

SKELETAL CLASS III UPPER BILATERAL CANINE ECTOPIA AND NANIC LATERAL INCISORS – A CAMOUFLAGE APPROACH

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Abstract: Skeletal class III patients, especially adults, are best treated by orthognathic surgery and orthodontic treatment; when adding an unfavorable factor such as upper nanic incisors, the treatment difficulty increases. In this particular case, the patient and both his parents rejected the orthognathic surgery, their main concern being the crowding of the teeth and not the physical appearance of the facial profile. Based on the skeletal measurements, the orthodontic treatment goals were: align both arches, retrude lower arch, stabilization of occlusion. MBT classic brackets were bonded aiming for closure of spaces in the lower arch and retrusion of lower incisors. After the active treatment, 16 months, essix retainers were given to wear 12/24. The patient was instructed to be aware of any change in his occlusion and call the clinic for any small tooth movement immediately.

Keywords: camouflage treatment, ectopic canines, nanic incisors, maxillary deficiency, stabilization of occlusion

Introduction

Class III Angle anomalies are among the most difficult malocclusions to treat, especially when taking the camouflage approach in most specialists' opinion: Zúñiga (2017), Cigerim (2020), Chang (2006) and Alam (2022). Skeletal class III malocclusion may be observed due to maxillary retrognathia, mandibular prognathia or both. Skeletal class III anomalies are triggered by normal or mildly prognathic mandible, in addition to maxillary deficiency. In ¼ of cases with skeletal class III malocclusions, mandibular protrusion is present together with maxilla retrusion (Mayor, 1993; Cozza, 2004). Therefore, patients often have a concave profile, and a retrusive maxilla. Lower lip protrusion is very often found in patients with skeletal class III. The upper arch is narrower than the lower, and there is a negative overjet and decreased overbite after Gelgor (2005) and Ngan (1996).

Treatment options for class III anomalies differ in relation to the jaw with deficiency and the growth phase. Major treatment approaches for skeletal class III malocclusions include: 1. Chincup - an orthopedic treatment alternative achieved by class III activator or face mask. Functional treatment in class III patients should be preferred before growth spurt completed according to Rabie (2008). The second treatment option is orthodontic camouflage which is achieved by removing mandibular 1st premolar. With orthodontic camouflage treatment, occlusion and facial appearance improve without correcting the skeletal problem. The third treatment alternative is orthognathic surgery: maxilla, mandible or both are surgical repositioned in Proffit's opinion (2007). In adults patients, combined orthodontic and orthognathic surgical treatment are presently effective methods after Chang (2006), Delaire (1997) and Garattini (1998). A good quality assessment should be done before deciding treatment choice in adults with class III anomaly (Kerr and Sivarajan, 2022; Eslami, 2018). Some authors (Kerr, 1992) stated that orthognathic surgery should be performed when the ANB angle is less than -4° , and the IMPA angle is less than 83° . In this case we describe the therapeutic management of an orthodontic camouflage treatment without tooth extraction in a man with skeletal class III malocclusion.

Diagnosis

The 16 years old boy referred to our clinic by his dentist for orthodontic evaluation. The patient's complaints were crowding of the upper teeth and no remarks of the prognathic mandible.

The medical history showed no major disease or dento-facial trauma and the patient was in a clinical good state of health. His parents did not recall any family history of prognathic mandible.

Orthodontic examination of the patient revealed a mild facial asymmetry consisting of entire left hemiface (including the lips) situated upper than the right one. The profile is slightly concave but patient's beard makes it look more concave than reality (Figure 1). Patient's smile reveals the upper crowding and also lower teeth are more visible than usual.



