

THE EFFECT OF INTER-ARCH ELASTICS IN CORRECTING ASYMMETRICAL DENTITION

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ABSTRACT

This case report deals with the treatment of a 21 years old male patient who had grossly shifted midline. His chief complaint was the asymmetric appearance of his teeth. Skeletally he represented Class III tendency. On the right side represented Class III canine and molar relationship, on the left side Class II canine relationship. Maxillary midline was shifted 3mm to the right and mandibular midline was shifted 3mm to the left side. Our treatment goals were to correct the midline problem and to achieve ideal overbite and overjet relationship. The treatment plan was non-extraction fixed straight wire therapy. After leveling, heavy elastics were used to correct the buccal relationship and anterior midline problem. The patient was superb in cooperation and the maxillary and mandibular dentition were shifted reciprocally in opposite direction with the help of the elastics.

At the end of the orthodontic treatment the facial aesthetics of the patient had improved and midlines had been corrected. Ideal overbite and overjet relationship was achieved.

It was concluded that inter-arch mechanics can be used effectively in cooperative patients. In this case report the success of the treatment greatly depended on patient cooperation. The patient was pleased with the overall facial changes and occlusal function.

Key words: Class III elastics, Class II elastics, Asymmetry

INTRODUCTION

In orthodontic patients, asymmetric malocclusions are common and very challenging to correct. For an adult patient with a severe skeletal Class III malocclusion and a midline deviation, combined surgical-orthodontic therapy is often the treatment of choice because of its satisfying outcome and stability.¹ Camouflage treatment is usually considered only for borderline patients.^{2,3} Case reports of nonsurgical treatment of mandibular asymmetries in nongrowing patients are rare because of the difficulty of reducing the skeletal asymmetry without growth. However, we sometimes treat patients with severe problems who do not want surgery as a part of their treatment plans.

A nonsurgical treatment approach and its outcome is reported for an adult patient with a skeletal Class III malocclusion and a lateral shift. Treatment included orthodontic treatment with interarchelastic to correct the malocclusion and improve both function and dental esthetics.

METHODOLOGY

The patient was 21 years old male. His chief complaint was the asymmetric appearance of his teeth. To determine the skeletal deformity, panoramic, cephalometric analysis were acquired. Skeletally he represented Class III tendency. Intraoral examination, on the right side represented Class III canine relationship, on the left side it was Class II canine relationship. Maxillary midline had shifted 3mm to the right and mandibular midline was shifted 3mm to the left side. The maxillary arch was narrow, with a posterior crossbite on the left from canine to the first molars. In addition, there was moderate crowding in the mandibular arch (Fig 1).

As the patient had a skeletal Class III relationship with chin deviation, orthognathic surgery combined with orthodontic treatment was considered to correct the skeletal anteroposterior (AP) discrepancies and asymmetry (table). However, he was content with his profile and refused surgery.

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Therefore, the overall treatment objectives were focused on the orthodontic establishment of positive overjet and overbite for maximum improvement of occlusion and to correct the midline problem. To

TABLE: CEPHALOMETRIC ANALYSIS OF THE CASE

	Pretreatment	Posttreatment
SNA	80°	82°
SNB	83°	83°
ANB	03°	-1°
NV-A	-3mm	-2mm
NV-Pog	+2mm	0mm
Y Axis	65°	66°
SN/ANS-PNS	13°	10°
SN/Oce.	15°	16°
SN/Go-Gn	36°	35°
ANSPNS/Go-Gn	23°	25°
Co-A	83mm	87mm
Co-Pog	124mm	126mm
N-Me	138mm	135mm
N-ANS	60mm	61mm
ANS-Me	81mm	79mm
S-Go	82mm	84mm
S-Go/N-Me	61%	62%
1/SN	101°	106°
1/Go-Gn	88°	84°
1/1	133°	136°
1/NA	4mm	6mm
1-NA	22°	24°
1/NB	3mm	4mm
1-NB	25°	24°

coordinate the arches and solid inter digitation in occlusion is one of the most important goals of the orthodontist. Class II and Class III elastics have been used routinely for correcting dentition. The success of the treatment solely depends on the patient cooperation because of the requirement of the usage of the elastics. Prior to the start of treatment the importance of the patient cooperation was emphasized to the patient.

Treatment Phase

The treatment plan was non extraction fixed straight wire therapy. The maxillary left first central had received endodontic treatment and restored with composite. The maxillary and mandibular first molars were banded and bonded to the rest of the teeth. The sequences of wires were 0.012Ni Ti, 0.014Ni Ti, 0.016Ni Ti, 0.016x0.022Ni Ti, 0.016x0.022ss and finally 0.017x0.025ss wires were used. To this end, the maxillary wire was expanded and the mandibular one constricted on the left side to correct the unilateral posterior crossbite. The rigid 0.017x0.025ss rectangular wires were inserted on the left, Class II elastics on the left, Class III elastics on the right and oblique elastics on the anterior side were used in order to correct the midline relationship. The patient wore the elastics 4 months and the total duration of the treatment was 12 months. After 12 months of orthodontic treatment, new photographs and radiographs were taken and a well- balanced face and an acceptable occlusion were achieved.

