, 6, 7, 8).



Figure 5: extraoral photographs during treatment



Figure 6: intraoral photographs during treatment

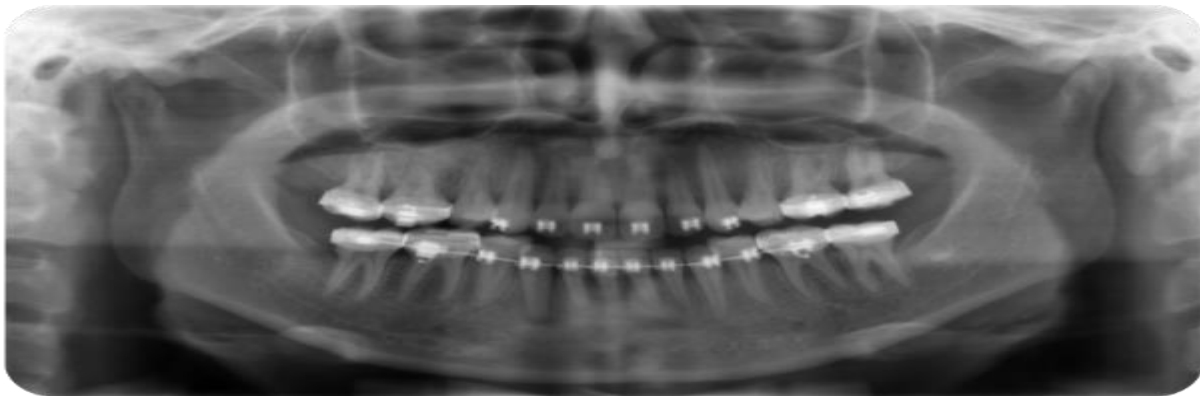


Figure 7: orthopantomogram during treatment

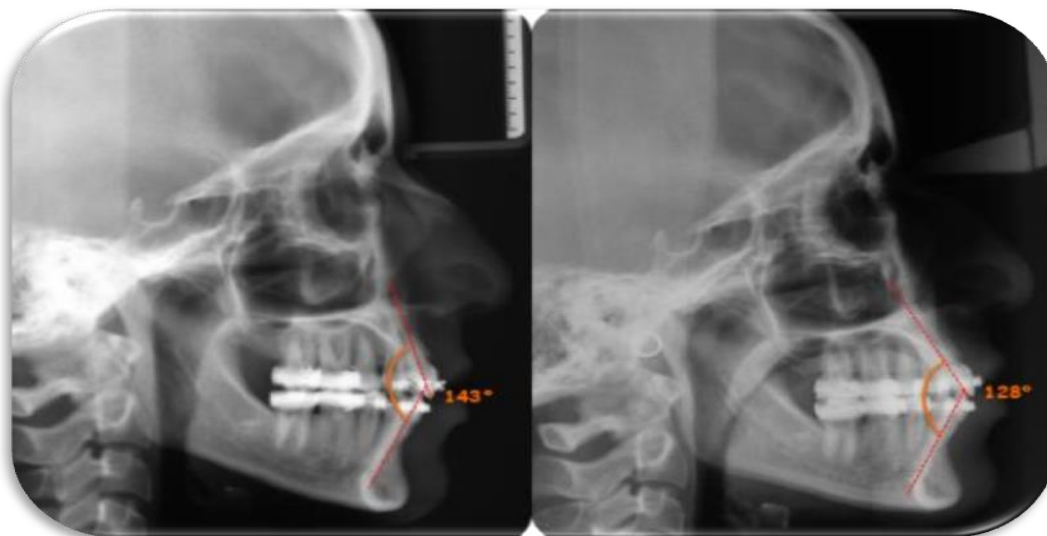


Figure 8: correction of maxillary incisor torque and inter incisal angle

Obtained results:

Patient regained a more harmonious face, a more confident smile, the lip closure is done without contraction of the perioral muscles and the profile is clearly more balanced.

Class I molar and canine relationships have been preserved, the maxillary and mandibular dental crowding has been reduced, the axes of the incisors have been corrected, with adequate overjet and overbite. Cephalometric analysis at the end of treatment showed a considerable improvement in the IMPA angle as well as the Z-angle. (Table 2) (Figure 9,10,11,12)

FMIA	67° ± 3	52	58
FMA	25° ± 3	24	24
IMPA	88° ± 3	104	98
SNA	82°	82	81
SNB	80°	77	77
ANB	2° ± 2	6	4
Ao-Bo	2mm ± 2	2	1
Plan d'Occ	10°	8	8
Angle Z	75° ± 5	65	71
Upper Lip	/	8	12
Total Chin	/	12	12
Ht Faciale Post	45mm	42	42
Ht Faciale Ant	65mm	59	59
Index Post Ant	0,69	0,71	0,71
Rapport d'évolution	2/1		

