ORTHODONTIC TREATMENT IN MANDIBULAR RETRUSION WITH SEVERE MANDIBULAR DENTAL CROWDING – A CASE REPORT

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ABSTRACT

Aim of study: this report describes a patient with severe anterior mandibular dental crowding determinated by mandibular retrusion and hypercontraction of mentalis muscle.
Material and methods: A 32-year-old female patient requested an orthodontic clinical examination in November 2019 having concerns about the possible loss of mandibular incisors with periodontal recessions.
Results: The patient refused orthognathic surgery being treated with fixed orthodontic appliances after dental extractions necessary for dental alignment and bite correction, under the supervision of the attending periodontist and dentist.
Conclusions: Even if the retrognathic mandibular position was not corrected by orthognathic surgery, the patient was very satisfied with the results of the orthodontic treatment, which improved her smile, dental and facial appearance and gave self-confidence.

Keywords: retrognatism mandibular, severe dental crowding, orthodontic treatment

INTRODUCTION

Adult patients with dental malpositions frequently require orthodontic treatment to correct them, especially if their smile or facial appearance is affected [1,2,3]. The main reason is anterior dental crowding, which causes aesthetic problems, but also can affects the periodontal health of this teeth[4,5,6].

Many times the patients investigated for orthodontic treatment find out that the existing dentomaxillary abnormality is determined by a skeletal component. An example is skeletal class II with small and retrognathic mandible, with hyperdivergent mandibular growth pattern , which, in adults, should be corrected through an interdisciplinary orthodontic-orthognathic surgical approach, considering that the skeletal growth potential no longer exists[7,8,9,10]. In addition, in adult patients with maxillary protrusion and skeletal mandibular retrusion, the risk of orthodontic relapse is high because the skeletal intermaxillary malrelashionships with sagittal and vertical alterations[11,12,13,14,15].

Although the stages of the orthodontic-orthognathic surgical treatment plan are explained to the patients, they often refuse the orthognathic surgical intervention, the reasons being various: fear regarding the risks that any surgical intervention involves, the additional financial costs and the time required for healing[16,17].

Patients with mandibular retrusion and maxillary dento-alveolar protrusion do not accept orthognathic surgery except in the situation where the facial appearance is visibly affected and self-confidence is low[18,19]; otherwise they only want

orthodontic intervention, with possible dental extractions necessary to align the teeth and level the occlusal plane, so is obtained an orthodontic camouflage with a beautiful smile, aligned teeth and an improved facial appearance. And, in this situations, most of the time, they are very satisfied[20,21,22].

CASE PRESENTATION

A 32-year-old female presented for an orthodontic consultation in November 2019, on the recommendation of the her dentist, to resolve severe mandibular incisal crowding; the patient's fear was the early loss of the mandibular incisors, with the lack of space for the application of an adequate prosthetic treatment.

To establish the orthodontic diagnosis, necessary for planning treatment, we followed several steps:

- anamnesis: the patient related the absence of any chronic desease and no orthodontic treatment in childhood, but multiple odontal treatments until now.
- general summary clinical examination and loco-regional examination: normosom, normoton, without pathological changes.
- facial examination and smile analysis : leptoprosop with ovoid facial features, a slight asymmetry determined by Gnation deviation to the right, labial competence, convex facial profile, hypercontraction of the mentalis muscle, naso-labial angle within normal limits, upper lip filter and Cupid's bow deviated to the right (figure 1)

Figure1. Initial photographic examination of facial aspect

- intra-oral examination and examination of the study cast revealed: multiple dental treatments at the level of upper incisors and molars, edentulous space after extraction of 36 with mesialisation of 37 and 38, severe mandibular anterior crowding (over 10 mm) with 41 rotated 90° in axis and superimposed on 42, both with periodontal recession, 44 in buccal position with traumatic periodontal recession and scissor bite with 13; crowding and protrusion of the upper anterior teeth, 8 mm overjet with bilateral distalized occlusion at canine and class I right molar, ¾ overbite, ”V” shape of the both dental arches, deep curve of Spee and overlap of crowded mandibular incisors (figure2)

Figure 2. The images of model casts before orthodontic treatment

- functional examination revealed canine and lateral mandibular movements blocked on the right side
- temporo-mandibular joint examination on both sides revealed an normal range of movements
- radiographic examinations consisted of orthopantomographic analysis, cephalometric analysis and CBCT.

