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CASE REPORT

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Interdisciplinary Treatment of an Adult Patient Using an Adjunctive Orthodontic Approach. Case Report

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ABSTRACT

The aim of this case presentation is to outline some of the advantages that an adjunct orthodontic treatment can offer in a comprehensive oral rehabilitation of an adult patient. Adjunctive orthodontic treatment is usually limited to a dental arch or to a group of teeth within an arch. The purpose of dental movements in this case will be to position the teeth in a way that makes the restoration or replacement of damaged or missing teeth as easy as possible and with minimal dental tissue sacrifice. In addition, the improved position of the teeth will create a healthier periodontal environment that is easier to maintain over time.

Keywords: interdisciplinary approach, adjunctive orthodontic treatment, prosthetic rehabilitation

INTRODUCTION

Adjunctive orthodontic treatment is carried out in the context of an oral rehabilitation.[1] It is usually done in adult patients seeking treatment to improve function, control disease and enhance their esthetic appearance.[2] The treatment is limited to a group of teeth or a single arch, and the average treatment time is somewhere between 6 and 8 months.

The goals of adjunctive orthodontic treatment are clearly established by an interdisciplinary team and consist of teeth movements that are carried out to facilitate other dental procedures.[3] One of the most important objectives is to reposition migrated teeth in order to allow the prosthodontist to be less invasive with the healthy dental tissue while restoring the missing teeth. We can achieve this goal by uprighting mesially inclined molars, intruding over-erupted teeth and recalibrating edentulous spaces.[3–6] The esthetic appearance can be improved by pre-prosthetic alignment and the leveling of gingival margins. Although many more objectives of adjunctive orthodontic treatment can be named, the following case presentation is limited to the goals mentioned above.[7,8]

FIGURE 1. Initial situation: **a** – exo-oral photos, **b** – intra-oral photos, **c** – cephalometry before the start of the orthodontic treatment, **d** – initial panorex

CASE PRESENTATION

A 48-year-old patient requested to improve the esthetic appearance of his upper frontal teeth and to change his old prosthetic restorations. He did not like the color of the upper frontal teeth and the fact that they were misaligned.

The clinical examination of the face revealed a convex profile with a prominent nose, an increased naso-labial angle, an acute labio-mental fold, a reduced chin projection, and a short chin-throat length. The anterior tooth display in resting position was reduced, the upper dental midline was centered, but the mandible was shifted to the right. Lip incompetence was noticeable with the contraction of the mentalis muscle and an everted lower lip. The patient agreed to the publication of his data and the institution where the patient had been admitted, approved the publication of the case.

The cephalometric analysis indicated a skeletal class II with SNA 83°, SNB 76°, ANB 7°, a short mandible Go-Me 65 mm, the Wits appraisal 7.4 mm, and clockwise rotation of the mandible with S-Go/N-Me 68%. The lower incisors showed a high labial inclination of i/MeGo of 109°, while the upper incisors were relatively good positioned I/SN 100° in the context of a long base of the nose. The dental analysis revealed a "V"-shaped upper arch with slight crowding in the frontal region, spaces in the lower arch and reduced edentulous spaces. The canine relationship on the right side was a full class II, while the relationship on the left side was class I. The over-jet was 3 mm, with no overbite. The gingival examination showed a thick gingival biotype, uneven gingival margins and recessions in the molar area, with increased probing depths and bleeding on probing. The panoramic X-ray confirmed the bone loss in the molar area and showed endodontic lesions on teeth 1.7, 1.6, 1.4, 2.6, 3.6, and 4.7.

The patient had no history of pain or clicking in the joints, the clinical examination of the joints and muscles revealed no TMD signs or symptoms, the slide between

FIGURE 2. Evolution of the orthodontic treatment: **a** – intraoral situation before the orthodontic treatment, **b** – 0.16 Niti, **c** – 19 × 25 SS, **d** – final situation of the orthodontic treatment

seated condylar position and centric occlusion was less than 1 mm, and the lower midline discrepancy was still present with the condyles seated. However, the patient had a history of sleep apnea and the reduced airway volume was confirmed on the cephalometric X-ray.

Two treatment plans were proposed, the first one included orthognathic surgery to advance the mandible, improve the profile and the airway volume, followed by restorative treatment. The second treatment plan included adjunctive orthodontic treatment to align the upper teeth, level the gingival margins, reduce the over-jet, and open spaces for adequate restorations of the missing teeth, followed by prosthodontic rehabilitation. Both treatment plans were discussed with the patient. He refused orthognathic surgery and chose the second option.

After the treatment of the carious, endodontic and periodontal lesions, the provisional crowns were placed by the prosthodontist, and the patient was referred to orthodontic treatment.

A fixed orthodontic appliance was used in the upper arch to align the teeth. The gingival margins were leveled using tooth number 11 as the key tooth.

The arch wire sequence was 0.14 Niti, 0.18 Niti, 19 × 25 Niti and 19 × 25 SS. The upper front teeth were distalized in order to reduce the over-jet, and spaces were opened to restore the missing teeth 14, 15 and 25. For this reason, mini-screws with a diameter of 1.6 mm and a length of 8 mm were used as anchorage. The first one was placed in the edentulous space mesial to the upper right molar to distalize the upper right canine, and the other one was placed distal to the upper left molar in order to distalize the molar and to open space for the restoration of the miss-

FIGURE 3. Functional and esthetic mock-up: **a** – intraoral frontal view, **b** – intraoral view right canine class II, left canine class I, **c** – protrusion on 11, 21, lateral guidance on the canines, **d** – static occlusal contacts

FIGURE 4. **a** – Initial situation, **b** – Facial appearance with the mock-up.

ing second upper left premolar. During the last couple of months a third mini-screw was used to reduce the overjet at the upper left canine. The total treatment time of the orthodontic phase was 9 months. After debonding, a functional and esthetic wax-up was made by the dental technician. The prosthodontist transferred the mock-up and let the patient accommodate for a couple of months. The new position of the teeth allowed the prosthodontist to be less invasive with the healthy tissue of the patient by doing minimal preparations on the abutment teeth.

The edentulous spaces in the premolar regions in the upper jaw and those in the molar region in the lower jaw were restored using fixed partial dentures. An implant was inserted distal to the upper left first molar to restore the missing tooth 27. The upper central incisors (1.1 and 2.1) and the upper right lateral (1.2) received palatal veneers in order to obtain proper contacts with the lower incisors. For that same reason, the marginal ridges of the lower incisors were restored with composite.

FIGURE 5. **a** – Initial situation, **b** – Preparation for the prosthodontic restoration; **c** – Final prosthodontic restoration.

Not only does this ensure stable contacts in the front, but also good incisal guidance with posterior disocclusion. The canines guide the lateral guidance. During this period, the periodontal health status improved, with no bleeding at probing and the periodontal pockets stabilized. The dental esthetic appearance of the patient was improved with vestibular veneers to correct the shape and mask the discoloration of the incisors. Stable occlusal contacts and the disocclusion of the posterior teeth by the anterior teeth in mandibular excursions were obtained with the help of the prosthetic restorations.

CONCLUSION

Complex oral rehabilitation cases require a multidisciplinary approach, and in this context adjunctive orthodontic treatment is a good method for improving the pre-prosthodontic situation. Migrated teeth can be moved into their initial position, and pre-prosthetic alignment and the leveling of the gingival margins can improve the esthetic outcome of the treatment. Having the teeth in a correct position, the prosthodontist can be less invasive with the preparation of the teeth, and the periodontal health status

is improved by correctly positioning the teeth inside the bone and ensuring ease of access for oral hygiene.

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