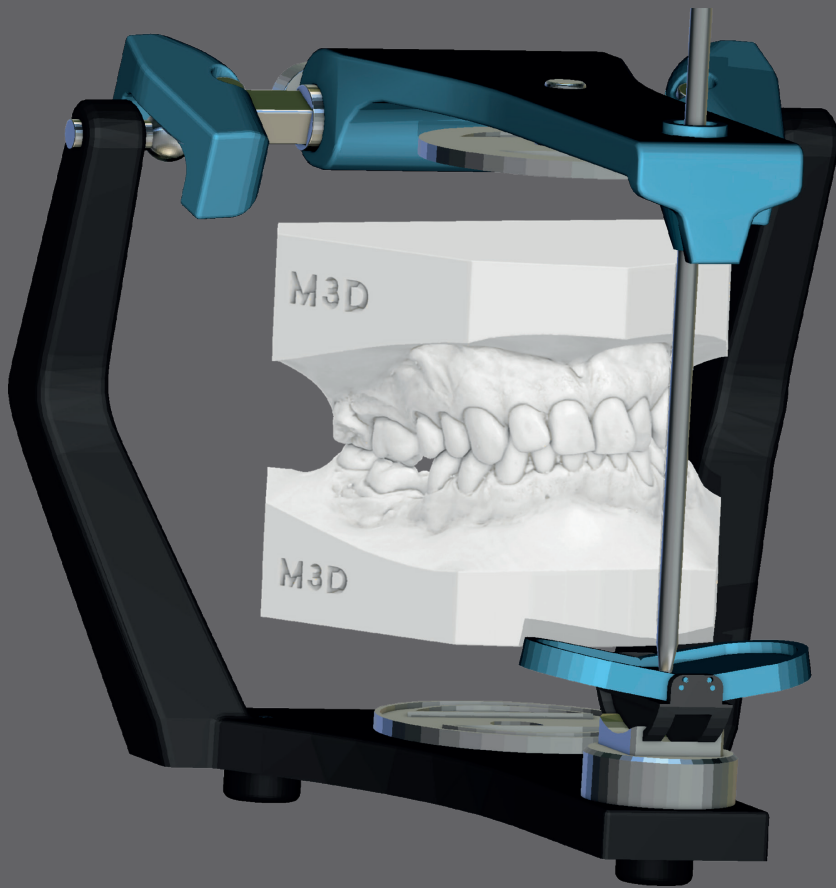


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## case report

Laser-assisted orthodontic treatment of a dilacerated impacted maxillary incisor

## case report

Canine substitutions: Protocols for predictable excellence

## feature

What will be the new normal after COVID-19?

# Treating teen athletes with ClearCorrect aligners and DentalMonitoring to minimise office visits

Dr Melissa Shotell, US

## Introduction

In orthodontic practice, a challenge many clinicians encounter is the phenomenon of over-scheduled patients, especially adolescents with substantial non-academic activities. These scheduled school and extramural activities throughout the day make it exceedingly difficult to attend regularly scheduled orthodontic appointments. This dilemma leads to many parents seeking alternatives to traditional orthodontic visits that allow their children to be seen less frequently and complete treatment faster. In addition, the recent world events associated with the global pandemic have led to patients desiring to reduce and/or limit office encounters.

Clear aligner therapy has become a growing aspect of orthodontic practice for a variety of reasons, including aesthetics, simplicity and enhanced orthodontic control for select cases. In addition to the aforementioned advantages, development of artificial intelligence and remote monitoring technology, in combination with teledentistry, has rapidly pushed clear aligner therapy into the modern age. This case report highlights a clinical case in which clear aligner therapy and remote monitoring were able to facilitate orthodontic treatment for a patient with scheduling time constraints and limited ability to return for multiple office visits.

