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Review Article

Retainer in different malocclusion: A review

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ABSTRACT

Objective: The purpose of this review article is to discuss the different type of retainers used to stabilize the treatment outcome in different malocclusions. Strategic and through search of the literature from different databases was undertaken using free text and MESH terms.

Result: Extensive study of the literature suggests that the duration and type of retention varies for different malocclusion and should be planned at the start of orthodontic treatment, as it plays important role in stabilizing the treatment outcome.

Conclusion: Irrespective of the type of appliance used for retention, the patient should be informed and prepared for the long term or indefinite use of retainers and its role in maintaining the treatment results.

1. Introduction

In orthodontics, once the fixed appliances are removed, the patient may believe that treatment has finished, but there is still a significant amount of work to be done. Because preserving the corrected tooth position and occlusal connections is still a problem, if excellent long-term results are desired, the appliance should be withdrawn gradually rather than abruptly. As a result, the final stage of orthodontic treatment is retention, which involves keeping the teeth in the position that they have obtained as a result of orthodontic treatment. To avoid orthodontic recurrence, the right diagnosis, treatment, and retention for the case must be planned at the start of therapy. Unfortunately, patient compliance drops significantly when a permanent equipment is removed, and poor compliance with retention appliances can commonly jeopardise treatment results.[1]

When retention appliances were not employed after orthodontic tooth movement, an experimental investigation found considerable degradation in corrected tooth rotations, lower incisor alignment, and overjet after just four weeks.[2] Retainers are thus a necessary aspect of orthodontic therapy in the vast majority of situations. There is no indication that the retention protocol for teenage and adult patients differs, as long as the periodontal supporting tissues are intact.

Post-retention outcomes in adults have been proven to be stable at the same level as those in adolescents in terms of midline, incisor alignment, overjet, overbite, and molar relationship.[3,4]

Various malocclusions, such as anterior and posterior crossbites, require minimal retention after obtaining excellent intercuspation.[5]

1.1. Type of retention

Not every case requires same duration of retention, on the basis of this retention period varies as-

1. Limited retention.
2. Moderate retention.
3. Permanent or semi permanent retention.

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1.2. Type of retainers

1.2.1. Removable

As the name suggests, they can be removed by patients to maintain the oral hygiene and wear them on a part time basis as indicated. These include Hawley's, begg type and Vacuum formed retainer.[1]

1.3. Fixed

In situations where 24-hour retention is essential to limit the risk of relapse, a set retainer is frequently required. Smooth wire, flexible spiral/multi-strand wire are examples of these.

The type of retainer used, as well as the length of time it is worn, are crucial factors in attaining long-term therapeutic benefits. Because each malocclusion necessitates a distinct retention strategy, the following examination encapsulates the type and duration of retention for various malocclusions.[1]

2. Class II (Growing /Nongrowing)

Relapse in case of class II relationship results from combination of tooth movement (forward in the upper arch, backward in the lower arch or both) and the differential growth of the maxilla relative to the mandible.[6]

Position of lower incisors plays important role in stabilizing the treatment outcome, if the lower incisors are positioned forward by more than 2mm permanent retention will be required.[7]

So, relapse tendency can be controlled by:[6]

1. Use of headgear.
2. Use of Functional appliance such as activator-bionator type.
3. In the growing age -at the end of active treatment, the use of either headgear or functional appliance will be needed as a retainer.

3. Class III malocclusion

Early corrected Class III relapse is highly common, and such growth is extremely difficult to manage. As a result, after treatment, retention is required to properly direct the development; if not, surgical correction after the growth has manifested may be the cure. A functional appliance or a positioner may be sufficient to maintain occlusal connections throughout posttreatment growth in mild Class III issues.[6,8]

3.1. Midline diastema

Relapse is most common in these cases, thus the best retainer for this is a bonded length of flexible wire shaped to lie near the cingulum to keep it out of the occlusal contact. The retainer's goal is to keep the teeth together while also enabling them to move independently during function.[6,9,10]

3.2. Crowding (Lower Incisor Alignment)

Because the lower arch serves as a pattern for the maxillary arch, a retainer in the lower incisor region is required until growth has slowed to adult levels.[11] Because maintaining adequate mandibular anterior alignment is less than 30% of the time, and approximately 20% of the cases are expected to display noticeable crowding many years after retainers are removed, these instances require full-time fixed retention.[12]

3.3. Severe rotations

Overcorrection of rotations is the first line of defence in such a situation. Otherwise, fibrotomy of supra-alveolar fibres that are stretched during rotational correction is preferable.[13] A considerable reduction in relapse in the fibrotomy group compared to the control group up to 30 days after appliance removal (0.42 degrees and 5.75 degrees, respectively) shows that the surgery might be explored for overcoming rotational relapse.[14] Early treatment of over-rotation and long-term retention using a flexible wire fixed retainer affixed to the buccal surface of the teeth and correct contouring of contact sites lowers the risk of relapse.

