

Knowledge, Attitude And Practice Of The Dental Practitioners Towards Orthodontic Root Resorption: A Questionnaire Study

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Abstracts: **Background:** Today's community is becoming more concern with the aesthetics and therefore orthodontics is coming into focus. With increasing numbers of patients receiving orthodontic treatment and with increased expectations, the adverse consequences of treatment should be emphasized. External apical root resorption is an iatrogenic consequence of orthodontic treatment, although it can also occur in the absence of orthodontic treatment. Thus every dental practitioner and orthodontist should know the risk factors of root resorption, so that he or she can do everything to reduce the occurrence of root resorption. **Methodology:** The study was consisted of 50 participants including of general dental practitioners and orthodontists. Study was carried out with the help of specially designed 12 questionnaires, which were validated by doing pilot study. **Results:** In the present study, 88% participants had knowledge about the fact of orthodontic root resorption and about 31% had come across such situations in their practice. Many of the participants were not having the knowledge of the etiological and other factors associated with the condition. **Conclusion:** Results of the present study were shown that, though root resorption induced by the orthodontic treatment is commonly seen among the community, many of them were not aware of the sufficient knowledge, attitude and practice towards this adverse situation. [S Darshan V NJIRM 2016; 7(1):104-107]

Key Words: Orthodontic root resorption, Orthodontic treatment, Root resorption.

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Introduction: Resorption of root is a pathological process results in a decrease in length of the dental root. Usually this condition is asymptomatic and missed in diagnosis. It can result in tooth mobility and even tooth loss if not diagnosed and treated early. Root resorption is a phenomenon that also plays an essential role in the physiological and dynamic process of tooth eruption. Resorption of deciduous tooth roots during permanent tooth eruption is a essential process that eventually results in the exfoliation of the deciduous tooth. However, resorption of root that occurs in permanent teeth is an unwanted process and is considered pathologic.¹

Orthodontics is a discipline in dentistry and like many other disciplines in this field; it can have certain adverse effects associated with the treatment. These adverse effects may be related to the patient or practitioner. Some of these effects are not fully understood, such as root resorption.² Ketcham in 1927, first discussed the problem of root resorption as a consequence of orthodontic treatment.^{2,3}

External apical root resorption is an adverse complication of orthodontic treatment and it can results in permanent loss of tooth structure from the root apex.⁴ Root resorption is common during orthodontic tooth movement and limited root resorption, involving a

number of teeth, can be considered a consequence of orthodontic treatment.²

However, it can be avoided with more accurate management of orthodontic treatment.⁴ Therefore every orthodontist and also the dental practitioner should have knowledge of the orthodontic root resorption, its consequences and management. The present study was done to know the knowledge, attitude and practice of the general practitioners and orthodontists towards the orthodontic root resorption.

Material and Methods: The study was consisted of 50 general dental practitioners, out of which 15 were orthodontists. The study was carried out with the help of specially prepared questionnaires consisting of 12 questions and which were validated by doing pilot study.

Inclusion criteria:

1. General dental practitioners.
2. Orthodontists
3. Other dental specialty.

Exclusion criteria:

1. Dental students, including interns.
2. Dentists, who were not practicing.
3. Dentists, who were not willing to participate.

Approval of the ethical committee was taken and informed consent was taken from all the participants.

The results were tabulated and the percentage analysis of the results was done.

Results: A total of 50 participants given the answers for the questionnaires and the percentage were calculated out of total. The results of the study shown that, 88% participants had knowledge about the fact of orthodontic root resorption and about 31% had come across such situations in their practice. Seventy-one percent participants were aware of the various responsible etiological factors. Age factor and the force applied were responsible for the root resorption were known to 33% and 89% of the study participants respectively. About 38% were not familiar with the treatment modalities available. (Table 1)

Table 1: Percentage-wise distribution of the responses given by the study participants regarding the knowledge, attitude and practice towards the orthodontic root resorption.