## Case report

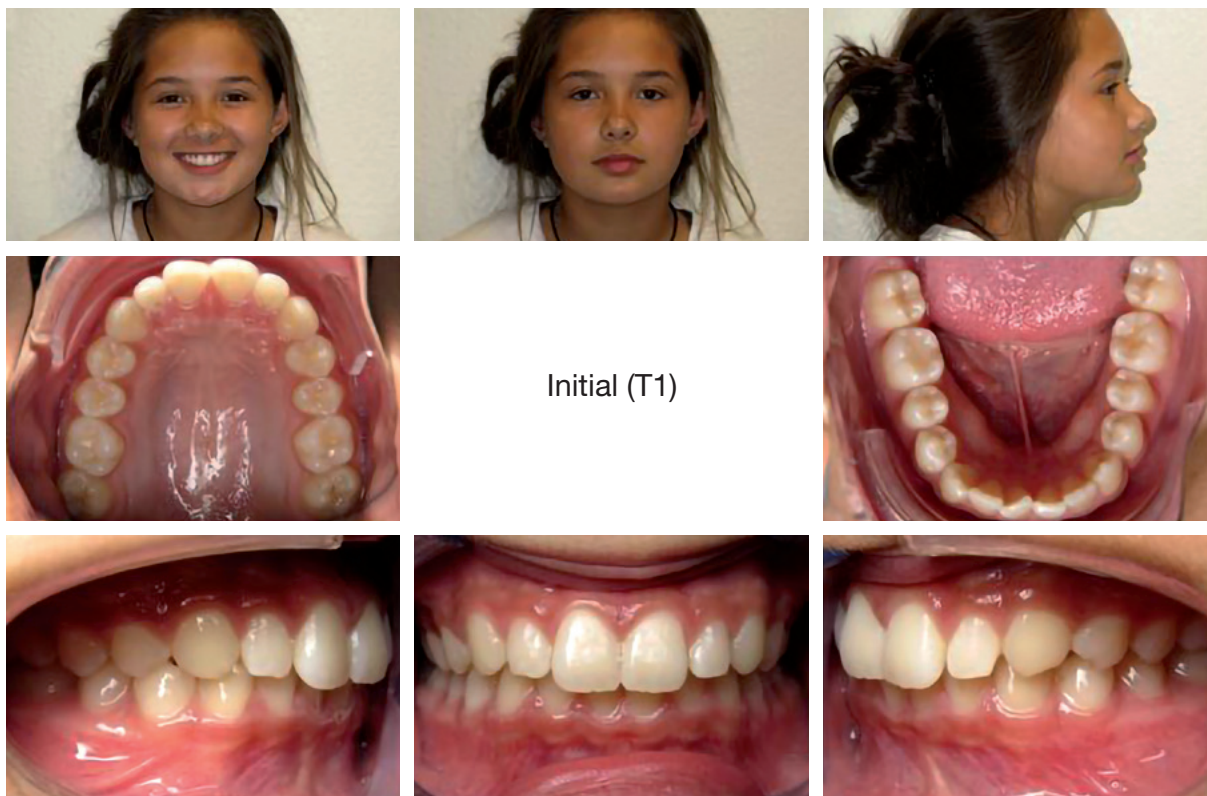
A 14-year-old female patient presented for orthodontic consultation with the chief complaint of pain in her mandibular incisors. The patient and her mother reported a history of parafunction, of grinding and clenching, with ongoing pain in the mandibular incisors. The patient and her mother described that she was a serious athlete participating in competitive soccer and that she had concerns of injury to her teeth and lips if treated with tradition-

al fixed appliances, owing to the high contact nature of the sport. Both the patient's mother and the patient herself expressed a strong preference for clear aligner treatment and were looking to minimise office visits, owing to the demanding schedule of both school and soccer. They were also interested in limiting the time in treatment with limited goals to resolve crowding and decrease the pain and pressure sensation on the anterior teeth.

Upon clinical examination, the patient's occlusion was classified as Angle Class II subdivision left, moderate overbite of 60% and excess overjet of 4 mm (Figs. 1a–h). There was mild crowding noted in both the maxillary and mandibular arches. The maxillary midline was centred and coincident with the midline of the face, and the mandibular midline was 1 mm to the left. The occlusion was stable, and there was no shift between centric relation and centric occlusion. The maxillary lateral incisors were small in size, creating a tooth size discrepancy with mandibular excess.

Radiographic examination with a CBCT reconstructed panoramic radiograph and lateral cephalogram showed a complete and healthy dentition for the patient's age and regular root morphology. It was noted that the mandibular third molars had not developed (Figs. 2 & 3). The lateral cephalogram showed a balanced skeletal Class I relationship, and the panoramic radiograph showed a fully erupted adult dentition from second molar to second molar. The temporomandibular joints were well corticated on the radiographic examination, with no signs of temporomandibular joint pathology. The patient was periodontally healthy and demonstrated excellent oral hygiene for orthodontic treatment.

