



Treating Open Bite and Class III Malocclusion with the Invisalign System



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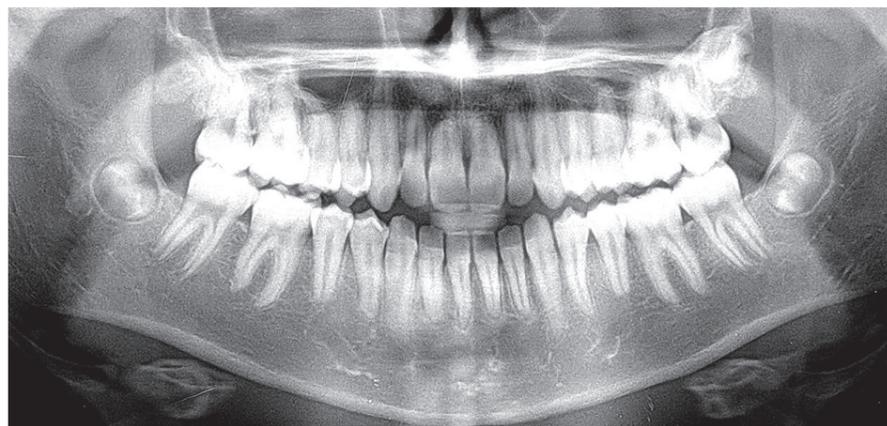
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The patient, CB, a female teenager was aged 13 years and 5 months at the time of first presentation. CB's chief complaint was her open bite leading to difficulty when eating. At an initial orthodontic consultation at another clinic, she was recommended fixed appliances in combination with orthognathic surgery. CB was not keen to have this form of treatment for psychosocial reasons, and her rural location would also impact on her ability to attend appointments at short regular intervals.

Figure 1. Intra- and extra-oral images before treatment



Figure 2. Panoramic radiograph before treatment



Clinical presentation

CB presented with open bite, mild crowding and chin strain at rest. She had also been wearing a Myobrace since the age of 9. CB and her mother were looking for treatment alternatives to surgery.

Figure 3. Cephalometric radiograph before treatment



Clinical findings

- Chin strain at rest.
- Mild crowding in both arches.
- Open bite from 7-7.
- Class III malocclusion tendency on the buccal segments.
- Edge-to-edge anterior bite.
- Grade 1 mobility on central maxillary incisors.
- Evidence of gingival recession anteriorly.
- Orthopantomogram revealed root resorption, especially in both central maxillary incisors.

Treatment goals

- Correct alignment.
- Obtain a positive overjet and overbite.
- Obtain Class I occlusion.
- Reduce open bite to aid in attaining the patient's goal of improved lip seal.
- To utilise Invisalign aligners for vertical dimension control.

Treatment approach

Initial diagnostic records were obtained. Polyvinylsiloxane (PVS) impressions were taken for developing a ClinCheck treatment plan in order to manufacture Invisalign aligners. Aligners were issued in sets of four and the patient was instructed to replace aligners every 2 weeks, while intraoral photographs were taken every 8 weeks. No aligners were lost or broken throughout the course of the treatment.

For this patient, the Class III tendency and anterior open bite were corrected by active intrusion of the lower posterior teeth. Her lower anterior teeth were retracted with Class III elastics to correct her anterior open bite. At the end of week 8, the anterior open bite had reduced considerably and a positive overbite was obtained. Mobility of the central maxillary incisors was monitored at each visit.

Treatment details

Active treatment time

8 months.

Aligners used

- 12 upper aligners and 17 lower aligners were used.
- No refinement/additional aligners were required.

Figure 4. Initial Clincheck treatment plan



Attachments

- Optimised Rotation Attachments on teeth 13, 14, 23, 25, 34, 35 and 45.
- Optimised Root Control Attachments on teeth 21 and 24
- Optimised Extrusion Attachments on teeth 31 and 41.
- Optimised Deep Bite with Extrusion Attachment on tooth 44.
- Conventional horizontal rectangular attachments on teeth 16, 26, 36 and 46.
- Conventional vertical rectangular attachments on teeth 12, 22, 32, 33, 42 and 43.
- Long rectangular occlusal attachments on the upper and lower first and second molars plus two parallel rectangular attachments aligned mesiodistally. Technicians were instructed to place the occlusal attachments as follows: 2 x parallel 2 mm by 5 mm attachments on occlusal of U & L 6s and 7s align with sides touching and with 5 mm dimension running mesial to distal. This was to ensure that the attachments occlude.

Retention

Upper and lower bonded retainers were used.

Treatment outcome

The patient and her parents were extremely happy at the end of treatment, as her chief complaint was addressed in a very short period of time without orthognathic surgery. CB was highly motivated throughout the entire treatment and she tolerated the occlusal attachments. This led to a successful outcome. As she had worn a removable appliance for many years, she did not

wish to wear a removable retainer. CB has been reviewed and her occlusion remains stable.

