CONSERVATIVE ORTHODONTIC TREATMENT IN A CASE WITH SEVERE DENTAL CROWDING

Loredana Golovcencu[1], Daniela Anistoroaei[2*], Alina Claudia Sodor[3], Iulia Catalina Saveanu[4], Georgeta Zegan[5]

[1]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Orthodontics
[2]*"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Orthodontics
[3]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Orthodontics
[4]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Preventive Dentistry
[5]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Orthodontics

Corresponding author Email: anistoroaei_daniela@yahoo.com

ABSTRACT

Non extraction orthodontic treatment should be the best choice for both practitioners and patients when possible. That's why in the last decades people are concerned more and more in developing new techniques for solving orthodontic problems without dental extractions . In our paper we present an adolescent case with severe dental crowding with two stage orthodontic treatment; in the first stage we used pedex appliance for distal movement of upper molars and correction of transverse discrepancy, followed by the second stage with fixed orthodontic appliance. The patient presented ectopic upper canines and class II malocclusion. At the end of the treatment our patient presented correct dental alignment, functional and stable occlusion, good profile, nice smile and improvement of the facial esthetics.

Key words: dental crowding; pendex appliance; upper molar distalization

INTRODUCTION

Dental crowding remains the main concern for the orthodontic patients maybe because dental irregularities are the most "seen" feature during speech and smile. We have different possibilities for solving crowding depending on the patient's age and degree of malocclusion. Among conservative methods we use dental stripping for mild cases, transverse expansion for narrow dental arches, forward movement of the frontal teeth if initial teeth position allows this and distal movement of the buccal teeth or combinations of this[(1,2)]. The extraction treatment remains an option when all conservative possibilities are not suitable[(3)]. We present a case of a 11 years patient, with ectopic canines and severe maxillary crowding, class II malocclusion treated by conservative approach.

Case presentation

BC, an 11 years boy, presented with class II division 2 malocclusion, deep bite, narrow upper arch, retroclined upper and lower incisors ectopic maxillary canines, congenitally missing left second lower premolar, high nasolabial angle, thin lips (fig.1, A to F).

The lateral cephalometric findings (fig.2): SNA = 83°, SNB = 80°, ANB = 3°, Wits = 1 mm, retrusive profile Z= 81°

The initial orthopantomography shows missing second lower premolar and lower left third molar bud (fig.3).

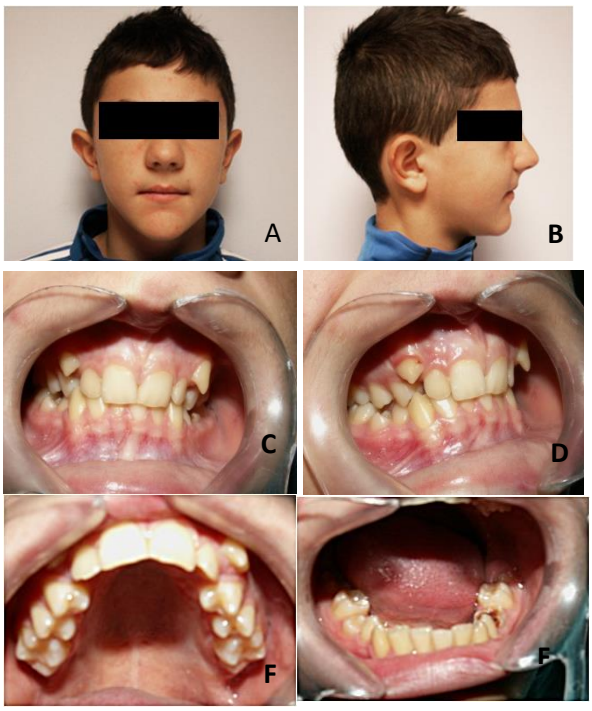
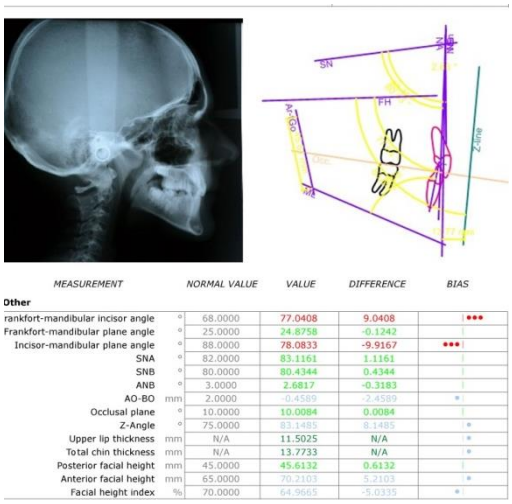


