

Widening the scope of aligner application: A case report

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Introduction

Over the last two decades, extensive research has been carried out to alleviate the two major shortcomings of orthodontic treatment: visibility and duration.

In order to decrease treatment duration, three methods have been proposed: chemical-led interactions, surgery, and device-assisted therapies.² The chemical-led interactions require further research to be accepted as routine methods and the surgical methods are found to be invasive and rarely acceptable to the patient. A simpler and less invasive method is the use of micro-osteoperforation, which

increases the local inflammatory response, promotes osteoclastogenesis and leads to faster tooth movement through the bone.³ This process has been proven to be safe and repeatable and well tolerated and accepted by patients.⁴

Deepbites are difficult to treat using aligners and often lead to prolonged treatment time.⁵ To facilitate this movement, Invisalign uses attachments on the premolars for anchorage, while an active intrusive force is placed on the incisors as well as bite ramps built into the lingual of the aligner of the upper anterior teeth that act as a bite plane; as yet no data exist on the effectiveness of these auxiliaries.⁵ Active intrusion can be facilitated with TADs.⁵



Even though aligners might be the most aesthetic, hygienic, as well as acceptable treatment modalities available with the orthodontist, a decrease in treatment time is often desired by the adult patient. A case report is presented with the combined short term use of bonded appliances, TADs combined with clear aligners from K Line Europe GmbH, Düsseldorf, Germany (K Clear) for an aesthetically conscious patient.

Case report

A 24-year-old male patient presented to the practice with a chief complaint of overlapping front teeth. As a model he wanted to avoid the use of bonded appliances. On examination, he presented with Class II features with the maxillary lateral incisors labially inclined and palatally inclined, supraerupted maxillary central incisors with a resultant 100% deep bite (Figs. 1a–h). He had an impacted mandibular incisor along with another incisor congenitally missing. The patient insisted on getting only the upper arch treated in the shortest time possible with an aesthetic appliance, as he had a modelling assignment starting in 4 months!

Treatment procedure

Keeping the patient's professional commitments and the limitation of aligner therapy in mind it was decided to place a fixed bonded appliance for a short duration, along with TADs placed between the maxillary central and lateral incisors bilaterally for intrusion of anterior teeth (Figs. 2a–d). Force systems to achieve intrusion of the incisors to be in force from day 1 for a duration of 3–4 months (Figs. 3a–d) and subsequently to shift him to K Clear for residual bite opening, space closure and final finishing. Attachments on the maxillary first molar and premolars,

bilaterally were provided to provide better retention to the aligners. The K Clear aligners were placed for 5 months (Figs. 4a–d). At the end of active treatment, retainer was bonded from canine to canine in upper arch (Figs. 5a–b). Additionally, the patient was provided an Essix retainer for night time wear. The patient is in retention for the past 1 year and the occlusion as well as other movements achieved are stable (Figs. 6a–d).

Discussion

The presented case involves three major aspects of orthodontic treatment, from a patient's perspective, aesthetics and duration of active treatment and, from a clinician's perspective, the control of planned tooth movement. Any clinician who has had the opportunity to work with traditional pre-adjusted appliances as well as aligners understands the pros and cons of both appliances systems. It is this recognition of limitations that propels us as clinicians to seek better appliances in order to deliver treatment results in the best interest of our patients. The aim of orthodontic therapy ought to include words such as 'in the least amount of time'. It has been postulated by Nicosizis⁶ that aligners can be changed as frequently as 3–4 days when micro-osteoperforations are used along with aligner therapy to initiate the RAP phenomenon. The use of TADs not only provides the means of stable anchorage to apply forces from an ideal location avoiding any untoward movement, but also cause a local insult leading to an inflammatory response.

This case was started with a pre-adjusted bonded appliance along with the use of TADs placed close to the teeth requiring intrusion. When used in this manner, the flexible NITi wires cause alignment and the vertical forces generated lead to intrusion and



flaring of the incisor teeth. Since TADs also cause trauma, a RAP phenomenon is generated, which causes an increase in the rate of tooth movement. The bite opening led to the increase in the upper incisor to NA from 12 degrees to 22 degrees (Fig 7). This led to minor spacing appearing between the anteriors. Clear aligners have been shown to provide good control where tipping movements are used⁵ and such controlled movements led to a near ideal finish for this case. The K Clear appliance was selected in this case based upon the variable thickness

used to achieve different movements in a predictable manner and our experience with it.

A bonded retainer is a must for all adult cases. A 0.175" coaxial wire was used for this purpose and bonded to all incisors individually. Retroclined incisors have a high tendency to relapse, especially when not supported by the mandibular incisors, hence the night time use of a KClear retainer. The settling in this case was excellent and that sometimes is one of the pit falls of treating cases with aligners⁵.





Fig. 1i



Fig. 7a

Conclusion

An appliance that satisfies the aesthetic needs of the patient and also the orthodontic goals of the treating clinician in a short duration should be chosen to treat patients. Customisation is the new thing in orthodontics.

References

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Fig. 7b