

The Hawlix: a simple and aesthetic prosthetic-orthodontic retainer

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This report introduces the Hawlix, a hybrid thermoformed and cold-cured retainer. It was developed to overcome the limitations that modified Hawley retainers possess when used in patients with bounded saddles, attributable to dental trauma or hypodontia. The Hawlix can be used as an intermediate retainer while a patient is waiting to receive restorative treatment. Some of the advantages of the Hawlix over the modified Hawley retainer include: superior aesthetics, cost-effectiveness, ease of manufacture, adequate resistance to fracture, preservation of a residual ridge, and precise space maintenance. (Aust Orthod J 2016; 32: 229-232)

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Introduction

The retention phase of orthodontic treatment aims to maintain the teeth in their corrected positions at the conclusion of active orthodontic treatment. This is achieved by preventing relapse, defined as 'the return following correction, of features of the original malocclusion.'¹ Although the vacuum-formed retainer (VFR) is a popularly prescribed retainer for most orthodontic patients,² it is not suitable for all. Patients with anterior bounded saddles as a result of traumatic tooth loss or hypodontia are usually prescribed a modified Hawley retainer (Figure 1). When compared with a VFR, a Hawley retainer is less cost-effective and patients report reduced satisfaction with respect to aesthetics and speech.³ These factors may negatively influence compliance with a prescribed retention regimen associated with a modified Hawley retainer.

The Hawlix is a removable prosthetic-orthodontic retainer; a fusion of the Hawley and Essix, the latter described by Sheridan and colleagues.⁴ The Hawlix was developed to satisfy the aesthetic requirements of adolescent patients who completed orthodontic

treatment and required restoration of an absent anterior tooth or teeth. The Hawlix is a hybrid thermoformed and cold-cured retainer that serves dual functions as a prosthetic appliance and an intermediate orthodontic retainer.

The Hawlix is delivered immediately at the end of active orthodontic treatment when fixed appliances are debonded. It is used during the initial retention phase while waiting for the reorganisation of the largely collagen fibres of the periodontal ligament to stabilise before restorative treatment is provided. In this way, the restorative results are expected to be predictable and not prone to failure due to dentoalveolar and periodontal remodelling. Similar to the hybrid VFR,⁵ the Hawlix can also be worn during eating, thus avoiding social embarrassment normally associated with alternative retainers.

Appliance design

The Hawlix is comprised of an acrylic tooth or teeth that restore the bounded saddle(s). The acrylic teeth may be stock or laboratory made. The anterior

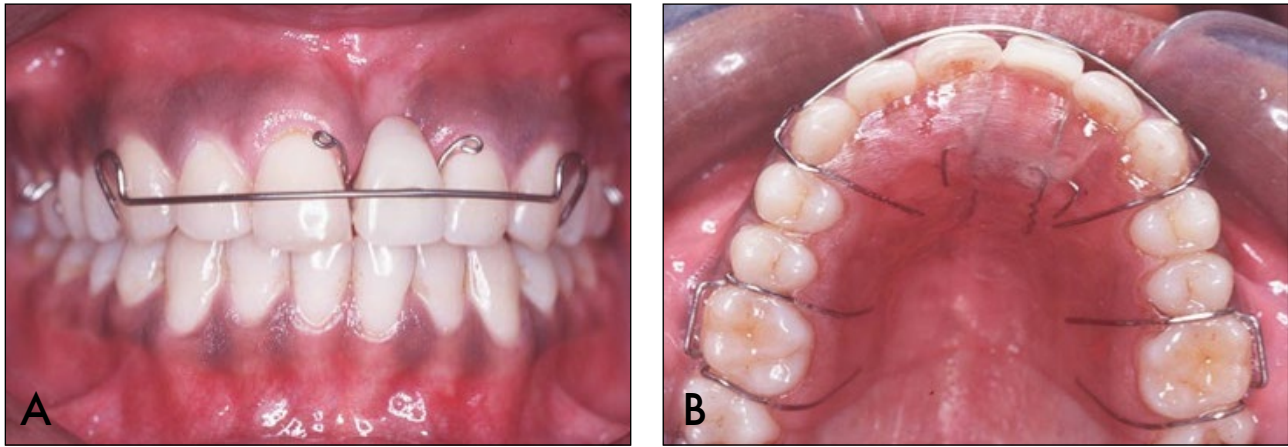


Figure 1. Clinical application of the modified Hawley retainer incorporating a single pontic in a patient with traumatic loss of upper left permanent central incisor. A, frontal view. B, occlusal view.

