

ORIGINAL RESEARCH

Effect of orthodontic treatment on pulp stone formation

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ABSTRACT:

Background: Dental pulp is an unmineralized living tissue survival of which depends on the continuous blood flow. Some factors that have been implicated in pulp stone formation include age, impaired pulpal blood supply, genetic predisposition, or long-standing irritants such as caries, deep fillings, or abrasion. Hence; the present study was conducted for assessing the effect of orthodontic treatment on pulp stone formation. **Materials & methods:** A total of 50 patients were enrolled in the present study. Complete demographic details of all the patients were obtained. Clinical examination of all the patients was carried out. Panoramic radiographic, intraoral Periapical radiographs of all the patients was obtained both before the starting of the orthodontic treatment and after finishing of the orthodontic treatment. Incidence of pulp stones both before the starting of the orthodontic treatment and after finishing of the orthodontic treatment was recorded. **Results:** Pulp stones were found to be present in 6 percent of the patients during the pre-treatment phase, while it was present in 16 percent of the patients post-treatment. **Conclusion:** Orthodontic treatment might induce the formation of pulp stones.

Key words: Orthodontic treatment, Pulp stones

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INTRODUCTION

Dental pulp is an unmineralized living tissue survival of which depends on the continuous blood flow. Changes in blood flow or vascular tissue pressure can affect the health of the dental pulp. Dental pulp tissue may form dentin or osteodentin in the reaction to the homeostasis induced either by surgical or chemical stimulation, and the activity of pulp cells regulates the calcification of pulp tissue.¹⁻³ There are two chief morphological forms of pulp calcifications: Discrete pulp stones (denticles, pulp nodules) and diffuse calcification. Pulp stones are calcified bodies in the dental pulps of the teeth, which can be seen in the pulps of healthy, diseased, and even unerupted teeth in the primary and permanent dentition.⁴ Some factors that have been implicated in pulp stone formation include age, impaired pulpal blood supply, genetic predisposition, or long-standing irritants such as caries, deep fillings, or abrasion. Pulp obliteration is most often caused by trauma, but it has also been described after orthodontic treatment or transplantation. In a generalized form, it is possibly a part of the aging process and is usually seen in older individuals. However,

generalized pulp obliteration has also been observed in certain systemic or genetic diseases.⁵⁻⁷ Hence; the present study was conducted for assessing the effect of orthodontic treatment on pulp stone formation.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the effect of orthodontic treatment on pulp stone formation. Ethical approval was obtained after explaining in detail the entire study protocol. Written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 50 patients were enrolled in the present study. Complete demographic details of all the patients were obtained. Exclusion criteria for present study included:

- Patients with history of any other systemic illness,
- Patients with any known drug allergy,
- Patients with history of any metabolic disorder

After meeting the exclusion criteria, clinical examination of all the patients was carried out. Panoramic radiographic, intraoral Periapical radiographs of all the

patients was obtained both before the starting of the orthodontic treatment and after finishing of the orthodontic treatment. Incidence of pulp stones both before the starting of the orthodontic treatment and after finishing of the orthodontic treatment was recorded. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

RESULT

In the present study, a total of 50 patients scheduled to undergo orthodontic treatment were enrolled. Mean age of the patients was 15.2 years. 40 percent of the patients belonged to the age group of more than 15 years. 36 percent of the patients and 24 percent of the patients belonged to the age group of 10 to 15 years and less than 10 years respectively. 58 percent of the patients were males while the remaining 42 percent of the patients were females. In the present study, pulp stones were found to be present in 6 percent of the patients during the pre-treatment phase, while it was present in 16 percent of the patients post-treatment.

