Prevalence of Root Dilacerations in an East Anatolian Endodontic Patient Population

Bir Doğu Anadolu Endodontik Hasta Populasyonunda Dilaserasyon Yaygınlığı

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ABSTRACT Objective: The purpose of this study was to determine the prevalence of root dilacerations in a sample of endodontic patient population with respect to sex, jaw (upper or lower), and dental localization. **Material and Methods:** Dilaceration of the root was detected by using periapical radiographs of 3412 patients, ranging in age from 18 to 65 years. A tooth was recorded as having a dilaceration if there was a deviation from the long axis (≥90°), and by evaluating its "bull's-eye" appearance. The radiographs were examined by an author, with a magnifying lens and an X-ray viewer. One month later, another examination was made again. Data was analyzed with the Pearson chi-square test. **Results:** 10.965 teeth were examined and 70 (0.7%) root dilacerations were determined. The maxillary third molar was the most frequently affected tooth (4.4%). There was no statistically significant difference between male (0.9%) and female patients (1%). Dilaceration was not detected in maxillary central incisors, maxillary canines, maxillary first premolars, and in the mandibular anterior region. Dilaceration was more common in the maxilla than in the mandible. **Conclusion:** In an endodontic patient population, dilaceration was most frequently found in molar teeth. The radiographic diagnosis of root dilaceration is very important before endodontic or other dental treatments begin. Additionally, the practitioners should be careful whilst treating dilacerated teeth.

Key Words: Radiography; prevalence

ÖZET Amaç: Bu çalışmanın amacı, bir endodontik hasta populasyon örneğinde cinsiyete, üst ve alt çeneye ve diş lokalizasyonuna göre kök dilaserasyonu görülme sıklığını belirlemekti. **Gereç ve Yöntemler:** 18 ile 65 yaş arasındaki 3412 hastanın periapikal radyografileri kök dilaserasyonu açısından incelendi. Bir dişteki dilaserasyon varlığı kök uzun aksında 90° veya daha fazla olan eğriliğin ve "bull's-eye" görünümünün değerlendirilmesi ile kaydedilmiştir. Radyografiler bir yazar tarafından büyütme merceği ve negatoskop kullanılarak incelendi. Bir ay sonra tekrar başka bir inceleme yapıldı. Veriler Pearson ki-kare testiyle analiz edildi. **Bulgular:** 10965 diş incelendi ve 70 (%0,7) dişte kök dilaserasyonu belirlendi. Üst 3. büyük azı dişi en çok etkilenen dişti (%4,4). Erkek (%0,9) ve kadın (%1) hastalar arasında istatistiksel olarak önemli fark yoktu. Dilaserasyon maksiller santral kesici dişlerde, kaninlerde, birinci premolarlarda ve mandibular ön bölge dişlerinde tespit edilmedi. Dilaserasyon, üst çenede alt çeneye göre daha yaygındı. **Sonuç:** Dilaserasyon, bir endodontik hasta popülasyonunda, en sık büyük azı dişlerinde bulundu. Dilaserasyona sahip olan bir dişi kanal tedavisi veya diğer tedavilere başlamadan önce teşhis etmek çok önemlidir. Ek olarak, klinisyenlerin dilaserasyona sahip dişleri tedavi ederken dikkatli olmaları gerekir.

Anahtar Kelimeler: Radyografi; prevalans

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Dilaceration is an angulation occurring anywhere on the tooth; for example, at the tooth's crown, root, amelocemental junction, or apex.[1] According to some authors,[1,2] angulations must be 90° or

greater at dilaceration, whereas in another study, it has been suggested that 20° or greater angulation is enough for defining the dilaceration.[1-3] Tomes used dilaceration as a term first in 1848 and Stewart has likened it to the hand of a traffic policeman, whereas Moreau used "scorpion tooth" as a term for dilaceration.[4-6]

Dilaceration had been considered to originate from traumatic displacement of already formed hard tissue in relationship to the developing soft tissue; however, this pathogenesis has been questioned, and it has been alternatively suggested that the deformity exists because of the ectopic development of the tooth germ rather than due to trauma.[7-10] Nevertheless, in the anterior region, trauma is still accepted as one possible cause of root dilaceration, even if it is not a common cause.[8,10]

Before root canal treatment, extraction, or orthodontic movement, diagnosing the dilaceration is important.[3,11] However, while a crown dilaceration can be diagnosed visually, if a tooth root has a dilaceration, a radiographic examination is required to diagnose it.[2] In literature, although there are many case reports related to dilaceration, there are only a few published articles discussing prevalence of dilaceration.

The aim of this study was to determine the prevalence of root dilaceration in an endodontic patient population with respect to sex, jaw (upper or lower), and dental localization.