After discussing the findings of the clinical examination with the patient and her mother, we reviewed their limited goals for treatment and the desire to complete treatment

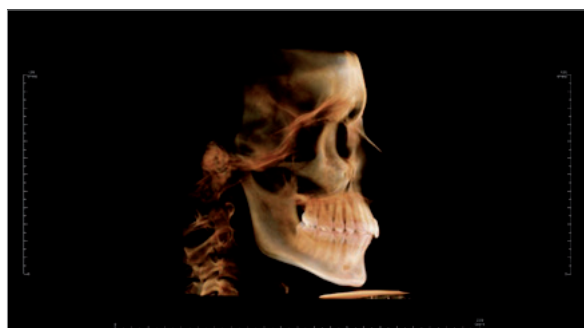


Initial (T1)

**Figs. 1a–h:** Pretreatment photographs showing the patient's initial smile aesthetics and malocclusion.



**Fig. 2:** Pretreatment panoramic radiograph.



**Fig. 3:** Pretreatment cephalometric radiograph.

quickly. Treatment options to correct the tooth size discrepancy with mandibular interproximal reduction or bonding of the maxillary lateral incisors were presented. Additional treatment options to correct the Class II malocclusion on the left side and reduce the excess overjet were also presented. The patient and her mother both wanted to avoid bonding of the maxillary lateral incisors owing to long-term maintenance of the restorations, and they both wanted to minimise interproximal reduction (IPR). The patient was not concerned with addressing the Class II occlusion on the left side and was primarily looking for an aesthetically pleasing smile.

With patient- and parent-limited goals for treatment in consideration, a treatment plan with the following treatment goals was established:

1. Resolve crowding.
2. Resolve excess overbite.
3. Improve overjet.
4. Improve mandibular midline.
5. Improve smile aesthetics.
6. Reduce office visits utilising remote monitoring.

In addition to CBCT, other orthodontic records were taken, including photographs and intra-oral digi-

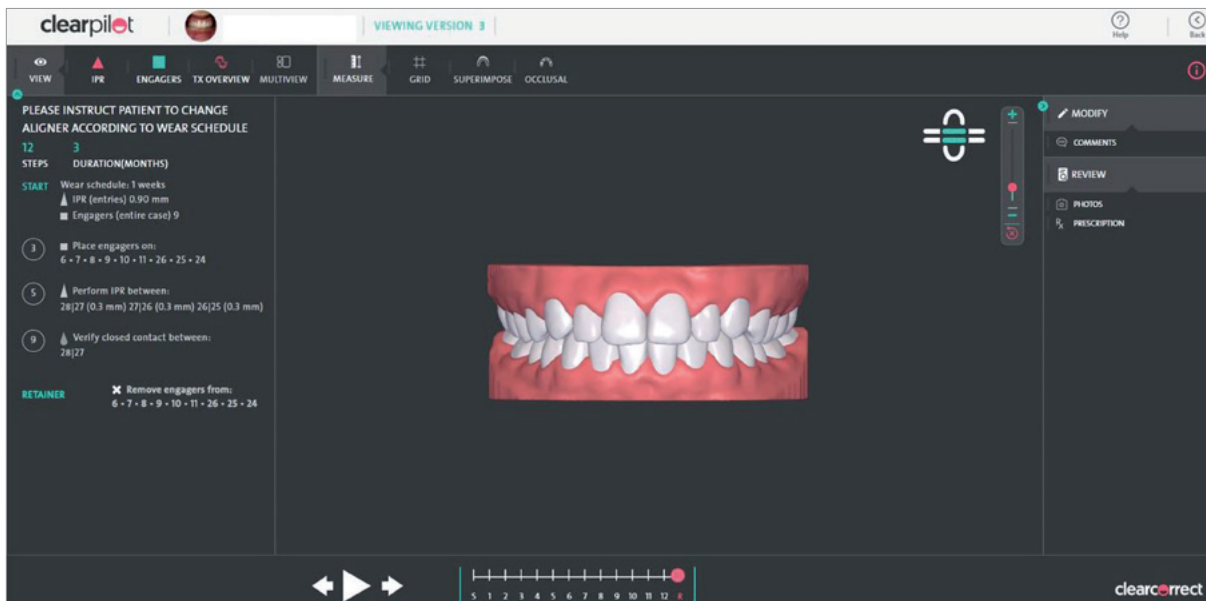


Fig. 4: Initial treatment set-up with treatment details in ClearCorrect's ClearPilot software.