On orthopantomogram we noticed multiple endodontic treatments on upper incisors, 16, 24 and 36, chronic granulomatous reaction at 22, root filling material exceeding the apex at 12, coronal restoration at 24 with mesial marginal proximal cavity (figure3)

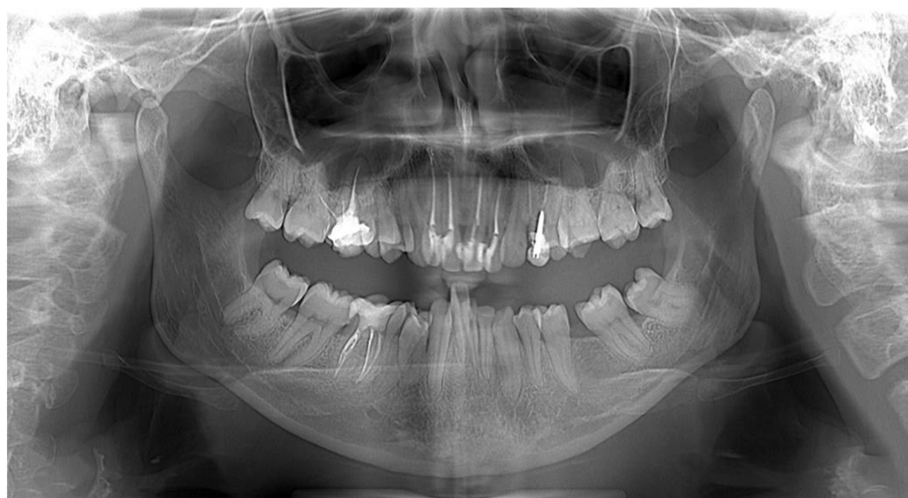
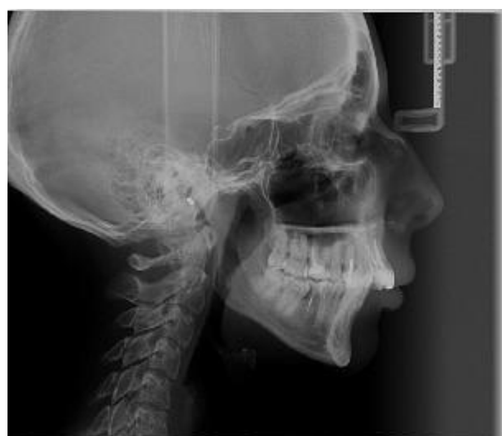
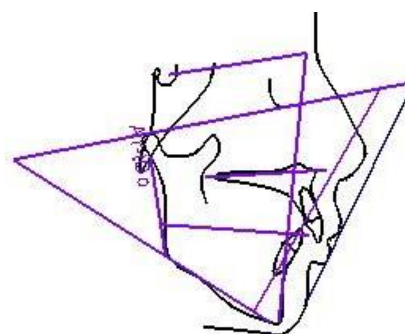


Figure 3. The initial orthopantomogram

The cephalometric analysis was performed using a computerised program Audax Ceph and revealed a very high Frankfurt-mandibular plane angle, increased IMPA angle, high SNA angle, low SNB angle, increased ANB angle, 7 mm Wits measurement , mandibular retrusion, low Z-Angle (figure 4).





MEASUREMENT		NORMAL VALUE	VALUE	DIFFERENCE	BIAS
FMIA	°	68	47	-21	●●● |
FMA	°	25	37	12	| ●●●
IMPA	°	88	96	8	| ●●
Angle SNA	°	82	85	3	| ●
Angle SNB	°	80	76	-4	●● |
ANB	°	3	9	6	| ●●●
Wits	mm	2	9	7	| ●●●
FH/OcP	°	10	13	3	| ●
Z-Angle	°	75	51	-24	●●● |

Figure 4 The lateral ceph and pretreatment cephalometric measurements

After analysing of all investigation the orthodontic diagnosis was:

- high degree of hyperdivergence (FMA = 37°),
- maxillary dento-alveolar protrusion (IMPA = 96°),
- skeletal class II relationships (SNA = 85°, SNB = 76°),
- class II bilateral canine relationships;
- overjet 8 mm, 2/3 deep bite
- retrognatic mandible with low Z-Angle (51°)
- facial asymmetry;
- deep curve of Spee
- canine and lateral mandibular movements blocked on the right side
- severe anterior mandibular crowding, with periodontal recession to 41 and 44

CBCT analysis showed low lingual alveolar bone to 42 and absence of buccal alveolar bone to 41 and 44 (figure 5)

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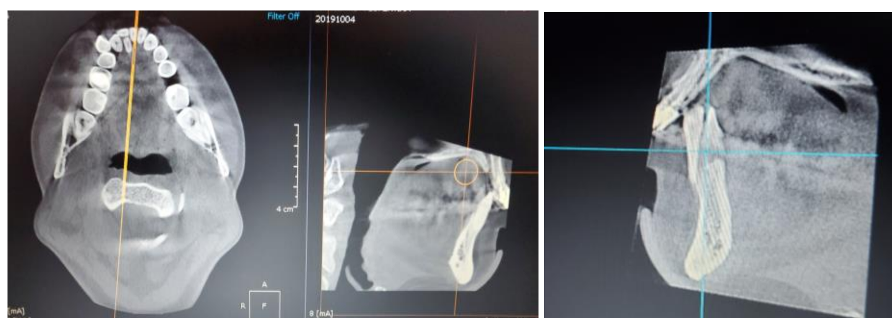


