Book reviews and article abstracts

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THESIS ABSTRACTS

The effects of buccolingual root torque on the appearance of root angulation on panoramic radiographs

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It is common practice for orthodontists to use panoramic images to assess root parallelism before, during, and after orthodontic treatment. The purpose of this laboratory study was to examine the effects of changes in buccolingual root torque on mesiodistal root angulation imaged on panoramic radiographs. Teeth investigated were maxillary lateral incisors and second premolars, and mandibular first and second premolars. By using a transparent tyndolnt model with anatomically correct teeth (typical crown and root anatomy), root torque was progressively added to the teeth in 5° increments, totaling up to 15° of torque in each direction. Standardized digital photographs and panoramic radiographs were made after each adjustment. The photographs made from a facial perspective documented that the roots remained parallel. With each increment of change in root torque, measurement of the root apex position in a mesiodistal direction was made on the panoramic radiograph. Results showed that when torque was changed, distortion inherent to the panoramic radiograph created the appearance of mesial or distal movement of the root apices. For the premolars, adding lingual root torque (LRT) resulted in apparent increases in mesial root tip (eg, with 15° LRT, the root tips moved mesially 1.9 to 2.8 mm), whereas adding buccal root torque (BRT) resulted in apparent increases in distal root tip (eg, with 15° BRT, the root tips moved distally 2.8 to 4.4 mm). For the lateral incisors, changes in torque had a less pronounced effect on apparent root tip (eg, with 15° LRT, the root tips moved mesially 1.2 mm; with 15° BRT, the root tips moved distally 0.17 mm). The results show that changes in root torque predictably affect the appearance of root tip on panoramic radiographs. The findings suggest that if roots appear incorrectly aligned on panoramic images, the teeth in question should be carefully examined clinically (or with periapical images) to differentiate the need for appliance adjustments that alter root tip versus root torque.

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External apical root resorption of the maxillary central incisor in anterior open bite malocclusion

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External apical root resorption is a pathologic process associated with orthodontic treatment. The purpose of this study was to evaluate the severity and risk factors associated with root resorption of maxillary central incisors in orthodontic patients who had anterior open bite malocclusions. This retrospective study used randomly selected open bite and control samples, 32 patients in each, screened from 800 orthodontic treatment records at Oregon Health & Science University. The open bite sample was defined as having no vertical overlap of the incisors before treatment. The control sample consisted of patients with 10% to 30% overbite. Subjects were excluded if there was a history of trauma to the maxillary central incisor, restoration of the incisal edge, reshaping or restoration of incisal edges during or after orthodontic treatment, root canal therapy, significantly malformed roots, incomplete root apex development, an obscured root apex, greater than 7 mm overjet, supernumerary teeth in anterior maxilla, a history of previous orthodontic treatment (including phase 1 treatment), orthognathic surgery during treatment, sibling relationship with another subject, or early termination of treatment. Each group contained 9 male and 23 female subjects, with mean ages of 18.7 years for the open bite group and 14.7 years for the control group. Tooth length and changes in tooth position were measured from tracings of the pretreatment and posttreatment lateral cephalograms. In addition, treatment records were reviewed to document use of elastics, length of treatment time, and age when treatment began. Incisor length measurements were compared with a 2-sample t test with P set to 0.05. By using a chi-square test for R × C contingency tables with P set to .05, the percentage change in incisor length was compared categorically: no resorption, mild (1%-10% decreased length), moderate (10%-30%), and severe (>30%). Treatment factors and changes in tooth position were analyzed with multiple linear regression analysis. Results showed a significant difference in the amount of incisor root resorption in patients with an open bite (2.26 mm; ± SD 1.76 mm) compared with those with a normal overbite (0.93 mm; ± SD 1.16 mm, P = 0.001). The chi-square test showed that the distribution of root resorption categories was significantly different for the 2 groups (P = 0.01). Multiple linear regression analysis indicated that an