Essix section is usually identical to the originally described design,⁴ which extends from canine to canine tooth, though can sometimes extend further, and is manufactured from thermoplastic co-polyester material that is either pressure or vacuum formed. The posterior Hawley baseplate section is composed of cold-cure acrylic. Retention posteriorly is achieved through single ball-ended clasps, usually situated between the first and second molars on each side.

Technical aspects

An impression is taken of the arch to create a working model that is used to construct the Hawlix. The model is surveyed and tooth and tissue undercuts are blocked out if developing guide-planes for a path of insertion. Two pre-formed ball-ended clasps are bent conventionally on the model and set aside. The acrylic tooth is adapted into the bounded saddle on the model then waxed up into position with a suitable type of wax that is compatible with thermoforming techniques. A 1 mm thick transparent blank that should be fully compatible with autopolymerising acrylic resins is used for the anterior section of the Hawlix. This is thermoformed over the model with the tooth in position. Pressure forming of the blanks is preferable to vacuum forming as the high pressure and higher temperature associated with the pressure forming process is related to better internal adaptation of the material over the cast, which results in a more precise fit of the appliance.⁶ The adapted labial blank forms the Essix portion of the Hawlix which will act as an 'overdenture' type of shell to which the baseplate will be added. The Essix portion is trimmed on the

working model to fit only the anterior teeth. The acrylic tooth is then cold cured within the Essix using an autopolymerising acrylic resin. The addition of a relief area, which is not visible as it is within the Essix portion, helps avoid direct contact of the appliance with the residual ridge. The ball-ended clasps are reassembled and waxed into position on the model. The posterior margin of the Essix, that will join the acrylic baseplate, is lightly abraded. A baseplate slurry is applied to the posterior margin of the Essix and baseplate acrylic region. In order to ensure that the stone of the model is separated from the acrylic, the model can be soaked in water, or if it has been cast recently, a mould sealant can be used. Subsequently, autopolymerising acrylic resin is applied onto the posterior section of the model, extending over or beyond the posterior margins of the trimmed Essix. The appliance is then cured and prepared for delivery, ensuring there is no contact with the residual ridge.

Clinical application

Figure 2 shows a patient who was fitted with a Hawlix retainer immediately following debonding of his fixed orthodontic appliances; the upper left permanent central incisor was lost due to trauma and details about the treatment were illustrated in a previous publication.⁷ The absence of an anterior labial bow and stainless steel stops approximating the abutment teeth, that are clearly discernible in a modified Hawley (Figure 1), contribute to the superior aesthetics of the Hawlix.

The retention from the Essix portion is effective in providing prosthodontic retention. Posterior retention

