

Evaluation of the Relationship Between Position of Mandibular Impacted Third Molars and External Root Resorption of Second Molars and Mandibular Canal by Cone Beam Computed Tomography: A Retrospective Study

Abubekir Laloğlu*, Sümeyya Demir, Binali Çakır

Abstract— The aim of this study was to determine the relationship between the position of mandibular impacted third molars and the external root resorption of the second molars and the mandibular canal in patients who applied to Atatürk University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology between January 2022 and October 2022. retrospective evaluation of images. In this study, Cone Beam Computed Tomography (CBCT) images of 120 patients who applied to our clinic were examined. Of 120 patients whose images were analyzed, 60 had impacted right mandibular third molar teeth and 60 left mandibular third molar teeth were impacted. The position of the impacted mandibular third molars, the relationship between the mandibular canal and the external root resorption of the mandibular second molars were investigated. In the retrospective study, the patients were between the ages of 15-60 and the mean age was 27.83 ± 8.552 . Of the 120 patients examined, 72 (60%) were female and 48 (40%) were male. It was determined that 25 (20.8%) of 120 mandibular impacted third molar teeth were related to the canal and 95 (79.2%) were not related to the canal. A relationship was determined between the resorption of the mandibular second molar and the position of the mandibular impacted third molar tooth ($p < 0.001$). Knowing the positions of the mandibular third molar teeth in the bone and their relationship with the mandibular second molar and mandibular canal prevents complications and determines the right approach during treatment. For this reason, three-dimensional examination of the positions of the mandibular third molar teeth and their relationship with neighboring anatomical structures helps the physician in diagnosis and treatment. When planning endodontic and surgical procedures in this region, CBCT can provide important information to ensure the continuity of anatomical structures and prevent complications." publication prepared by the Ministry of Justice, General Directorate of Criminal Records and Statistics, was analyzed and visualized.

Index Terms— Mandibular 3rd molar, Mandibular Canal, Retrospective

INTRODUCTION

Mandibular third molars are the most frequently impacted teeth among all third molars [1, 2]. Heredity, differences in facial development, sizes of jaws and teeth, nutrition, use of masticatory muscles, narrowness of the jaw arch, delayed mineralization of third molars, rickets, anemia, various endocrine disorders and syndromes can be counted among the reasons for these teeth to be impacted [3]. As a result of clinical and radiological examinations of impacted or semi-impacted third molars; it is seen that these teeth form cysts, cause resorption or caries on the distal surfaces of the second molars, and are associated with the mandibular canal [2, 4]. Cone Beam Computed Tomography (CBCT); It is the most ideal imaging method used to examine the position of impacted mandibular third molars and their relationship with the mandibular second molar and mandibular canal [4, 5].

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This technique; In addition to helping to interpret the complex relationship of craniofacial structures, it is highly preferred because it provides many advantages such as imaging this region without superposition, taking sections from the desired region in different planes (sagittal, coronal and axial) and in desired dimensions. The most basic feature of the CBCT technique is that it can create multiplanar projections by performing a single rotational scan [5, 6]. CBCT; Compared to multislice computed tomography, it is more preferred due to its low cost, easy accessibility and low radiation [6].

AIM

The aim of this study is to examine the relationship between the position of mandibular impacted third molars and external root resorptions of second molars and mandibular canal on cone beam computed tomography images in patients who applied to Atatürk University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology between January 2022 and October 2022. evaluated retrospectively.

MATERIAL AND METHOD

In this study, those who applied to Atatürk University Faculty

of Dentistry Oral and Maxillofacial Radiology clinic from Erzurum and surrounding provinces (Ağrı, Iğdır, Kars, Muş, Bingöl) between January 2022 and October 2022; Cone-beam Computed Tomography (CBCT) images of 120 patients between the ages of 15 and 60 were examined. 120 patients whose images were analyzed; 60 had impacted right mandibular third molar teeth and 60 left mandibular third molar teeth were impacted. The position of the impacted mandibular third molars, the relationship between the mandibular canal and the external root resorption of the mandibular second molars were investigated. Our research; Axial, coronal and cross-sectional sections of tomography images taken by applying various indications and FOV intervals with the CBCT device (NewTom Vgi evo, Quantitative Radiology, Verona, Italy) were evaluated. The position of the impacted mandibular third molars, their impact on the second molars and their relationship with the mandibular canal were evaluated separately by two observers, an Assistant of Oral, Dental and Maxillofacial Radiology with 3 years of experience. The agreement between the first and second observers was evaluated with the Kappa test.