Figure 1. Patient BC, 11 years initial intraoral and extraoral view

Figure 2. Patient BC , initial orthopantomography



MEASUREMENT		NORMAL VALUE	VALUE	DIFFERENCE	BIAS
Other					
rankfort-mandibular incisor angle	°	68.0000	77.0408	9.0408	•••
Frankfort-mandibular plane angle	°	25.0000	24.8758	-0.1242	
Incisor-mandibular plane angle	°	88.0000	78.0833	-9.9167	•••
SNA	°	82.0000	83.1161	1.1161	
SNB	°	80.0000	80.4344	0.4344	
ANB	°	3.0000	2.6817	-0.3183	
AO-BO	mm	2.0000	-0.4589	-2.4589	*
Occlusal plane	°	10.0000	10.0084	0.0084	
Z-Angle	°	75.0000	83.1485	8.1485	*
Upper lip thickness	mm	N/A	11.5025	N/A	*
Total chin thickness	mm	N/A	13.7733	N/A	*
Posterior facial height	mm	45.0000	45.6132	0.6132	
Anterior facial height	mm	65.0000	70.2103	5.2103	*
Facial height index	%	70.0000	64.9665	-5.0335	*

Figure 3. Pretreatment cephalometric analysis

Treatment options

Considering the age of the patient, the high nasolabial angle and the retroclination of the incisors we considered that first premolar extraction would worsen the patient's profile and occlusal relationships. So, we decided to make a two-phase treatment plan:

1. In the first stage we used a pendex appliance consisted of a Nance button with expansion screw on the midline bonded on upper premolars and TMA 0.8 mm wires on the palatal tubes of the first molar bands[4,5]. In order to control molar tipping we added "U"- shape loops on the TMA wires. The screw was used in order to correct transverse discrepancy and the patient was instructed to activate it once a week. The TMA arches were activated every 2 months in order to overlap the palatal tube on a distance equal with its length (fig.4, A to C).

Fig

2. After 8 months we got 6 mm space distal to the second upper premolar right and left and the pendex appliance was removed[6]. The first molars were kept in the new position with a palatal Gosgharian bar and a .022x.028 straight wire appliance was bonded in order to continue dental alignment (fig.5).

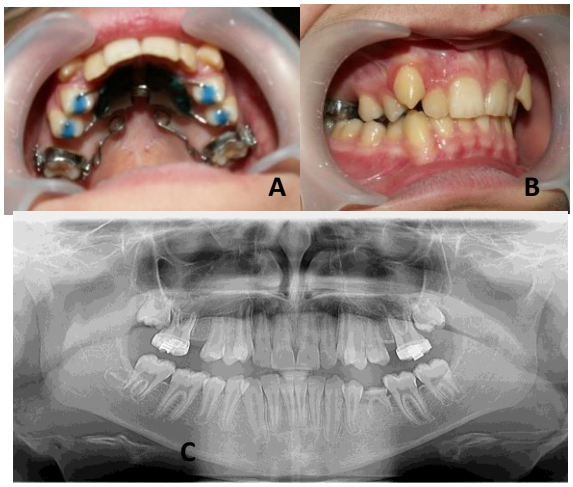


Figure 4. Patient after pendex appliance

Figure 5. Treatment in progress

RESULTS AND DISCUSSIONS

The overall treatment time was 32 months, 8 months for the initial phase when we achieved distal movement of the molars and 24 months for fixed orthodontic treatment completion. At the end of the treatment we established correct dental alignment, a class I dental occlusion with class I skeletal relationships, improved facial esthetics and good profile[7] (fig.5, A to I). The cephalometric exam shows normal values for skeletal and dental measurements (fig.6) and the final orthopantomography reveals good dental relations (fig.7). Considering that the left lower third molar is congenitally missing, we decided to keep space on the dental arch for left second premolar for a future dental implant placement . For this purpose we created a fixed space maintainer soldered on firs molar band and with a stop in the distal groove of the left first premolar bonded with composite resin for caries prevention[8].

