Significant improvement with limited orthodontics – anterior crossbite in an adult patient

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Summary

Objectives. **Orthodontic treatment is known to last as long as 18 or 24 months in average, which is one of the reasons adult patients and their dental caregivers frequently seek other alternatives to solve problems related with malocclusions. The aim of this clinical report is to describe an example for a malocclusion that looks more severe than it is in reality, and can be treated to a great extent with only limited orthodontics in a relatively short period of time, along with an interdisciplinary treatment alternative, and to give information regarding the differential diagnosis in pseudo-prognathic patients.**

Material and methods. **A 45-year-old male patient presented with Class III malocclusion and anterior crossbite, complaining of attrition of lateral incisors, missing 25, and unaesthetic facial appearance. A pseudo-prognathism was diagnosed. The treatment plan was to protrude upper incisors into correct position.**

Results. **Orthodontic treatment lasted 6,5 months, then a bridge with an inlay as anchor on 26 was fabricated and the lateral incisors were built-up with composite. Aesthetics, as well as function were markedly improved.**

Conclusions. **This case report shows that in selected malocclusions, limited orthodontics for a short period of time can bring about an extraordinary alteration of aesthetics and function. General practitioners should be able to perform a functional examination in order to distinguish between true skeletal prognathism and pseudo-prognathism. It should be their role to differentiate severe and simple malocclusions, and to consult an orthodontist before deciding for irreversible occlusal changes and prosthetic solutions.**

Key words: **anterior crossbite, pseudo-prognathism, adult orthodontic treatment.**

Introduction

Skeletal mandibular prognathism is one of the rare malocclusions where the only treatment alternative is orthognathic surgery. Apart from the large mandibular projection in the profile, the main characteristic of this malocclusion is the reverse overjet, often referred to as 'anterior crossbite'. This malocclusion does not only have a great impact on the facial appearance of a patient, but is also functionally unacceptable. However, in mild expressions of mandibular prognathism, where the facial appearance is tolerable, patients tend to live with their malocclusion rather than to accept jaw surgery [1]. On the other hand, etiology of anterior crossbite may well be other than skeletal prognathism. Also dental malpositions and faulty incisor inclinations in both jaws can result in anterior crossbite [2]. If this dental problem simultaneously leads to anterior positioning of the mandible, it is called a "pseudo-prognathism", or a "pseudo-Class III". The pseudo–Class III malocclusion has been defined as a positional malrelationship with an acquired neuro-muscular reflex [3]. Premature contact between the maxillary and mandibular incisors results in forward displacement of the mandible so as to disengage the incisors and

permit further closure into the position in which the posterior teeth occlude.

The differential diagnosis depends on the clinical examination of the patient, more than on a radiological cephalometric analysis, because the habitual anterior position of the mandible does not reflect the true skeletal relationship. The diagnosis is based on the evaluation of the occlusion when the mandible is in centric relation. Using one of the methods to locate centric relation, light chin-point guidance for example [4], or the bilateral manipulation technique [5], the clinician should try to find out whether the anterior crossbite is corrected partly or completely. In pseudo-prognathism cases, upper and lower incisors usually come at least to an edge-to-edge relationship in centric relation.

Other than the orthognathic surgical treatment of a true skeletal mandibular prognathism, the treatment options for pseudo-prognathism are the proclination of upper incisors, the retroclination of lower incisors, or both. The aim of this clinical report is to describe an example for such a case along with an interdisciplinary treatment alternative.

Case Presentation

A 43 year old male patient, a general surgeon, presented with Class III malocclusion and anterior crossbite of all incisors. His chief complaint was the attrition of the lateral incisors along with unaesthetic facial appearance, and a missing upper second bicuspid. The referring dentist rejected to build-up the lateral incisor crowns unless the malocclusion that had caused their attrition was treated.