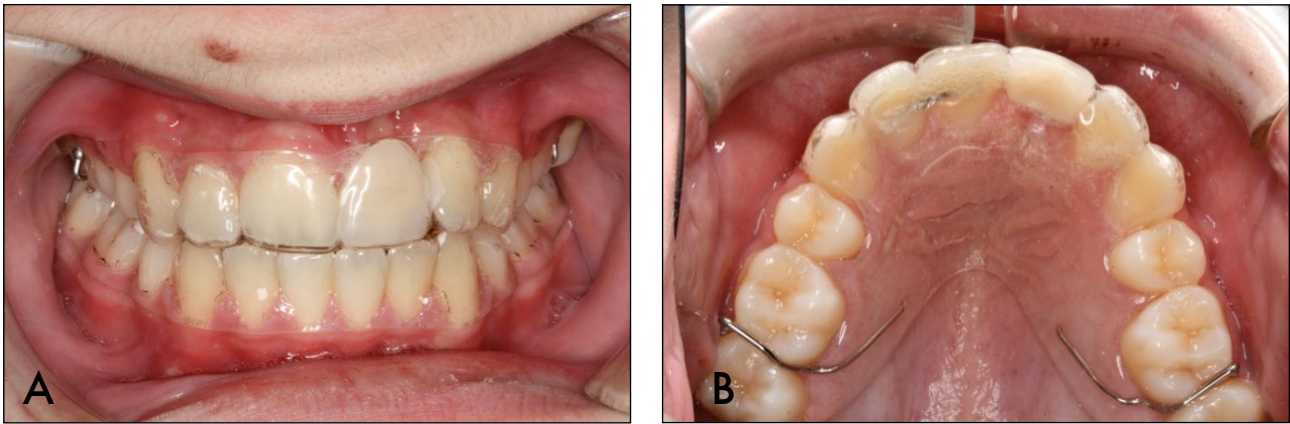


Figure 2. Clinical application of the Hawlix retainer incorporating a single pontic in a different patient who also had traumatic loss of upper left permanent central incisor. A, frontal view. B, occlusal view.

is satisfactorily achieved with ball-ended clasps, avoiding the need for the relatively more complex Adams clasps. The reduced laboratory costs, as well as shorter clinical time for reviews and adjustment, reflect the cost-effectiveness and ease of manufacture of the Hawlix.

The rate of alveolar bone loss, an inevitable and irreversible consequence of tooth loss, is expected to be lower when using a Hawlix compared with the modified Hawley retainer. A modified Hawley retainer may contribute to resorption of the residual ridge as the ridge-lap fabrication is similar to that of an acrylic partial denture in which the anterior pontic(s) make direct contact with the residual ridge during occlusal loading; this may be visualised clinically with soft tissue indentations of the 'necks' of the ridge-lap teeth. Unfavourable occlusal loading of the residual ridge against the base of the denture (ridge-lap pontic) contributes to bone loss.⁸ In contrast, the pontic(s) used in the Hawlix do not contact the residual ridge, and this is checked before the appliance is delivered. Therefore, as there is no pressure loading in the bounded saddle when a Hawlix is used, the rate of resorption attributable to functional factors is expected to be lower compared to that when a modified Hawley is used.

Finally, concern might be raised that the Hawlix could contribute to occlusal disruption, such as the creation of anterior open bites or reduced overbites, attributable to the retainer having occlusal coverage only in the anterior portion. Two prospective studies into the effectiveness of a Hawley versus a VFR^{9,10} found no significant differences in overbite over a six month period of retention. A prospective randomised

controlled clinical trial into the effectiveness of full-time versus part-time wear of VFRs reported that over a six month retention period, occlusal results, including overbite, were maintained effectively.¹¹ From these findings, it may be concluded that regardless of the degree of occlusal coverage and the retention regimen followed, it is unlikely that overbite changes will occur in relation to the use of the appliance in the short term. It is also important to appreciate that the original thickness of the blank used to manufacture the Hawlix retainer is 1 mm. Thinning occurs due to the thermoforming process, resulting in a reduced post-fabrication thickness. Though there are no studies published into the post-fabrication thickness of thermoformed VFRs, one can extrapolate the findings from a recent study investigating post-fabrication thickness of mouthguards which are manufactured using the same technical process.⁶ Tunc and colleagues reported that the prefabrication thickness of a 2 mm thick single-layered mouthguard decreased to 0.91 ± 0.02 mm in the upper right central incisor region; a 57% thinning rate.⁶ Therefore, in the relatively short period that the Hawlix would be used, it is unlikely that the minimal post-fabrication thickness of the Hawlix would introduce vertical changes large enough to result in the formation of anterior open bites or a reduction of an overbite.

Conclusion

The superior aesthetics, cost-effectiveness, ease of manufacture, adequate resistance to fracture, preservation of residual ridge, and precise space maintenance achievable with a Hawlix compared with other retainers, should be considered during the

shared decision-making process between clinicians and patients,^{12,13} when deciding on the type of prosthetic-orthodontic retainer to prescribe.

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