

Case Report

The Subharti protocol for interdisciplinary management of non-vital teeth

ABSTRACT

Endodontic treatment of the teeth is now a common procedure across all age groups, either as a result of caries or as a result of trauma. Furthermore, as the number of adults undergoing orthodontic treatment increases, the number of orthodontic patients presenting with root-filled teeth is on the rise. Trauma is the most common cause of pulp necrosis and loss of vitality. Sometimes, adult patients may present to the clinic with grossly decayed teeth or severely traumatized teeth which often require endodontic treatment, followed by placement of prosthetic crown before orthodontic treatment. There is no consensus regarding timing of root canal treatment, extension of root end filling material, material selection for crown placement, and cement used for crown cementation. There is no well-defined protocol for such cases. Here, in this article, we present well-defined guidelines for endodontic-prosthodontic-orthodontic patients so that we can provide better care to patients with less ambiguity about the role of different specialties.

Key words: Multidisciplinary treatment; orthodontic treatment; root canal treatment; temporary crown.

Introduction

Management of nonvital teeth involves a multidisciplinary approach including endodontic therapy followed by prosthetic rehabilitation. But in the present scenario patients undergoing orthodontic therapy is also on the rise along with presence of nonvital teeth. Therefore in such cases factors such as timings of endodontic and orthodontic treatment, extension of root end filling, remaining crown structure, orthodontic forces, root resorption due to orthodontic forces, material selection for crown placement, cement for crown placement, complete duration of treatment etc. may play a major role. Thus, Subharti Protocol sets well defined precepts to provide better and comprehensive care with equal role and importance of different specialties

Subharti protocol

This protocol derives its name from our university (Swami Vivekananda Subharti University). There are six components in our protocol. It starts with timing of root canal treatment (RCT), building of crown structure before bracket

placement, selection of material for temporary crown fabrication and cementation; progresses with bracket placement and orthodontic treatment, replacement of temporary crown with permanent crown; and ends at retainer in selected cases. All these steps are explained in detail one by one.

Timing of root canal treatment

In patients who need multidisciplinary approach, RCT is done before commencement of the orthodontic treatment. A good periapical seal is primary requirement regardless of material used for obturation. Extension of root end

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filling material is kept slightly shorter to apex (0.5–1 mm) as orthodontically induced inflammatory root resorption is unwanted side effect of orthodontic treatment, especially in the anterior teeth.^[1] By doing this, we provide slight leeway to apical root resorption.

Rebuilding of crown structure

If the tooth is slightly damaged and is restorable with direct composite filling, we should restore the tooth to the ideal dimensions before bracket placement. If enough crown structure is not present, then we can choose crown preparation and crown placement. Core buildup may be required in some cases with questionable crown structure.

Selection of material for crown fabrication and cementation

It is of utmost importance in these cases. For posterior teeth, we recommend all metal prostheses as orthodontic bands are usually cemented with permanent luting cements. Cement can be easily removed from metal crown as compared to ceramic crown, and cement removal process will not affect the surface of metal crown. As force levels are high in the posterior region, plastic crowns and temporary resin crowns are not advisable in the posterior region. After orthodontic treatment, unaesthetic metal crown can be replaced with esthetic crown if patient desires so. For anterior teeth, esthetics is of greater importance compared to the strength. We recommend good quality resin temporary crown (we used Integrity from Dentsply) cemented with permanent luting cement. This protocol gives us multiple advantages such as sufficient strength for bracket attachment, acceptable esthetics, lesser cost, and no frequent re-cementations. We cannot place permanent ceramic crown as bonding procedure and adhesive removal will deteriorate the facial surface necessitating crown replacement. We cannot cement temporary crown with temporary cement as they will not last for 18–24 months which is average treatment time required for routine orthodontic cases.

Bracket placement and orthodontic treatment

Treatment should be ideally started 3–4 months after asymptomatic RCT. Bracket should be placed according to the individualized chart. Orthodontic forces should be kept low. Torquing of the upper anterior teeth should be cautiously performed if needed. Regular evaluation of RCT-treated tooth is necessary by intraoral periapical (IOPA) X-rays taken periodically once in 6 months.