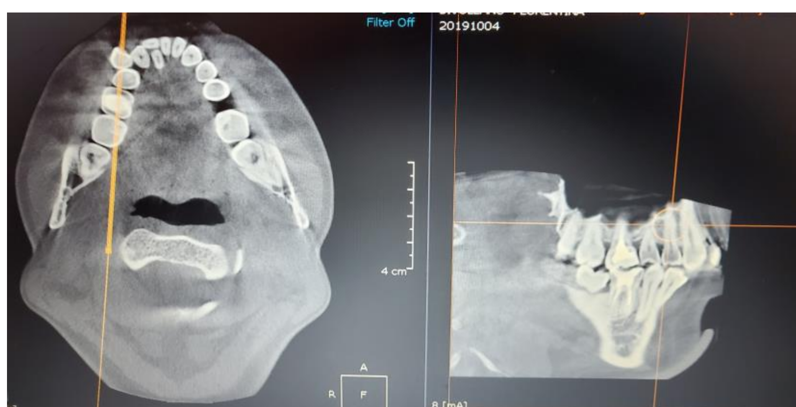


Figure 5. Selected images of CBCT to show the crowding of anterior mandibular teeth and the amount of alveolar bone

The main therapeutic objectives were: resolving bimaxillary dental crowding, with dental alignment and leveling of the Spee curve, correcting over-jet and over-bite, obtaining a good dental intercuspation, correct mandibular functional relationships. The patient refused any orthognathic surgical intervention and in the end she chose to treat the dental malposition with teeth extraction and orthodontic treatment.

The patient was also evaluated by a periodontist, who decided on periodontal surveillance of the lower incisors (with periodontal recession at 31 and 42) during orthodontic treatment and reevaluation after dental alignment (figure 6).

In the first stage of orthodontic treatment, 41 and 44 were extracted and were applied bimaxillary aesthetic brackets, 022 MBT prescription , leveling arches NiTiHA 014, NiTi 018 and alignment with CuNiTi 016x016 .

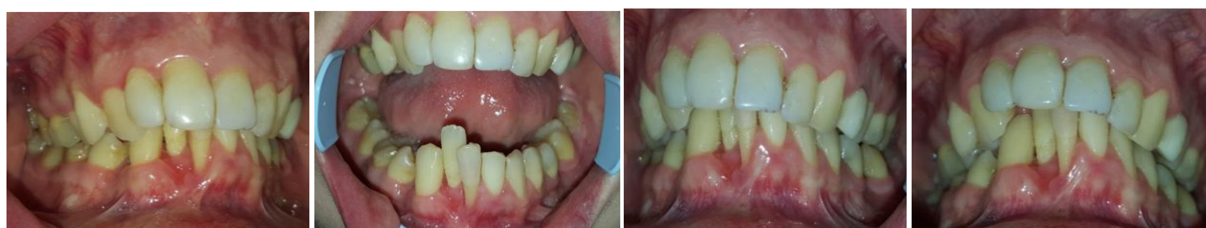


Figure 6. Images of dental arches after extraction of 41 and 44, pre-orthodontic treatment

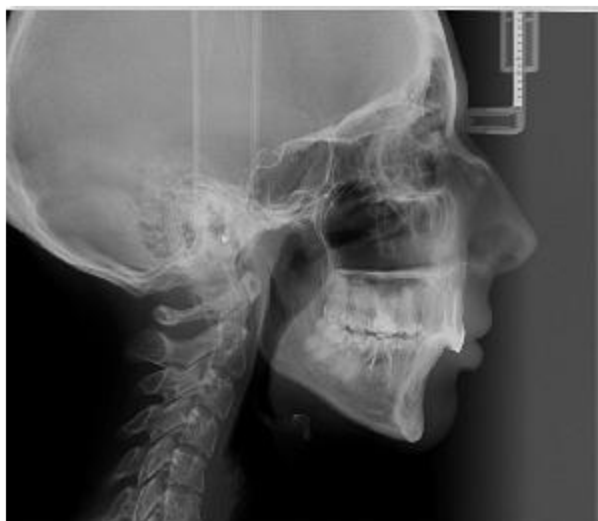
After the bimaxillary dental alignment, considering the persistence of the sagittal inocclusion greater than 8 mm, the patient decided to accept the extraction of the upper first premolars, still refusing the orthognatic surgery. After 30 months of orthodontic treatment, the orthodontic therapeutic objectives were achieved, the patient requesting the removal of the orthodontic appliance being very satisfied with the results obtained.

