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C L I N I C A L C A S E

Treatment of a case of a Class III bimaxillary protrusion

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INTRODUCTION

This article describes a Class III malocclusion with bi-alveolar protrusion of the incisors treated by extraction of premolars and a follow-up of 3 years post-retention by the Dento-Facial Orthopedic Service of the CHU of Casablanca.

CLINICAL CASE

The patient S.F., 18 years old, came to the Dento-Facial Orthopedic Service of the CHU of Casablanca for an esthetic problem related to dental crowding and an edge-to-edge occlusion of the incisors. The patient reported prior facial trauma at 11 years of age (practicing a fighting sport).

CLINICAL EXAM

An examination of the face revealed a long face with weak asymmetry, particularly affecting the middle third of the face with deviation of the nasal septum to the left

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side probably due to the reported trauma. We also noted a flat profile line with a slightly protruded lower lip, inverted lips relationship, a straight nasolabial angle, a faint labio-mental furrow, and a broad chin that resembles a skeletal Class III. Vertically, the patient presents an increased lower facial height. (Figs. 1a to c).

Reviewing the intra-oral examination, the patient presents with good oral hygiene and thick periodontium. Regarding the orthodontic condition we noted a Angle's Class I right canine and left molar relationship, with a Class III left canine and right molar relationship, a dental shift of the incisor midlines, and an anterior edge-to-edge occlusion. In the maxillary arch there are disto-rotations of 12 and 22, missing 24 and complete mesial drift of the left molar sector. In the mandibular arch, there is also anterior crowding and left posterior crowding due to the trapped 45 (Figs. 2 a to c, 3 a & b).

a b c

Figures 1
Facial portraits, anterior, profile and smile at the start of treatment.

a b c

Figures 2 a to c
Intra-oral vestibular views, right, anterior and left, at the start of treatment.

a b

Figures 3 a & b
Maxillary and mandibular occlusal views, at the start of treatment.

ADDITIONAL EXAMINATIONS

A study of the models confirms all the clinical elements we observed, notably the anterior infraclusion and the accentuated mandibular Curve of Spee (Fig. 4).

The functional evaluation meanwhile reveals mixed breathing, atypical swallowing, disturbed speech (a hiss) and unilateral right side chewing. No problems with the TM joints were found upon examination.

The panoramic x-ray taken at the start of treatment shows an incomplete adult dentition with 24 missing, an angulated root on 15 and no osteolysis detectable on the four wisdom teeth (Fig. 5).

The Steiner and Tweed Analyses were (Figs. 6 & 7) performed. The Cephalometric values are displayed in tables I and II. The profile Cephalometric x-ray confirms a skeletal Class III (AO-BO: -3mm) with hyperdivergence and bimaxillary protrusion.

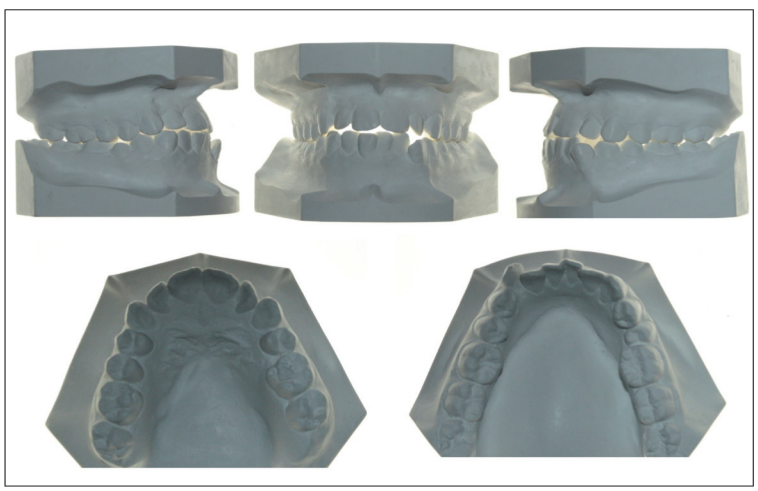


Figure 4
Photographs of models before treatment.