RESULTS

At the end of the orthodontic treatment the facial aesthetics of the patient had improved and midlines were corrected. Ideal overbite and overjet relationship was achieved. Panoramic radiograph showed no root resorption. As an added benefit, the patient reported a feeling of better self-esteem and a greater degree of pleasure related to his appearance (Fig 2).



Fig 1: Pre-treatment intra oral views

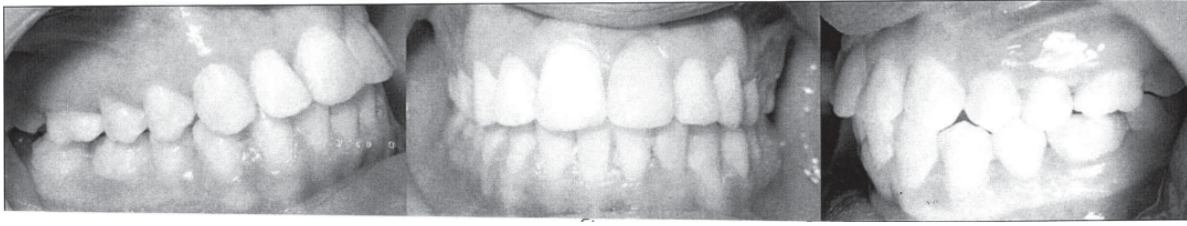


Fig 2: Post-treatment intra oral views

DISCUSSION

In the patients with asymmetric malocclusions, it is important to diagnose the components of the malocclusion correctly. Careful planning and clear treatment objectives make this treatment option viable. The treatment approach for this patient posed a challenge. According to Profit⁵, when the patient is actively growing, an attempt can be made to control and modify asymmetric growth, if the problem is moderately severe.^{6,7}

An asymmetric functional appliance can then be constructed that attempts to restore symmetry through better growth and function on the affected side by forcing the patient to function with the mandible in a symmetric position. For adults, fewer methods of treatment are available: clinicians have the dilemma of either treating the skeletal problem surgically or resorting to dental compensation. Asymmetric malocclusion can be complicated and challenging to correct, especially when there is an underlying skeletal component. Usually, skeletal asymmetries are treated with a combination of orthodontic and orthognathic surgery.

However, this option was quickly rejected by the patient, who did not want an invasive procedure and whose concern was mainly dental aesthetics. It is important to listen to the patient's main concerns in order to respond adequately to his or her needs. In dealing with a dentoalveolar Class III malocclusions, it might be possible to achieve an ideal occlusion with orthodontic tooth movement alone. If the skeletal discrepancy is caused by excessive growth of the mandible, there seems to be little that can be done because "inhibiting" mandibular growth has proven to be almost impossible.⁸

In this case, as the patient rejected the surgical approach, the transverse discrepancy was masked by dental expansion of the maxillary left arch and the

slight constriction of the mandibular right side. The only drawback of this treatment plan was the additional retroclination of the mandibular incisors and for the stability of the dental expansion, long term retention is important to maintain the result. However, questions concerning the stability of the dental expansion remain. For this reason, long term retention is imperative to maintain the result.

In addition, questions of whether an orthodontist should correct a unilateral posterior crossbite in an adult by orthodontic means alone have been raised.⁹

There is some evidence of adaptive remodeling changes in the TMJ with age as a consequence of a unilateral posterior crossbite.¹⁰

The concern is that, with correction of this occlusal problem, a sudden change in condylar position could occur that might be beyond the adaptive capabilities of some persons.¹⁰ This leads to two important questions; Will nonsurgical correction of unilateral posterior crossbite in adults has an impact on the status of the TMJ? Could it lead to reemergence of pain and discomfort. This patient had a history of TMD symptoms during adolescence. However, no pain or limitation of jaw movement was started. The answers to these crucial questions are not clear. Some studies showed that the TMJ complex adapts to displacements of the mandible by surface modeling of the fossa^{10,11} but the study of Pirttiniemi et al¹² concluded that complete adaptation of the TMJ in adults with posterior unilateral crossbite did not take place. Carlton and Nanda¹³, in a prospective study, examined the changes in the TMJ after orthodontic treatment; they noted that with treatment, the condyle became more concentrically positioned. Additionally, this study did not show an increase in TMD that could be attributed to treatment. Similar observations were reported by Sadowsky et al¹⁴, and O'Reilly et al.¹⁵

Other investigators found that orthodontic treatment is essentially neutral for the TMJ and is not a risk factor for developing TMD.^{16,17}

However, more specific studies are needed to document condylar position changes in the fossa as a result of unilateral posterior crossbite correction in adults by orthodontic means alone. These patients should also be followed after treatment to determine whether condylar adaptation occurs. These studies may show great clinical implications. Until then, many questions cannot be answered satisfactorily.

CONCLUSION

Inter arch mechanics can be used effectively in cooperative patients. The final outcome of the treatment was a substantial improvement in function and aesthetics. The midlines were corrected and acceptable overbite overjet were achieved. The occlusion was functional and stable, and the patient had a pleasing smile. His quality of life had been greatly improved, and surgery was avoided. As a result in this case report the success of the treatment greatly depend on patient cooperation. The patient was pleased with the overall facial changes and occlusal function.

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