

ORIGINAL RESEARCH

Retrospective assessment of apical root resorption in patients undergoing fixed orthodontic treatment – An Original Research

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ABSTRACT:

Background: Root resorption becomes often a nightmare for almost every practicing orthodontist. The present study was conducted to assess apical root resorption in patients undergoing fixed orthodontic treatment. **Materials & Methods:** The present study was conducted on 94 patients of age range 12-26 years of both genders. In all subjects, root and crown lengths were measured in pre- and post-treatment panoramic radiographs. Later on relative changes of the root length during treatment were calculated by a root-crown-ratio taking pre and post-treatment root and crown lengths into consideration. **Results:** Out of 94 patients, males were 50 and females were 44. Pre treatment showed that mean length of root in males was 7.4 mm and in females was 7.0 mm and during treatment it was 7.1 mm in males and 6.4 mm in females. The difference was significant ($P < 0.05$). **Conclusion:** Author found significant reduction in root length and significant root resorption in males and females when compared it during the orthodontic treatment.

Key words: Orthodontics, Root resorption, Root length.

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INTRODUCTION

Root resorptions (RR) appear to be multifactorial and might be a combination of mechanical effects, a genetic disposition and an individual biological variability. They are described as a permanent loss of tooth structure from the root apex and the clinical manifestation among orthodontic patients is highly variable. Former publications referred that orthodontically treated patients were more likely to gain severe apical root resorption (ARR).¹

Patient characteristics such as type of malocclusion, gender, age, root morphology, dental anomalies, and previous trauma have been suggested as possible risk factors. There is some controversy as to whether the age of the patient is related to orthodontically induced resorption.

Root resorption becomes often a nightmare for almost every practicing orthodontist. The literature indicates that patients undergoing orthodontic treatment are more likely to have root resorption. Orthodontic treatment can be a major trigger for apical root resorption. In most cases, it is insignificant clinically and less frequently noticeable on X-rays. However, some patients react more severely. If the roots become too short, the teeth can become mobile or even be lost.² Severe root resorption during orthodontic treatment (more than $\frac{1}{4}$ of the root length, >5 mm) occurs very rarely, just in 1-5 % of patients. Analysis

and assessment of factors inducing root resorption would simplify timely diagnosis of root resorption and would help avoiding complications impacted by it.³ The present study was conducted to assess apical root resorption in patients undergoing fixed orthodontic treatment.

MATERIALS & METHODS

The present retrospective study was conducted in the department of Orthodontics. It comprised of 94 patients of age range 12-26 years of both genders undergoing fixed orthodontic treatment. All subjects were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study from institutional ethical committee.

General information such as name, age, gender etc was recorded. In all subjects, root and crown lengths were measured in pre- and post-treatment panoramic radiographs. Later on relative changes of the root length during treatment were calculated by a root-crown-ratio taking pre and post-treatment root and crown lengths into consideration. A reduction of this ratio was considered as shortening of the initial root length. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

| Gender | Total- 94 | |
|--------|-----------|---------|
| | Males | Females |
| Number | 50 | 44 |

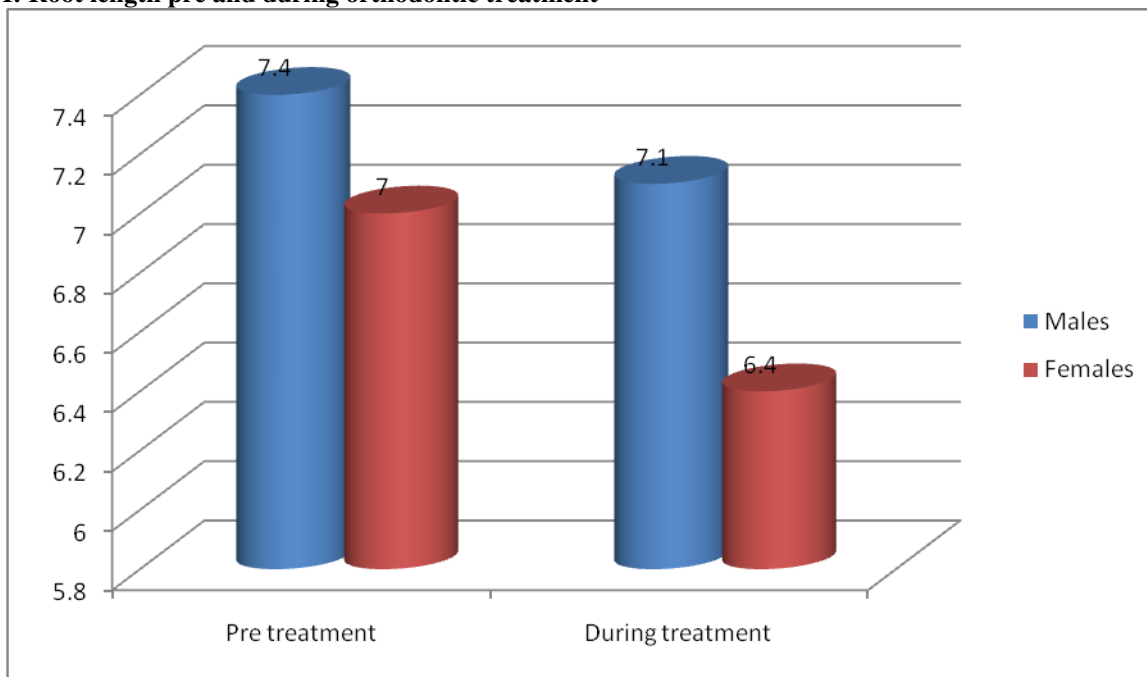
Table I shows that out of 94 patients, males were 50 and females were 44.