Questions	Responses of the dentists in percentage of the total (n= 50)
Do you know that root resorption can occur after orthodontic treatment? a. Yes b. No.	88% 12%
Do you come across any such case of root resorption? a. Yes b. No.	31% 69%
Do you familiar with the various etiological factors responsible for the orthodontic root resorption? a. Yes b. No	71% 29%
According to you, what could be the etiological factors for the orthodontic root resorption? a. Root morphology- abrupt root deflection, narrow root, pipette shaped root. b. Pre-treatment root resorption c. Endodontically treated teeth d. Habits- nail biting, lip/tongue deflection. e. All of the above	21% 11% 34% 14% 20%

Can gingivitis and periodontitis influence root resorption? a. Yes b. No.	44% 56%
Is age factor influence the occurrence or rate of orthodontic root resorption? a. Yes b. No.	33% 67%
Which type of tooth movement has maximum chances of causing root resorption? a. Intrusion b. Extrusion c. Lateral movement d. Other	66% 12% 10% 12%
Do you know the classification systems for the extent of the orthodontic root resorption? a. Yes b. No.	55% 45%
Is the amount of force applied affect the root resorption? a. Yes b. No.	89% 11%
What should be the forces to decrease the chances of the root resorption? a. Intermittent and light b. Continuous and heavy	77% 23%
Do you know the treatment modality for such cases? a. Yes b. No.	38% 62%
Do you usually perform periapical radiographic follow-up during orthodontic treatment? a. Yes b. No. c. Sometimes.	37% 50% 13%

Discussion: Many general dental practitioners and other dental specialists believe that root resorption can be avoidable and hold the orthodontist responsible when it occurs during orthodontic treatment. It is therefore necessary to have knowledge regarding which orthodontic treatment factors contribute to resorption of roots, so that the detrimental effects can be minimized and it can be reduced.⁵ Orthodontic forces are one of several etiological factors that have been implicated in external root resorption

and the other etiological factors include reimplantation, trauma, pressure from adjacent unerupted teeth and related pathological conditions such as odontogenic and nonodontogenic tumours.⁶

The etiology of resorption of roots in orthodontic treatment is complex and still remains unclear, including genetic predisposition and environmental factors. The genetic predisposition makes resorption of roots associated with orthodontic treatment more predictable.²

The other risk factors include the duration of treatment. The risk for resorption of roots increases with the length of treatment. For example, treatment of impacted canines can extend treatment time or the movement of these canines may lead to an increase in the risk for root resorption. Tapered, thin and dilacerated root morphology, results in roots that are more prone to resorption. Also, history of trauma associated with the anterior teeth increases the risk.²

The process of resorption of dental hard tissues found to be triggered by the activity of cytokines as well as that of bone. Immune cells migrate out of the blood vessels in the periodontal ligament and interact with locally residing cells by elaborating a large array of signal molecules.⁷

In the present study, about 88% of the participants know that root resorption can occur during the orthodontic treatment, but still 12% does not aware of this important fact. Among the years of practice of this practitioner's, about 31% had come across such situations in their practice, but 71% of this doesn't have any knowledge of the various etiological factors associated with this type of the conditions.

Around 56% of the study participants were not familiar with the fact that gingivitis and periodontitis can influence the root resorption in case of orthodontic treatment. Most of the practitioners (67%) do not have information that age can affect the rate of resorption of the roots. Sixty-six percent of the participants were aware of the fact that intrusion was the most common orthodontic treatment causing the root resorption. Amount and the type of force can affect the rate of root resorption was accepted by the 89% and 77% of the participants respectively. But, the most important fact is that 62% of the dental practitioners were not having the knowledge of the treatment modality for such type of

situations. Only, thirty-seven percent of the study participants perform radiographs during the duration of the orthodontic treatment.

