Feature Article

Retainers: A Comparative Guide 🛛 🖬

by Eli Halabi, DMD



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Children's National, he dedicated time to the study of facial growth and development as a member of the Craniofacial Team at the Washington Hospital Center in Washington, D.C. Dr. Halabi is a member of the Omicron Kappa Upsilon honor society. His interpersonal, clinical, and management skills are all cutting-edge. His communication skills are mirrored by the fact that he is able to speak four languages, enabling him to communicate with and treat individuals from various walks of life. Dr. Halabi maintains private practices on Kings Highway in Brooklyn, N.Y. and in Denville, N.J.

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Removable Retainers Hawley Retainer

Named after inventor Dr. Charles Hawley, this retainer is built on an acrylic body that sits on the palate (in the maxillary version) or hugs the lingual aspects of the lower teeth (in its mandibular counterpart). Embedded in the acrylic, the Hawley retainer has a labial wire, or Hawley bow, which incorporates two omega loops for adjustment with three-pronged orthodontic pliers.

Hawley retainers are usually lab-fabricated and have many different designs.

The most common design used for the maxilla is the "circumferential" design (**Figure 1**), in which the labial wire wraps around the entire maxillary arch and is soldered to a



Figure 1: circumferential Hawley retainer.

C-clasp on the upper molars for retention. The advantage of this design is that it touches only the palatal aspect of the teeth (with the acrylic) and the labial aspect of the teeth (with the wire), while the occlusal surface of the teeth is free to erupt. This design allows for post-treatment "settling" of the occlusion. It can be beneficial in cases that have minor posterior open bite due to aligner thickness, as it allows the posterior segment to erupt into "socked-in" occlusion (a final locked-in occlusion with no gaps between the upper and lower teeth in centric occlusion).

The standard lower Hawley (**Figure 2**) has occlusal rests on the lower first molars or Adams clasps for added retention.

In recent years, a more esthetic version of the Hawley has been developed, in which the labial metal wire is replaced with a translucent, highly adaptable, resilient polymer wire called ASTICS® (**Figures 3, 4**). This wire replaces the earlier QCM wire, which was bulkier and had more incidents of breakage. The ASTICS retainer has better esthetics while maintaining the same adjustability and durability as a standard Hawley.

Modified Spring Hawley Retainer

This retainer has the acrylic body of a standard Hawley, but incorporates a flexible spring encased in the acrylic on



Figure 2: lower Hawley retainer.



Figure 3: ASTICS.



Figure 4: ASTICS bow.



Figure 5: modified spring Hawley retainer.

the lingual side of the anterior teeth (**Figure 5**). This provides the flexibility and force needed to correct minor relapse, when it occurs because of a patient's noncompliance with wearing the retainer as directed, or to achieve ideal alignment in cases where full finishing and detailing were not attained during the active phase of treatment.

To summarize, Hawley-type retainers have:

Advantages:

- Adjustability: labial bow can be manipulated to provide minor corrections
- Durability: may last several years with normal wear
- Allows posterior settling of occlusion

Disadvantages:

- Usually lab-fabricated, and may take more time and expense to deliver to the patient
- Poor esthetics (except for ASTICS)
- Speech: may be affected by palatal coverage of maxillary Hawley retainers, if daytime wear is needed

Invisible Thermoplastic Retainers (Essix)

Another removable retainer which is gaining popularity for esthetic reasons is the Essix retainer, made from a clear acrylic wafer, vacuum- or pressure-formed over a model of the arch (**Figures 6, 7**). A further selling point for this type is the clinician's ability to fabricate these retainers in-office using a vacuum "suck-down" machine or a pressure machine like the Drufomat (**Figure 8**) (Dentsply Raintree Essix, Sarasota, Fla.; www.essix.com). (Pressure machines can be used to make nightguards, occlusal splints, bleaching trays, and sports mouthguards in-office, in addition to retainers.)