Table II Assessment of root length pre and during orthodontic treatment

| Root length(mean) | Males | Females | P value |
|-------------------|-------|---------|---------|
| Pre treatment | 7.4 | 7.0 | 0.02 |
| During treatment | 7.1 | 6.4 | 0.01 |
| P value | 0.01 | 0.02 | |

Table II, graph I shows that pre treatment showed that mean length of root in males was 7.4 mm and in females was 7.0 mm and during treatment it was 7.1 mm in males and 6.4 mm in females. The difference was significant ($P < 0.05$).

Graph I: Root length pre and during orthodontic treatment



DISCUSSION

Individual susceptibility is a main factor determining root resorption, which can manifest in both milk-teeth and permanent teeth. Historically, there has been appreciable variability among orthodontic patients in susceptibility to root resorption, which may be due to a systemic or innate predisposition to occurrence of resorption. It is supposed that in case of increased susceptibility to root resorption, severe root resorption may occur without any evident reason.⁴

Genetics predisposition to root resorption may be autosomal dominant, autosomal recessive, or hereditary determined by a few genes. It is supposed that, genetic predisposition is very important to occurrence of root resorption. Genetic factors account for at least 50 % of the variation in root resorption. Allergic patients are in the group of increased risk for root resorption. On the grounds of researches it was established that lack of estrogens may induce quick orthodontic tooth movement, and calcitonin inhibits activity of odontoclasts. Conditions like asthma also appear to indicate a greater risk for a large amount of apical root resorption.⁵ The present study was conducted to assess

apical root resorption in patients undergoing fixed orthodontic treatment.

We found that out of 94 patients, males were 50 and females were 44. It was observed that pre treatment showed that mean length of root in males was 7.4 mm and in females was 7.0 mm and during treatment it was 7.1 mm in males and 6.4 mm in females. Ketcham⁶ conducted a radiographic survey of 385 treated cases and he found that 22 % of 224 patients had experienced some degrees of root resorption during orthodontic treatment. His study have shown that maxillary teeth were affected twice as frequently as mandibular teeth and that more resorption occurred in cases treated with ribbon arch or pin and tube appliances than in cases treated with labial or lingual arches.

Lars Goldson⁷ conducted a study to evaluate root resorption during Begg treatment. Forty-two patients consecutively treated by the Begg method, all of whose first premolars had been extracted before orthodontic treatment, were examined roentgenologically by an intraoral technique on three to four occasions. They found that the resorption level increased more for the upper central incisors, which were subjected to root torque, than for the upper lateral incisors

and the lower premolars showed the lowest incidence of root resorption.

Kaley J, Phillips C⁸ conducted a study of 200 consecutively debanded patients receiving comprehensive orthodontic treatment with the edgewise appliance. They found six severe resorption (greater than one-quarter of the root length) of both maxillary central incisors in 6 (3%) cases. For other teeth, resorption of this extent occurred in less than 1% of the patients. They found significantly more resorption among class III patients.

CONCLUSION

Author found significant reduction in root length and significant root resorption in males and females when compared it during the orthodontic treatment.

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