External root resorption is a problem commonly observed in association with orthodontic movement. The factors relevant can be divided into mechanical and biological factors. Among mechanical factors, the extensive tooth movement, root torque, intrusive forces, movement type, orthodontic force magnitude, duration and type of force are involved. For biological factors, a genetic susceptibility, systemic factors (hormone unbalance), teeth agenesis, and medication intake have been demonstrated influence in root resorption.^{7,8}

The prevalence among the various researches varies widely. Means values ranging from 0.5 to 3 mm of root shortening during orthodontic treatment have been reported. A frequency of severe apical root resorption of 5-18% has been reported.⁷ Resorption occurs primarily in the maxillary anterior teeth, averaging over 1.4 mm. The worst resorption is seen in maxillary lateral incisors.^{7,9,10}

In study by Esteves T et al, there was no significant difference in apical root resorption found in maxillary central incisors treated endodontically and untreated homologs submitted to orthodontic treatment.⁹ Results of Wierzbicki T et al were shown that mean resorption lacuna depth, length, and volume in the treatment teeth were greater than in the control teeth.¹¹

The clinical diagnosis of orthodontic root resorption is based mainly on routine radiographic procedures, such as panoramic and periapical radiography.¹² Therefore, it would be crucial to take periapical radiographs periodically during treatment.⁷ When root resorption is detected during active treatment, a decision should be made as to whether to continue, modify or discontinue the treatment. Extremely heavy forces should be avoided, since they have been shown to produce greater resorption activity.⁷

Conclusion: From the present study it can be concluded that the orthodontic root resorption is commonly seen in patients undergoing the orthodontic treatments and still many facts of this serious topic were not known to much of the practicing dentists and the orthodontists. Therefore, the continuous update of the knowledge is very important, which can be done by various seminars,

continuing dental educations programs or the workshops on this topic.

resolution. *Am J Orthod Dentofacial Orthop* 2009;135:434-7.

References:

1. Prakash A, Gupta SD, Arora A, Dungarwal N, Rai S. Burning of roots in orthodontics-reviewing every aspect. *Universal Journal of Medicine and Dentistry* 2013;2(1):1-9.
2. Talic NF. Adverse effects of orthodontic treatment: A clinical perspective. *The Saudi Dental Journal* 2011;23:55–9.
3. Brezniak N, Wasserstein A. Orthodontically Induced Inflammatory Root Resorption. Part I: The Basic Science Aspects. *Angle Orthod* 2002;72:175–9.
4. Topkara A, Karaman A, Kau CH. Apical root resorption caused by orthodontic forces: A brief review and a long-term observation. *Eur J Dent* 2012;6:445-53.
5. Weltman B, Vig KWL, Fields HW, Shanker S, Kaizar EE. Root resorption associated with orthodontic tooth movement: A systematic review. *Am J Orthod Dentofacial Orthop* 2010;137:462-76.
6. Leach HA, Ireland AJ, Whaites EJ. Radiographic diagnosis of root resorption in relation to orthodontics. *British Dental Journal* 2001;190(1):16-22.
7. Abuabara A. Biomechanical aspects of external root resorption in orthodontic therapy. *Med Oral Patol Oral Cir Bucal*. 2007;12(8):E610-3.
8. Preoteasa CT, Ionescu E, Preoteasa E, Comes CA, Buzea MC, Gramescu A. Orthodontically induced root resorption correlated with morphological characteristics. *Romanian Journal of Morphology and Embryology* 2009;50(2):257–62.
9. Esteves T, Ramos AL, Pereira CM, Hidalgo MM. Orthodontic Root Resorption of Endodontically Treated Teeth. *J Endod* 2007;33:119–122.
10. Picanco GV, Salvatore de Freitas KM, Cancado RH, Valarelli FP, Picanco PRB, Feijao CP. Predisposing factors to severe external root resorption associated to orthodontic treatment. *Dental Press J Orthod* 2013;18(1):110-20.
11. Wierzbicki T, El-Bialy T, Aldaghreer S, Li G, Doschak M. Analysis of Orthodontically Induced Root Resorption Using Micro-Computed Tomography (Micro-CT). *Angle Orthod* 2009;79:91–6.
12. Dudic A, Giannopoulou C, Leuzinger M, Kiliaridis S. Detection of apical root resorption after orthodontic treatment by using panoramic radiography and cone-beam computed tomography of super-high

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