3.4. Deepbite

Overeruption of the maxillary incisors, mandibular incisors, or both can produce deep bites. It is most frequently encountered in Class II division 2 instances. It should be controlled with adequate retention once it has been rectified, as it is more likely to reoccur.[15] Retention is performed with the use of a removable maxillary retainer with a bite plate, which allows the lower incisors and cuspids to contact the plate as the bite deepens. With the use of an appliance, the posterior teeth should not disocclude. Because vertical growth continues throughout late adolescence, causing relapse, retainers should be worn at night until late adolescence or early adolescence to preserve occlusal stability.[16,17]

3.5. Openbite

The cause of open bite malocclusion might be either dental or skeletal. Thumb- or finger-sucking habits, as well as improper tongue posture, can promote incisor depression, leading to dental open bite. In skeletal open bite, the incisors are in normal place, but the posterior teeth have extended.[16] As a result, to control the relapse into anterior open bite situations, which can be caused by a combination of incisor depression and molar elongation. Controlling the eruption of the upper molars is essential for long-term retention.

One efficient technique to manage open bite relapse is to employ highpulll headgear on the upper molars in conjunction with a standard removable retainer to maintain

tooth position. An device with biting blocks between the posterior teeth, which stretches the soft tissues and provides a force opposing eruption, is another option. If severe open bite correction does not begin in the mixed dentition, it will almost certainly necessitate orthognathic surgery in late adolescence or adulthood. If relapse is to be avoided, an open bite must be carefully recognised and treated.[18,19]

3.6. Expansion cases

Because there isn't much data about the long-term stability of maxillary expansion, it's important to keep in mind the dentition's limitations when expanding in either arch.[20,21] To provide the patient the best chance of long-term stability, growth in the maxillary arch should only result in modest extension in the lower arch. Because of the tooth crown buccal inclination, which is frequently a result of tooth-supported expanders, some authors propose overcorrection of the posterior cross bite.[22–25] There is some data to suggest that six months of permanent or removable appliance retention is sufficient to prevent relapse or guarantee minimal alterations in a short-term follow-up.[26]

3.7. Habits

Oral habits should be eradicated as much as possible before beginning mechanotherapy. Many malocclusions are caused by a neuromuscular system imbalance, which can include habit. Although the significance of tongue pushing in the aetiology of malocclusion is still debated, it is assumed that the maintenance of detrimental behaviours like tongue interposition or thumb sucking contribute to the relapse of orthodontic therapy.

Retainers come in a variety of shapes and sizes, but these appliances only keep teeth in their corrected positions. They don't include anything to prevent previously corrected habits from reappearing after orthodontic treatment. Long-term retention was planned after successful completion of therapy since these cases may relapse due to resumption of the tongue thrust habit.[27–29] A new modified essix retainer might be planned as a retainer when treatment is completed.[30]

3.8. Retainers as space maintainers

Maintaining room in the anterior region for erupting teeth or eventual implant implantation following orthodontic therapy. Pontic is used to do this, and it is held in place with the use of a fixed bondable retainer put lingually to keep pontic in place until the therapy is completed. As a result, the space and aesthetics are preserved for the time being.[31]

4. Conclusion

Retention is not a distinct problem or phase of orthodontic treatment, but it is and will continue to be a factor in diagnostic and treatment planning. "Retention is one of the most challenging difficulties in orthodontia; in fact, it is the problem," Oppenheim said.[32] It can be quite difficult to keep teeth in their corrected placements after orthodontic treatment. Because relapse is unexpected, it's safe to assume that every patient will have long-term alterations.[33] The odds of relapse can be reduced with the use of an appropriate retainer and retention regimen.

5. Conflict of Interest

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