Figure 1. Frontal and Lateral facial photographs

When evaluating the intraoral aspects (Figure 2) the presence of both upper deciduous canines and lateral deciduous incisors may be observed, as well as the persistence of lower right deciduous canine. Moreover, both upper permanent lateral incisors are nanic and both upper permanent canines are ectopic (vestibular) erupted. Deciduous teeth present are all presenting signs of dental abrasion but no mobility, as their permanent homologues erupted ectopically (permanent canines are vestibular erupted and lateral incisors are distally erupted). No cavities were found but the oral hygiene is unsatisfactory gums are bleeding at palpation, dental plaque is present on frontal teeth and gums inflammation may be observed.

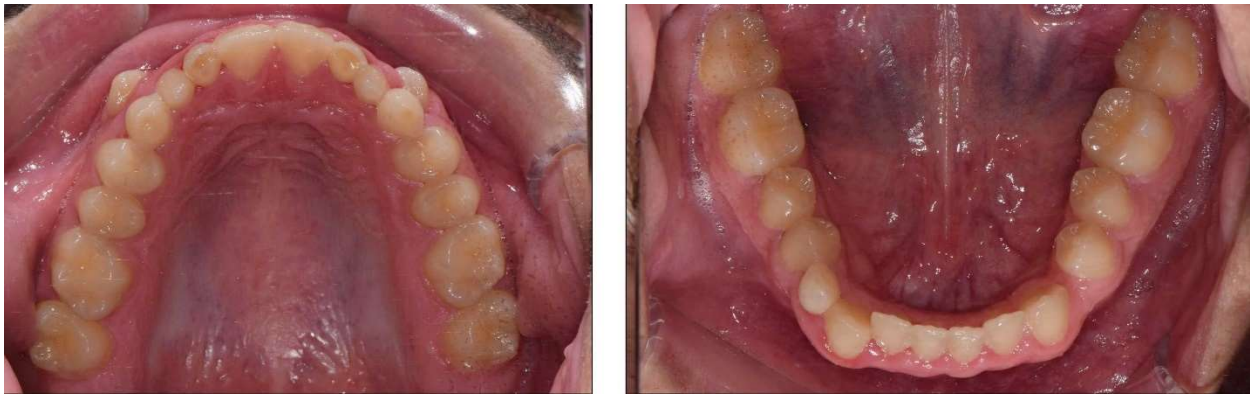


Figure 2. Intraoral photographs of upper and lower arch

Occlusal check reveals bilateral canine cross-bite, left first premolar incomplete crossbite. Both upper canines are in vertical inocclusion due to ectopic vestibular position (Figure 3). There is also a slight class III molar tendency on the left side and the lower midline is deviated 1mm to the left. The lower midline is shifted 1mm to the left because of the persistent deciduous lower right canine at this age.



Figure 3. Intraoral photographs of dental occlusion

A panoramic radiograph (Figure 4) revealed the mesial inclination of both upper lateral incisors and also the presence of all four third molars. A frontal cephalometric X-ray (Figure 5) confirmed the asymmetry observed in the facial examination: left Or, nasal fossae, Go are upper than their right homologues.