MATERIAL AND METHODS

3.783 patients' periapical radiographs were used. These were chosen between January 2008 and January 2010 from the Department of Endodontics, Faculty of Dentistry, University of Atatürk, in the city of Erzurum, located in the northeast part of Turkey. Exclusion criteria for the collected radiographs included: more than one record of the same region in the same patient; patients younger than 18 years old; radiographs of poor quality; and record with radiographs of only primary teeth. The final sample included 3.412 periapical radiographs with 10.965 permanent teeth examined.

The radiographs were examined by an author, using Hamasha's criteria with a magnifying lens and an X-Ray viewer.[2] One month later, another examination was made again, and 100% agreement was obtained. A tooth was considered as having a dilaceration towards the mesial or distal direction if there was deviation of 90° or more along the axis of the tooth or root as seen in Figure 1. Dilaceration towards the buccal or lingual were determined by evaluating the bull's-eye appearance of the root.[2]

The data was analyzed using the computer program (SPSS Inc.; Chicago, USA 17.0). The frequencies of anomalies detected were calculated with respect to sex, jaw (upper or lower), and dental localization. The Pearson chi-square test was used to determine potential differences in the distribution of dental anomalies when stratified by sex. A p value of < 0.05 was considered statistically significant.

RESULTS

3.412 patients were examined and 70 (0.7%) root dilacerations were determined in 67 patients (31 males 46.2%, 36 females 53.7%). There was no statistically significant difference between male (0.9%) and female patients (1%). The most often dilacerated teeth were maxillary third molar (4.4 %), followed by mandibular third molar (4%). Dilaceration was found in 1.5% of maxillary second molars and 0.8% of maxillary first molars. Root dilaceration was not detected in maxillary central incisors, maxillary canines, maxillary first premolars, and in the mandibular anterior region. The prevalence of dilacerations for both jaws is shown in Table 1 and 2.

DISCUSSION

In this study, root dilacerated teeth were most frequently found to be maxillary third molars, whereas Hamasha et al. and Miloglu et al. reported that the most frequently dilacerated teeth were mandibular third molars. Our results show that the prevalence is greater in posterior regions, similar to that reported by Hamasha et al. and Miloglu et al.[2,12] In the literature, various degrees of prevalence of dilaceration were reported especially in

