

## Dentists 2018- External Apical Root Resorption after Six and 12 months of NonExtraction Orthodontic Treatment- Paula Cabrini Scheibel- Dental School of the Universidade Estadual de Maringá

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### Abstract

#### Objectives:

The aim of the present study was to test the hypothesis that external apical root resorption (EARR) after six months of orthodontic treatment could be an incidence indicator of EARR after 12 months of treatment in non extraction orthodontic cases. A comparison of EARR between different types of root morphology was also performed.

#### Material and Methods:

Periodical radiographs of the upper incisors were obtained prior to treatment (T<sub>1</sub>) as well as at six months (T<sub>2</sub>) and 12 months (T<sub>3</sub>) of non-extraction orthodontic treatment among 47 patients aged 11 years or older. The roots were classified based on anatomic shape. Triangular, pipette-shaped, bent and/or short roots were classified as having a tendency toward EARR, whereas those with a rhomboidal and rectangular shape were classified as having no tendency toward EARR.

**Results:** At 12 months of orthodontic treatment EARR ranged from 0 to 12.1% of total tooth length (mean: 3.5%; SD: 3.03), which meant 0 to 2.7mm of EARR. There was significant correlation between EARR at six months and EARR at 12 months.

#### Conclusions:

EARR after the first six months of orthodontic treatment was a good incidence indicator of EARR after 12 months of treatment ( $r = 0.8$ ). Root shape did not show significant influence in root resorption level in non extraction orthodontic cases.

#### Keywords:

Orthodontic tooth movement; Root resorption; Periapical radiographs

#### Introduction:

Although root resorption does not substantially compromise root integrity in most patients, it is severe in 5% to 14.5% and can compromise dental support in such cases. Many factors . magnitude of the force, extension and type of dental movement; history of dental trauma; and genetic factors, such as the presence of the P2X7 receptor .There are few studies. A number of studies reports a significant association between root resorption and different types of root morphology, such as pipetteshaped, narrow or bent .However, other studies have not confirmed this association . Considering the limited effect of risk factors identified for EARR during active orthodontic treatment, studies

involving multivariate analysis suggest that individual predisposition could be the main etiological factor .

#### Materials and Methods:

The sample in the present prospective study was made up of 91 upper central incisors of 47 patients aged 11 years and older, who had their complete fixed orthodontic appliance installed (straightwire technique) by orthodontic graduate students from July 2008 to April 2009. Signed informed consent was the primary condition for the inclusion of each patient. upper incisors with either intact crown or only proximal restorations; nonextraction orthodontic treatment plan.

#### Radiographic analysis:

**Measurement of external apical root resorption:** The length of the upper central incisors (teeth 11 and 12) and respective crowns was measured on the three occasions (DT<sub>1</sub> , DT<sub>2</sub> , DT<sub>3</sub> and CT<sub>1</sub> , CT<sub>2</sub> , CT<sub>3</sub> , respectively) to a precision of 0.1 mm with the aid of the CorelDRAW X4 program .In order to compensate for possible variations in the inclination of the radiographic takes on the different occasions, supposing that the crown measurement remains unaltered throughout treatment, the expected tooth length at T<sub>2</sub> (expected DT<sub>2</sub>) was calculated using the following equation ,expected DT<sub>2</sub> = (CT<sub>2</sub> .DT<sub>1</sub>) / CT<sub>1</sub> . The amount of EARR was determined by subtracting the expected tooth length at T<sub>2</sub> from the tooth length measured at T<sub>2</sub> : EARR at T<sub>2</sub> = expected DT<sub>2</sub> – DT<sub>2</sub> . The same procedure was used to determine EARR at T<sub>3</sub>.

#### Determination of root morphology:

These root anatomies are considered in the judgment of the susceptibility to apical resorption (morphologic risk).

#### Statistical analysis:

EARR at T<sub>2</sub> and T<sub>3</sub> did not exhibit normal distribution (Lilliefors test). Therefore, the non-parametric Spearman correlation test was performed. The Mann-Whitney test was used for the comparison of the amount of EARR between groups with and without a tendency toward resorption. The level of significance was set at 5% for all statistical tests.

#### Results:

There were no significant differences in EARR between incisors 11 and 21. Root resorption of the upper central incisors after six months of treatment (EARR T<sub>2</sub>) ranged from 0 to 10.7% (mean: 2.1%; SD: 2.38) .No root resorption occurred in ten patients (21%) in this period.

## *Short Communication*

### Discussion:

Moreover, Smale report that, while narrow and bent roots may exhibit an increased risk of EARR in the early stages of treatment, the explanation of the variance of these risk factors is less than 25%.

### Conclusion:

The amount of EARR after the first six months of orthodontic treatment does give an indication of the incidence of some external apical root resorption .

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