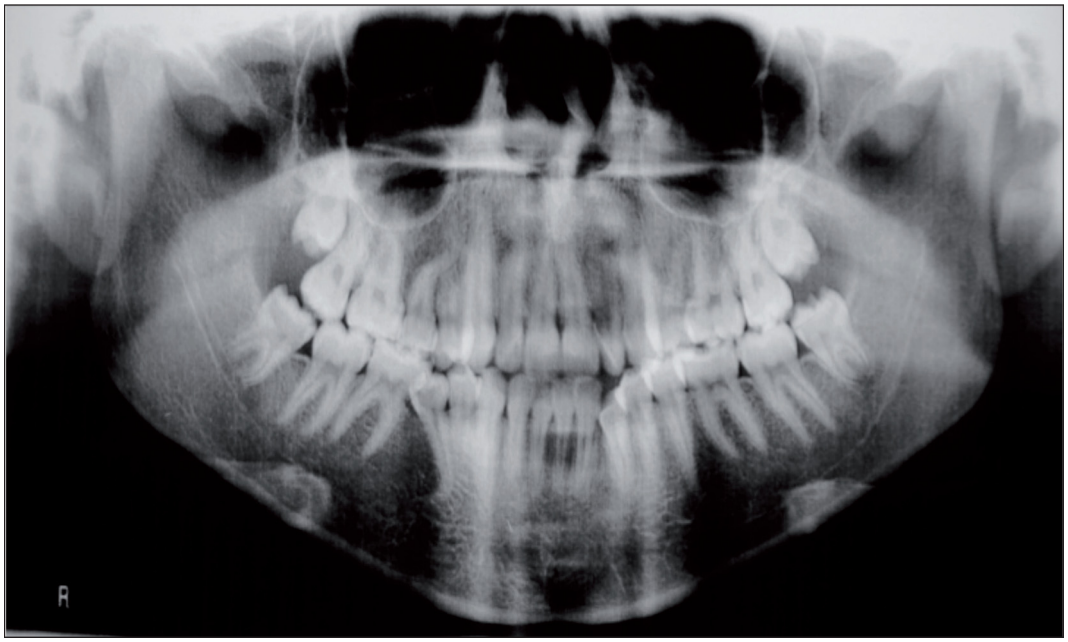


Figure 5
Panoramic radiograph at the start of treatment.

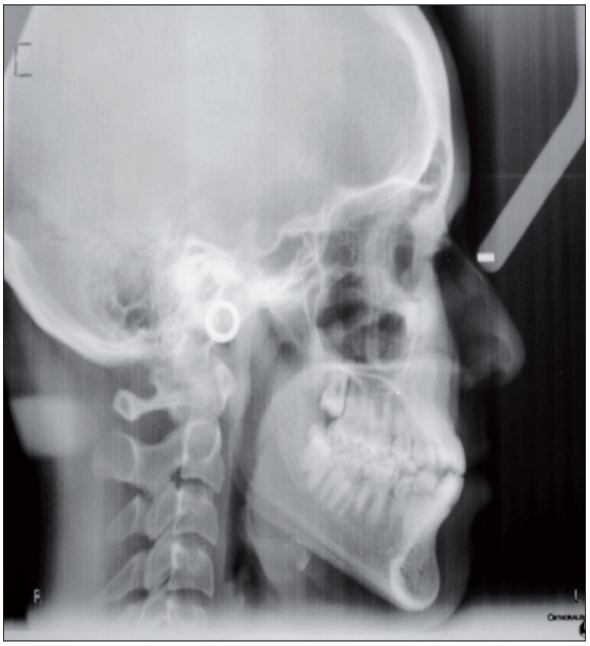


Figure 6
Lateral cephalometric x-ray at the start of treatment.

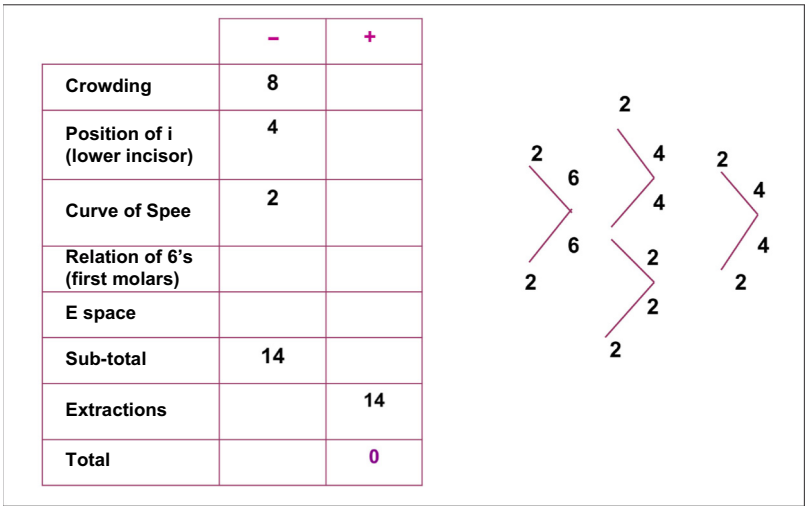


Figure 7
Chevrons and Steiner Box.