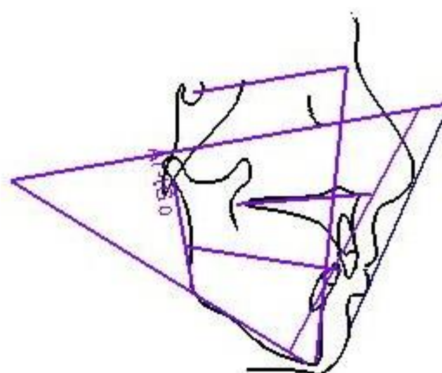
DISCUSSIONS

Considering that the main reason for which the patient requested orthodontic treatment was to resolve the mandibular incisal crowding and to reduce the protrusion of the upper anterior teeth, we can say that it were achieved.

When analyzing the cephalometric

performed at the end of the orthodontic treatment, it can be seen that, in the absence of orthognathic surgery, the skeletal components (values) were not significantly modified, the mandible remaining in retrusion. After extraction of 41,44,14 and 24, the overjet was reduced through the mandibular incisal alignment and maxillary frontal group retraction, and the values of the Z angle and the nasolabial angle increased slightly (figure 7).





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Wits	mm	2	9	7	| ●●●
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Z-Angle	°	75	54	-21	●●● |

Figure 7 The lateral ceph and postreatment cephalometric measurements

Although the facial asymmetry remained, the patient's profile and smile were slightly improved, bilateral canine class I was obtained, with ½ overbite and stable interdental contacts. At the end of the orthodontic treatment, fixed canine-canine lingual retention was applied, the patient being instructed to continue the dental treatment (endodontic, coronal restoration of 16, 46 and 37), as well as periodontal treatment for 31 (figure 8).

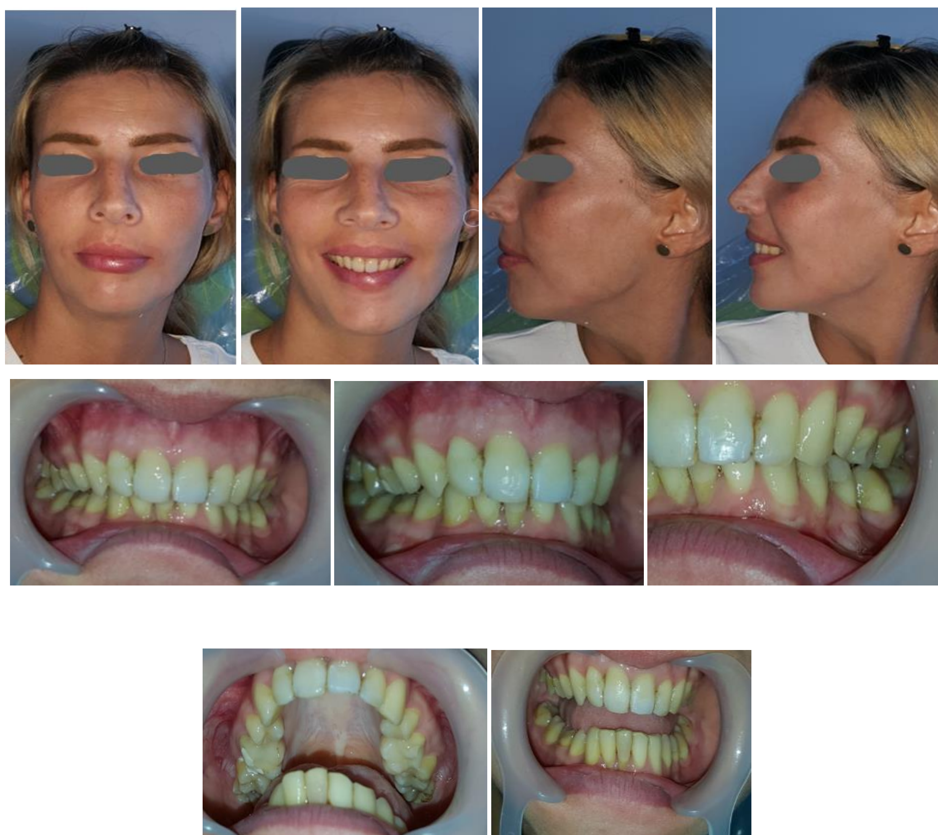

Figure 8 . Facial aspect and intraoral images after debonding

CONCLUSIONS

In this case, female patient with mandibular retrusion and severe anterior mandibular dental crowding, the orthodontic treatment provides a good aesthetical, functional, and stable result. The patient was properly informed by the beginning about of all possible treatment options, but she chose only orthodontic treatment associated with teeth extractions. At the end of the treatment, the dental alignment and occlusal level have improved significantly leading to increased her smile and, implicitly, to increased self-esteem.

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