



## COMPARISON OF HAWLEY'S RETAINER, ESSIX RETAINER AND MULTISTRANDED CANINE TO CANINE RETAINER- OUR EXPERIENCE

### Surgery

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### ABSTRACT

**Objective:** The aim of our study was to document our experience with the use of Hawley's retainer, Essix retainer and multistranded canine to canine retainer. **Methods:** 68 patients undergoing fixed orthodontic treatment at Punjab Institute of Medical Sciences, Jalandhar from April 2017 to March 2021 were included in this study. 21 patients wore Hawley's retainer (9 males, 12 females), 18 patients wore Essix retainer (8 males, 10 females) and 29 patients had bonded multistranded canine to canine retainer (12 males, 17 females). The mean retention time and follow up was 1 year. **Results:** The results showed that both Essix retainer and multistranded canine to canine retainer were similar in terms of patient acceptance. Compliance and wear patterns were similar for both removable retainers i.e., Hawley's and Essix. **Conclusion:** The retention obtained by all 3 retention methods was similar.

### KEYWORDS

Retention, Relapse, Orthodontic appliance, Retainers.

### INTRODUCTION:

There is a tendency of teeth to return to initial position after completion of active orthodontic treatment and this is known as relapse. The maintaining of newly moved teeth in position, long enough to aid in stabilizing their correction is called retention. There is a plethora of retainers and retention protocols in use, but few of the most common in use these days are 1) Hawley's retainer 2) Essix retainer 3) Multistranded canine to canine fixed retainer. These retainers help in maintaining the arch form and reduce the probability of relapse, though the nature of relapse remains unpredictable<sup>1,5</sup>. The most suitable mode of retention remains controversial in orthodontics, particularly for the lower anterior segment of teeth<sup>6,7</sup>. The Hawley's retainer was designed in 1919 by Charles Hawley<sup>8</sup>. It is a very popular removable retention appliance. Essix retainer was introduced in 1993 by Sheridan et al<sup>9</sup>. It is an aesthetic and comfortable alternative to traditional retention appliances. It has been said that Hawley's retainer is insufficient for anterior teeth because of the fact that the retainer wire has point contact on the labial surface and a mass of acrylic approximating the lingual cervix Sheridan et al<sup>9</sup>.

Continued craniofacial growth, forces acting on the dentition from the orofacial musculature, stretching of periodontal tissues and inadequate occlusal contacts may be the factors causing relapse. These factors may be acting collectively to bring about relapse which occurs to some extent in many patients (Littlewood et al 2006<sup>7</sup>, Joondeph 2011<sup>10</sup>). Investigations with high methodological quality have shown little difference between various retention protocols in the short term<sup>11-13</sup>. Many studies have reported on the failure rate of bonded retainers<sup>14-18</sup> but relapse incidence has been reported by few investigators. Cost effectiveness, occlusal contact pattern, patient satisfaction and articulation of speech has been compared in some studies<sup>11,19-21</sup>. In their review study, Littlewood and colleagues have failed to establish any reliable guidelines regarding the protocols of retention<sup>7</sup>.

### MATERIALS AND METHODS:

This study was conducted during the period April 2017 to March 2021. The types of retainers used were:

1. Hawley's Retainer (Fig 1)
2. Essix retainer (Fig 2)
3. Multistrand canine to canine retainer (Fig 3)



Figure 1



Figure 2



Figure 3

68 patients who had completed Fixed Orthodontic treatment at Punjab Institute of Medical Sciences, Dental Department, were included in this study.

### Inclusion and Exclusion criteria:

- Class I or slight Class II dental and skeletal pattern
- Non extraction treatment plan
- No history of previous orthodontic treatment

Treatment was carried out for all patients with MBT 0.022" straight wire appliance. The mean retention time and follow up was one year.

Post debonding oral prophylaxis was carried out in all patients and alginate impressions were poured to obtain maxillary and mandibular models. Hawley's retainer included a canine-to-canine labial bow and Adam's clasp on both the first molars with acrylic on the lingual aspect. Essix retainer was fabricated in 1.5mm sheet according to the manufacturer's instructions. Both were delivered by the next day. Canine to canine retention was carried out chairside by the orthodontist with multistranded retainer wire and flowable composite.

Hawley's retainer was used in 21 patients out of which 12 were female patients and 9 male patients (Table 1). Essix retainer was used in 18 patients out of which 10 were females (Table 2). The most commonly used retainer was multistrand canine to canine fixed retainer, which was used in 29 patients, including 17 females (Table 3).

Table 1

Age group in years	No. of male patients	No. of female patients
11-20	6 (8%)	8 (11%)

21-30	3 (4%)	4 (5%)
31-40	-	-

**Table 2**

Age group in years	No. of male patients	No. of female patients
11-20	1 (1.4%)	2 (3%)
21-30	2 (3%)	6 (8%)
31-40	5 (7%)	2 (3%)

**Table 3**

Age group in years	No. of male patients	No. of female patients
11-20	2 (3%)	5 (7%)
21-30	6 (8%)	8 (11%)
31-40	4 (5%)	4 (5%)

**RESULTS:**

In the current study, a total of 68 patients were studied with regard to the retention method used post fixed orthodontic treatment at Punjab Institute of Medical Sciences between April 2027 and March 2021. There were 29 males and 39 females in the study. According to age distribution, there were 24 patients (35%) in the age group of 11-20, 29 (43%) patients in the age group of 21-30 and 15 patients (22%) in the age group of 31-40.