Table I
Steiner analysis before and after treatment.

	Before treatment	After treatment
SNA	86°	86°
SNB	84°	84°
ANB	2°	2
SND	81°	80°
I to NA	32°	24
I TO NA (mm)	6 mm	4 mm
I TO NB	32°	24°
I TO NB (mm)	6 mm	4 mm
Pog to NB (mm)	2 mm	1 mm
I to I	116°	130
Occl to SN	14°	16°
GoGn to SN	31°	35°

Table II
Tweed analysis before and after treatment.

	Before treatment	After treatment
FMIA	56°	65°
FMA	30°	30°
IMPA	94°	85°
SNA	86°	86°
SNB	84°	84°
ANB	2°	2°
AO-BO	−3 mm	−3 mm
Occlusal Plane	11°	8°
Z Angle	72°	81°
Upper lip	8 mm	8 mm
Total chin	9 mm	9 mm
Post. facial hgt	42 mm	68 mm
Ant. facial hgt.	57 mm	40 mm
Post/ant index	0.73	0.58

DIAGNOSIS

In reviewing the facial examination the patient presents with hyperdivergent morphology with a stretched nose-lip-chin relationship. Based on the skeletal pattern, there is a skeletal Class III hyperdivergent pattern. Based on the dental pattern the patient presents insufficient vertical overlap, and a Class III with bimaxillary protrusion. The occlusal asymmetry is reflected by an incisor midline deviation, a total loss of space on the left due to the missing 24 allowing for maintenance of the Class I molar relationship with a very strong left side Class III cuspid relationship. The extreme crowding is related to relatively large teeth.

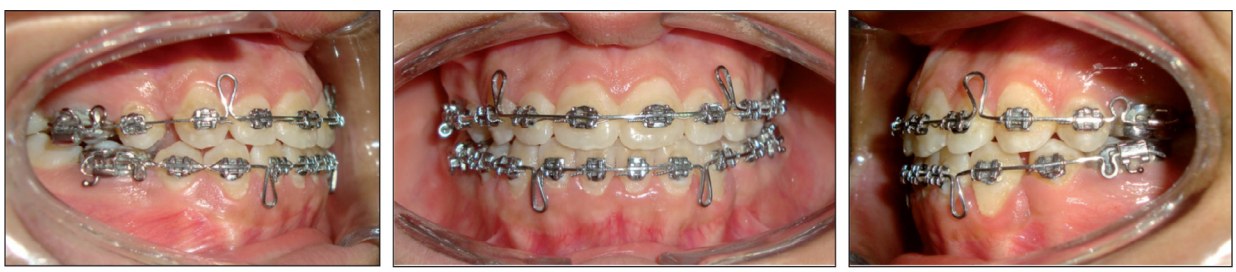
TREATMENT OBJECTIVES

The following objectives were identified:

- correct the crowding;
- correct the bimaxillary protrusion;
- center the incisor midlines;
- re-establish Class I relationship of the left cuspids;
- obtain anterior guidance that is functionally efficient and esthetic;
- ensure long-term stability of the corrections.