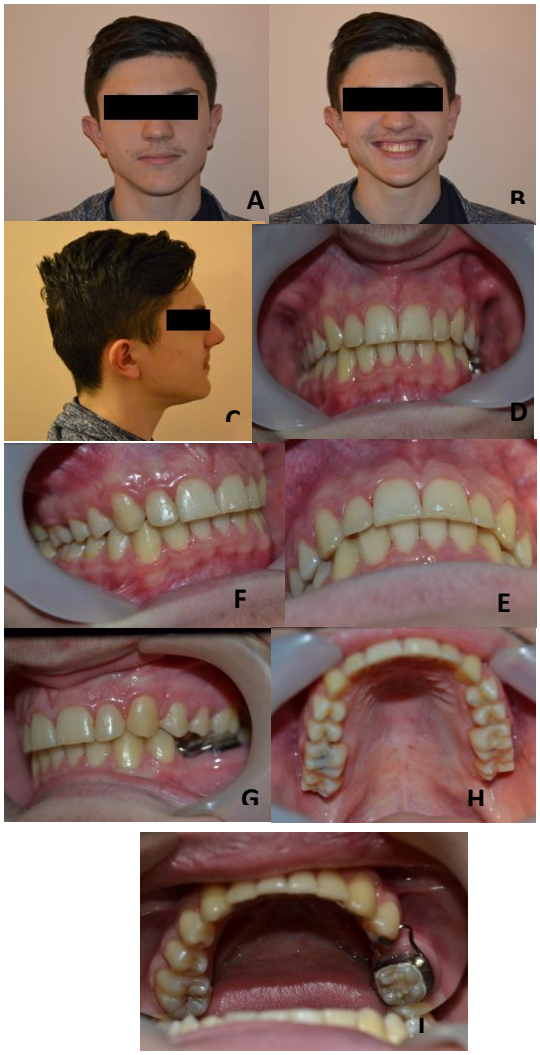


Figure 4 (A to I). BC, 14 years, at the end of the orthodontic treatment

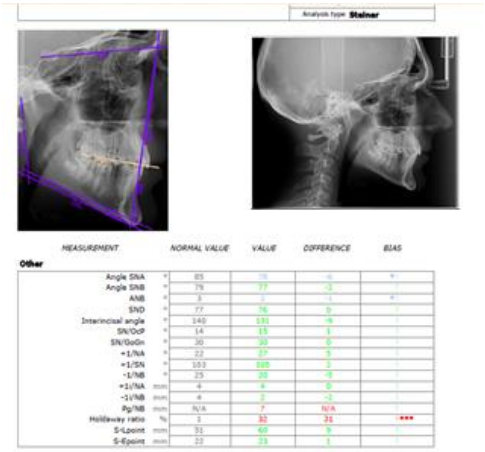


Figure 5. Cephalometric analysis at the end of the treatment

Figure 6. Orthopantomography at the end of the orthodontic treatment

CONCLUSIONS

1. The conservative orthodontic treatment can be an available treatment option during growth period, even in more sever crowding in the upper arch.

2. The pendex appliance can increase arch length in transverse and sagittal dimension by distal movement of the upper first molars, especially before second molar eruption.

3. In borderline cases with severe crowding tooth extraction should be delayed until all the correct methods of achieving space failed.

REFERENCES

1. Dimitrios Konstantonis. The impact of extraction vs nonextraction on soft tissue changes in cxlass I borderline malocclusions. Angle Orthodontist 2012; 82, 209-217.
2. XU TM, Liu Y, Yang MZ, Huang W. Comparison of extraction vs nonextraction orthodontic treatment outcomes for borderline Chinese patients. Am.J.Orthod. Dentofacial Orthop. 2006 May; 129(5): 672-7
3. Al-Thomaly Y, Basha S, Mohamed RN. Pendulum and modified pendulum appliances for maxillary molar distalization in class II malocclusion – a systematic review. Acta Odontol Scand. 2017 Aug; 75(6):394-401
4. Angelieri F, Almeida RR, Almeida MR, Fuziy A. Dentoalveolar and skeletal changes associated with the pendulum appliance followed by fixed orthodontic treatment. Am J Orthod Dentofacial Orthop. 2006 Apr;129(4):520-7.

5. Noorollahian S, Alavi S, Shirban F. Non-compliance Appliances for Upper Molar Distalization: An Overview. Int J Orthod Milwaukee. 2015 Fall;26(3):31-6
6. A M K Wong, A B M Rabie, U Hagg. The Use of Pendulum Appliance in the Treatment of Class II Malocclusion. British Dental Journal 1999 October; 187(7): 367-370
7. Cheng HC, Wang YC. Effect of nonextraction and extraction treatments on smile esthetics for different malocclusions. Am.J.Orthod. Dentofacial Orthop.2018 Jan; 153(1): 81-86
8. Hanganu SC, Armencia AO, Murariu AM, Macovei G, Hanganu LC, Grigoras S, Bobu LI. In vitro Interaction Between Two Composite Restorative Materials and Artificial Saliva. Materiale Plastice 2014; 51(4): 388-390