Clear aligner therapy: anterior open bite with fraenectomy

Filipe Amante[1]

Orthodontic treatments are often referred to by clinicians as 'a game of patience', as they frequently involve long treatment plans, which can take several months or years to be concluded, during which time subtle changes take place in a gradual, steady but not rapid fashion.

In today's digital world, the immediacy that technology has brought prevails and it's not the easiest of tasks to pass the message on that the best roads are often the longest – especially to a generation seemingly obsessed with Tiktok and clickbait content.

These predicaments have led to an avalanche of requests from patients that see extensive composite bond-ups and fixed prosthesis treatments – such as multiple veneers and invasive crown preparations – as quick fixes and a faster path to the perfect smile that they've dreamed of.

Sometimes, this path leads to a trip abroad, to a sunnier destination with lower cost dental bills, and sadly, more often than not, a recipe for disaster.

Case study

This case report relates to a 39-year-old, healthy, male patient. He attended for a consultation in March 2021 in Watton, Norfolk, reporting that he didn't like his front teeth and avoided smiling in public (Figure 1).

Prior to this consultation, he had been a regular attender at this dental practice for years, with the usual routine and hygienist visits taking place twice a year. His oral hygiene was satisfactory and besides the aforementioned concerns with the appearance of his smile he had no other dental complaints (Figure 2).

Examination

Following a preliminary conversation where medical and dental anamnesis were performed and patient expectations were discussed, a clinical examination followed, including a dental and periodontal assessment, as well as a panoramic X-ray.

The patient seemed to present a satisfactory level of oral hygiene and no obvious dental or periodontal pathology was noted. He did present some heavily restored posterior dentition, but the current restorations were fairly sound. He had lost his first right lower molar some years ago and despite the recommendations, he chose not to have this replaced with a dental implant.

The patient presented with a clear malocclusion that led to no anterior occlusal guidance due to a severe anterior open bite (AOB) with the incisal edges of is upper and lower incisors separated for 6.5mm, which resulted in a dynamic that focused all of his occlusal forces in the posterior dentition.

He also had a large interincisal maxillary fraenum, which was clearly associated to the interincisal maxillary diastema, which was one of his main aesthetic concerns.

Anterior open bite

Anterior open bite malocclusions have been defined by Subtelny and Sakuda (1964) as: 'An open vertical dimension between the incisal edges of the maxillary and

[1] Filipe Amante, LMD MSC
Private Practice,
Together Dental, Norfolk, UK.

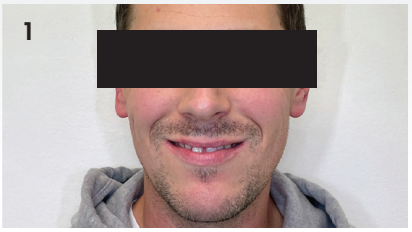


Figure 1: Preoperative, full face.

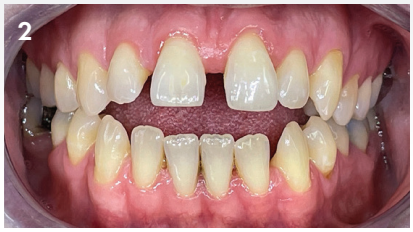


Figure 2: Initial presentation.

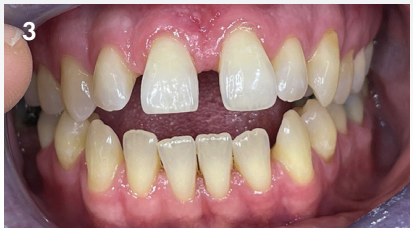


Figure 3: After fraenectomy.

mandibular anterior teeth'.

Furthermore, Mizrahi (1978) described anterior open bite as: 'A vertical discrepancy where upper incisor crowns fail

to overlap the incisal third of the lower incisor crowns when the mandible is brought into full occlusion'.

The cause of an anterior open bite is generally multifactorial and can be due to a combination of skeletal, dental and soft tissue effects. It occurs due to interaction of many causes, which include hereditary and environmental factors.

In this patient's case, he did not mention any present or past parafunctional habits, such as thumb sucking or dummy usage to a later age. However, he did mention that his father and siblings 'had similar teeth', so it was fair so assume that his malocclusion was of hereditary nature.

It is essential for an adequate treating of anterior open bite that the causes of the malocclusions are established, as failing to do this may result in inability to achieve success in correcting the occlusal issue or maintaining the results long term.

Treatment approach

After assessing the clinical data gathered, we recommended the patient have a multidisciplinary treatment approach, including a maxillary label fraenectomy followed by a comprehensive course of orthodontic treatment including fixed and removable retention.

Different orthodontic options were discussed, namely a conventional fixed self-ligating orthodontic approach or alternatively a treatment with clear aligners.