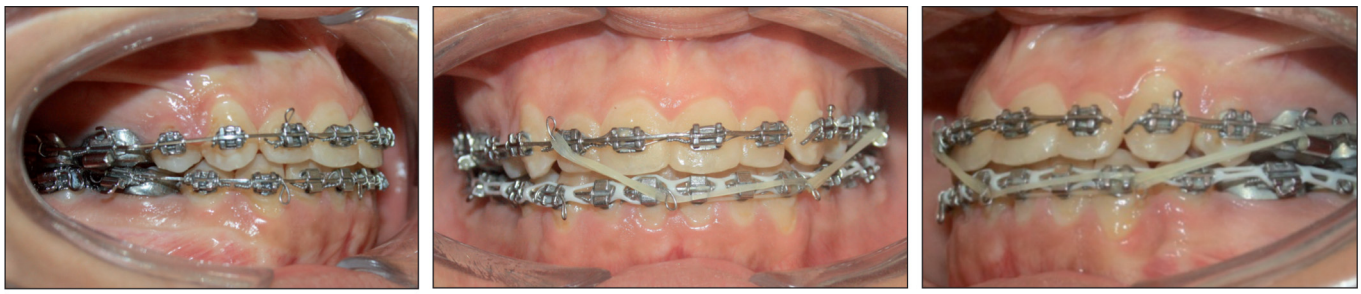
TREATMENT PLAN

To accomplish these objectives we proposed only one therapeutic option consisting of extraction of 14, 34, and 44 as confirmed by the Steiner box with a total DDM of 14 mm requiring extractions of PM. This option allows for the correction of the Class III canine/molar relationship as well as the crowding while at the same time reducing the axes of the maxillary and mandibular incisors. One objective was that the strict repositioning according Steiner standards that was hindered by the vertical excess and the labial contact with the protruded lip. Secondarily, it was the management of the occlusal Class III to a Class I. The appliances utilized were



a b c

Figures 8 a to c
Intraoral vestibular views right, frontal and left, during treatment.



a b c

Figures 9 a to c
Intraoral vestibular views right, frontal and left at finish.

Edgewise .022 x .028 inch (Figs. 8 a to c, 9 a to c) and the duration of treatment was 22 months. Fixed retention in the maxilla from 12-22 and in the mandible from 33 to 43 was used at the end of treatment.

THERAPEUTIC STEPS

- Preparation of the arches
  - alignment and leveling;
  - canine retraction;
  - anchorage preparation.
- Arch correction
  - lower incisor retraction;
  - maxillary anchorage loss.
- Intercuspation finalization
- Removal of appliances and begin retention.

a b c

Figures 10 a to c
Portraits frontal, profile and smile at finish.

END OF TREATMENT

Our treatment objectives were achieved, our patient's profile was normalized, the relationship of the lips and the smile was improved (Figs. 10 a to c). For the dental plan, the left canine Class I was achieved with symmetry of the incisor midlines and standard overbite and overjet (Figs. 11 a to c, 12 a & b and 13).

The panoramic radiograph showed the presence of significant apical root resorption on 11 and moderately so on 21. This could be related in large part to the use of a heavy deformation of the maxillary finishing arch; i.e. essentially the forward tip and anterior torque differential utilized with the goal of harmonizing the intra- and inter-arch relationship of the anterior guidance. This resorption should be the focus of a clinical and radiologic follow-up. The eruption of the wisdom teeth into functional occlusion was achieved (Fig. 14). At the same time despite the weak tip forward of 15 in the finishing arch, the crown-root angulation created an apparent closeness of the root in the 2D image. The conserving of the 3rd molars has yet to be decided.

The cephalometric profile (Fig. 15), the cephalometric results (Tabs. I

a b c

Figures 11 a to c
Intraoral vestibular views right, frontal and left, at the end of treatment.

a b

Figures 12 a & b
Maxillary and mandibular views at the end of treatment.

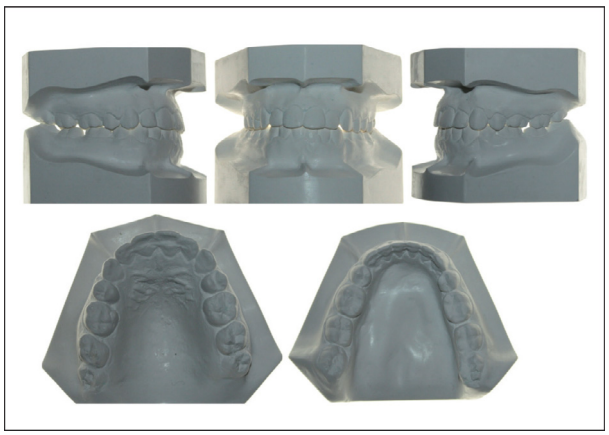


Figure 13
Photographs of the models at the end of treatment.

