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ROOT CANAL MORPHOLOGY OF MAXILLARY AND MANDIBULAR PREMOLARS IN BELARUSIAN POPULATION USING CONE BEAM COMPUTED TOMOGRAPHY

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Resume. The maxillary first premolars and mandibular premolars are the most difficult teeth for endodontic treatment because of the number of roots and canals, the direction and longitudinal depression of the roots, difficulties in visualization of apical limit. Cone beam computed tomography (CBCT) is the most accurate method to detect root canal morphology.

Keywords: root, canal, maxillary premolars, mandibular premolars, cone beam computed tomography.

Relevance. Lack of knowledge of internal anatomy of teeth and dental pulp is second most important cause of treatment failures after wrong diagnosis and treatment planning. The root canal system has a complex anatomy [1]. Common intraoral and panoramic radiographs only provide a two-dimensional image and miss the important third dimension, which could lead to missing canals and the buccolingual curves of root canals. Cone beam computed tomography (CBCT), since its introduction in 1990, provides three-dimensional high-resolution images with the possibility of removing the superimposed structures; it could help in a better determination of root canal anatomy and morphology in a noninvasive way [2]. Root canal anatomy does not usually reveal a single uniform tapered canal; extra canals, anastomosis, and other irregularities exist [3]. CBCT is the most accurate method to detect root canal morphology.

Aim: The purpose of this study is to assess the anatomy and morphology of maxillary and mandibular premolars based on Vertucci's classifications in a defined group of dental patients in Belarus.

Objectives:

1. To define the number of roots and root canals.
2. To define root canal morphology based on Vertucci's classification.

Material and methods. CBCT images of randomly selected 70 patients of dental policlinics in Minsk (45 males and 25 females between 23-65 years old) during the period 2012-2017 were analyzed. The final number of the scans became 30 (20 males and 10 females) according to chosen criteria such as presence of at least maxillary or mandibular first and/or second premolars from both right and left sides with fully developed root, absence of periapical lesion or other pathology in the region of the root apex, no endodontically treated teeth. Teeth with crowns or posts were not assessed. All images were analyzed in axial, coronal and sagittal view.

Were evaluated the number of roots and root canals, root canal morphology according to Vertucci's classification. The influence of sex was not evaluated.

All images were taken using tom Galileos GAX5 (Sirona Dental System, Bensheim, Germany) and analyzed by program GALILEOS Viewer.

Results and discussion. The program ''Statistica'' was used to assess the data. In this group of 30 patients (20 males and 10 females between 23-65 years old) were evaluated:

1) in maxillary first premolars the most common root number was two (52%) and most of these teeth showed Type IV canal configuration (68.75%), shown on Figure 1 below,

also was shown Type II (18.75%) and Type I (6.25%);

(a) *(b)*

Fig. 1 – CBCT of maxillary first(a) and second(b) premolars, axial plane:
a) Type IV canal configuration; b) Type II canal configuration

2) in maxillary second premolars the most prevalent were one rooted teeth (83%) and most of these teeth showed Type I canal configuration (48%), also was shown Type II(16%);

3) mandibular first premolars had a single root (94.5%) and most of these teeth showed Type I canal configuration (81.6%) shown on Figure 2; also was shown Type II (3.4%) and Type III (6.8%);

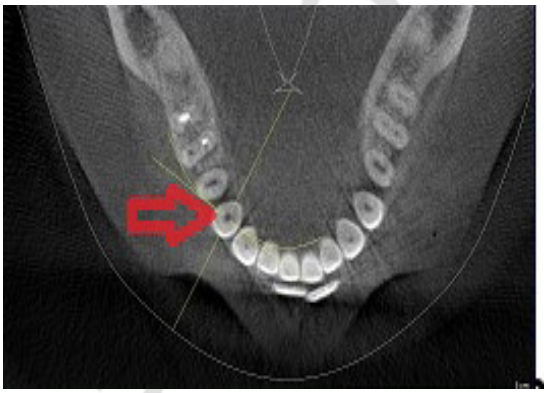

Fig. 2 – CBCT of mandible first premolar; axial plane, Type I canal configuration

Conclusions: In this research with a Belarusian population most common first maxillary premolars had two roots with Type IV canal configuration, most common second maxillary premolars had a single root with Type I canal configuration, most common both mandibular premolars had a single root with Type I canal configuration.

References

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