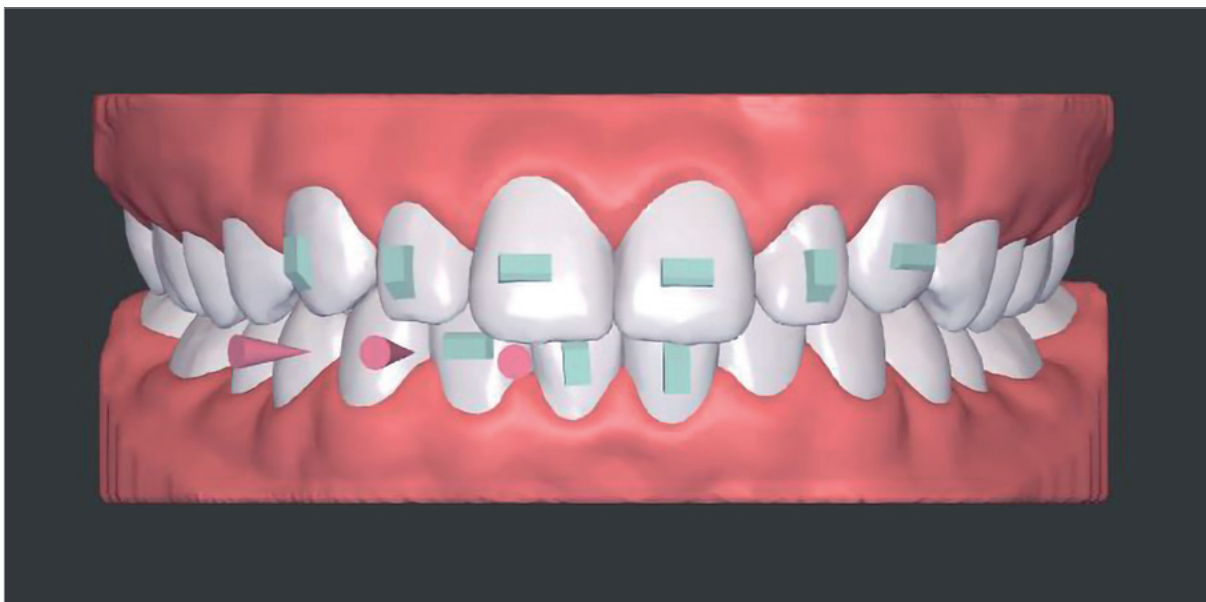


Fig. 5: Initial treatment set-up with engagers and location of interproximal reduction.

tal impression scans. The records were submitted to ClearCorrect to create a treatment set-up (Fig. 4). The first set-up included 12 treatment steps and utilised engagers on the maxillary and mandibular anterior teeth, to aid intrusive and rotational movements (Fig. 5). Interproximal reduction (0.9 mm in total) was planned on the mandibular right to relieve crowding and to aid in shifting the mandibular midline to the right and resolve crowding of the mandibular incisors. The aligners were planned to be worn for ten to 14 days per aligner.

Aligners were delivered to the patient with home care instructions, and the DentalMonitoring app was introduced

for remote monitoring (Fig. 6). Patient treatment was monitored using the DentalMonitoring app (Fig. 7), and the patient was instructed to take her remote monitoring scan every ten days to check the fit of each aligner. The patient was instructed to move to the new aligner if the current aligner was fitting correctly (Fig. 8). This reduced the time of wear for each aligner from an arbitrary time instruction to a custom timeline for the patient.

The patient completed the initial set of 12 aligners in four and a half months and only two office visits in comparison with six months of treatment and four visits without the DentalMonitoring app. The patient was seen in the



**Fig. 6:** Delivering ClearCorrect aligners.



**Fig. 7:** Introducing and demonstrating the DentalMonitoring app.



**Fig. 8:** DentalMonitoring remote monitoring of treatment progress.

office for evaluation of treatment progress at her third office visit. At this visit, it was determined that additional improvement in tooth position could be achieved, including midline correction, additional correction of mandibular arch crowding, and improvement of canine guidance. The engagers were removed, and progress records were taken, including photographs (Figs. 9a–h) and new intra-oral digital impression scans. The progress records were sent to ClearCorrect, and a treatment revision was requested. A total of four additional aligners with attachments on the canines were planned, to aid extrusion for improved canine guidance (Fig. 10). IPR of the mandibular central incisor contact point was planned to resolve rotation of the mandibular right central incisor and to improve the mandibular midline.

It was agreed that the patient would discontinue use of the DentalMonitoring app during the treatment revision owing to her demanding schedule, but would stay very consistent and compliant with her ClearCorrect aligners. The patient completed her revision aligners in six weeks and was not seen during the revision aligner sequence.

An office visit was scheduled at the completion of the revision aligner sequence, and at this visit, the engagers were removed and the patient was placed into final retention with retainers made by ClearCorrect (Figs. 11a–h).

### Treatment results

Treatment was completed in a total of six months and a total of 16 sets of aligners, and the patient came to the office only five times from the initial consultation to final retention. While her appointments to the office were minimized, her progress was tracked throughout treatment on an individual basis using the DentalMonitoring app. The final treatment results addressed the patient’s chief complaint and fulfilled the goals and expectations of both the patient and her mother. The crowding and excess overbite were relieved, and the patient reported that the discomfort in her mandibular anterior teeth was resolved. The patient indicated that her aesthetics were greatly improved and that she was incredibly pleased with her overall treatment results and experiences of using both clear aligners and remote monitoring technology.