The patients were studied along the following parameters:

- Breakage/ loss of appliance
- Patient acceptance
- Compliance
- Infection
- Successful completion of retention protocol

**Breakage/loss of appliance**

Out of the 21 patients using Hawley's retainer, 2 patients lost the appliance and 1 patient broke the labial bow of the appliance. All the 3 appliances were made again and given to the patient. In the patients using Essix retainer (18), 3 patients lost their appliance. Although no breakage was reported, 1 patient wore out the appliance before completion of the retention time of one year due to clenching. All the appliances were replaced.

Out of the 29 patients with bonded multistranded canine to canine retainer, 4 patients broke the wire from a single tooth, whereas 2 patients reported back with the entire wire debonded and missing.

**Patient acceptance**

Patient acceptance was best with the multistranded canine to canine retainer, followed by Essix retainer. Patients usually took 3 days to 1 week to accept the Hawley's retainer.

**Compliance**

The compliance of the patient was directly related to the comfort and aesthetics of the appliances. The multistranded canine to canine retainer had the maximum compliance. None of the patients had any major problem with the retainer for the study period.

Essix retainer also showed good compliance. The only issue was the number of hours the retainer was worn. In the initial months it was worn for an average of 20 hours per day which dropped to 8 hours daily wear by the end of 1 year. Compliance was least with the Hawley's retainer, both in terms of number of hours worn per day and the total time the retainer was used.

**Infection**

All the three types of retainers showed very good infection control with adequate oral hygiene measures. Of the 68 patients in the study, only 1 patient developed inflammation of the palatal mucosa with Hawley's retainer. 1 patient with multistranded canine to canine fixed retainer had heavy calculus deposits between the retainer wire and the gingiva. Both the patients performed better with oral prophylaxis and oral hygiene instructions.

**Successful completion of retention protocol**

The retention time was 1 year for all the patients. This protocol was successfully completed by all the 68 patients in the study.

**DISCUSSION**

For orthodontic retainers, stability and patient compliance remain the most important factors. The choice of retainers depends upon several factors, such as severe rotations, periodontal involvement, initial

spacing and the inclination of the lower labial segment<sup>15/22/23</sup>. However, due to the lack of an evidence-based retention protocol, the retention strategy is still based on operator preference and experience.

Retention remains very essential, since it has been found that retention decreases the total amount of relapse after orthodontic tooth movement<sup>24</sup>. Significant change in alignment during retention has been found by Artun et al<sup>25</sup> but in the study, the number of cases in which relapse occurred has not been specified. In many surveys, it has been seen that bonded retainers remain the most popular retention appliance in the mandible<sup>26-30</sup>. One reason for this seems to be the increased convenience and compliance with bonded retainers, especially in adults<sup>23/31</sup>.

No significant difference has been found after comparing different fixed and removable protocols<sup>7/25</sup>. For retention, success seems to be related with the degree of communication and cooperation with the patient<sup>32</sup>. Continuous evaluation of the patient during active treatment as well as patient feedback help the operator decide the appropriate retention modality at the end of treatment.

Sauget et al found Hawley's retainer still used frequently, especially in the upper arch<sup>21</sup>. This aided in settling the occlusion, resulting in an optimal functional retention of the entire arch. It is particularly effective when wire components were not crossing occlusally. In addition, these appliances were found to be very durable. High degree of cooperation and consistency from the patient is required regarding maintenance and application in cases of removable devices<sup>33-34</sup>.

A study was carried out by Lindauer and Shroff comparing Hawley's retainer and Essix retainer<sup>35</sup>. They found the Essix retainer to be as effective as the Hawley's retainer in maintaining the orthodontic results. The Essix retainer did not lead to the appearance of anterior open bite in any subject in the study. Rowland et al<sup>11</sup> also compared Hawley's retainer and Essix retainer in a single center Randomized Controlled Trial. The results of their study showed Vacuum Formed retainers to be more effective, especially in the lower anterior region.

Hichens et al<sup>36</sup> reported patients as being more satisfied with the Vacuum formed retainers than Hawley's retainer. The transparent and clear nature of these retainers lead to more acceptance among patients. The acrylic and wire components of the Hawley's appliance can conversely cause problems of speech, aesthetics and comfort among patients. This difference in aesthetics and comfort also contributed to more cooperation in the Essix group.

Mandibular canine to canine fixed retention is one of the most popular retention regimes these days. Composite bond failure is the prime challenge with these retainers, due to differing topography of the incisor lingual surfaces<sup>37-39</sup>.

Although fixed retention seems to be more effective than removable retainers in maintaining lower incisor stability in the first six months, there seems to be no statistically significant difference at the end of the retention period. The studies by Littlewood et al<sup>40</sup> and Attack et al<sup>41</sup> also found no statistical difference in the retention of bonded retainers and vacuum formed retainers.

The time of wear of retainers in the present study was 1 year, which was in concordance with other studies also<sup>13/42-44</sup>. However, there is no consensus regarding the number of hours per day of retainer wear or how long post treatment retainers should be continued. Opinions seem to vary from full time wear to only night time wear and from 1 year retention to lifetime retention.

Thus, there is insufficient evidence to warrant the use of any one retention regime in all patients. Clinically, the decision regarding retention depends upon the initial malocclusion, cost benefit ratio, operator preference and patient compliance.

**CONCLUSION:**

Stressing the need for retainers is of utmost importance in all orthodontic patients. The type of retention should be case specific for each patient. Both fixed and removable retainers can be effective in maintaining the orthodontic results. Good communication and post retention follow up is essential for success.

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