

# Treatment of Anterior Dental Crossbite in Adult Libyan Patient

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## Abstract

**Objective:** Anterior crossbite presents when one or more of the upper incisors occlude lingual to lower incisors. Several techniques were used to correct anterior crossbite. The aim of this article was to present the treatment of anterior crossbite under skeletal Class I relationship using multilooped archwire. **Methods:** A 24-year-old female has a complaint of anterior crossbite. She has concave profile, all her teeth present except the maxillary canines, 4 mm reverse overjet, 4 mm crowding in the lower anterior and 25% overbite. The treatment was started in the lower arch by the extraction of the lower first premolars. Different arch sequences of nickel–titanium alloys, followed by different sequences of stainless steel archwires were used. **Results:** The correction of crossbite was achieved successfully within 18 months. Normal overjet and overbite and orthognathic profile were accomplished. **Conclusion:** The treatment of anterior crossbite was achieved using retraction multilooping arch to achieve normal overjet and overbite.

**Keywords:** Adult, anterior crossbite, Libyan

## INTRODUCTION

An anterior crossbite is present when one or more of the upper incisors are in lingual occlusion relative to the lower incisors.<sup>[1]</sup> On the other hand, under normal circumstances, the maxillary teeth overlap the mandibular teeth both labially or buccally.<sup>[2]</sup> However, when the mandibular teeth, single tooth or a segment of teeth, overlap the opposing maxillary teeth labially or buccally on their location in the arch, this situation can be defined as a crossbite.<sup>[3]</sup>

## LITERATURE REVIEW

Dental crossbite involves localized tipping of a tooth or teeth and does not involve basal bone.<sup>[4]</sup> Patients with anterior dental crossbite will show a normal anterior-posterior skeletal relationship with a smooth path of mandibular closure into an Angle Class I relationship and coincident centric occlusion (CO) and centric relation (CR).<sup>[4]</sup> The incidence of anterior dental crossbite showed 4–5% and mostly occurs during the early mixed dentition phase.<sup>[5,6]</sup> The cause of anterior dental crossbite was reported to be multifactorial and includes the following: maxillary anterior incisors have a lingual-erupted path, displacement of the permanent tooth germ of incisors due to trauma to the primary incisors, over-retained of necrotic or pulpless deciduous tooth, anterior supernumerary

teeth, inadequate arch length and crowding in incisors, and habit of biting the upper lip.<sup>[5-7]</sup>

When an anterior crossbite is detected in a mixed dentition, the orthodontist should realize that the malocclusion may adversely affect the forward maxillary alveolar growth and further complicate the crowding of the maxillary anterior teeth.<sup>[3]</sup> Therefore, anterior crossbite should be corrected as soon as it discovered.<sup>[2,3,8]</sup>

As an important part of the diagnosis, the orthodontist must check the presence or absence of anterior shift from CR to CO during mandibular closure to differentiate between pseudo and true Class III malocclusion<sup>[3]</sup> and to distinguish the dental or skeletal origin of anterior crossbite.<sup>[9-11]</sup> Furthermore, the overbite has an effect on the treatment and retention of the teeth in crossbite. A posterior bite block is needed for the treatment of an anterior crossbite associated with a deep anterior overbite.<sup>[3]</sup> To allow lingually positioned maxillary incisors

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move anteriorly without occlusal interferences from the lower incisors.<sup>[3]</sup> In this case report, we represent the management of an adult patient with anterior dental crossbite malocclusion under skeletal Class I background.

### CASE PRESENTATION

A 24-year-old female came to the orthodontic department in faculty of dentistry at university of Benghazi complaining of anterior crossbite. On examination, the patient has concave profile [Figure 1]; intraoral examination showed that all teeth present except the upper right and left maxillary canines which extracted early as they erupted labially and occlusally (according to the patient’s history), anterior crossbite with 4 mm revers overjet [Figure 2], molar classification was Class I on both sides, 4 mm crowding in the lower anterior with well-aligned upper arch, and about 25% of the upper incisors covered by the lower incisors. Cephalometric examination revealed the following [Table 1]. From the previous information, the problems’ list and treatment objectives are summarized in Table 2.

### TREATMENT PLAN

As the patient had skeletal and dental Class I, a camouflage treatment was our choice. Because the upper canines extracted early, the upper first premolars well replaced the upper canines. The anterior crossbite and the lower crowding will be corrected by the extraction of the lower first premolars and retracted the canines and lower incisors by using multilooping retraction arch with maximum anchorage in the lower jaw (lingual holding arch).

### METHODS

As the upper arch was well aligned, the treatment postponed in it and started in the lower arch by bonding stainless steel brackets (0.018). The extraction of the lower first premolars was done, followed by leveling and alignment which achieved within about 3 months. The arch sequence used was (nickel–titanium alloy) 0.014, 0.016, and 0.018, followed by

stainless steel archwires 0.018, 0.016 × 0.022, 0.017 × 0.025, then the retraction of the canines was done until the Class I occlusion achieved between the upper first premolars and lower canines, since the upper canines were extracted early.