Diagnosis

The patient was characterized by a symmetrical face but a very mild concave facial profile due to a strong mandible that was well concealed with a beard and moustache. He had a normal smile line with lower incisor show (Figures 1a-c). Intraorally he exhibited anterior crossbite (a reverse overjet) combined with a deep bite due to overextrusion of the maxillary

figure 1 a

figure 1 b

figure 1 c

incisors, and a rectangular archform because of a flattened incisor curvature. He had a Class III relationship on the right, and a Class I relationship on the left side and mild crowding in the maxillary arch in spite of the missing teeth (14,15, 16,25). The left upper arch was restored with a metal-ceramic bridge. There was a composite filling on 22 and a large amalgam restoration on 14 that had caused discoloration of the tooth (Figures 1d-i).

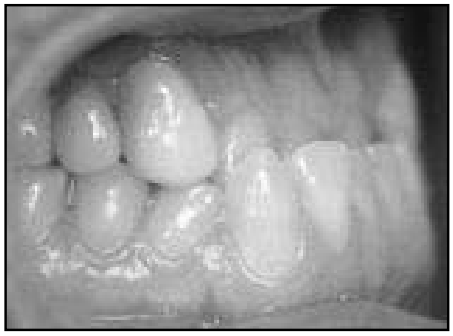

figure 1 d

Radiographic evaluation exposed an impacted tooth, possibly a duplication of the right maxillary canine, apical to the right central incisor (Figures 1i, 4i, 5g).

The eruption path was reversed, with the crown pointing to the nasal floor, and circa 2/3 of the root had already formed. The patient had

figure 1 e

figure 1 f

figure 1 g

figure 1 h

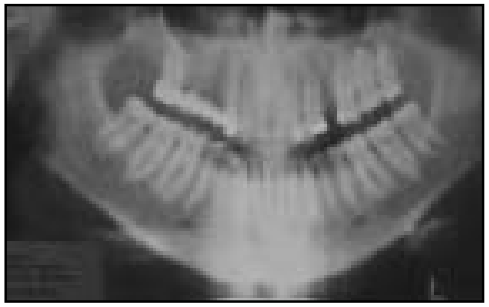

figure 1 i

no complaints associated with this supernumerary tooth.

The functional examination revealed that this occlusion was just a habitual bite, and when the mandible was manipulated into centric relation, the patient showed an edge-to-edge bite of incisors along with a large posterior openbite because the overerupted incisors created a primary contact early during the path of closure (Figures 2a-c).

figure 2 a

figure 2 b

figure 2 c

Treatment Plan and Technique

The patient requested the restoration of the upper lateral incisors that showed attrition due to the crossbite with the lower canines, along with a bridge to restore the missing 25. Orthognathic surgery had been proposed before, and that was the reason he never thought about the correction of the crossbite anymore. But he accepted readily when orthodontic correction with a treatment time of 6 to 8 months was proposed. Therefore the restorative work –composite restoration of 12 and 22, and replacement of 15 with bridgework- was postponed. It was decided to leave the supernumerary tooth, because its removal would necessitate a traumatic surgical procedure, and for the time being, there were no complaints related to it.

The treatment goal was correction of the crossbite through the protrusion of maxillary incisors, leveling, and improvement of the maxillary arch form. 0.018" slot Roth prescription tubes and brackets were bonded to upper first molars and incisors. A segmental arch technique was used and incisor protrusion and intrusion was achieved with consecutive utility arches of varying sizes starting with 0.016" TMA up to 0.016" x 0.022" stainless steel wires (Figures 3a, b). In order to be able to "jump the bite", the deep overbite had to be opened temporarily, to allow the upper incisors to protrude. A large block of composite material was bonded on the lower first molars as a bite raiser (Figure 3 a), and the height of the bite raiser was gradually reduced as a normal overjet formed progressively. The final step was to upright the roots of the incisors with torque bends on a rectangular stainless steel wire, and to correct the arch form with continuous mechanics.