Replacement of temporary crown with permanent crown

Special precaution should be kept during crown removal. The crown should be cut with a bur and removed instead of snap removal to avoid any damage to the remaining crown structure. Abutment may need some extra preparation before receiving permanent restoration.

Permanent retainer placement

Regular removable retainers do not need any modification. Bonding a permanent retainer may need some mechanical roughening of lingual surface, which can be achieved by sandblasting.

Case Report

A 25-year-old female patient was referred to the Department of Orthodontics from Department of Endodontics and Conservative Dentistry for orthodontic treatment. The patient had a chief complaint of spacing in the front teeth [Figure 1]. She had previous history of RCT in 12 when she reported to the department. She had deep curve of Spee and deep bite [Figure 2]. The endodontist's chief concern was an anterior deep bite which was interfering with crown placement. IOPA X-ray taken immediately after RCT showed marked apical radiolucency in respect to 12 and 11 [Figure 3]. After detailed clinical and radiological examination, intrusion



Figure 1: Extraoral photograph showing spacing in upper and lower teeth



Figure 2: Intraoral photograph showing spacing in upper and lower arches and marked deep bite with lower incisor touching gingiva of upper arch

and retraction of upper and lower incisors were planned. After joint discussion, temporary crown constructed from Integrity (Dentsply) and cemented with permanent luting cement [Figure 4]. The patient underwent orthodontic

treatment for 13 months. Special precaution was taken to keep orthodontic forces low and continuous. Leveling of the curve of Spee was achieved by incorporating reverse curve in the archwire. Space closure was achieved by retraction of anterior teeth in both the arches. After completion of



Figure 3: Intraoral periapical radiograph showing radiolucency in respect to 11 and 12 just after completion of root canal treatment



Figure 4: Intraoral photograph showing temporary crown cemented with permanent luting cement on 11



Figure 5: Intraoral photograph after debonding. Eleven is still having temporary crown



Figure 6: Intraoral photograph after debonding. Temporary crown on 11 replaced with permanent crown



Figure 7: Extraoral photograph of patient after completion of orthodontic treatment



Figure 8: Intraoral periapical radiograph showing improvement in bone support in respect to 11 and 12, taken after orthodontic treatment

orthodontic treatment [Figure 5], temporary crown was replaced by permanent crown [Figure 6]. Temporary crown never needed re-cementation during the entire duration of orthodontic treatment and the patient was happy after her treatment [Figure 7]. Permanent crown was sandblasted from the lingual surface as permanent retainer was indicated in this particular patient. IOPA X-ray showed signs of bone regeneration at post-treatment stage [Figure 8].

Discussion

Endodontically treated teeth can be moved by orthodontic treatment just as readily as vital teeth. Generally, they are at no greater risk of root resorption. However, for those teeth that have suffered intrusive trauma, there is a greater risk of moderate to severe root resorption. Teeth with slight or moderate trauma and an intact periodontal ligament after an observation period of at least 4–5 months can be moved with a prognosis comparable to that of uninjured teeth.^[2] Hamilton and Gutmann have proposed that if a root-filled tooth has been well cleaned, shaped, and three-dimensionally obturated, the apical seal would be maintained regardless of the amount of resorption and these teeth are less likely to initiate periapical pathology if root resorption occurs.^[3] Early studies showed increased root resorption in root canal treated teeth^[4] while recent studies have shown the opposite trend.^[5-7] There is no consensus whether root canal-treated teeth show less, equal, or more root resorption as compared to vital teeth. Hence, we need regular radiological evaluation by IOPA X-rays during the orthodontic treatment.

Conclusion

Subharti protocol could be effective and useful tool in the management of patients requiring multidisciplinary approach without any ambiguity among different specialties.

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Conflicts of interest

There are no conflicts of interest.

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