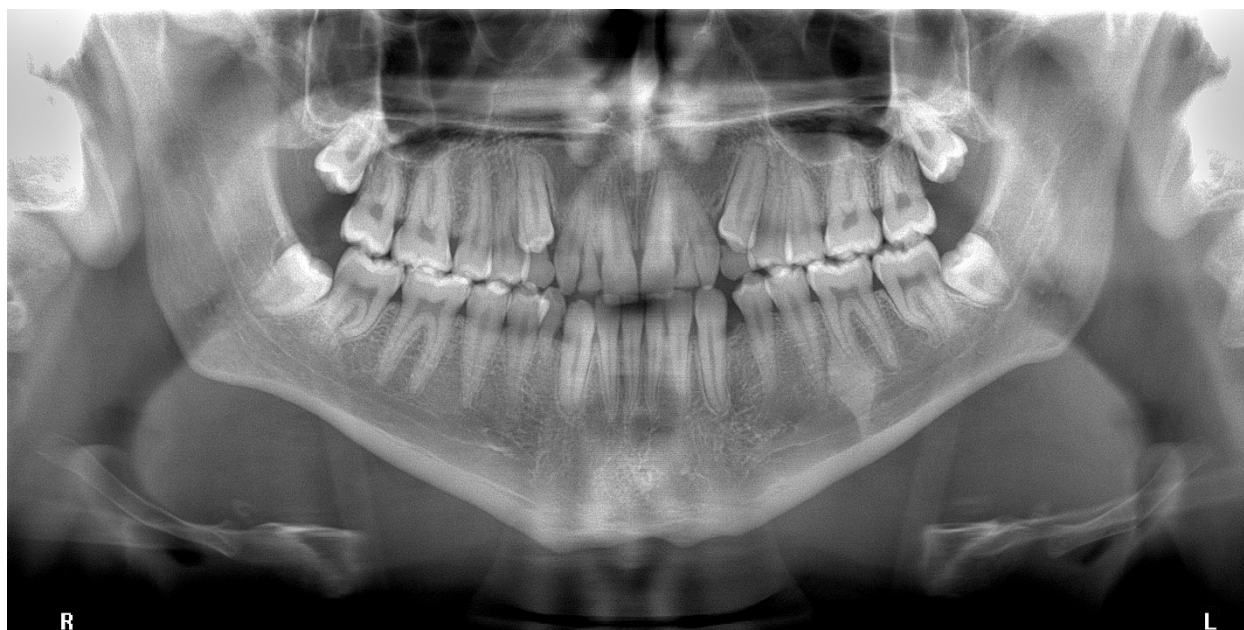


Figure 4. Panoramic radiograph before the treatment

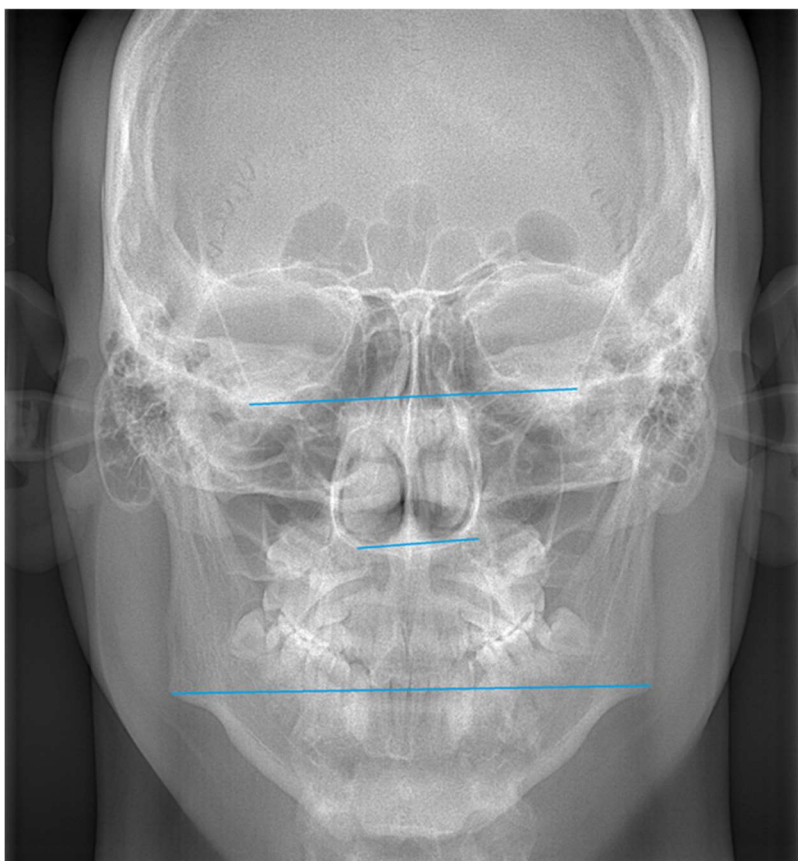


Figure 5. Frontal cephalometric X-ray before treatment

Lateral cephalometric X-ray (Figure 6) showed a skeletal class III pattern with ANB of $-2,1^{\circ}$ mostly based on the SNB of $85,8^{\circ}$ (Figure 6). The facial growth pattern is hypodivergent determined by the FMA of 22° , an unexpected value for mandibular prognathism. The dental analysis on the lateral cephalometric X-ray exposes a $+1/SN$ of 113° and a $-1i/NB$ of only 1,5 mm (Figure 6). Based on the appearance of the CVM index according to Baccetti (2002), Verma (2021), Hassel (1995) and Morosan (2021), much of the skeletal growth was already done, as the inferior margins of C2, C3 and C4 are already concave (Figure 6).