Table 2: post-treatment cephalometric analysis



Figure 9: post treatment extraoral photographs



Figure 10: post treatment intraoral photographs

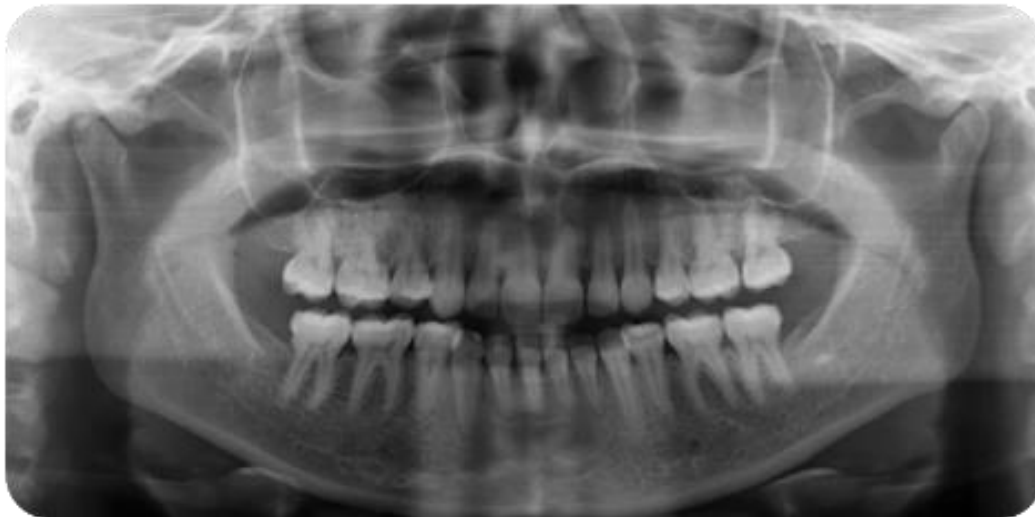


Figure 11: post treatment orthopantomography

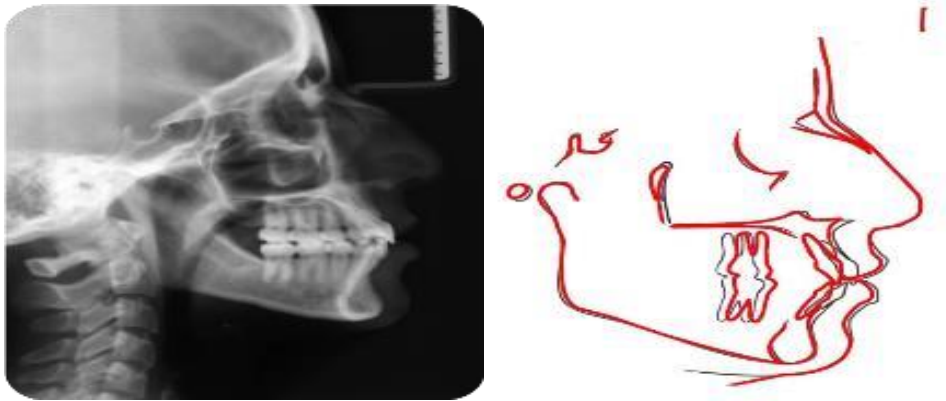


Figure 12: post treatment cephalometric radiograph

The therapeutic result obtained is stable over the long term (Figure 13)



Figure 13 : 3 years follow-up

Discussion:

In orthodontic practice, bimaxillary protrusion is a very frequent reason for consultation because of its aesthetic implications. Patients with this malocclusion feel profoundly uncomfortable with their aesthetic appearance due to the excessive exposure and projection of their upper incisors and the resulting labial incompetence and projection (2).

The etiology of bimaxillary protrusion is multifactorial with a genetic component and another related to the disruption of labiolingual balance in favour of lingual forces. It is mainly due to: macroglossia; an anterior lingual impulse during swallowing, phonation or sucking tics; labial hypotonicity; labial inoclusion at rest most often in relation to oral ventilation. It is considered as an expression of dento-maxillary disharmony that is expressed by proclination of the incisors. (3)(4)

When faced with a bimaxillary protrusion with a class I occlusion, the option of abstaining may be considered. Several authors consider that it corresponds to a situation of balance within the patient's muscular environment, depending or not on his ethnic characteristics. (1). On the other hand, when treatment is decided, the following therapeutic objectives must be met :

- Retraction and straightening of the axes of the incisors.
- Reduction of the convexity of the profile, normalizing the nasolabial angle and reducing lip projection.

These objectives are most often achieved by extraction of the first premolars with maximum anchorage (3). This has been confirmed by several studies: a study carried out by Alqahtani showed a statistically significant increase in the nasolabial angle following retraction and retroversion of the maxillary and mandibular incisors in people with bimaxillary protrusion treated by extraction of the first 4 premolars.

In addition, incisal retraction resulted in a statistically significant decrease in upper incisor exposure, facial convexity, and mento-labial fold depth. Multiple regression analysis showed that retraction of the maxillary and mandibular incisors by 1 mm would result in 0.44 mm retraction of the upper and lower lips (5).

A systematic review conducted by Iared demonstrated that no significant difference exists between the facial profiles of patients receiving orthodontic treatment with and without extraction of 4 premolars in terms of aesthetic results. However, in patients who initially had biprocheilis and significant facial convexity, premolar extractions tended to be beneficial for soft tissue structure (6).

Conclusion:

The treatment case was successful, the main end of treatment goals proposed to the patient were achieved, namely good occlusion and pleasant facial aesthetics. Good root parallelism was achieved and the extraction spaces were properly closed with retraction of the maxillary and

mandibular incisors. The labial closure was done without contraction of the perioral muscles and the smile appeared more harmonious and pleasant which contributed significantly to the complete satisfaction of our patient.

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