

THE USE OF VACCUM FORM RETAINERS FOR RELAPSE CORRECTION

Azrul Hafiz Abdul Aziz¹ and Haslinda Ramli²

^{1,2} Islamic Science University of Malaysia, Faculty of Dentistry, Level 15, Tower B, Persiaran MPAJ, Jalan Pandan Utama, Pandan Indah, 55100, Kuala Lumpur, Malaysia

Corresponding Author Email: afizz80@usim.edu.my

Abstract

This case study was done to show the possibility application of a vacuum form retainer (Essix) as an inexpensive device to correct relapse of space reopen in orthodontics (braces) patient. The modification of the retainer was simple and can be done during chair side consultation in normal dental clinic setting. Bondable molar tubes and orthodontic elastics were also use with the modified vacuum form retainer to close the space between teeth. The treatment was done in minimal time and the end result was satisfactory good. This study will open up a new technique for relapse correction in the near future as vacuum form retention appliance has become more popular among orthodontist and dentist worldwide.

Keywords: Vacuum form retainer, Essix's retainer, relapse, orthodontics, braces,

Introduction

Long-term stability of corrected teeth is the major goal of every orthodontist after orthodontics treatment with fixed appliances (braces). However, there are always probabilities in which the teeth will return back to their original position after orthodontics treatment, which is known as relapse [1]. Relapse could happen due to consequences of periodontal fibres force around teeth. These forces tend to retract teeth

to their pre treatment position [2]. In addition, relapse can also be caused by maturation process, which involved a highly complex and complicated interaction of numerous craniofacial and dental matrices as stated by Sinclair *et.al.* [3]. A long term study by Little *et. al.* has showed that 10 years after the completion of orthodontics treatment, only 30% to 50% of orthodontics patients effectively retain the satisfactory alignment initially obtained [4]. After 20 years, satisfactory alignment reduces to 10% [4]. Therefore, all patients were required to undergo a retention phase by using some type of retainer devices after completing the orthodontics treatment [5].

Almost all orthodontist will agree that the most difficult thing to achieve in orthodontics treatment is to maintain or retain the position of teeth after treatment. As defined by Moyers, retention is “the holding of teeth following orthodontics treatment in the treated position for the period of time necessary for the maintenance of the result [1]. Therefore, several retention devices have been invented to maintain the dentition, arch form and to minimize relapse. As an example, Charles Hawley designed Hawley’s retainer as early as 1919 and the design was widely used until now [6]. Another type of retainer recently develop is a vacuum-formed retainer which is known as Essix’s retainer. It was introduced in 1993 by Sheridan *et.al.* and has become more acceptable due to its low cost and easy fabrication [7]. Both Hawley and Essix’s retainers are removable type of retainer that could be removed by patient during cleaning. Another type of retainer is fixed retainer that consist of small stainless steel wire bonded to the lingual or palatal surface of the teeth.

Vacuum form retainer or Essix’s retainer is the preferred choice among orthodontic patient due to aesthetics and less expensive compared to traditional bonded retainers and other removable retainers. Its design to completely encapsulate the whole teeth and also superior part of the alveolus [8]. Essix’s retainer was also well tolerated by patients [9]. There are several study that compare vacuum form retainer and Hawley’s retainer. These studies shows that Essix’s retainers are more effective at holding the correction of the maxillary and mandibular labial segment contrast to Hawley’s retainer [8,10]. However, patients must have a good oral hygiene to prevent dental caries and demineralisation of teeth from occurs [11].

Relapse cases such as space reopening can be close by many ways. Various orthodontics mechanics can be done but the main concern is the long-term stability and post-treatment maintenance. The mechanics should be simple, cost effective and easy to use. Orthodontist should also explain the advantage and disadvantage of each option and must link it to the long-term outcome.

Objective and aim

The aim of this study is to present a clinical case of 35 years old female patients, which presented with space reopening (relapse) after undergoes orthodontics treatment with fixed appliances (braces). The spaces were closed back with the use of modified vacuum form retainers (Essix) and orthodontics elastics with molar tube attachments.

Methodology

This is a clinical case of 35 years old female patients, which presented with relapse (space reopen on upper and lower arches). She has a Class III incisor relationship on a mild Class III skeletal pattern. Her upper and lower arches were mild crowded with unilateral anterior cross bite on upper left lateral incisor (22). Apart from that, her lower midline was shifted to the right about 3mm. Her treatment plan involved four units extraction, fixed appliances (braces) and retention with vacuum form retainers. The four units extraction involved upper second premolars (15 and 25), lower right second premolar (45) and lower left first premolar (34). This extraction pattern was done to relieved mild crowding and to correct the lower centreline.

Her orthodontic treatment follow normal sequences of upper and lower 014' Nickel Titanium (Niti)arch wires, 016' Niti archwires, 16x22' Nitiarch wires and finish with 17x25' stainless steel (ss)arch wires. A couple of months were needed to correct anterior crossbite with 018' ss arch wire with 012' Niti as "piggy back".

The treatment with fixed appliances (braces) took almost 26 months with few missed appointments. As summary, her treatment started on August 2012 until October 2014. Her occlusion at the end of treatment are perfect Class I incisor, molar and canines relationship with nice midline corrected. She was then fitted with upper and lower vacuum form retainers that need to be wear for 24 hours for one month and then night time after that. However, after several months she noticed some space reopen on the upper and lower posterior teeth. Upon examination, there was 2mm of space between 16-14, 26-24 and 46-44. After discussion with patient, she requested the spaces to be close.

Her upper and lower right first molars (16,26 and 46) were then bonded with molar tubes (Figure 1 and 2) and her vacuum form retainers were cut at upper and lower right first molar areas. Small indentations were made on the vacuum form retainers at the canines region using heated bending appliance.

Patient was then instructed to attach orthodontic rubber elastics (medium force) from the molar tubes to the indentation on the vacuum form retainers for 24 hours a day (Figure 3 and 4).

The upper right and left spaces were closed after a month, but the lower took another few months to close. Her molar tubes were then removed and she was fitted with a new set of retainers.



Figure 1: Upper arch with bondable tubes



Figure 2: Lower arch with bondable tubes



Figure 3: Elastic attached to bondable tube



Figure 4: Elastics attached to bondable tubes

Discussion

There are many methods to close space cause by relapse such as fixed appliances and removable appliances. However, both methods would incur some additional cost to patients. By using patients own retainers and buccal tubes this could offer an alternative and cheap way to treat relapse cases. The most important thing in this treatment is the compliance of the patient. Patient has to be motivated and willing to use elastics as instructed by the clinician. In this case, the patient was advised to wear the elastics on both sides for 24 hours a day except during brushing, eating and contact sport. A continues force from the elastics could retract teeth and close the space.

Conclusion

In summary, orthodontics patient with relapse case of space reopened could be treated with simple modification of vacuum form retainers and molar tubes. Traction of elastics rubber band could deliver continues force to close spaces between the teeth. This could be the cheapest way to treat relapse cases by using patient's own retainers. Moreover, this case has demonstrated the possibilities of vacuum form retainer to treat relapse cases. The modification of vacuum form retainer was easy to make and could be done on the chair side. Patient was happy and the treatment time to close the space was minimal.

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