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Orijinal Makale **Aydın ve ark.**

Türk Popülasyonunda Agresif Periodontitis ile Kök Anomalisi Arasındaki İlişkinin Değerlendirilmesi

Assessment of the Relationship Between Aggressive Periodontitis and Root Abnormality on the Turkish Subpopulation

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Özet

Bu çalışmanın amacı Türk popülasyonu üzerinde agresif periodontitis ile kök anomalisi arasındaki ilişkinin değerlendirilmesidir.

Gereç ve Yöntemler: Buçalışmaya agresif periodontitise sahip 54 hasta (16 erkek, 38 kadın, ortalama 32.16 ± 1.2 yaş) dahil edildi. Hastaların maksiller ve mandibular premolar ve molar dişleri kök anomalisi açısından değerlendirildi. Elde edilen veriler Ki-kare analizi ile değerlendirildi.

Bulgular: Mandibular dişlerde (% 39,1) maksiller dişlere (% 38.3) göre daha sık anormali gözlendi. Maksillada en sık Tip 4 kök anomalisi, mandibulada ise en sık Tip 2 kök anomalisi görüldü($p<0.05$).

Sonuç: Bu çalışmanın limitasyonları altında AP ile kök anormalliği arasında bir ilişki olduğu bulundu.

Anahtar kelimeler: Agresif Periodontitis, Kök Anormalliği, Panoramik Radyografı

Abstract

The aim of this study is to investigate the relationship between aggressive periodontitis and root anomaly on the Turkish population.

Materials and methods: In this study 54 patientswith aggressive periodontitis (AP) were included (16 male, 38female; meanage32.16±1.2 years). Maxillary and mandibular premolars and molar teeth of patients were evaluated in terms of root anomaly. The obtained data were evaluated by Chi-square analysis.

Results: More frequent abnormalities were observed in mandibular teeth (39.1%) than in maxillary teeth (38.3%). Type 4 is the most common root abnormality seen in maxilla, while type 2 seen in mandible ($p<0.05$). Conclusion: Under the limitations of the study, there was a relationship between AP and root abnormality.

Key words: Aggressive Periodontitis, Root Abnormality, Panoramic Radiography

Introduction

Aggressive periodontitis (AP) is a rapidly progressive disease that affects the tooth-supporting structures, leading to loss of bone support and a tendency to aggregate in families. It also generally affects healthy young individuals systemically (1,2).

Epidemiological researchs Show varying degrees of occurrence such as 0.4-0.8% in North America, 0.3-1.0% in South America,0.1-0.5% in western Europe, 0.5-5.0% in Africa and 0.4-1.0 in Asia (3,4).

Microbial factors are not sufficient to explain inter individual differences in the outcome of AP[5]. Some genetic factors are thought to increase the host susceptibility including family aggregation, single nucleotide polymorphisms, polymorphonuclear neutrophils, antibodies to bacteria, smoking, stress, and a local contributing factor (root morphology) (6,7).

The shape, length, and spread of roots are important factors in tooth prognosis, as they can affect the anchorage and stability of teeth,and may contribute to an unfavorable crown-root ratio, resulting in an increased susceptibility to loosening when they are subjected to heavy occlusal force (8,9). In addition, root shapes may contribute to the development of periodontal defects by providing an environment favorable to the retention of plaque. Consequently, knowledge of root anatomy is important to obtain a diagnosis and treatment of existing or potential periodontal problems (10).

The aim of this study was to investigate root abnormalities according to Meng et al. [7] classification, in order to research the effects of root form abnormalities on periodontal attachment loss and treatment of AP.

Materials and Methods

In this retrospective study, the study protocol was approved by the Local Ethics Committee of the x x University.

The patients who were included in the study suffered from AP They attended xx University Faculty of Dentistry, Department of Dentomaxillofacial Radiology, between January 2015 and May 2018 for various dental problems.

In this study 54 patients with AP were included (16 male, 38 female; mean age 32.16±1.2 years) The assessment criteria for AP were defined according to the classification proposed by the International Workshop for the Classification of Periodontal Diseases and Conditions (11).

To be included in the study, panoramic radiographs that meet the technical quality criteria with clearly visible molar and premolar teeth for both archs were performed. The exclusion criteria were as follows; history of orthodontic therapy, having teeth with root canal treatment, apical surgery treatment, root fracture, internal-external resorption, trauma, periapical lesions.

All panoramic radiographs were taken with using Soredex (CranexNovus, Tuusula, Finland) at 70 kVp, 10 mA for 8 s exposure time.

We evaluated the roots as suggested by Meng et al.[7]; type I: cone root, type II: slender root, type III: curved root, type IV: poor crown-root ratio and type V: syncretic root for first-second premolar and first-second molar,both maxilla and mandible (Figure 1).