The position of the mandibular third molars was examined in three groups as vertical, oblique and horizontal. (Picture: 1 a, b, c)

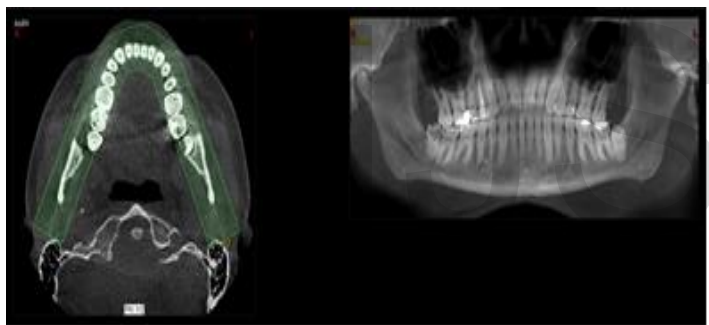


Figure 1-a. Impacted Mandibular Molar Tooth in Vertical Position. (38)

Figure 1-b. Impacted Mandibular Molar Tooth in Oblique Position. (38)

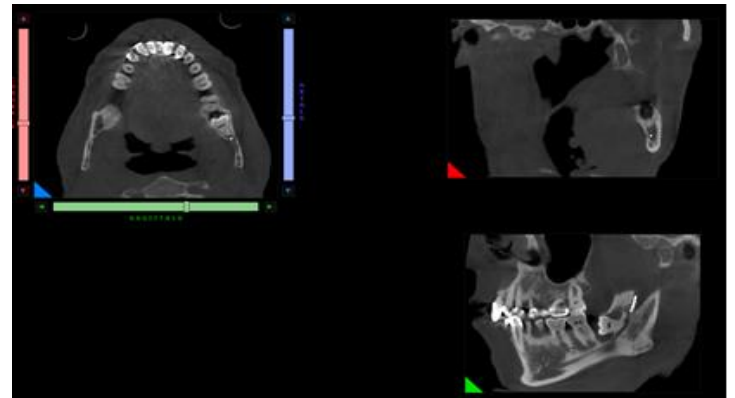


Figure 1-c. Impacted Mandibular Molar Tooth in Horizontal Position. (38)

The effect of impacted third molars on second molars was evaluated in 2 categories.

- 1) There is resorption on the distal surface of the second molar tooth (Picture 2)
- 2) No resorption on the distal surface of the second molar tooth (Picture 3)

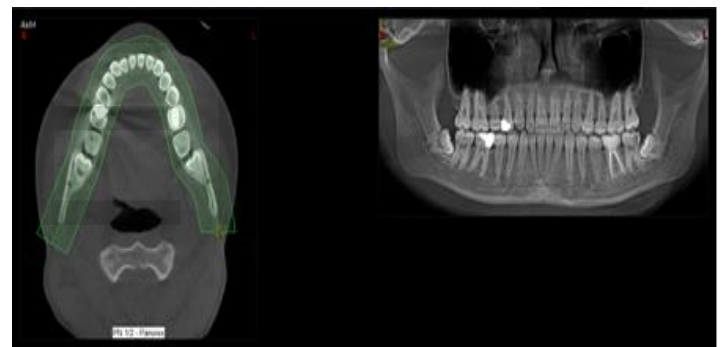


Figure 2. There is resorption on the distal surface of the second molar tooth

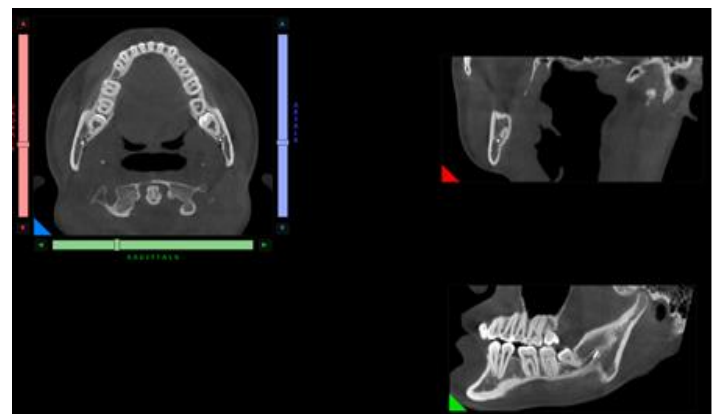
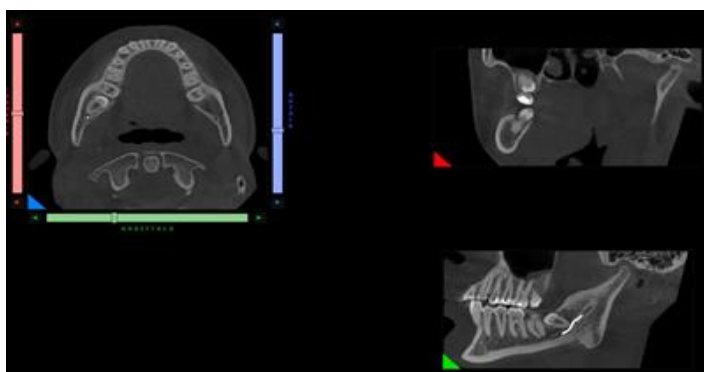


Figure 3. No resorption on the distal surface of the second molar.

