Maintaining Orthodontic Success: Retention for the Adult Patient

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Stability has always been a prime objective of orthodontic treatment. Relapse in orthodontics may occur in the transverse, sagittal, and vertical dimensions, or there may be rotational relapse. Developmental changes, such as mandibular terminal growth rotation adaptations in post adolescence, resulting in mandibular incisor crowding, occur with aging and must not be confused with "relapse" associated with orthodontic treatment. The lack of stability may compromise ideal function and esthetics. This concern for stability is intensified in the adult patient, because longitudinal evaluation of early orthodontic treatment has shown more stable long-term results. Retention in the adult patient is an ongoing process. The retention dilemma is different in a patient where an existing malocclusion over 30 to 40 years has been corrected in 18 to 24 months compared to that of a growing patient whose treatment to correct the malocclusion has been started in the transitional dentition.

The realignment of long-standing malposed teeth that are corrected over a 1- or 2-year period requires the continuous attention of the orthodontist and of the patient's general dentist and hygienist. There are many biologic factors that must be considered in establishing and maintaining an ideal occlusion. Once the orthodontist achieves normal relations of the teeth and harmonious arch form, he or she must be aware that stabilization and guidance are an ongoing process. The elastic memory of the displaced and disoriented supra-alveolar connective tissue fibers, the transseptal fibers, and the principal periodontal fibers requires different periods of time to reorganize and stabilize. This is more pronounced in the adult.

The first step in establishing a stable occlusion is over-correction in all aspects of the original condition with the anticipation of readjustment of the dentition as neuromuscular function exerts its influence over time. The most difficult cases to retain are those with unfinished results. The forces of occlusion in an unfinished case with improper contacts and inclinations will tend to return toward its original position. Relapse is predictable if the causes of the malocclusion are not removed and a Class I normal occlusion is not achieved.

The first logical approach to developing a plan for stabilization is to review the original casts of the malocclusion. There is a plethora of techniques and appliances that may be used, but they must be individualized to the needs of the patient.

Two commonly used techniques to reduce relapse during the post-retention period are circumferential supracrestal fibrotomy (CSF) and reproximation (interproximal stripping). The health of the periodontal tissues must be evaluated before initiating these procedures to prevent periodontal sequelae.
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![Intra-oral occlusal photograph of the mandibular arch of an adult female patient displaying recurrent anterior crowding with initial placement of a removable mandibular spring aligner.](image)

The relapse of orthodontically rotated teeth is primarily due to the displaced supra-alveolar connective tissue fibers. To enhance success, rotations should be overcorrected and maintained in the corrected position for at least 6 months before the removal of orthodontic appliances. This allows sufficient time for reorientation of the principal fibers. Reorientation of displaced supra-alveolar fibers takes much longer. Here CSF is usually performed after the removal of fixed orthodontic appliances and the restoration of health to the gingival tissues.

**RECURRENT CROWDING**

Reproximation (interproximal stripping) is performed primarily when recurrent mesiodistal crowding of the mandibular anterior dentition occurs. This crowding is particularly common with lateral incisors that are wide mesiodistally. This procedure has a long history, and its clinical application was made less empirical and more predictable by studies that showed that a relation exists between mandibular incisor shape and the presence and/or absence of mandibular incisor crowding. Reproximation should be performed cautiously and judiciously, and spring aligners are usually used in conjunction with this procedure (Figure 1).

A choice of fixed or removable retainers for the adult patient must be made. Removable retainers generally lack patient compliance and fixed retainers are used more often in the mandibular arch. Dentists are frequently asked how long the patient will have to wear a fixed lingual retainer. Some patients require these retainers indefinitely. There are many types of fixed lingual retainers for the maxillary and mandibular arch: molar-to-molar retention bar to maintain crossbite corrections, mandibular premolar-to-premolar, canine-to-canine, and incisor lingual fixed retainers (Figures 2 and 3).

There is an abundant assortment of removable appliances available to the clinician, ranging from traditional maxillary/mandibular Hawley retainers to various maxillary/mandibular spring aligners, positioners and modified Crozat appliances (Figures 4 and 5). At times a head gear or lip bumper may be indicated for retention. The frequency or duration of use of removable appliances is determined by the orthodontist and the patient. Usually removable appliances are worn continuously and immediately after removal of fixed appliances. As the occlusion stabilizes, removable appliances may be worn at night only. The frequency of wear is then regulated by the patient's determination of fit as his/her wear is decreased. If there is no tightness of fit, and contact areas between the teeth, especially
Figure 2. A, Intra-oral frontal photograph of an adult male patient displaying a large diastema and incisal fractures. B, Intra-oral frontal photograph of the patient after orthodontic treatment during retention and before final anterior restorations. C, Intra-oral occlusal photograph of a bonded fixed lingual retainer for the maxillary central incisors.

the mandibular incisors, are not excessively tight, then the patient may gradually reduce the wear and dependency on the appliance.

**Retention is Forever**

The relationship shared by the restorative dentist, orthodontist, hygienist, and patient is a dynamic one. With the termination of active orthodontic therapy a new phase of retention and maintenance begins. Primary care is reinstated by the restorative dentist and hygienist, and they become active in monitoring the occlusal stability of the patient. Active cooperative communication between the orthodontist and restorative dentist must
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When the prosthodontist or restorative dentist completes a complicated rehabilitation of a mutilated dentition, his or her responsibilities and the patient's responsibility of maintenance do not end with the final restoration; likewise, the orthodontist's responsibility after completing a complex orthodontic case does not end at de-banding or placement of retainers. There has to be follow-up and maintenance of these patients. After active orthodontic treatment is completed, there has to be communication between the orthodontist, general dentist, periodontist, and hygienist to maintain a stable occlusion and healthy supporting tissues. Adult treatment requires a multidisciplinary approach.

For most adult patients the initial treatment is orthodontic, with the final ideal restoration to be completed by the restorative dentist. These patients should be managed with retainers for a minimum of 6 months before restorations, such as porcelain laminates, are placed on the maxillary anterior teeth. Retention should be discussed and coordinated between the orthodontist and restorative dentist. Many times, interim retention appliances are used, such as vacuum-formed matrices, splinted resin provisional crowns, lingual composite resin splinting, or orthodontic splinted lingual wire retention. A case-by-case evaluation must be made.

Figure 4. Intra-oral occlusal photograph of the maxillary arch of an adult female with a removable modified spring aligner.

When final restorations are completed, a new retainer is required. All this should be discussed with the patient and the restorative dentist prior to commencing orthodontic therapy.

Figure 5. Intra-oral occlusal photograph of the maxillary arch of an adult female with a removable spring aligner.
REFERENCES


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