All analysis were performed by a maxillofacial radiologist with 8years' experience and a endodontic specialist with 5 years' experience in the field.

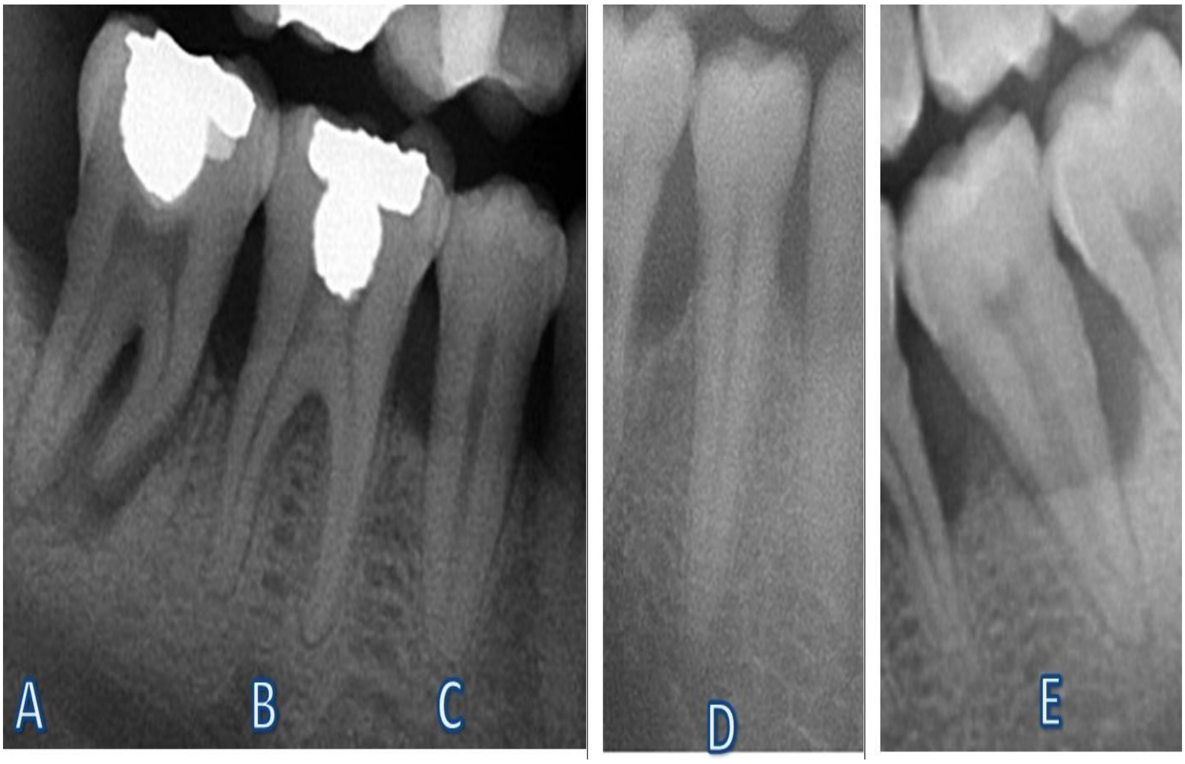

Figure 1. Types of root abnormalities A. type III: curved root, B. type II: slender root, C. type I: cone root, D. type IV: poor crown-root ratio, E. type V: syncretic

Statistical Analysis

The SPSS ver. 14.0. (SPSS Inc., Chicago, IL, USA) program was used to data managament procedures. Distribution of root form were analyzed using the chi-square test.

Maxillary first and second premolars, and mandibular first premolars did not show type 5 abnormalities, but all abnormalities were seen in all the other tooth groups. Type 2 abnormalities was most frequently observed in the mandibular first molar, type 3 abnormalities were most frequently observed in the maxillar second molar, type 4 abnormalities were most frequently observed in the first premolar, and type 5 abnormalities were the most frequent deformity in the maxillar second molar ($p<0.05$). (Table 1). More frequent abnormalities were observed in mandibular teeth (39.1%) than in maxillary teeth (38.3%). Type 4 is the most common root abnormality seen in maxilla , while type 2 seen in mandible ($p<0.05$). The most common type of abnormalities is type 4 (Table 2).

Table 1. Analysis of root form deformity by tooth.

