

Simple orthodontic tooth aligner

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تهدف هذه المقالة إلى عرض طريقة بسيطة وسريعة لرصف الأسنان في المنطقة الأمامية من القوس السنية باستعمال صفيحة بايلون القاسية الشفافة بسمك 1 ملم. ومن خلال عرض نتائج معالجة حالتين، يمكن الاستنتاج بأن لهذه الطريقة فعالية في إجراء تحريك بسيط للسن ورصف الأسنان خلال فترة بسيطة.

The aim of this article was to introduce a simple and fast method for creating teeth alignment in the anterior segment of dental arch. Biolon transparent hard plate material of 1 mm thickness was used. The description and the outcome of the two treated cases with Biolon plate are reported in this article. The use of the present method proved to be effective in creating minor tooth movement and teeth alignment in a rather short treatment time.

INTRODUCTION

Dental crowding is the most common anomaly that is associated with the different types of malocclusion. Its degree varies from mild to moderate to severe among affected individuals. The etiology of dental crowding can either be the result of environmental factors such as premature loss of primary dentition and inter-proximal caries or of genetic factors such as small jaw size or large teeth size. Dental crowding is often more disturbing to patients when located in the anterior segment of the dental arch because it often affects the quality of patient's dental smile and may cause social embarrassments to some patients. Although patients often desire an aligned dentition for cosmetic reason, alignment of the dentition can provide additional advantages such as improved function, elimination of traumatic occlusion and permit better access for maintenance of oral hygiene. Among adult patients with mild to moderate crowding in the anterior segment who visit orthodontic practice seeking aligned dentition, many patients often show resistance to wear or re-wear fixed orthodontic appliance. Clinical experience has shown that such patients are willing to

be very cooperative provided that they could avoid wearing fixed orthodontic appliance and provided their treatment time is short. An orthodontic treatment method based on the usage of removable, clear semi-elastic polyurethane aligners known as Invisalign® was introduced since 1997.¹ This aligner is made from a thin, transparent plastic that fits over the buccal, lingual/palatal and occlusal surfaces of the teeth. Conventionally, it is worn for a minimum of 20 hours per day and changed sequentially every two weeks.² Invisalign® has been indicated by its manufacturer for use in adult and adolescent patients who have fully erupted permanent dentition. There seems to be a general agreement that it is not indicated for all types of patients receiving orthodontic treatment.³ Mild to moderate crowding or spacing and non-extraction cases are the best cases treated with Invisalign® method. The average treatment time for patients with mild crowding or spacing in Class I malocclusion treated with Invisalign® is 20 months.⁴

Essix retainer is another removable clear appliance which was used to create minor tooth movement.⁵ It is fabricated from .030 inch Essix plastic sheet, which is reduced to .015 inch during

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thermoforming. Its action is based on cutting window into the Essix appliance for unimpeded tooth movement and the force is generated by divot placed directly in the appliance at specific point.

The aim of this article was to introduce the Biolon plastic invisible retainer as a fast method for teeth alignment. Two clinical cases are presented where treatment of mild to moderate crowding in the anterior dentition was carried out in a short period of time without the use of bands, brackets or wires.

METHOD OF TREATMENT

Two adult patients were treated for teeth alignment in the anterior segment. One had no prior history of orthodontic treatment whilst the other patient had previous orthodontic treatment by conventional fixed orthodontic appliance therapy. The chief complaint of these patients was the alignment of their anterior teeth, and they resisted treatment with fixed orthodontic appliance. They were also very concerned regarding the length of their treatment time.

Alginate impression of the upper and lower dentition was obtained and poured up in dental plaster. Manual repositioning of the anterior teeth in affected jaws was carried out on the cast model and the two jaws were manually articulated and checked for any occlusal interference. A clear removable appliance was constructed for each patient using Biolon* transparent hard plate 1 mm thick. The Biolon material was plastified in a suitable thermoforming unit "Drufomat"*. The temperature that was achieved during processing was 160°-170° C applied for 1 hour and 10 minutes. With the help of the vacuum, the plate was conformed to the dental cast. In order to maintain the transparency, plaster

models was first watered. The Biolon material was trimmed 2-3 mm above the gingival margin of the teeth using hard cutter and grinded using grinding paper with rough grains to avoid heat-generated smearing of the edges.

During each patient's first visit, interproximal dental stripping was carried out among the front six anterior teeth. Each patient was given the instruction to insert the appliance on the dentition applying gentle force directed to the anterior teeth. Once the patient started to feel the pressure on the anterior teeth, further increasing the pressure was stopped. The two patients were given appointments to visit the clinic regularly on weekly bases. During the visits, the level of teeth alignment and the extent of appliance use were monitored and more interproximal dental stripping was carried out if needed (Fig.1). The patients were given the instruction not to bite hard and not to eat while wearing the appliance to avoid any distortion of the appliance. The course of treatment was continued until the appliance completely conformed on the dentition.



Fig. 1. Biolon plate toward its conformed fitting in place following two weeks of treatment.

