

Retention of Orthodontic Treated Cases

ORTHODONTIC RETENTION

Retention is the phase of orthodontic treatment which maintains the teeth in their orthodontically corrected positions following the cessation of active orthodontic tooth movement. Orthodontic retainers resist the tendency of teeth to return to their pre-treatment positions under the influence of periodontal, occlusal and soft tissue forces, and continuing dentofacial growth.

Retention is advisable for almost all treated malocclusions.

A recent survey carried out in the UK found that the most commonly used retention period was 12 months. This approach is supported by scientific studies but a need for further specific studies has been identified. Individual patient factors can often modify the length of the retention phase.

Lower incisor alignment

Increases in lower incisor irregularity occur throughout life in a large proportion of patients following orthodontic treatment and also in untreated subjects. Recent evidence suggests that most change will take place by the middle of the third decade. It has been suggested that prolonged retention of the lower labial segment until the end of facial growth may reduce the severity of lower incisor crowding.

If an individual is unwilling to accept any deterioration in lower incisor alignment following orthodontic treatment then permanent fixed or removable retention may have to be considered.

Correction of deep overbite

Following the correction of a very deep overbite, the use of an anterior biteplane until the completion of facial growth has been recommended.

Periodontal disease

In patients with previously treated severe periodontal disease, *permanent retention* is advised. For those with minimum to moderate disease, a more routine retention protocol can be used.

There is evidence of an increased risk of deterioration of lower incisor alignment post-retention in cases with root resorption or crestal bone loss. These cases may therefore benefit from prolonged retention.

Growth modification treatment

Following the use of headgear or functional appliances, retention using a modified activator appliance has been reported as effective in maintaining Class II correction.

Correction of posterior and anterior crossbites

When the incisor overbite and posterior intercuspation are adequate for maintaining the correction, no retention is necessary.

Adult Patients

When the periodontal supporting tissues are normal and no occlusal settling is required, there is no evidence to support any changes in retention protocol for adult patients compared with adolescent patients.

Spaced dentitions

Permanent retention has been recommended following orthodontic treatment to close generalised spacing or a midline diastema in an otherwise normal occlusion.

RETAINER DESIGNS

Removable retainers with a labial bow (Hawley and Begg type retainers)

These retainers are robust and can be worn during eating. Hawley retainers have been shown to have the advantage of facilitating posterior occlusal settling in the initial three months of retention. The labial bow can be used to accomplish simple tooth movements if required, and an anterior biteplane can easily be incorporated for retention of a corrected deep overbite. A retention regime with Hawley retainers of 6 months full time wear followed by 6 months nights only has been recommended.

Removable vacuum formed retainers

Vacuum formed retainers (VFRs) are discreet and can be modified to produce tooth movements if required. Full posterior occlusal coverage (including second molars if present) is advisable in order to reduce the risk of overeruption of these teeth during retention. There is evidence that they are preferred by patients compared with Hawley retainers.

One study has shown that VFRs were significantly less likely to allow posterior occlusal settling than Hawley retainers. This needs to be considered in some cases.

A recent prospective randomised clinical trial showed that VFRs were significantly more effective than Hawley retainers at maintaining the alignment of the labial segments. Although the mean differences in irregularity between groups were small.

Fixed bonded retainers (Smooth wire, Flexible spiral wire)

Fixed retainers are indicated for long-term retention of the labial segments, particularly when there is reduced periodontal support, and for retention of a midline diastema. Fixed retainers are discreet and reduce the demands on patient compliance. However, they are associated with failure rates of up to 47%, particularly on upper incisors when there is a deep overbite. In addition, calculus and plaque deposition is greater than with removable retainers. Fixed retainers, therefore, require long-term maintenance and excellent oral hygiene.

EXPLANATORY NOTES

Deterioration in lower incisor alignment during the second, third and fourth decades of life has been reported in multiple studies of normal subjects as well as in subjects who have undergone previous orthodontic treatment followed by retention. Such changes in lower labial segment alignment are now recognised to be a **normal** rather than an exceptional occurrence. It continues throughout life, although it is reported that the greatest changes in untreated occlusions occur before the age of 18 years.

The use of prolonged retention of the lower labial segment has been suggested to be effective in reducing the severity of lower incisor crowding following treatment. Reported results using an average period of 8.4 years with a fixed lower lingual retainer were more favourable than other studies using shorter retention times.

The pattern of rotational tooth displacements in a malocclusion has a strong tendency to repeat itself when post-treatment changes occur. Most relapse in rotations occurred within 4-6 years of appliance removal in one study.

Opinions differ about the amount of stable proclination of the lower incisors that can be achieved during orthodontic treatment. Mills found that the average amount of stable proclination of the lower incisors following orthodontic treatment was 1-2 mm. Houston and Edler reported that when the antero-posterior position of the lower incisors was changed during treatment, in the majority of cases the lower incisors returned towards their pre-treatment position after retention.

The stability of anterior open bite correction is unpredictable, with one study reporting that more than one third of cases relapsed to more than 3mm anterior open bite when examined a minimum of nine years following retention. No predictors of relapse could be identified.

Post-retention treatment results in adults with similar retention protocols have been shown to be at least as stable as those in adolescents with regard to all clinically relevant factors including midline alignment, overjet, overbite, molar relationship and incisor alignment although deterioration in lower incisor alignment is much less marked after age 21.

References to the published scientific evidence can be supplied on request.

We should be most grateful for the feedback if you could complete the website questionnaire