



## MORPHOLOGICAL CHANGES IN ROOT LENGTH OF MANDIBULAR CANINES AND FIRST MOLARS FOLLOWING ORTHODONTIC TREATMENT

Karthiga Senthil\*<sup>1</sup> and Dr. A. V. Arun<sup>2</sup>

<sup>1</sup>Undergraduate, Saveetha Dental College.

<sup>2</sup>Senior Lecturer, Department of Orthodontics, Saveetha Dental College.

Article Received on  
14 April 2018,

Revised on 04 May 2018,  
Accepted on 25 May 2018,  
DOI: 10.20959/wjpps20186-10074

\*Corresponding Author

**Karthiga Senthil**

Undergraduate, Saveetha  
Dental College.

### ABSTRACT

**Aim:** The aim of this study is to determine the morphology changes in the root length of mandibular canines and first molars. **Objective:** The objective is to analyse the degree of morphological changes in the root length of different tooth groups, i.e. canines and molars. **Background:** External apical root resorption is a common phenomenon associated with orthodontic treatment. The factors relevant to root resorption can be divided into biological and mechanical factors. The various mechanical factors include extensive tooth movement, root torque and intrusive forces, movement type, orthodontic force magnitude, duration and type of force. The various biological factors are genetic susceptibility, systemic disease, gender and medication intake have been demonstrated to influence root morphology. **Reason:** The purpose of this study is to determine any morphological changes in the root length that may lead to any considerable changes to the tooth structure.

**KEYWORDS:** The aim of this study to the tooth structure.

### INTRODUCTION

Root resorption is a pathological process that causes a shortening of the dental root. Although this condition is generally asymptomatic and missed in diagnosis, it may result in tooth mobility and even tooth loss if not diagnosed and treated early (Ahangari et al., 2010).<sup>[1]</sup> In orthodontics, induced inflammatory root resorption is a form of pathologic root resorption related to the removal of hyalinized areas of the periodontal ligament following the application of orthodontic forces and is considered an undesirable but unavoidable iatrogenic

consequence of orthodontic treatment (Brezniak & Wasserstein, 2002a; Brezniak & Wasserstein, 2002b).

The root resorption may compromise the existence and functional properties of the affected tooth, depending on the magnitude of the damage (Brezniak & Wasserstein, 1993a, Brezniak & Wasserstein, 1993b)<sup>[2]</sup>, because the root structure (volume and contour) is changed (Consolaro, 2002<sup>[3]</sup>). The process of root resorption during orthodontic treatment is usually smooth and ends when the force is removed (Brezniak & Wasserstein, 1993; Levander et al., 1994)<sup>[4]</sup> some authors have pointed out that the aesthetic and functional improvements are worth the risks (Brezniak & Wasserstein, 1993).<sup>[5]</sup>

## MATERIALS AND METHODS

The post and pre operative records were collected from 20 patients who underwent fixed orthodontic treatment in department of orthodontics, saveetha dental college. For radiographic evaluation of root resorption ortho pantograph (OPG) was advised. The post and pre operative OPG were traced using tracing paper and the length of the root was measured using an scale.

## RESULTS

This study includes 20 patients of which 13 were female and 7 were male. On comparison of OPG taken after followup showed that there was remodelling of mandibular canine and first molar. The result reveal that out of 20 patients 19 patient has root resorption.

## DISCUSSION

Nigul and Jagomagi (2006) did not find differences in the occurrence of root resorption between patients with increased or reduced overjet and overbite. However, the results reported by Brin et al. (2003) and Taner et al. (1999) correlated the occurrence of root resorption after treatment between patients with Class I and Class II division 1 malocclusion.<sup>[6],[7]</sup>

According to several investigators (Linge and Linge, 1983; Brezniak and Wasserstein, 1993; Mirabella and Artun, 1995a; Mavragani et al., 2000; Sameshima and Sinclair, 2001; Ren et al., 2008), the factor age is directly related to the greater occurrence of root resorption after orthodontic treatment, because adult patients are more susceptible to root resorption.

However, other studies (Phillips, 1955; McFadden et al., 1989; Baumrind et al., 1996; Nigul and Jagomagi, 2006) did not find a higher frequency of root resorption in adults.<sup>[8],[9],[10]</sup>

Possible patient-related risk factors include a previous history of root resorption (Brezniak & Wasserstein, 1993; Hartsfield et al., 2004; Marques et al., 2010), tooth/root morphology, length and roots with developmental abnormalities (Brin et al., 2003; Fox, 2005; ; Marques et al., 2010; Sameshima & Sinclair, 2001, 2004; Smale et al., 2005), genetic influences (Al-Qawasmi et al., 2003; Bollen, 2002; Hartsfield et al., 2004; Ngan et al., 2004; Sameshima & Sinclair, 2001), systemic factors (Adachi et al., 1994; Igarashi et al., 1996), including drugs (nabumetone) (Villa et al., 2005), hormone deficiency, hypothyroidism, hypopituitarism (Loberg & Engstrom, 1994; Poumpros et al., 1994), asthma (Brezniak & Wasserstein, 2002; McNab et al., 1999), proximity of root to cortical bone (Horiuchi et al., 1998; Kaley & Phillips, 1991; Otis et al., 2004), alveolar bone density (Midgett et al., 1981; Otis et al., 2004), previous trauma (Brezniak & Wasserstein, 2002; Brin et al., 2003; Hartsfield et al., 2004; Mandall et al., 2006), endodontic treatment (Brezniak & Wasserstein, 2002; Hamilton et al., 1999), severity and type of malocclusion (Brin et al., 2003; Sameshima & Sinclair, 2001; Segal et al., 2004), patient age (Bishara et al., 1999; Fox, 2005; Harris et al., 1993; Levander & Malmgren, 1998; Mavragani et al., 2002) and gender (Chan & Darendeliler, 2006; Fox, 2005; Harris et al., 1997; Sameshima & Sinclair, 2001).<sup>[11][12][13][14]</sup>

