Relationship between maxillary molars and the maxillary sinus floor

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Introduction

The surgery and endodontic procedures of the posterior maxillary region require detailed knowledge of anatomic relationship between the maxillary sinus floor and the roots of the maxillary molars.

Aim of study

To investigate the relationship between the roots of the maxillary molars and the maxillary sinus floor using cone beam computed tomography

Materials and methods

Ninety nine CBCT scans of randomly selected patients who visited dental outpatient hospitals of Minsk, Belarus during the period from 2012 to 2017 were retrospectively analyzed. Of the 99 patients, 47 were women and 52 men, mean age: 30.3, SD: 11.2. All selected participants were 18-60 year-old, had maxillary premolars and first and second molars present at least on one side, had no radiographic signs of trauma and artifacts or technique related image defects. Reformatted computerized tomograms (CT) from 198 sinuses were analyzed using imaging software. Type of vertical and horizontal root apex-sinus relationships and distance between root apices and sinus floor were measured.

Results

The vertical relationship between each root of the molar and the sinus floor was classified into four types: Type 0, the root was not in contact with the sinus floor; Type 1, the root was in contact with the sinus floor (more frequent in the palatal roots of maxillary molars); Type 2, the root apes was in contact with the sinus floor making small elevation into the sinus cavity; and Type 3, the root apex was projecting into the sinus cavity (more frequent in the mesiobuccal and distobuccal roots of second molars). In Type 0 and Type 3, the distance between the apices of the molars and the sinus floor was measured. In Type 0 the closest to the sinus floor was the apex of the distobuccal root of the first molar (Me = 2.09 mm).

Conclusions

The root apices of the maxillary molars can be located below the maxillary sinus floor, contact with the sinus floor or project into its lumen. Root apices of 31.6% of mesiobuccal and 21.5% of distobuccal roots of second molar were projected into the sinus lumen. Root apices of 76.3% of mesiobuccal and 70.8% of palatal roots of second molar were in contact with sinus floor. The results of the performed study are relevant for endodontic treatment of the first and second maxillary molars and surgical procedures in the posterior maxilla. Cone-beam computed tomography allows to study in detail relationship between the roots of the maxillary molars and the maxillary sinus floor.