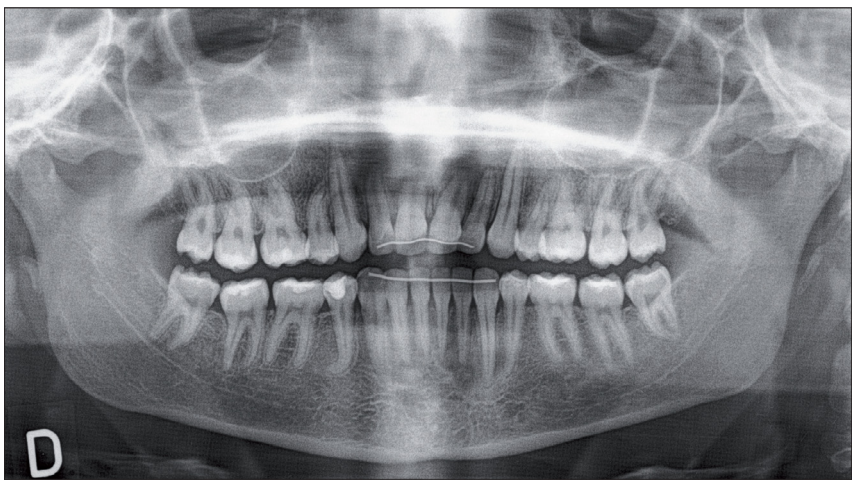


Figure 14
Panoramic radiograph at the end of treatment.

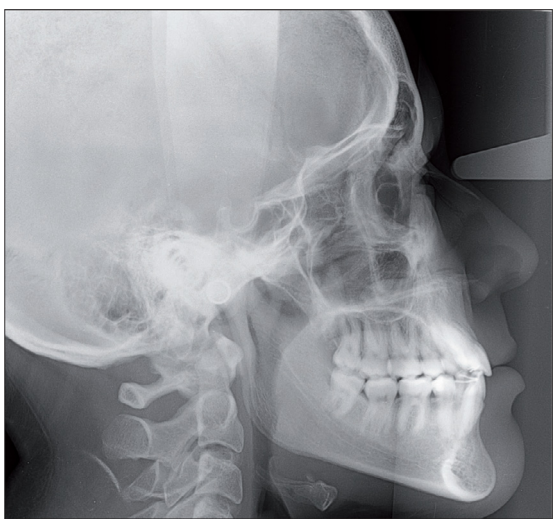


Figure 15
Profile cephalometric radiograph at the end of treatment.

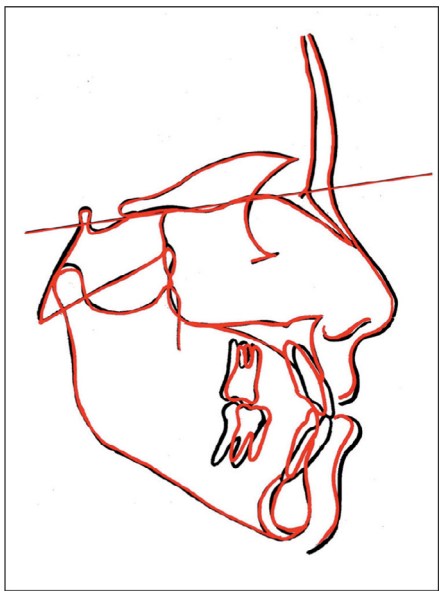
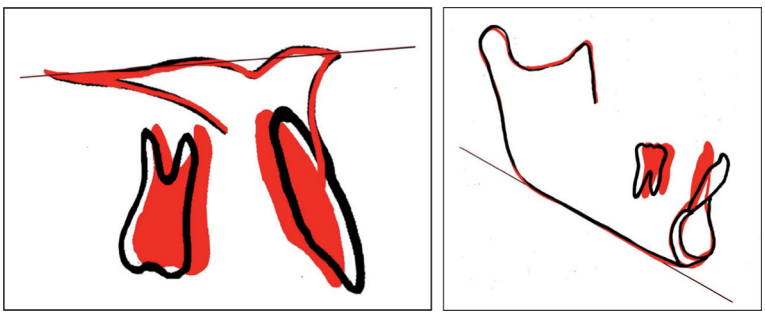


Figure 16
General superimpositions (Tweed).



Figures 17 a & b
Local Tweed superimpositions of the maxilla and mandible.

and II) as well as the superimpositions (Figs. 16, 17a & b) have shown a significant change in the dento-alveolar relationships with the increase in the overlapping of the teeth and the uprighting of the axis of the incisors. The Class III hyperdivergent morphology remains undisturbed.

POST TREATMENT FOLLOW-UP

Photos taken 2 years after removal of the appliances show perfect stability of the results, despite the loss of the maxillary and mandibular retainers one year following de-banding as reported by the patient. These documents are therefore the ''post retention'' documents (Figs. 18 a to c, 19 a & b).

a b c

Figures 18 a to c
Intraoral vestibular views right, frontal and left at two years post-treatment (1 year post-retention).

a b

Figures 19a & b
Maxillary and mandibular occlusal views
At two years post-treatment (1 year post-retention).