The relationship of the impacted third molars with the mandibular canal was evaluated in 2 categories.

- 1) The impacted third molar tooth is associated with the mandibular canal. (Picture 4)
- 2) The impacted third molar tooth is not associated with the mandibular canal. (Picture 5)

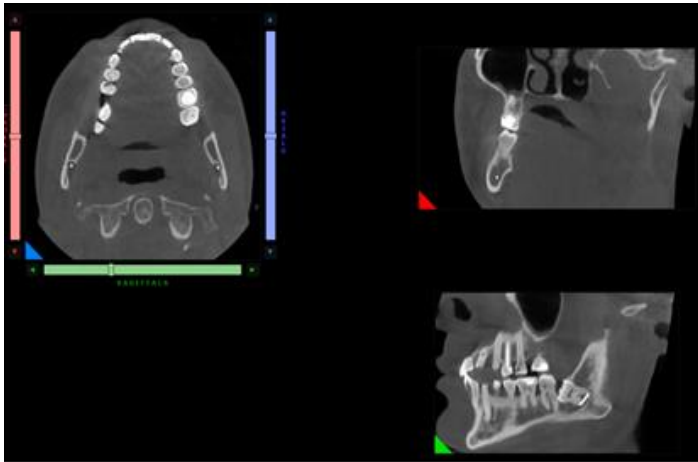


Figure 4. The impacted third molar tooth is associated with the mandibular canal.

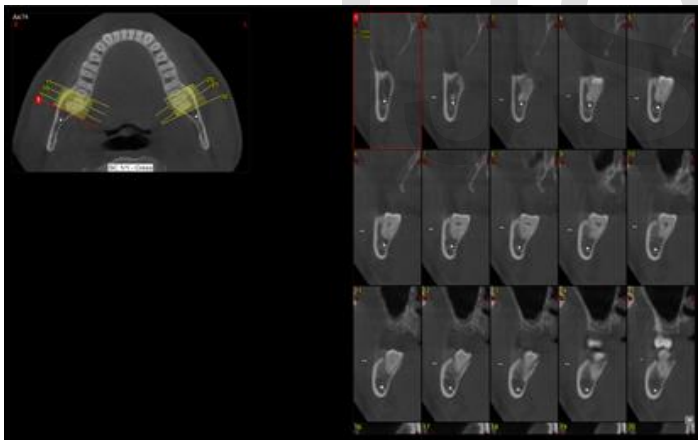


Figure 5. Impacted third molar tooth is not associated with the mandibular canal.

In our study, statistical analysis of the parameters of mandibular impacted third molars; By using SPSS 24.0 program, the mean age was determined by descriptive analysis method and the difference between genders was calculated by Student's t test. Correlation of impacted teeth with mandibular canal and second molars was also analyzed by Pearson Correlation method.

RESULT

In the retrospective study, the patients were between the ages of 15-60 and the mean age was 27.83 ± 8.552 . Of the 120 patients examined, 72 (60%) were female and 48 (40%) were male. No gender difference was observed between the position of the mandibular third molar teeth and the resorption of

the mandibular canal and the mandibular second molar tooth ($p < 0.001$). It was determined that 25 (20.8%) of 120 mandibular impacted third molar teeth were related to the canal and 95 (79.2%) were not related to the canal. A relationship was determined between the resorption of the mandibular second molar and the position of the mandibular impacted third molar tooth ($p < 0.001$).

DISCUSSION

Subhashraj and friends, analyzed different pathologies associated with impacted third molar teeth in their study and found that the most common is resorption formation in the root of the second molar tooth with a prevalence of 22%[1]. In the study of Marques and friends, it was concluded that caries formation in the second molar tooth increased significantly in the horizontal position of the impacted tooth [7]. Polat and friends (2008) reported that the horizontal and mesioangular position of the third molar tooth constitutes a high-risk factor for the development of caries in the second molar tooth [8]. In our study, the third molar teeth; A relationship was determined between the resorption of the mandibular second molar and the position of the mandibular impacted third molar tooth ($p < 0.001$).

Aksoy and friends, investigated the relationship of the mandibular teeth with the mandibular canal and found that the relationship of the mandibular third molars with the mandibular canal was higher than the other teeth [9]. In our study, the relationship of impacted mandibular third molars with the inferior alveolar nerve was investigated. It was determined that 25 (20.8%) of 120 mandibular impacted third molar teeth were associated with the canal.

CONCLUSION

Knowing the positions of the mandibular third molars in the bone and their relationship with the mandibular second molar and mandibular canal prevents complications and determines the right approach during treatment [10]. For this reason, the three-dimensional examination of the positions of the mandibular third molars and their relationship with the adjacent anatomical structures greatly helps the physician in diagnosis and treatment [10].

When planning endodontic and surgical procedures in this region, CBCT can provide important information to ensure the continuity of anatomical structures and prevent complications.

Keywords: Mandibular 3rd molar, Mandibular Canal, Retrospective

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