

A NON-ACRYLIC REMOVABLE CAST RETAINER (AL-BALKHI TYPE)

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لقد عرف (موير) التثبيت في تقويم الأسنان بأنه الإبقاء على الوضع الجديد للأسنان المحركة تقويمياً لمدة كافية حتى تثبت في مكانها الجديد، ولا تعود إلى وضعها القديم، ويعتبر تثبيت الأسنان في وضعها الجديد عنواناً لنجاح المعالجة التقويمية. وأن التثبيت ضرورياً بعد تحريك نشيط للأسنان لتسمح للأنسجة المحيطة بالأسنان وعظم السنخ حول الأسنان المحركة أن تترمم وتعود إلى وضعها الصحي الطبيعي.

وجهاز التثبيت الناجح يسمح بالإبقاء على وضع الأسنان الجديد إضافة إلى أنه يسمح بالوصول إلى توازن في القوى العضلية للحد والشفة واللسان والقوى الإطباقية. إضافة، إلى أن جهاز التثبيت يجب أن يكون مقبولاً من المريض وبأقل تأثير ممكن على الكلام، والمضغ، وصحة الفم والنسج المحيطة بالأسنان ومرحياً.

وإن أجهزة التثبيت يمكن أن تكون مؤقتة مثل الأجهزة الأكريلية المتحركة أو دائمة مثل الجسور الثابتة. الأجهزة المؤقتة صممت لتستخدم لمدة محدودة لتسمح للنسج المحيطة بالأسنان والنسج اللثوية أن تعود إلى وضعها النظامي الطبيعي. وحتى الآن أكثر الأجهزة المؤقتة شيوعاً هي جهاز (هاولي وتعديلاته المختلفة).

جهاز التثبيت الدائم يستطع أو يستخدم عندما لا يمكن أن تتوافق القوى العضلية مع وضع الأسنان الجديد، أو يكون ضغط النسج اللينة على الأسنان مستمراً مما قد يؤدي إلى تكس في المعالجة.

لذلك فإن أجهزة التثبيت الدائمة صممت لتستعمل لمدة غير محدودة وأكثر هذه الأجهزة شيوعاً هي الأسلاك الحنكية أو اللسانية الملصقة على الأسنان والفوس الحنكي الملصق على الأسنان.

أما جهاز التثبيت الجديد والذي أطلق عليه اسم (جهاز البلخي) للتثبيت فهو عبارة عن جهاز متحرك وشبه ثابت في آن واحد، مصنوع من مادة الكروم كوربات قوي، خفيف الوزن، وصغير الحجم، يعمل على الأسنان بواسطة ضغبات كروية، ولا يمس الأنسجة اللينة. يحيط بالأسنان بحيث يمنع تحرك أي منها، يمكن استخدامه لتثبيت أو تحريك الأسنان الأمامية بواسطة قوس دهليرزي قابل للتعديل، هذا بالإضافة إلى غلظ الجهاز من مادة الأكريل ذات التأثيرات السلبية.

Existing retainers are either fixed or removable. Each has its own advantages and disadvantages. An attempt is made to introduce a non-acrylic removable retainer that has the advantages of both removable and fixed retainers, but without inheriting their disadvantages, The "Al-Balkhi type" removable retainer is proposed and described. It could be used either as a temporary or as a permanent removable retainer with more favorable clinical properties. Indications and different possible modificational designs are presented.

Introduction

Retention was defined by Movers¹ as "maintaining newly moved teeth in position long enough to aid in stabilizing their correction". It is considered as a vital part of a complete and a successful orthodontic treatment. It is needed following active movement of teeth to permit reorganization of the periodontium, as well as the alveolar bone, around the teeth back to their normal state of health.²

Received 24/11/91; revised 26/04/92; accepted 5/05/92

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A successful retainer is one which mechanically maintains the position of the teeth. Further, it assists in achieving a balance between the muscular forces of the lips, cheeks or tongue and the forces of occlusion. The retainer should be well tolerated by the patient, with minimal negative effects on speech, mastication, oral hygiene, comfort and the general health of the oral tissues.

There are two classes of orthodontic retainers, fixed or removable. Orthodontic retainers could also be classified as temporary (commonly removable) or permanent (commonly fixed). A temporary retainer is designed for a limited retention period to allow for the reorganization of the gingival and periodontal tissues. So far, the most common

removable retainer is the Hawley retainer,^{3,4} and its many known modifications. A permanent retainer is indicated or used when an equilibrium between the various muscular forces acting on the teeth could not be achieved and the soft tissue pressure is constantly producing a relapse tendency.⁵ Therefore, such a retainer is designed for an indefinite or prolonged retention period. The most commonly used permanent (fixed) orthodontic retainers are: the bonded lingual or palatal wires^{6,12} and the cemented lingual arch wires.¹³

The purpose of this investigation was to introduce a new retainer and compare its clinical performance to the most standard orthodontic retainers; the fixed lingual bonded retainer and the removable Hawley retainer.

Materials and Methods

A new retainer is introduced. It consists of three soldered components; cast chrome cobalt framework that is 1.6-1.8 mm in height (occluso-gingivally), an anterior labial bow that is made of 0.7 mm round hard stainless steel wire, with reverse closing loops bilaterally extending to the buccal eminence of the first bicuspid, and retentive ball clasps [Figs. 1a-c].