The patient was keen to have his treatment with a clear aligner approach.

An Itero scan was performed, followed by a sequence of intraoral and extraoral clinical photographs, which were forwarded to Invisalign together with a clinical prescription. A Clincheck simulation was subsequently produced. The patient was invited to have a look at this and discuss the expected timeframes and outcomes.

Digital dentistry has revolutionised the ability that clinicians have to communicate orthodontic treatments to their patients.

The possibility of having a sequential video simulation of the progression of the treatment and the individualised predicted movement of each of the patient's teeth is a powerful tool for the clinician with highly motivational value for the patient, particularly before embarking on a journey that may take several months or even years to be concluded.

In this case, the patient was over the moon with the predicted results shown on his Clincheck. The aligners were therefore ordered and within a few weeks the treatment began.

Treatment

Two weeks prior to the commencement of the active orthodontic stage, the maxillary labial fraenectomy was performed uneventfully under local anaesthetic (Figure 3).

As protocolled in our workflow, we start by placing all the attachments and perform all the interproximal reduction required in an initial appointment (Figure 4).

In this case, five maxillary aligners and six mandibular attachments were placed. The patient was meticulously instructed on how to place, remove and clean his aligners. Speech tests were also performed and the patient seemed to tolerate the aligners easily and seemed also quite motivated to follow the instructions given.

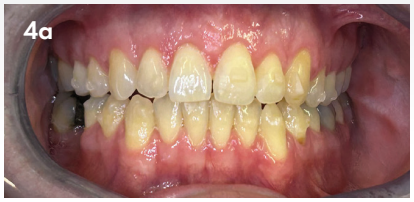
Addressing an anterior open bite with aligners can prove to be quite challenging, particularly because of anchorage issues, and often clinicians opt to use auxiliary techniques such as intermaxillary elastics that can be linked to micro-implants, buttons or even precision cuts on the aligners.

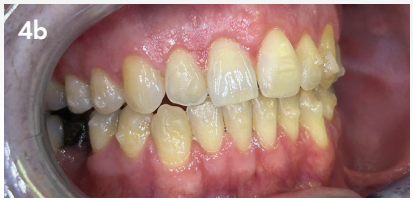
In this particular case, we decided not to use any of these techniques initially, but the patient was warned that, depending on the progression of the orthodontic movement, they could be required.

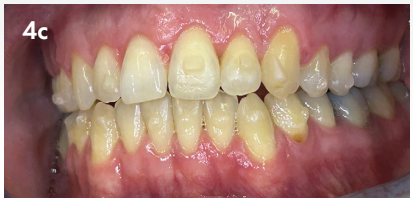
Result

The patient was reviewed every eight weeks for routine appointments and the treatment progressed uneventfully and remained 'on track' (Figure 5).

At the end of the active stage of treatment, which







Figures 4A, 4B and 4C: All the attachments are placed and interproximal reduction performed.

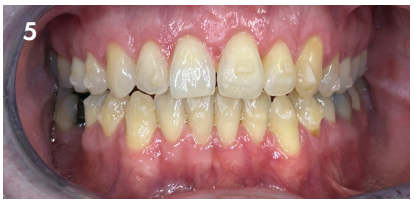


Figure 5: Progression at 10-months.

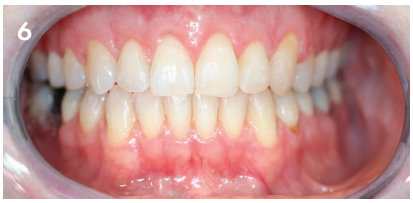


Figure 6: Final result.

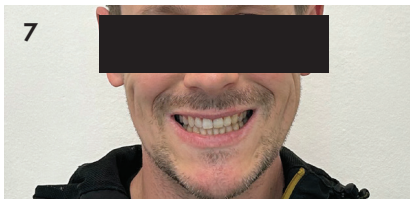


Figure 7: Postoperative, full face.

comprised the usage of 30 aligners followed by eight refinement aligners, the patient was over the moon with the results achieved. The anterior open bite was corrected, and the patient confessed he could not stop smiling!

A fixed upper palatal retainer was subsequently fitted, and the patient was provided with upper and lower Essix retainers that he was advised to use constantly for the first three months and nightly from then onwards.

It is essential to stress the importance of retention following orthodontic treatment, particularly in cases of treatment of anterior open bite malocclusions, and one year on the patient is still using his retainers (Figure 6).

The results are so far stable and the patient is still radiant (Figure 7).

References

Mizrahi E (1978) A review of anterior open bite. Br J Orthod 5(1): 21-7

Subtelny JD, Sakuda M (1964) Open-Bite: Diagnosis and Treatment. American Journal of Orthodontics and Dentofacial Orthopedics 50: 337-358

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