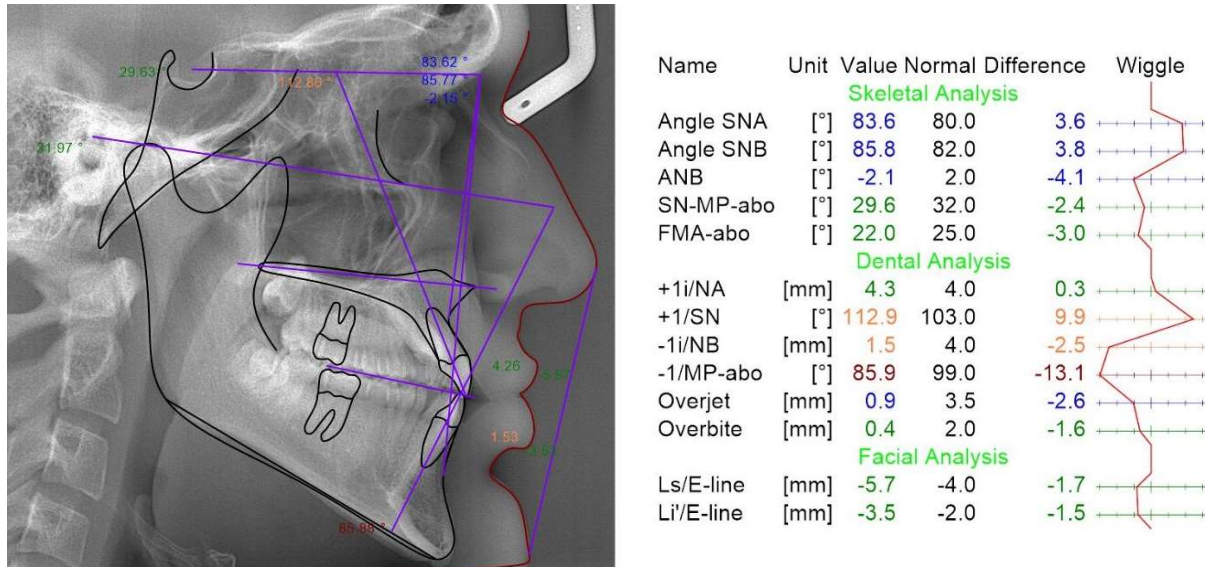


Figure 6. Lateral cephalometric X-ray and American Board of Orthodontics Analysis

Based on all the findings gathered from the clinical examination, panoramic X-ray, frontal cephalometric X-ray and lateral cephalometric X-ray, we could diagnose skeletal class III and molar class I malocclusion I with ectopic upper canines, nanic upper lateral incisors.

Problem list and treatment objectives

In this particular case report, the main problem list is the following: 1. Skeletal class III; 2. Ectopic upper canines; 3. Nanic Upper lateral incisors; 4. Deviation of lower midline; 5. The presence of all four third molars; 6. Low angle facial pattern; 7. Biprotusive profile.

