Unilateral canine crossbite correction in adults using the Invisalign method: A case report

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The aim of this paper is to present and debate the treatment of a unilateral canine crossbite using clear aligners (Invisalign). The possibility of combining partial fixed appliances with removable elastics to optimize the final outcome is also described. The advantages of protected movement, due to the presence of the aligners, to jump the occlusion during crossbite correction is also highlighted. ORTHODONTICS (CHIC) 2012;13:122–127.

Key words: adult treatment, displaced canines, Invisalign, unilateral crossbite

Maxillary canine crossbite is a clinical condition that can be observed in adult patients with moderate crowding. Palatal displacement of maxillary canines can occur despite adequate space and is generally due to some interference during the normal eruption process. There is no epidemiologic data, but it is well documented that maxillary canines are the most frequently impacted teeth in the permanent dentition, with the reported prevalence ranging from 0.8% to 2.8%. Seventy to 85% of impactions in European populations are characterized by palatal displacement. Jacoby reported that 85% of impacted canines are palatally located and concluded that they occur in patients with adequate arch length. Obviously, not all displaced teeth are in fact impacted. However, a small number of them can erupt late in the palate and in a crossbite position. In these patients, the esthetic alteration of the smile is particularly evident and is usually the patient’s main treatment request. From a medical point of view, though, the functional concerns related to the lack of canine function, as well as the traumatic occlusion, are more relevant clinical aspects that must be considered.

The use of Essix preformed appliances to move teeth is widely documented in literature. Recently, several authors have described the use of Invisalign appliances in treating moderate malocclusions—for example, in cases of premolar extractions, deep overbites, slight molar distalization, anterior and posterior crossbites, anterior open bites, and periodontally involved patients.

Adults’ awareness of the importance of the smile in overall facial esthetics has meant an increase in the demand of orthodontic treatment to correct malocclusions without fixed appliances.

This article describes the treatment of a unilateral crossbite with the Invisalign system.
CASE REPORT

Diagnosis
A 35-year-old woman presented with a unilateral crossbite of her maxillary left canine (Fig 1). She was particularly concerned about the esthetic alteration of her smile due to the canine displacement, as well as crowding of her anterior teeth. She had pleasant, well-balanced facial proportions. Intraoral examination revealed ovoid-shaped dental arches with moderate crowding. The lower midline was deviated 2 mm to right. Moreover, a moderate deep bite and slight right canine Class II relationship were detected.

Three of the third molars had already been extracted—the mandibular right third molar was partially erupted.

Treatment plan
According to the patient, the full crossbite of the maxillary left canine was the main anomaly requiring treatment. Moreover, both arches showed a slight dentoalveolar discrepancy. Other important objectives were to maintain the Class I molar occlusion while alleviating the crowding through a combination of expansion and interproximal reduction. Particular interest was given to the interdental papilla and gingival margins, both of which are crucial for periodontal health and smile esthetics.

The ClinCheck projection (Fig 2) showed a satisfactory resolution of all occlusal anomalies, with good crossbite correction and alignment of the teeth in both arches. The space needed for correction of the crossed canine was gained by slightly expanding the maxillary arch.

In the mandibular arch, on the first premolars, horizontal beveled attachments were placed to promote arch leveling by slightly intruding the mandibular incisors. Moreover, a vertical rectangular attachment was placed on the mandibular right canine to upright and rotate it.

For active treatment, 28 aligners were planned for the maxillary arch and 22 for the mandibular arch. The patient was seen every 4 to 6 weeks to check aligner fit, attachment stability, and patient cooperation. After the first phase of aligner treatment (Fig 3), the treatment was further refined with the addition of eight aligners in both arches. The objectives of this second phase of treatment were to complete canine extrusion and optimize torque. Moreover, better gingival contour leveling of the anterior teeth was pursued to obtain a more pleasant appearance of the smile and promote good hygiene. This final objective was achieved by means of an auxiliary light elastic attached to the canine between the palatal and buccal face and then stretched over the aligner (Fig 4).
Treatment results
The final result was good, and all objectives were achieved. The patient’s teeth were aligned well and in good occlusion, thanks to her ideal cooperation in wearing each aligner for 2 weeks as planned. Posttreatment results showed complete correction of the canine crossbite. The maxillary left canine was
properly positioned by reaching a functional relationship with the opposite arch. The final canine torque seemed to be good, despite the complexity of the movement performed by the Invisalign appliances.

The periodontal tissue was healthy overall, with ideal alignment of gingival margins of the six anterior teeth, and resulted in a pleasant smile (Figs 5 to 7).
At the end of treatment, the patient was given a clear overlay retainer to wear at night in both arches.

CONCLUSION

This clinical report demonstrates that the Invisalign method can be effective in the treatment of adults with unilateral canine crossbites. The malocclusion was corrected in 18 months as planned, but to optimize the left canine extrusion, an auxiliary light elastic was utilized.

The patient in this case report was informed about the possibility of optimizing the result by means of fixed appliances. This is a normal initial approach before starting a clear aligner treatment to ensure the patient is aware of the differences between planning and clinical responses. However, the patient wanted to have as much of her treatment as possible performed with Invisalign, and we were not able to use fixed appliances at all (except for the light auxiliary elastic). The satisfactory treatment outcome was certainly facilitated by the apical position of the teeth to be moved. In fact, no apical movement was required, and the amount of crown tipping was predominant. Another crucial point to be considered is the optimal response of periodontal tissue. The patient was seen for periodontal maintenance at 3-month intervals throughout orthodontic treatment, with reports from her periodontist describing reasonable control of tissue inflammation and excellent plaque removal. She also had ideal compliance with aligner wear. We strongly suggest the Invisalign technique as an elective method to treat adults with unilateral canine crossbite and mildly crowded teeth.

REFERENCES


Fig 7  Posttreatment records.