Table 1: Demographic data

Parameter		Number of patients	Percentage of patients
Age group (years)	Less than 10	12	24
	10 to 15	18	36
	More than 15	20	40
Gender	Males	29	58
	Females	21	42

Table 2: Incidence of pulp stones pre-treatment and post-treatment

Incidence of Pulp stones	Number of patients	Percentage of patients
Pre-treatment	3	6
Post-treatment	8	16

DISCUSSION

The etiological factors and mechanisms of the formation of pulp stones are vastly unknown, although some factors are considered to stimulate pulpal calcifications, such as degenerative lesions of the pulp, inductive interactions between epithelium and pulp tissue, increased age, having other dystrophic soft tissue calcifications (urinary lithiasis, calcified atheromas etc.), genetic predisposition, problems with the blood circulation of the pulp and long-term irritation such as deep caries, restorations and orthodontic tooth movements.⁶⁻⁹ Hence; the present study was conducted for assessing the effect of orthodontic treatment on pulp stone formation.

In the present study, a total of 50 patients scheduled to undergo orthodontic treatment were enrolled. Mean age of the patients was 15.2 years. 40 percent of the patients belonged to the age group of more than 15 years. 36 percent of the patients and 24 percent of the patients belonged to the age group of 10 to 15 years and less than 10 years respectively. 58 percent of the patients were males while the remaining 42 percent of the patients were

females. Ertas ET et al assessed the incidence of dental pulp stone formation during orthodontic treatment. A sample of 545 patients (334 girls and 211 boys, age range; 12-22 years) who had undergone nonextraction orthodontic treatment were included in this study. 8442 teeth (T1) and 8410 teeth (T2), including the first and second maxillary and mandibular premolars and molars were evaluated from the pre- (T1) and post-treatment (T2) panoramic radiographs of the patients. Dental pulp stones were detected in 3% of the teeth at pretreatment panoramic radiographs and 5.2% of the teeth at posttreatment panoramic radiographs. Pulp stone prevalence increased pointedly (2.2%) in the pre- and post-treatment radiographs (P < 0.001). Also, there was a significant difference between the age groups (P < 0.001). In the maxilla, dental pulp stones were found significantly more than that in the mandible at T1 and T2 panoramic radiographs. Maxillary first molars exhibited dental pulp stones the most frequently, followed by the maxillary second molars and mandibular first molars. Orthodontic treatment may trigger the formation of dental pulp stones.¹⁰

In the present study, pulp stones were found to be present in 6 percent of the patients during the pre-treatment phase, while it was present in 16 percent of the patients post-treatment. Jena D et al assessed the prevalence of pulp stones in known South Indian orthodontic patients and to find correlation between pulp stones and patients who underwent orthodontic treatment as well as to reveal any differences due to gender, tooth type, and dental arches. The retrospective study was carried out among 200 patients who underwent nonextraction orthodontic treatment. Maxillary and mandibular first and second premolar and molar teeth were selected for the purpose of the study using panoramic radiographs. A total of 3200 teeth of 200 patients were studied for the presence of pulp stones. In all, 11.5% of cases reported pulp stones before the commencement of the orthodontic treatment and 15.5% cases after completion of orthodontic treatment. Overall, 4% increase in cases were found which was statistically significant (p < 0.05); 5.1% of total number of teeth were evaluated in both arches before orthodontic treatment and 6.3% of teeth after orthodontic treatment revealed the presence of pulp stones. Maxillary first molar was found to be teeth with maximum number of pulp stones before and after orthodontic treatment. The study reported the prevalence of pulp stones to be increased by 4% in the pre- and posttreatment radiographs, which was statistically significant. The study found the presence of pulp stones more in maxillary first molar and it was found to be teeth with maximum number of pulp stones before and after orthodontic treatment. However, further researches with larger samples are advisable. Dentists performing endodontic treatment among patients who have undergone orthodontic treatment should be aware about the increased chances of presence of pulp stones and thus to avoid hindrances encountered during extirpating the pulp, they should thoroughly study the radiographs beforehand.¹¹

CONCLUSION

From the above results, the authors conclude that orthodontic treatment might induce the formation of pulp stones. However; further studies are recommended.

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