To focus on all of the problems above, the treatment plan was developed: 1. Extraction for all the deciduous teeth was indicated in order to create space for canines alignment; 2. Low forces from fixed orthodontic treatment were preferred, seeking to delicately traction down to the occlusal plane the upper canines. 3. Closing all mandibular spaces by retruding the lower frontal group, trying to achieve neutrality in sagittal plane. 4. Direct remodeling of upper lateral incisors for both occlusal and esthetic reasons; 5. Odontectomy of the lower third molars in order to avoid mandible growth at that level; 6. good compliance in retention, which is essential in class III patients.

Treatment

When first arriving into our clinic, the patient and his parents strongly rejected the orthognathic surgery, their main concern being the crowding of the teeth and not the appearance of the facial profile. Before beginning the orthodontic treatment, the patient had extracted all deciduous teeth, so we had the space we needed for the permanent upper canines. Subsequently a 0,022 inch slot Roth brackets were bonded to commence the orthodontic treatment. Levelling frontal teeth took a few months, while slowly tractioning the canines to the arch, as it is well known, slow forces work better and faster according to Ferreira (2017), Thirunavukkarasu (2015) and Hamada (2021).

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There were spaces needed to be closed, but not entirely, as the upper lateral incisors were nanic and needed reconstruction. Therefore, after 12 months, upper lateral incisors were debonded and the patient was referred to his dentist for dental reconstruction (Figure 7). Afterwards we focused on closing all the spaces left as well as regulating the midline – which was not difficult taking into consideration it was shifted to the right, and the left lower deciduous canine was still on the lower arch. While closing the remaining spaces on the upper arch, very mild class III elastics - 7,9 mm medium were needed as always in camouflage class II treatment (Beltrão 2015; McIntyre, 2022) and also we used 3,2 mm medium vertical elastics for getting the intercuspatation in the last 3 months of the treatment before debonding.



Figure 7. Debonded upper lateral incisors for dental reconstruction

The essix retainers were given to wear 12/24 h on the same day of debonding and the patient was instructed to return for the first recall after 3 months and even earlier if noticing any change in his bite.

Treatment results

Treating a class III patient is always challenging as well as treating teenagers, therefore treating a skeletal class III on a teenager is expected to be twice as difficult.

The active treatment period time was 16 months, 17 appointments. There was a need for two or three more months into treatment for obtaining the hypercorrection of class III, but unfortunately the patient was leaving the country and had to finish the treatment earlier than the medical team would expect. The patient and his parents were very well instructed on the importance of wearing the retainers every night and also to keep observing and analyzing his occlusion once a week, being aware of the possible unfavorable mandible growth.

The facial appearance of the patient did not change much except for the smile which is discovers the aligned teeth as well as the upper teeth and not the lower as was the case at the beginning of the treatment. Patient's facial modifications in appearance may be covered by his beard, therefore, in this particular case we would refer to the lateral cephalometric analysis and not the facial appearance which in this case would be misleading (Figure 8).



Figure 8. Photographs of facial appearance after orthodontic treatment

The intraoral photographs at the end of the treatment (Figure 9) show us the alignment of all teeth as well as the closing of all spaces while maintaining the class I. Gums are still suffering but dental plaque is no longer visible on the teeth. The reconstructed upper lateral incisors are now on their rightful place, as well as the upper canines. A small demineralization is noticed mesial on 35, but no cavities are found at this stage.



Figure 9. Intraoral photographs at the end of orthodontic treatment

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The occlusion photographs (Figure 10) reveal the achievement of neutral occlusion in all planes. The intercuspation is adequate, the overjet and overbite are within neutral values. One can also notice the correspondence of the midlines.



Figure 10. Dental occlusion at the end of the orthodontic treatment

The panoramic X-ray at the end of the treatment (Figure 11) was taken one month before removing the braces and it showed us the root parallelism, which was also satisfactory, as well as the presence of the lower third molars needing both to be extracted before removing braces.



Figure 11. The panoramic X-ray one month before removing the braces

The lateral cephalogram shows very small improvement of skeletal parameters as may be observed in Figure 12. SNB angle was decreased by only 0,8°, but that was never expected, considering the patient's age and anomaly, we anticipated a mandibular growth.