The esthetic clarity of the Essix retainers makes them ideal in cases that need long-term, full-time retainer wear—such as in patients with congenitally missing lateral incisors. In such a case, the pontic is embedded in the plastic and the retainer is worn until the patient is ready to get the lateral incisor implants.

The durability and adjustability of these retainers depend on the type and thickness of the plastic used. For example, Dentsply offers the Essix Ace plastic, which has an average life of 18 to 24 months and can be adjusted, as advocated by Dr. Keith Hilliard, using Thermoplier pliers to add dimples or "force points" to correct minor relapse. For patients who are heavy bruxers, you may consider the Essix C+ plastic for added durability.

AlignTech, the manufacturer of Invisalign, has its own retention system called Vivera, which uses scans or PVS impressions to fabricate thermoplastic retainers. Align claims these are stronger and more durable than other manufacturers' plastic retainers. A perk of using Vivera is that AlignTech stores a digital file of the patient's dentition, and can fabricate new retainers without taking a new impression or scan.



Figure 6: Essix retainer.

To summarize, invisible thermoplastic retainers have

Advantages:

- Esthetics and clarity
- Good for long-term, daytime retention; does not affect speech
- Easy transition for patients who had CAT (Clear Aligner Therapy)

Disadvantages:

- Durability: average life is only 24 months
- Posterior coverage may not allow settling in cases where full-time wear is prescribed

Tooth Positioners

A tooth positioner (**Figure 9**) is a custom-made, lab-fabricated, resilient silicone mouthpiece that is constructed over a set-up and fabricated in normal hinge-axis relationship (www.tportho. com). It is historically used as a "finishing appliance" to correct minor intra-arch and interarch discrepancies in cases where active treatment has to be stopped early for whatever reason.

The tooth positioner is also considered one of the most effective retention devices ever invented. It has the advantages of producing small amounts of detailed tooth movement and conditioning the gingival tissues. However, long-term compliance with it is problematic because patients consider it bulky and unesthetic, and it interferes with function.

Advantages:

- Ability to stop active treatment earlier
- Ability to close slight spaces and to correct minor rotations and buccolingual discrepancies
- Corrects and relates teeth in both arches simultaneously

Disadvantages:

- Bulky
- Unesthetic
- Cumbersome to wear



Figure 7: Essix+2.



Figure 8: Drufomat.



Figure 9: tooth positioner.



Figure 10: fixed retainer.



Figure 11: Ortho-FlexTech.

Fixed Retainers

With the advent of composites in dentistry, the use of bonded fixed retainers (**Figure 10**) has become more popular, especially in the lower incisor region, the area most prone to post-treatment relapse. One system entails placing a passive, flexible wire that extends canine to canine and fixing the wire to every incisor with flowable composite. An example of such a retainer is the Ortho-FlexTech (**Figure 11**), which comes as a 14K gold or stainless steel chain (Reliance Orthodontic Products, Itasca, III.; www.relianceorthodontics.com).

These retainers maintain tooth position very well. However, a few problems may occur. One is that the composite can break away from a tooth, allowing the tooth to move. For another, hygiene is often a challenge because plaque can accumulate on the retainer and in the closed interproximal surfaces.

These retainers can stay in place for years. Caution should be taken not to rely solely on fixed retainers in cases where expansion of the arch was needed during treatment. In these cases, full-coverage removable retainers are more appropriate in lieu of or in addition to the fixed retainer to retain the posterior arch expansion.

Advantages:

- Retains area most prone to relapse: lower anteriors
- Compliance not an issue
- Esthetic solution
- Can stay in place for many years

Disadvantages:

- Accumulates plaque; hard to maintain excellent hygiene
- Bonding may break without patient's knowledge and teeth can shift
- Does not retain posterior segments
- Upper fixed retainers must be bonded more gingivally to avoid anterior occlusion; this can be challenging in some cases

Understanding postorthodontic relapse, and the different types of retainers available, can certainly help the doctor and patient maintain the excellent orthodontic treatment result they have worked so hard to achieve.



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