Clinical tips

- The Invisalign System is a useful treatment option for correcting open bite and Class III malocclusions.
- This System allows control of the vertical dimension which prevents inadvertent posterior extrusion, as well as enables active intrusion of the posterior teeth when aided by occlusal attachments (which were not filled with composite). It is essential the attachments are not filled as they simply provide increased aligner thickness to assist with the posterior intrusion. When patients remove their aligners they are then able to occlude effectively. They are designed to work by the activation of the masseter and medial pterygoid muscles.
- The aligners also help to precisely correct the anterioposterior dimension by keeping the lower incisors retroclined.
- Long vertical attachments on mandibular canines allow for the addition of 'self-cut' elastic hooks that enable the use of Class III elastics, where necessary, throughout treatment.
- In this case, initial bite closure results were obtained within a few weeks. In such a situation, where treatment results are seen in a short period of time and ahead of schedule, it may be difficult to track progress with the ClinCheck treatment plan.

Impact on clinical practice

The Invisalign System is an excellent choice for patients with anterior open bite, as it reduces treatment time and the need for temporary anchorage

Figure 5. Intra- and extra-oral images after treatment



Figure 7. Panoramic radiograph after treatment

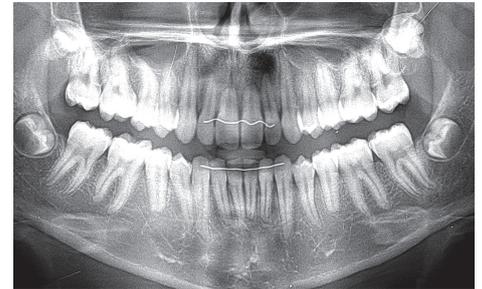


Figure 8. Cephalometric radiograph after treatment

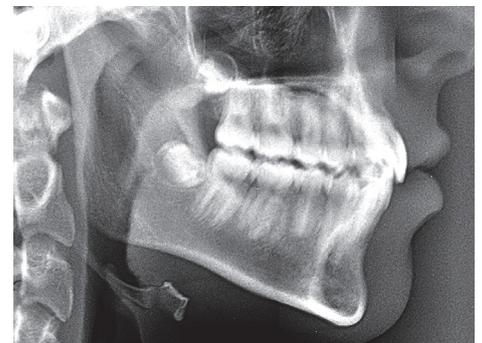
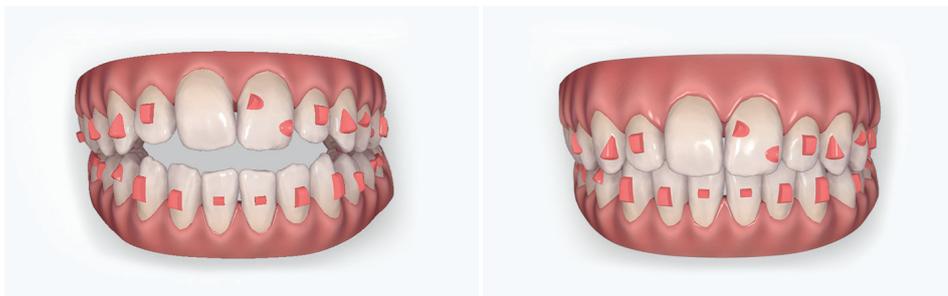


Figure 6. Initial and final Clincheck treatment plan



devices or complex biomechanics. Treatment with the Invisalign System is extremely useful for our rural patients, reducing the need for frequent travel for appointments compared with a fixed appliance system. In addition, there is a lower risk of having a broken device with the Invisalign System as compared with fixed appliances. Developing and checking the ClinCheck treatment plan is convenient as it can be done in between patient visits, and remotely from literally anywhere, using the ClinCheck web access.

Conclusion

The patient presented with a Class III malocclusion with a 7-7 open bite and maxillary central incisor root resorption. This case could be treated with fixed appliances, temporary anchorage devices or orthognathic surgery; however, the Invisalign System was more effective in treating this type of malocclusion, ensuring satisfactory results with minimal dental movement of the upper central incisors, along with an improved prognosis for gingival recession. At the end of the

treatment there was no evidence of dental mobility. CB's malocclusion was corrected with 12 upper aligners and 17 lower aligners, from the 24 aligners initially planned. Root resorption of the upper central incisors remained unchanged. The final photos and radiographs showed that the occlusal plane and proclination of the lower incisors improved. The patient was satisfied with her treatment outcome.

Author disclosure

Dr Rosario Rodriguez was provided an honorarium from Align Technology, Inc., for her contribution towards the creation of this case report.

Dr Rosario Rodriguez

Rosario Rodriguez completed her Masters in Orthodontics at the National Autonomous University of Mexico. After completing her dental and specialist postgraduate examination through the University of Sydney, Australia, she joined the Orthodontic Department at Westmead Hospital in Sydney, where she treated patients with complex orthodontics and multi-disciplinary treatment needs. She was actively involved in teaching undergraduate and postgraduate students, and also mentoring dental officers and hygienists. She has worked in private orthodontic practice in Sydney and currently practices in Mackay (Queensland). Dr Rodriguez has a special interest in all aspects of aesthetic orthodontics, especially Invisalign treatment.