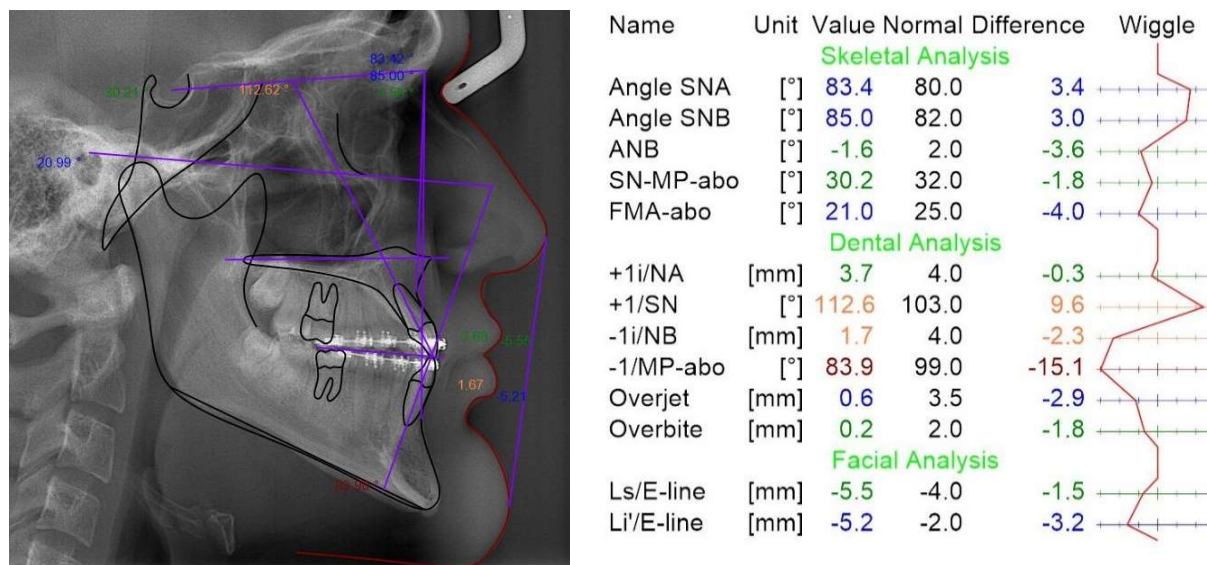


Figure 12. Lateral cephalogram and its analysis at the end of orthodontic treatment

Discussion

Skeletal class III malocclusions are not very often met in the worldwide population. The overall prevalence of Class III malocclusion registered in the literature varies from 0% to 26.7% for different populations according to Vaida (2019). In Caucasians, prevalence went from 3% to 5%, as was stated in Hardy's meta-analysis in 2012.

The accurate diagnosis of the severity of mandibular prognathism and its transversal and dento-alveolar components is essential for orthodontic treatment success. The decision for the finest treatment tactic in the various cases of maxillary hypoplasia in adult patients depends on several factors, all of which should be evaluated simultaneously in Jawale's opinion (2021). In our case, the patient's age (16), the ANB angle of -2,1°, the appearance of the low margins of C2, C3 vertebrae, but mostly the patient's parents and his wish conducted to the camouflage treatment decision. Based on the treatment's outcome, both patient and orthodontist were pleased, but further we need to well supervise the contention phase.

The camouflage treatment in class III patients is not always the best choice, but in less severe cases, like the present one and also when the patient is almost finished his growth, one can consider this treatment as an option.

Conclusion

When treating a class III patient it is always important to consider the facial aspects of this anomaly and always correlate it with the remaining expected growth in order to make the best treatment options for each case.

When the active orthodontic treatment is done for a class III patient, the contention phase is equally important and the patient needs to be made aware of its importance. Retainer type should always be easy to convert into an active orthodontic appliance, in case some remaining growth would push the mandible forward.

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