

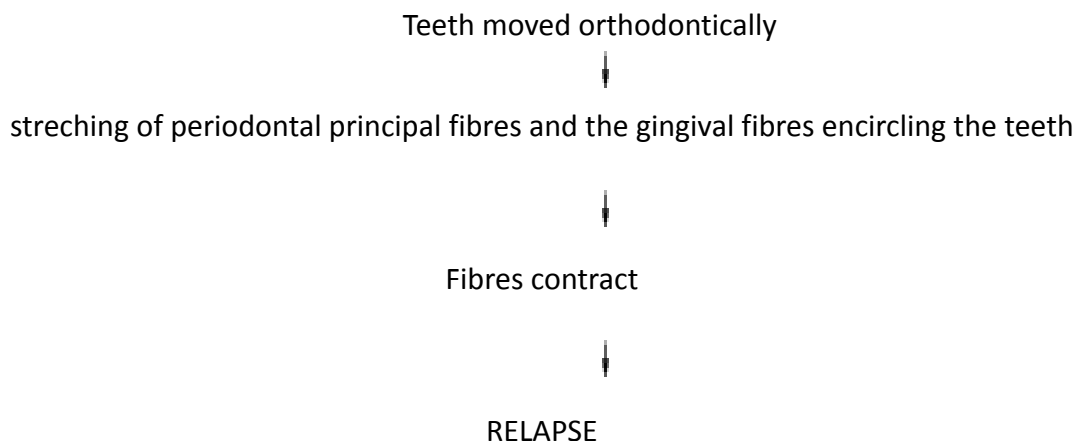
Relapse

Definition: It has been defined as the loss of any correction achieved by orthodontic treatment.

After active orthodontic treatment is completed, teeth tend to shift unless restrained by retainers. The retention phase is extremely important and is often a source of frustration for both the patient and the treating doctor. The prudent clinician should “build in” overcorrection of tooth movement during the active phase of treatment in anticipation of relapse, and then implement an appropriate retention protocol with fixed and/or removable retainers. Many theories have been suggested as to why teeth relapse after orthodontic treatment. One possible cause is a force exerted by the supracrestal gingival fibres, which are slow to remodel. Let’s examine the most commonly relapsed orthodontic movements:

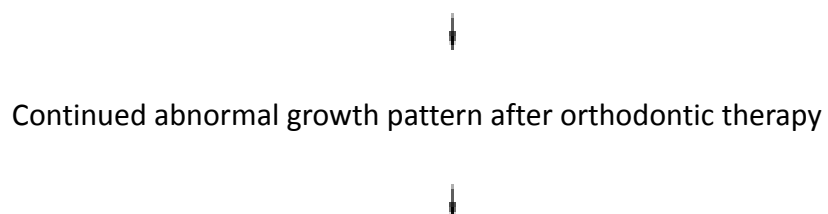
Causes of Relapse:

1. Periodontal ligament traction:



2. Due to growth related changes

Patient with skeletal problems associated with class II and class III



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3. Bone adaptation

Teeth moved recently are surrounded by lightly calcified osteoid bone.



No adequate stabilization of teeth



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4. Muscular Forces

Teeth are encapsulated in all directions by muscles.



If muscular imbalance at the end of orthodontic therapy.



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5. Persistent Aetiology

Cause of malocclusion not eliminated



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6. Role of third molars

If third molar erupt after the orthodontic treatment



Exert pressure on the teeth



Late anterior crowding



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Lower incisor crowding

Lower incisor crowding is the most common undesirable change that occurs after treatment. It has been associated with many variables. One variable is change in the intercanine dimension.

In general, increasing intercanine distance to gain arch length by lower anterior arch expansion is an unstable change and usually leads to higher incidence of relapse. Therefore, limiting the amount of lower anterior arch expansion is advisable. Interproximal Reduction or, in cases of severe crowding, premolar or lower



incisor extraction is the more appropriate treatment plan. The initial orthodontic study models or the Invisalign ClinCheck can serve as excellent diagnostic tools to determine the amount of pre-treatment arch length discrepancy. They can help the clinician establish the amount of Interproximal Reduction to perform, and/or whether extractions are needed. Of course, other diagnostic methods, such as cephalometric and soft-tissue profile analyses, should also be considered if extraction treatment is contemplated.

Third molars, and their role, represent another concern. Some believe that the presence of third molars leads to more incisor crowding due to pressure, in the form of an anterior component of force exerted from the back part of the arch. At present, there is no consensus on the validity of this theory. Some studies in which third molars have been removed, either unilaterally or bilaterally, support the view that third molars are related to lower incisor crowding. For example, when third molars were removed on one side of the arch, it was noted that there was less incisor crowding on that side. In contrast, no differences in lower incisor crowding were noted by others who evaluated groups of patients with and without third molars.



The universe of studies, then, is inconclusive on this point. Post-treatment growth has been also implicated as a source of lower incisor crowding. Maxillary growth is usually completed before mandibular growth. Therefore, as the mandible continues to grow, change develops in the sagittal maxillomandibular relationship. If the mandibular incisors cannot move forward because of the restraining influence of the maxillary arch, they may become retroclined and, as a consequence, crowded. The foresighted clinician will include overcorrection of tooth movement in the active phase of orthodontic treatment. For example, if a lower incisor has a significant pre-treatment mesial-in rotation, the clinician can overcorrect the derotation by adding 5 to 10 degrees of mesial-out rotation past perfect alignment, in anticipation of future relapse. The amount of overcorrection to use is determined by the pre-treatment misalignment and the doctor's own clinical experience. The new Invisalign ClinCheck Pro with 3-D Controls software can help the clinician "dial in" these overcorrections, and can potentially reduce or eliminate the need for refinement in some cases. The use of fixed retention for the lower incisor region has become increasingly popular in recent years because of worry about patient compliance when wearing a removable retainer.