Figs. 9a–h: Progress photographs taken after the initial set of 12 aligners.

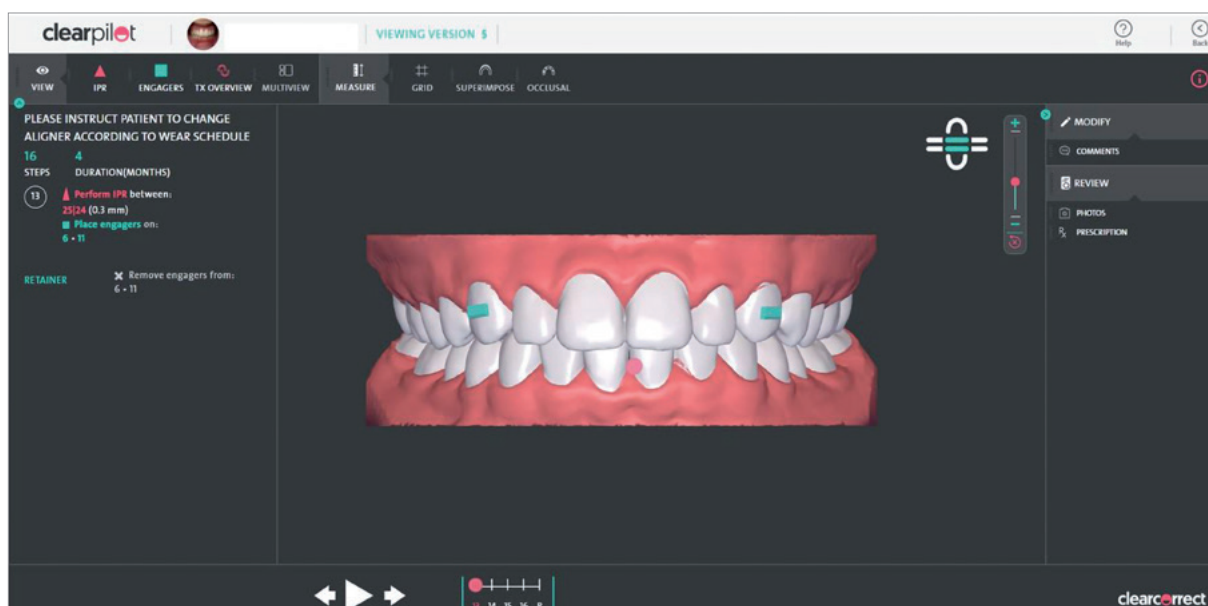


Fig. 10: Treatment revision set-up of four aligners with engagers and interproximal reduction.



Final (T3)

**Figs. 11a–h:** Final photographs at the completion of treatment.

## Conclusion

ClearCorrect aligners were able to deliver the treatment results that the patient and her mother were expecting in a limited amount of time. The use of ClearCorrect aligners allowed the patient to avoid injury to the teeth during contact sports that can be caused when wearing traditional fixed appliances. The use of the clear aligners in combination with attachments and IPR was able to resolve the crowding and provide excellent incisor intrusion to reduce the excess overbite and relieve the traumatic occlusion causing the patient's initial discomfort. The use of selective IPR was also able to correct the mandibular midline. There was an overall improvement in smile aesthetics. The high level of patient compliance with the aligners and the use of the DentalMonitoring app to customise the aligner wear schedule allowed the patient to complete treatment more quickly than initially anticipated, exceeding the expectations of both the patient and her mother.

## about



**Dr Melissa Shotell** is a board-certified orthodontist and practises in a multi-specialty practice in Sonoma in California in the US focusing on the interplay of orthodontics and restorative treatment. She received all of her dental training in the US. Dr Shotell received her DMD at Nova Southeastern University in Florida in

the US and a general practice residency certificate from the Ohio State University in Columbus in Ohio in the US. After spending years in general practice treating a broad range of patients, Dr Shotell completed a certificate and master's degree in orthodontics at Loma Linda University in California. There, she focused her training on cutting-edge 3D imaging technology for diagnosis and treatment planning for interdisciplinary dentistry. Dr Shotell considers education to be her passion and regularly consults and lectures on dental technology, clear aligner therapy, orthodontics, in-office clear aligners, office efficiency and workflow, and teamwork. She shares tips and tricks on orthodontics and clear aligners on social media as alignerbee.