Orthodontic treatment lasted 6.5 months. A fixed retainer was bonded on the palatal surfaces of upper incisors and left canine (Figures 4a-i). A bridge with an inlay as anchor on 26 was manufactured and the lateral incisors were built-up with composite (Figures 5a-g). The patient did not want to change his bridge on the right upper quadrant.

Discussion

The favorable treatment outcome of the case described in this article shows that limited orthodontics can accomplish a great improvement in the treatment of adults. The

figure 3 a

figure 3 b

figures 4 a, b, c

figure 4 d

figure 4 e

figure 4 f

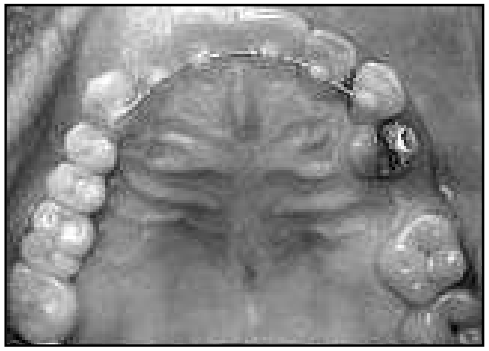

figure 4 g

figure 4 h

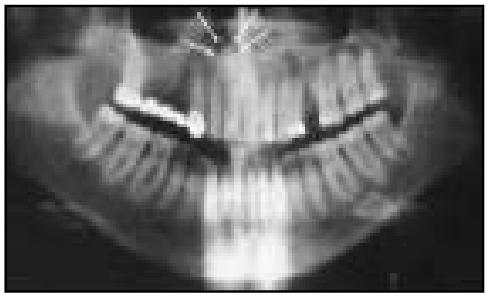

figure 4 i

most difficult part for the patient was to live with the bite raisers that prevented the posterior teeth from occluding, so chewing ability was limited for the greater part of the treatment duration. However, the patients' acceptance of the appliance and the level of cooperation were high, probably due to the medical background, and he was very much satisfied with the treatment result. A side effect was seen in the mandibular dentition, the amount of

figure 5 a

figure 5 b

figure 5 c

figure 5 d

figure 5 e

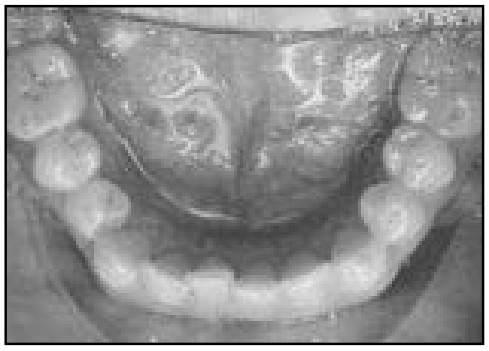

figure 5 f

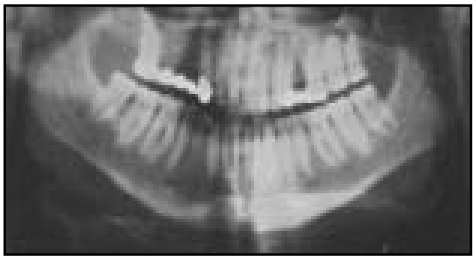

figure 5 g

crowding in the incisor region increased slightly (Figure 4h). This was due to a change in the force-equilibrium of the dentition. As soon as a normal overjet was achieved, protrusive movements of the mandible were guided by the upper incisors, so that the protrusive force created a reactive force in the opposite direction acting on the lower incisors, who responded with slight retroclination. However, as the amount of crowding was minute, the

patient did not accept to receive treatment to resolve this crowding in order not to elongate the overall treatment time.

Conclusions

This case report shows that in selected malocclusions, limited orthodontics for a short period of time can bring about an extraordinary alteration of aesthetics and function. General practitioners should be able to perform a functional examination in order to be able to distinguish between true skeletal prognathism and pseudo-prognathism.

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