The clinical performance of the new retainer was evaluated during a 6-month follow-up in comparison with two of the most standard and commonly used retainers; the removable Hawley retainer and the fixed lingual bonded retainer (Zacchrisson type). Twelve orthodontic cases starting retention phase were divided into three groups. Each group consisted of four patients. Members of the first group were given Hawley retainers, while the second and third groups were given new retainers and fixed lingual bonded retainers, respectively. Sixteen parameters that are of importance to both the patient, as well as the clinician, were clinically and subjectively evaluated. These parameters and the performance of each retainer relative to each parameter are presented in Table 1.

Results

As Table 1 suggests, the new retainer seems to have several advantages when compared to the two standard orthodontic retainers used in comparison. However, the major disadvantages of the



Figure 1a,b,c: "Al-Balkbi" retainer, A: an occlusal view, B: an anterior view, and C: buccal view.

new retainer were its cost and the time-consuming laboratory procedure necessary for its construction.

Discussion

It is well known that the major advantage of a removable retainer is the ability of the patient to perform optimal oral hygiene care. The major disadvantage of such a retainer is the acrylic base plate which is basically thick and bulky. Such bulk affects speech negatively, potentially toxic, irritable and unhygienic upon prolonged wearing. On the other hand, the major disadvantage of a fixed retainer is

Table 1. Subjective and clinical comparisons among Hawley removable, fixed bonded and "Al-Balkhi" type retainers.

	Hawley Removable Retainer	Al-Balkhi Type	Fixed Bonded Retainers
Comfort	—	+	+
Aesthetic	±	+	+
Speech	—	+	+
Mastication	—	+	+
Hygienic	+	+	—
Weight*	±	+	+
Rigidity	+	+	+
Retention	+	+	+
Soft tissue irritability	±	+	—
Caries Risk	+	+	—
Tooth adaptability	±	+	+
Versatility**	±	+	+
Cost	+	—	+
Construction time	+	—	+
Failure of retention material***	+	+	—
Chairside time****	+	+	+

+ Superior (for an average jaw size) - Inferior ± Acceptable

* The weight of the presented appliance relative to a Hawley retainer for an average jaw size was 2.5 grams vs. 5 grams. For the lower arch, it was less than 2 grams.

** Adaptability and comfort.

*** Indicates the frequency of failure of the retentive bonding or cementing material.

**** The presented retainer needs longer laboratory construction time, but not clinical or chair-side time. In bonded fixed retainer, it is (±) since it is technique dependent which may utilize longer or shorter chair-side time.

the close adaptation of the retainer to the teeth at all times resulting in its consolidation to act clinically as a stable dental unit. Such consolidation maintains the position of the dentition even in the presence of unfavorable or unbalanced soft tissue forces. The major disadvantage of a fixed retainer is the difficulty in obtaining optimum interproximal oral hygiene around the retainer. This deficiency may negatively affect the periodontium and the caries status of the individual wearing the fixed retainer.^{5,14}

Taking into account the major positive and negative aspects of the two classes of retainers, it was thought that a combination of a removable well-adapted cast and non-acrylic retainer will be a more favorable appliance to both the patient and the clinician. The new retainer could be used as a

removable orthodontic retainer for patients who could not tolerate the clinical disadvantages of the acrylic base plate of removable appliances. Additionally, it can also be utilized as a removable or semi-permanent retainer for finished orthodontic cases where equilibrium between various muscular forces acting on the teeth could not be achieved. Such cases are a) ortho/perio cases with moderate to advanced periodontal conditions, b) orthodontic cases with excessive spacing in the dental arches, c) orthodontic cases with wide median diastema, d) orthodontic cases with severe crowding and/or maxillary constriction accompanied by muscle hypertonicity, e) post expansion in cleft lip and palate cases, and f) as a space maintainer.

Unlike the non-adjustable (Sarhan type) retainer¹⁵, the new retainer appears to have the advantages of both the removable and fixed retainers.

The appliance can be modified into different possible designs, such as in cleft palate with missing laterals where false teeth could be incorporated [Figs. 2a and b], in ortho/perio cases with no occlusion freedom (grind from the occluso-interproximal



Figure 2a, b: The retainer used in cleft lip and palate cases to hold arch expansion as well as esthetically replace missing laterals. A: an occlusal view, B: an anterior view.



Figure 3a: An occlusal view of the preparations for the clasps,



Figure 4: A mandibular none loops rigid modification.



Figure 3b: The upper and lower dental arches fitted with no occlusal interferences by the clasp wire.



Figure 5. An aesthetic non-labial bow modification

of the bicuspid and molars) [Figs. 3a and b], and as a rigid retainer with no loops also in perio cases [Fig. 4]. In cases where the anterior labial bow is not tolerated by the patient, soldered hooks with night wear elastics could be used [Fig. 5]. Other modifications may involve the use of a conventional anterior labial bow with vertical loops in addition to Adam clasps or other type of clasps for retention,

Summary and Conclusions

This report introduces a new removable cast retainer - "Al-Balkhi type", which appears to have improved clinical properties. Being biocompatible, removable, adjustable, comfortable, well adaptable and non-acrylic seems to make it the retainer of choice for certain orthodontically treated cases.

Long term analysis and further evaluation of the clinical performance of the new retainer is needed so as to confirm the retainer's positive and negative aspects.

Acknowledgment

The author expresses his appreciation and personal gratitude to Professor H. Sheikh, Dr. Omar Sarhan and Mr. Terry Fones for their assistance in assessing the clinical effectiveness of the appliance. Thanks is also due to Miss Cirila Libutaque for typing the manuscript

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