

Morphological analysis of maxillary first premolars by cone beam computed tomography in a Chilean sub-population

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Abstract

The root canal system of the maxillary first premolar (MFP), present a high rate of variation, especially at apical level. This complicates the action of antiseptic solutions and endodontic instruments at this level. The object of this in vivo study was to analyse by Cone Beam Computed Tomography (CBCT) the radicular and canalicular morphology of MFP in a Chilean sub-population. We carried out a cross sectional, descriptive and observational in vivo study with CBCT examinations of 70 MFP, both left and right. The data were analysed using descriptive statistics (mean (M), standard deviation (SD), with a confidence interval of 95 %), and one-factor ANOVA was used to relate the sections observed. Tooth 1.4 presented one root in 64.86 % of cases and two roots in 35.15 %. Tooth 2.4 presented one root in 66.67 % of cases and two roots in 33.33 %. The frequency of one and two canals was observed to be 30 % and 70 % respectively. The walls with the smallest cementodentinal thickness were the mesial (1.11 ± 0.55) and distal (1.08 ± 0.52). The thickest dentinal wall was the palatine (2.07 ± 1.29), followed by the buccal (1.6 ± 1.0). No statistical differences between males and females were found in the thickness of the root wall, nor in the location of the premolar in the maxilla ($p>0.05$). In conclusion, the root morphology of the MFP is highly variable. Care must be taken not to over-instrument the proximal walls to avoid perforations or fractures. CBCT has proved to be a useful and effective diagnostic tool for in vivo study of dental morphology.

Author keywords

Cone Beam Computed Tomography
Endodontics
Maxillary first premolar
Root canal anatomy
Vertical root fracture