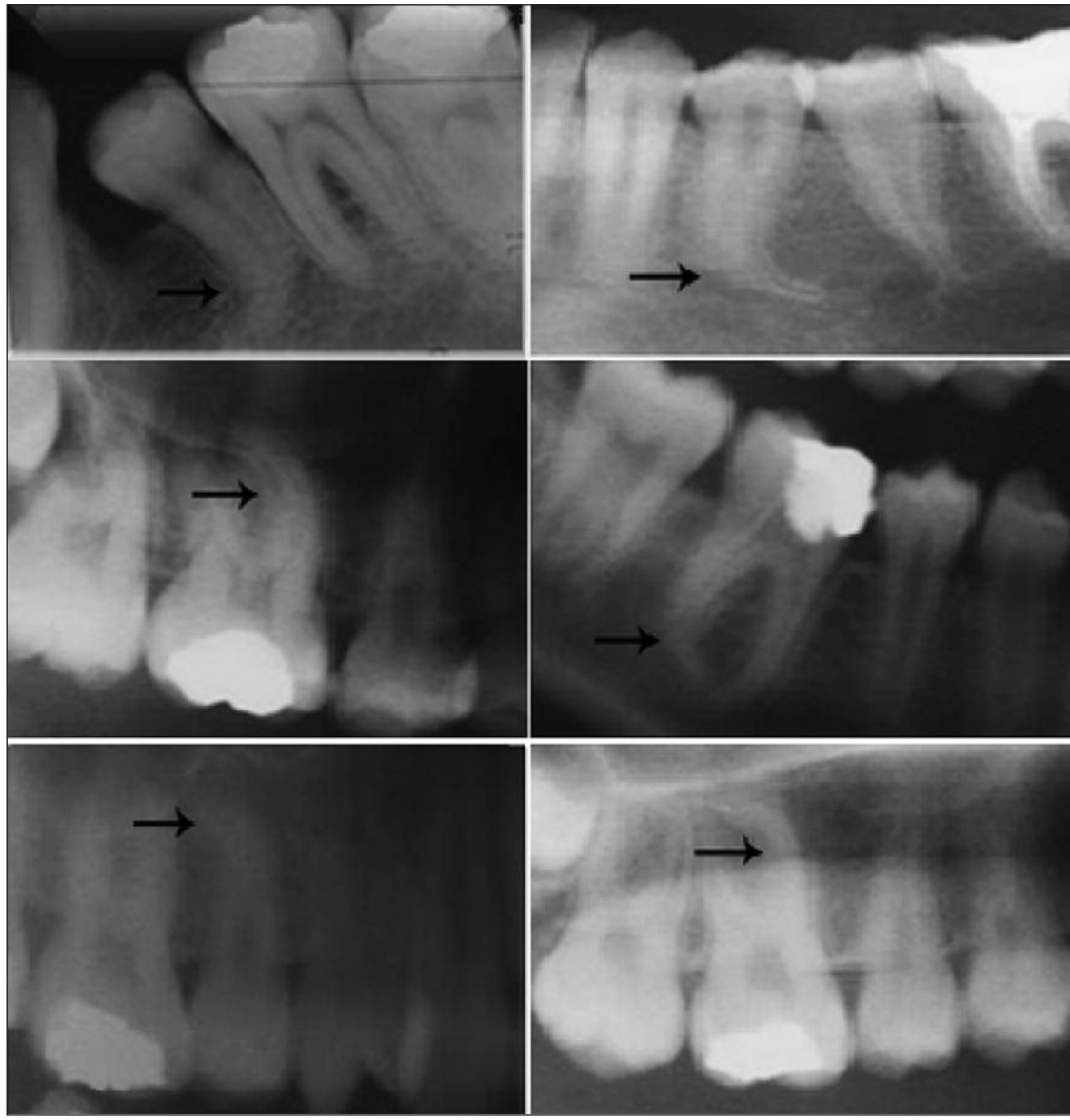

FIGURE 1: Samples of dilacerations on formed periapical radiographs.

maxillary lateral incisors.[2,3,12] In our study, however, the prevalence of dilaceration in maxillary lateral teeth was 0.2% and we were not able to find dilacerated incisors or canine at mandible and central incisor or canine at maxilla. In addition, root dilacerations have shown higher prevalence at maxilla than at mandible. These differences might be a cause of other authors' definition of dilaceration (20° or more).[3]

Previous studies have reported the prevalence of dileceration with the frequencies ranging from 0.32% to 98%.[3,4] This study showed that prevalence in all teeth was 0.7 %. The occurrence rate of dileceration among teeth in the present work is "1" and similar to that of Hamasha et al. and lower than the rate of Chohayeb.[2,3] This differences might be cause of the definition of dileceration too, also might be cause of the type of teeth which were examined and racial differences .

To diagnose an unextracted, dilacerated tooth, radiographic examination is the most appropriate method.[13] For this purpose, periapical

TABLE 1: Prevalence of dilacerations of the roots of maxillary teeth detected by using periapical radiographs.

Maxilla	1	2	3	4	5	6	7	8
Total	757	727	755	694	668	585	688	563
Apical	0	2	0	0	4	1	2	16
Middle	0	0	0	0	0	4	9	6
Coronal	0	0	0	0	0	0	0	3
Prevalence	0%	0.2%	0%	0%	0.5%	0.8%	1.5%	4,4%

TABLE 2: Prevalence of dilacerations of the roots of mandibular teeth detected by using periapical radiographs.

Mandible	1	2	3	4	5	6	7	8
Total	787	785	774	749	722	512	653	546
Apical	0	0	0	1	0	1	0	13
Middle	0	0	0	0	1	0	2	5
Coronal	0	0	0	0	0	0	0	4
Prevalence	0%	0%	0%	0.1a%	0.1%	0.1%	0.3%	4.0%

and panoramic radiographs may be used. However, panoramic radiography alone is not the method of choice for diagnosing root dilacerations, which can occur in the buccal/labial or palatal/lingual directions.[11] Periapical radiographs are adequate to determine the direction of dilaceration.[3] For this reason, we used periapical radiographs in this study.

The most widely accepted cause of dilaceration is mechanical trauma to the primary predecessor tooth, which results in dilaceration of the developing succedaneous permanent tooth.[4] However, some reports have questioned the etiology of dilaceration and do not support the belief that trauma is the major etiologic factor.[5,14] Andreasen&Rann mentioned that the major factor for dilacerations was ectopic development of tooth bud.[9] In our study, most of the dilacerated teeth were found in the posterior region, and these are not prone to direct trauma.

If endodontic therapy is planned in a dilacerated tooth, the dentist may come across some difficulties. It is often difficult to explore and pass through the root canals easily when the state of the pulp has caused apposition and/or resorption of the canal wall.[15] Another problem in endodontic treatment of these cases is the inability to follow the root canal curvature continuously. This might result in blocking of the canal, ledging, transportation, zipping, perforation, and instrument breakage.[10] Because of these complications, the diagnosis of root dilacerations is very important before endodontic treatment.

CONCLUSION

This study confirms that however uncommon and varied between tooth types dilaceration is, before endodontic treatment or other treatments (such as extraction, orthodontics), this anomaly should be taken into consideration.

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