The correction of anterior crossbite was started using retraction looping arch (ball loop). The vertical loops were placed between the lower anterior teeth and lower canines (mesial to the lower canines), after opening the overbite by placing a composite block on the occlusal surfaces of the lower first molars. 17 × 25 SS wire was used as a finishing wire. Appointments were given every 5 weeks for checking the progress of the treatment, activation of the appliance, and changing the archwire if required.

### RESULTS

The correction of the crossbite was achieved successfully within 18 months. Orthognatic profile [Figure 3], normal overbite and overjet [Figure 4] were accomplished at the end of the treatment. There was no need for retention after the treatment as anterior crossbite as it self-retained. 3 months and 6 months’ appointments were arranged

**Table 1: Skeletal and dental cephalometric values**

Skeletal and dental finding	Patient values	Normal values
SNA	75	82±2
SNB	75	80±2
ANB	0	2±2
FMA	27	25±3
SN to mand pl.	35	33±3
U1 to FH	122	118°
L1 to mand pl.	94	94°
Wits (mm)	-1	0-1

SNA: Sella, Nassion, A point, SNB= Sella, Nassion, B point, ANB: A point, Nassion, B point, FMA: Frankfort mandibular angle, SN to Mand. Pl: Sella nassion line to mandibular plane

**Table 2: Problems list and treatment objectives**

Problems list	Treatment objectives
1. Skeletal Class I with concave profile	Profile enhancement
2. Anterior dental crossbite	Achieve normal overjet and overbite
3. Crowding in lower anterior teeth	Relief crowding
4. Proclined upper incisors	Achieve proper axial inclination of upper incisors
5. Extracted upper 3s	Replace U 4s instead missing U3s



**Figure 1:** Frontal and lateral view of the patient. Note the concave profile in the lateral view



**Figure 2:** Intraoral photographs of the right and left sides show Class I molars and anterior crossbite



**Figure 3:** Frontal and lateral view after treatment, note the improvement of the patient profile

for following the case and taking more photographs for documentations.

## DISCUSSION

As the patient was an adult and has Class I malocclusion with a history of early extraction of the upper canines, a fixed appliance treatment was the choice to achieve bodily movement and avoid the great labial inclination of the upper incisors.<sup>[3,9]</sup> The extraction of the lower first premolars was done to create enough space for the lower incisors to aligned and retracted and also to accommodate the early missing of the upper canines.<sup>[4,8]</sup> The lingual arch was used to reinforce the anchorage,<sup>[1]</sup> and segmental retraction of the canines with light force helps in maintaining about 75% of extracted space for the retraction of the canines.<sup>[1,3]</sup> Furthermore, the patient with about an average angle case this may help in reinforce the anchorage and reduce the tendency of posterior segment from mesial movement.<sup>[12]</sup> This may coincide with Mitchell<sup>[12]</sup> who explained that the patient with reduced vertical dimension has less anchorage loss because of the relative strength of the facial muscles. In the next visit and by achieving Class I relation between the upper first premolars and the lower canines, the lower anterior retracted with multilooped arch 16 SS × 22 SS with light retraction force until normal overjet and overbite were achieved [Figure 4] and the profile had been enhanced [Figure 3].



**Figure 4:** Normal overjet and overbite with Class I molars and upper first premolars occlude in Class I with the lower canines

## CONCLUSION

Anterior dental crossbite in adult can be treated by various and contemporary methods but still the use of retraction multilooping arch with light retraction forces is considered effective and a less aggressive method of correction the bite and achieve normal overjet and overbite.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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## ملخص المقال باللغة العربية

### معالجة عضة الأسنان العكسية لأمامية في مريض ليبي بالغ

#### المؤلف:

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**الخلفية:** تظهر العضة المتقاطعة (أو العكسية) الأمامية عندما تسد واحدة أو أكثر من القواطع العلوية من الأسفل بالقواطع السفلية. تم استخدام العديد من التقنيات لتصحيح العضة الأمامية.

**الهدف:** كان الهدف من هذه المقالة تقديم علاج العضة الأمامية العكسية ذات العلاقة بالهيكل العظمي من الصنف الأول باستخدام السلك المقوس متعدد الفواصل.

**الإعدادات والطرق:** امرأة تبلغ من العمر 24 عامًا تشكو من عضة عكسية أمامية. شكل الوجه الجانبي مقعر، وجميع أسنانها موجودة باستثناء أنياب الفك العلوي، و4 مم تطابق عكسي، و4 مم إزدحام في الجزء السفلي الأمامي و25% عضة عمودية. بدأ العلاج في القوس السفلي باستخراج الضواحك الأولى السفلية. تم استخدام تسلسلات قوس مختلفة من سبائك النيكل والتيتانيوم، تليها سلاسل مختلفة من أسلاك الفولاذ المقاوم للصدأ.

**النتائج:** تم تصحيح العضة المتقاطعة بنجاح خلال 18 شهر. تم تحقيق التراكب الأفقي والعمودي للعضة ومقوم الفكين بطريقة طبيعية.

**الاستنتاجات:** تم تحقيق علاج العضة العكسية الأمامية باستخدام قوس التراجع متعدد الفصوص لتحقيق التراكب الأفقي والعمودي الطبيعيين للعضة.

**الكلمات المفتاحية:** البالغ، العضة الأمامية العكسية، ليبيا.