The greater occurrence of root resorption among males in relation to females, is due to the fact that the group of male patients exhibited a higher number of maxillary central incisors with pipette-shaped and dilacerated apical morphologies when compared to the females, which presented only eight teeth with such apical morphologies. Even though some studies still report a greater tendency to apical root resorption after orthodontic treatment among the females (Kjaer, 1995; Kurol et al., 1997; Mohandesan et al., 2007), this statement should be revised based on the current knowledge. Despite the controversial reports, most studies indicate the lack of gender dimorphism in this aspect (Linge and Linge, 1983; Levander and Malmgren, 1988; Linge and Linge, 1991; Baumrind et al., 1996; Parker and Harris, 1998; Sameshima and Sinclair, 2001; Nigul and Jagomagi, 2006; Santamaria, 2009).<sup>[15][16][17]</sup>

Some investigators agree with this reduced susceptibility of endodontically treated teeth to root resorption after orthodontic treatment (Spurrier et al., 1990; Mirabela and Artun, 1995a, b; Bender et al., 1997) despite some discordant reports (Drysdale et al., 1997; Consolaro, 2002; 2005; Esteves et al., 2007).<sup>[18][19][20]</sup>

**REFERENCES**

1. Ash M M, Ramfjord S P. Occlusion, 4<sup>th</sup> edn. W.B. Saunders Company, Philadelphia, 1995.
2. Baumrind S, Korn E L, Boyd R L. Apical root resorption in orthodontically treated adults. *American Journal of Orthodontics and Dentofacial Orthopedics*, 1996; 110: 311–320.
3. Bishara S E, VonWald L, Jakobsen J R. Changes in root length from early to mid-adulthood: resorption or apposition? *American Journal of Orthodontics and Dentofacial Orthopedics*, 1999; 115: 563–568.
4. Brezniak N, Wasserstein A. Root resorption after orthodontic treatment: part 1. Literature review. *American Journal of Orthodontics and Dentofacial Orthopedics*, 1993; 103: 62–66.
5. Fanning E. A longitudinal study of tooth formation and root resorption. *New Zealand Dental Journal*, 1961; 57: 202–217.
6. Gleiser I, Hunt E E. The permanent mandibular first molar: its calcification, eruption and decay. *American Journal of Physical Anthropology*, 1955; 13: 253–283.
7. Grant D, Bernick S. The periodontium of ageing humans. *Journal of Periodontology*, 1972; 43: 660–667.
8. Hendrix I, Carels C, Kuijpers-Jagtman A M, van't Hof M. A radiographic study of posterior apical root resorption in orthodontic patients. *American Journal of Orthodontics and Dentofacial Orthopedics*, 1994; 105: 345–349.
9. Lagerström L, Kristerson L. Influence of orthodontic treatment on root development of autotransplanted pre- molars. *American Journal of Orthodontics*, 1986; 89: 146–150.
10. Linge B O, Linge L. Apical root resorption in upper anterior teeth. *European Journal of Orthodontics*, 1983; 5: 173–183.
11. Mavragani M, Vergari A, Selliseth N J, Bøe O E, Wisth P J. A radiographic comparison of apical root resorption after orthodontic treatment with a standard edgewise and a straight-wire edgewise technique. *European Journal of Orthodontics*, 2000; 22: 665–674.
12. Mirabella A D, Årtun J. Prevalence and severity of apical root resorption of maxillary anterior teeth in adult orthodontic patients. *European Journal of Orthodontics*, 1995; 17: 93–99.
13. Reitan K. Initial tissue behavior during apical root resorption *Angle Orthodontist*, 1974; 44: 68–82.
14. Rosenberg M N An evaluation of the incidence and amount of apical root resorption and dilaceration occurring in orthodontically treated teeth having incompletely formed roots

- at the beginning of Begg treatment. *American Journal of Orthodontics*, 1972; 61: 524–525.
15. Rudolph C E. A comparative study in root resorption in permanent teeth. *Journal of the American Dental Association*, 1936; 23: 822–826.
  16. Rudolph C E. An evaluation of root resorption occurring during orthodontic treatment. *Journal of Dental Research*, 1940; 19: 367–371.
  17. Slagsvold O, Bjercke B. Autotransplantation of premolars with partly formed roots. *American Journal of Orthodontics*, 1974; 66: 355–366.
  18. Stenvik A, Mjör I A. Pulp and dentin reactions to experimental root intrusion. A histologic study of the initial changes. *American Journal of Orthodontics*, 1970; 57: 370–385.
  19. Van der Linden F P G M, Duterloo H.S. *Development of the human dentition—an atlas*. Harper and Row Publishers, Hagerstown, Maryland, 1976.
  20. Zander H A, Hürzeler B. Continuous cementum apposition. *Journal of Dental Research*, 1958; 37: 1035–1044.