One system entails placing a passive, flexible spiral wire extending from canine to canine, and fixing the wire to every incisor with composite. These retainers maintain tooth position well.

However, a few issues can occur. One such issue is that the composite can break off a tooth, unbeknownst to the patient, allowing the tooth to move. Another problem is that hygiene can be a challenge because plaque can accumulate in the interproximal surfaces around the retainer. Since fixed retainers are left in position for years, they should be reserved for adult patients who have adequate hygiene and can be relied upon to maintain them as clean as possible. Deep overbite Studies have shown that deep overbite correction will relapse at a rate of 20% to 40%. This means that if the bite is opened 5 mm, we can expect 1 mm to 2 mm of relapse.

Therefore, overcorrection of bite opening by 20% to 40% is advisable. The best retention following correction of deep overbite is a maxillary removable retainer (Hawley or Essix type) with an anterior bite plane or bite ramps built in. It is worn as much as possible (a minimum of 10 to 12 hours daily, usually at nighttime). The anterior bite plane disoccludes the posterior teeth, which become free to erupt, thereby keeping the anterior bite from deepening. Open bites. The etiology of the anterior open bite should be determined before

treatment. Higher incidence of relapse has been noted in cases when the incisors are extruded to close an open bite that is skeletal in nature.

A more appropriate approach for such patients would be orthognathic surgery, or the use of temporary anchorage devices (TADs) to intrude the posterior teeth so as to close the anterior open bite. Further, newfound success has been shown in using Clear Aligner Therapy to intrude the posterior teeth to aid in closing the anterior open bite. Overcorrecting the anterior bite as much as possible is recommended, owing to the high incidence of relapse. Accordingly, Essix-type retainers with full-thickness plastic posterior coverage are the best retainers for open bites because they maintain intrusive force on the posterior teeth, which in turn maintains good anterior bite depth. Overjet The correction of increased overjet and Class II molar position appears to be reasonably stable when a successful occlusal result has been achieved during treatment. In cases that had severe pre-treatment overjet, overcorrecting the anterior teeth to almost edge-edge bite in anticipation of relapse is advisable. Rotated teeth Studies in cases of rotated teeth have shown a markedly decreased tendency toward relapse after surgical transection of the supracrestal fibers, especially in the maxillary arch.

However, the long-term benefits of this procedure have not been established. Overcorrecting the derotations is highly recommended since orthodontic relapse is multifactorial, it is impossible to predict the rate at which a specific case will relapse. Therefore, it is prudent to implement a strict retention protocol for all patients who undergo orthodontic therapy. The onus of maintaining the orthodontic treatment result should be put squarely on the patient, though of course with the continued guidance of the doctor. The patient must be educated to the fact that, in order to continue having straight teeth, indefinite retention is a must. Understanding the pre-treatment records, choosing the appropriate treatment plan, incorporating overcorrections of tooth movements, and establishing a proper retention protocol are all necessary measures in retaining the orthodontic.

Retention:

- Defined as maintaining newly moved teeth in position, long enough to aid in stabilizing their correction. (Moyer)

Need Of Retention

1. Gingival and periodontal tissue require time post- treatment to reorganize
2. Soft tissue pressures are likely to cause relapse if teeth are placed in an unstable position
3. Growth post-treatment may cause relapse

Principles of Retention:

- Relapse potential may be predicted by evaluation of initial occlusion; teeth usually want to return to their original position; this is due to gingival fibers and unbalanced lip-tongue forces
- Full-time retention is required for 3-4 months to allow for reorganization of PDL
- Retention should continue for at least 12 months in non-growing patients or until growth has ceased in growing patients

Theorems of Retention:

Theorem 1.

“Teeth that have been moved tend to return to their former position”

Theorem 2.

“Elimination of the cause of malocclusion will prevent relapse”

Theorem 3.

“Malocclusion should be over corrected as a safety factor”

Theorem 4.

“Proper occlusion is a potent factor in holding teeth in their corrected positions”

Theorem 5.

“Bone adjacent the tissue must be allowed time to reorganize around newly positioned teeth”

Theorem 6.

“If the lower incisors are based upright over basal bone they are more likely to remain in good alignment”

Theorem 7.

“Corrections carried out during periods of growth are less likely to relapse”

Theorem 8.

“The farther the teeth have been moved , the lesser is the risk of relapse”

Theorem 9.

“Arch form, particularly in the mandibular arch, cannot be permanently altered by appliance therapy”

Theorem 10.

“Many treated malocclusions require permanent retaining devices”

Types of Retention:

Retention can be three types :

1. Natural or no retention
2. Limited or short term retention
3. Prolonged or permanent retention

Natural or No Retention

- Conditions that do not require retention are:-
 1. Anterior crossbite.
 2. Serial extraction procedures.
 3. Posterior cross bite in patients having steep cusps.
 4. Highly placed canines in class 1 extraction cases.

Limited or Short Term Retention

- Most cases routinely treated fall in this category. Retention is given to allow bone n PDL tissues to adapt in their new location.

1. Class I, class II div 1 and div 2 cases, treated by extractions.
2. Deep bites.
3. Class 1 non extraction with dental arches showing proclination and spacing.

Prolonged or Permanent Retention

Cases requiring permanent retention are

1. Midline diastema.
2. Severe rotations.
3. Arch expansion is achieved without ensuring good occlusion.
4. Certain class II, div 2 deep bite cases.
5. Patients with abnormal musculature or tongue habits.
6. Expanded arches in cleft palate patients.