

# Endodontic–orthodontic Interrelationships: A Clinician’s Guide

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## ABSTRACT

The multidisciplinary approach to the management of clinical situations holds the utmost importance for the success of dental treatment. Endodontic involvement of cases undergoing orthodontic treatment is not uncommon. Similarly, orthodontic treatment of already endodontically treated teeth also poses challenges to the clinicians. This article discusses in brief such endodontic–orthodontic interrelationships and the guidelines for managing complex cases where both these streams of dentistry are involved.

**Key words:** Endodontics, interrelationship, multidisciplinary, orthodontics

## INTRODUCTION

There are many instances during clinical management of patients undergoing orthodontic treatment, in which endodontic involvement of one or more teeth occurs. The diagnosis and treatment planning of such cases many times is difficult, due to the complex nature of multiple factors involved. Similarly, treatment planning of orthodontic cases, in which endodontic treatment of one or more teeth has already been performed, arises innumerable queries in the clinician’s mind. An astute clinician must be well versed with complexities involved in such cases to provide the highest standard of care to the patients.

## POTENTIAL DAMAGE TO TEETH DURING ORTHODONTIC TREATMENT

### Compromising Vitality of Teeth during Orthodontic Treatment

Usually, the vitality of teeth does not get compromised during orthodontic movement.<sup>[1]</sup> In the instances, where one encounters the compromised pulp vitality of teeth undergoing orthodontic treatment, one fails to recognize the fact that whether proper records were made for the same tooth/teeth in question before the start of the treatment. Mostly, an already non-vital tooth, when subjected to orthodontic movements, responds aggressively to the treatment, and this enhances its progression toward further non-vitality. Therefore, it is recommended that proper records such as history taking, clinical photographs, radiographs, and pulp vitality test records (wherever appropriate) must be taken before starting orthodontic treatment to critically evaluate the pre-treatment status of all the teeth.<sup>[2]</sup>

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## Root Resorption during Orthodontic Movement

It is not very uncommon to see root resorption at the apical end of teeth during or after orthodontic treatment.<sup>[3]</sup> However, one must understand that this situation arises when heavy forces are placed during orthodontic movement, especially in cases where extrusion of teeth is being performed. Appropriate and balanced forces never lead to root resorption.

The situation gets grave in case root-end resorption starts in endodontically treated teeth. In such cases, gutta-percha gets exposed to the periradicular environment and, at times, initiates an inflammatory response. Such a situation may require immediate intervention by means of surgical or non-surgical methods of removing gutta-percha to alleviate the patient's symptoms.

## CLINICAL CONSIDERATIONS OF ENDODONTIC–ORTHODONTIC INTERDISCIPLINE

It is imperative to know and understand that there is no difference in the orthodontic movement of teeth with vital pulp versus endodontically treated teeth as usually thought of.<sup>[4]</sup> A properly endodontically treated tooth, if orthodontically moved, would neither increase nor decrease the risk of its root resorption.<sup>[5]</sup>

If the tooth gets non-vital for one reason or the other during orthodontic treatment, the endodontic therapy of that tooth can be performed without a second thought.<sup>[6]</sup> Several researchers have made their opinions pertaining to the time of obturation in such cases.

One school of thought is to perform the entire root canal cleaning procedure and placing calcium hydroxide as intracanal medicament followed by placement of coronal seal, till the time the orthodontic treatment gets completed.<sup>[7]</sup> After that, the obturation is done using gutta-percha.

The other school of thought is to complete the entire endodontic therapy in one go. In such cases, the tooth under orthodontic forces is relieved from those forces transiently and then included in the procedure again, 10–15 days after the completion of endodontic treatment. In all such cases, the use of chlorhexidine as an irrigant is recommended during the endodontic procedure because of its broad-spectrum antibacterial activity and substantivity.

It is imperative to realize that a certain amount of time must be given for the healing to occur after endodontic therapy is finished before the orthodontic forces can be applied. In general, 15–30 days time-lapse is considered sufficient.<sup>[8]</sup>

Similarly, in cases of teeth associated with periapical lesions, after the completion of endodontic therapy, movement of the tooth can be started after 15–30 days as this much amount of time is sufficient for the exudates and inflammatory infiltrate to be resorbed or to migrate from the area of granulation tissue.<sup>[8]</sup>

A discrete history of any traumatic injury to teeth must be taken before starting a case of orthodontic treatment.<sup>[6]</sup> This is for the fact that such teeth are more prone to root resorption after the orthodontic treatment is initiated. The chances of such occurrences must be explained to the patient beforehand.<sup>[8]</sup> Under all circumstances, such teeth must be kept under regular radiographic examination every 3 months to verify the degree of root resorption, if happening. Whenever possible, these teeth must be avoided for use as anchorage points or subjected to extensive movements such as intrusion.<sup>[8]</sup> In case of mild trauma, such as concussion/subluxation, it is recommended to wait for at least 3–4 months before subjecting the tooth to orthodontic forces. It is advisable to radiographically evaluate if the periodontal tissue is back to normal before activating the orthodontic forces. In the case of moderate dental trauma, such as tooth luxation, the 1-year waiting period is recommended, whereas it is 2 years in more severe cases such as reimplantation or root fracture cases.<sup>[8]</sup>

Starting orthodontic treatment in teeth that have already undergone the surgical endodontic procedure can be challenging as these teeth are more prone to root resorption in cases where endodontic therapy is not meeting the standards.<sup>[8]</sup>

There can be certain instances wherein surgical endodontic treatment of one or more teeth becomes essential during orthodontic treatment. Although there is no absolute contraindication, the general guidelines are to withhold the active orthodontic movement and resume and resume the treatment after at least 6 months of the surgery. This is to allow for adequate tooth stability and healing of periradicular tissues.<sup>[6]</sup>

The orthodontic extrusion of a tooth may be required in certain instances, especially when it is fractured infrabony and cannot be managed by crown lengthening procedure alone.<sup>[9]</sup>

Greater care is required in all such cases to maintain the biological width as a restoration that impinges on biologic width will eventually result in progressive periodontal disease. The endodontic therapy of such teeth is performed before the start of orthodontic extrusion. The tooth in question is attached to the main orthodontic wire, using specially designed hooks or provisional posts that are screwed/cemented to the post-space prepared in the root canal of the

tooth, in case a band/bracket/button cannot be fixed onto its crown. Basic principles of extrusion are applied on such as teeth, and regular follow-up is done for evaluation. Once 2 mm of supragingival coronal tooth structure is obtained, the treatment can be stopped. A stabilization period of 6 weeks is recommended before proceeding for further restorative treatment.<sup>[10]</sup>

Rapid tooth movement, if done, may cause pulpal injury due to alteration in the blood vessels in the apical periodontium and those entering the pulp.<sup>[11]</sup> Furthermore, in certain cases, due to alteration in the pulpal vasculature and subsequent alteration in the metabolism of pulpal cells during orthodontic movement, there is seen increased deposition of reparative dentin in the pulp chamber and root canals along with dystrophic calcification.

## CONCLUSION

Concurrent endodontic and orthodontic treatment in a patient poses a magnificent challenge to a clinician, whenever required. It is essential to understand that both the specialty treatments have their own strategic importance. Therefore, it becomes necessary for the concerned specialists to formulate a comprehensive plan for the patient and then execute it in such a manner that the final outcome turns out to be beneficial for the patient. For this to happen, an intellectual understanding between endodontist and orthodontist is of paramount importance which shall ensure the success of the particular case in the long run.

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