CASE NO.1 (FIG. 2a-f)

A 21 years old female patient showed crowding mainly in the anterior segment of the upper arch. The upper central incisors exhibited improper axial inclination and the lateral incisors was palatally displaced relative to the central

* Dreve Dentamid GmbH, Germany,
www.dreve.com

incisors. Buccal segment intercuspation was acceptable. A tooth alignment was completed in 4 weeks and bonded fixed retainer was applied for retention.

CASE NO.2 (FIG. 3a-f)

A 24 years old female patient with a chief complaint of anterior crowding in both upper and lower jaws, with the upper central incisors tipped distally and the right lateral incisor tipped labially and the lower central incisors tipped lingually. No history of previous orthodontic

treatment. The treatment was limited only for the upper jaw. Two Bion plates 1 mm thick were used to create alignment and the treatment time for this patient was 8 weeks. After which, bonded fixed retainer was applied for retention.

DISCUSSION

The use of 1 mm Bion material as a fast tooth aligner in the two trial patients proved to be effective in creating teeth alignment in a rather short treatment time. The description and the outcome



Fig. 2a. Pretreatment frontal view



Fig. 2b. Post treatment frontal view



Fig. 2c. Pretreatment lateral view (L)



Fig. 2d. Post treatment lateral view



Fig. 2e. Pretreatment lateral view (R)



Fig. 2f. Post treatment lateral view



Fig. 3a. Pretreatment frontal view



Fig. 3b. Post treatment frontal view



Fig. 3c. Pretreatment lateral view (R)



Fig. 3d. Post treatment lateral view



Fig. 3e. Pretreatment lateral view (L)



Fig. 3f. Post treatment lateral view

of the two treated cases with Biolon plate are reported in this article. The present appliance was able to correct minor sagittal tooth displacement, tooth rotation, and correct tooth axial inclination. The treatment time using this appliance varied between patients from four weeks to a maximum of two months. This depends on the amount of initial teeth irregularities and the patient cooperation in the duration of appliance wear. In one case, the Biolon plate was constructed on the final set up of teeth

alignment on cast model and in another case, teeth set up was carried out in two steps. During teeth set up on dental cast it was important to limit tooth movement to be within a range of 1 mm to allow at least 40 to 50% appliance fitting. After teeth alignment is achieved, the same appliance could be used during bed time as a retainer or a bonded fixed retainer can be constructed and bonded to teeth. One plate was often enough to complete the whole treatment, however, clinical experience showed that the main reason

of constructing another new plate was due to plate distortion caused by the patients applying more force to speed up the treatment. It is therefore advisable to spend some time explaining to the patient how the appliance works and preserve the set up cast model to avoid repeating the process of teeth set up if a new plate is to be needed by the patient.

Adult patients with mild to moderate crowding or with some degree of dental relapses following orthodontic therapy often visit the orthodontic practice demanding better alignment of their dentition. Most of these patients are mainly concerned about the treatment time and often reject wearing and re-wearing the fixed orthodontic appliances. The use of Essix appliance require cutting window for the tooth to be moved and force is generated by creating divot at specific point in the appliance. This makes the appliance more suitable if a single tooth needs to be aligned and tipping movement is more desirable. Invisalign® orthodontic is more accepted to some adult over the conventional fixed orthodontic appliances since it provides them with better appearance and accessibility to maintain better oral hygiene. However, it is still considered an expensive treatment method for some patients and more importantly it takes a longer treatment time to resolve mild to moderate dental crowding.

In this article 1 mm Biolon material has been utilized as a fast orthodontic teeth aligner. The idea of this appliance is based on setting up teeth in their normal position using a template of 1 mm hard Biolon material. As the patient exercises to fit the template over his dentition, the flex memory of Biolon material makes minor tooth movement possible and teeth start to align themselves to their normal position.

It is important to obtain quality impression and cast model following

the teeth set-up process in order to obtain a well fitting appliance. Patients' enthusiasm and extra cooperation in obtaining dental alignment in a short treatment time and without wearing the fixed orthodontic appliance facilitate positive result. To minimize patient's inconvenience which may be due to incomplete fit of the appliance at the early phase of treatment, the patients were instructed to start by wearing the appliance on and off as much as they could at home. This initial regimen allows for the application of an interrupted type of orthodontic force on the maligned teeth. It was found expedient to deliver the appliance to the patient at the weekend days. Gradually as the appliance gained a better fit, instruction was given to the patient to wear the appliance as often as was possible during the day and night time. This introduced more of continuous type of orthodontic force. The patient should be checked regularly on weekly bases. During these visits the appliance is examined and inter dental spaces is checked to be sure that the spaces are enough for teeth alignment, and more inter-proximal stripping is carried out if needed. It is important that the patient does not apply extra force in order to gain better appliance fit and speed up the treatment. Such action will cause unnecessary excessive force on mal-aligned teeth and might cause permanent distortion of the appliance which in return might cause impairment of its own action. Minor tooth movement occurs when there is adequate force and space.

CONCLUSION

The use of 1 mm Biolon material plate as a fast tooth aligner proved to be effective in creating minor tooth movement and teeth alignment in a rather short treatment time and was acceptable by adult patients.

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