	Type I	Type II	Type III	Type IV	Type V	Total	P value
Maxilla							
First Premolar	89(89)	8(8)	5(5)	21(21)	0(0)	100(100)	0.000
Second Premolar	81(66.9)	11(9)	8(6.6)	21(17.3)	0(0)	121(100)	0.000
First Molar	67(57.2)	16(13.6)	6(5.1)	24((20.5)	4(3.41)	117(100)	0.000
Second Molar	59(50)	10(8.47)	11(9.3)	11(9.3)	27(22.8)	118(100)	0.000
Mandible							
First Premolar	84(67.7)	19(15.3)	3(2.41)	18(14.5)	0(0)	124(100)	0.000
Second Premolar	85(70.8)	11(9.1)	8(6.6)	15(12.5)	1(0.8)	120(100)	0.000
First Molar	56(51.3)	24(22.01)	8(7.3)	18(16.5)	3(2.75)	109(100)	0.000
Second Molar	62(52.1)	16(13.4)	11(9.2)	17(14.2)	13(10.9)	119(100)	0.000

Table 2. Composition of root form by jaw type

	Type I	Type II	Type III	Type IV	Type V	Total	*P*-Value
Maxilla	296(62.1)	45(9.4)	30(6.3)	77(16.1)	31(6.5)	479(100)	0.000
Mandible	287(60.8)	70(14.8)	30(6.35)	68(14.4)	17(3.6)	472(100)	0.000
Total	583(61.3)	115(12.0)	60(6.3)	145(15.2)	48(5.0)	951(100)	0.000

Discussion

Dental anomalies are deformities caused by genetic or environmental factors at the morphogenesis stage of developmentof the tooth. Dental anomalies have the potential to affect the prognosis of the affected tooth in a negative way, and it is therefore important to investigate the etiology (12). Peridontal diseases have different effects on teeth, and on the surrounding bones and soft tissue. Similarly, a number of previous studies have demonstrated that there is a relationship between periodontal diseases and dental anomalies (7,13,14). Dental anomalies such as dens invaginatus, dens evaginatus, peg-shaped lateral incisors, congenitally missing lateral incisors, and root anamolies are associated with periodontal disease (7,13). There was no study in the literature evaluating the relation between AP and root anomaly on Turkish Population. For this reason, this study aimed to provide data in this field in the literatüre (14,15). After root abnormalities were associated with periodontal diseases, Meng et al (7). described such abnormalities in teeth with periodontal disease in terms of 5 groups. In this study, the presence of root abnormalities was evaluated according to this classification using panoramic radiographies of patients with AP.

In the evaluation of dentalanomalies, radiographyhas been used in many studies (12,16). Panoramic radiographs are a radiographic method which has advantages such as low dose radiation, low cost, as well as the possibility of examining a wide area of maxilla and mandible, and have been used in many studies investigating dental anomalies (12,17). Cone beam computed tomography (CBCT) and intraoral radiographs can provide more detailed data in the evaluation of dental structures (18). However, this study was performed using panoramic radiographs routinely taken from patients to avoid the need for an additional radiograph and a consequent increase in radiation exposure.

The root-shape and root-surface area has a great influence on the connection provided by the periodontal attachments and the occlusal force distribution (19). Similarly, it has been reported that various combinations of anomalies in the teeth are associated with decreased alveolar bone levels in adults (20). For this reason, dental anomalies or other causes of decreased root surface area may cause a decrease in periodontal support, which may adversely affect the prognosis of the concerned tooth. In this study, we found that patients with AP had root abnormalities consistent with a previous study (7,14). Chung et al (14) reported that type 5 abnormalities were most common in a study of AP patients in the Korean population(6.6%), but the most common anomaly seen in this study was type 4 (15.2%). In the same way, it has been stated that the most. [14] In our study, type 4 abnormalities were the most common type in maxillary, and type 2 root abnormalities were the most common type in mandible. This difference can be explained by the metalogical differences, including the fact that studies are carried out on different populations.

Type 4 root abnormalities, which indicate longer roots or shorter roots than normal, may lead to decreased resistance to occlusal forces due to periodontal tissue loss or unwanted crown root ratio (21,22).

Likewise, type 2 root abnormalities, which indicate that the root is thinner than normal, may cause a decrease in the periodontal support surface due to the reduction of the root surface area and procedural errors during the related tooth extraction.

A type 3 root abnormalities, which indicates the presence of curvature in the root, may cause more lateral force to develop in the tooth and thus more periodontal injury (20). In addition, when applying root canal treatment, the root canal may be difficult to access, and cause fractures of the file used (23). Type 5 root abnormalities indicate the presence of root fusions, and are one of the most common anomalies reported (24). Several studies have reported that type 5 root abnormalities may be a contributing factor in the progression of aggressive periodontitis, and may reduce the periodontal connection surface, such as is the case with type 4 and type 2 root abnormalities in the studies conducted (24,25). Therefore, the investigation of the etiology of dental anomalies is important for the prognosis of the tooth.

This limitations of this study using panoramic radiographs of a small number of patients may suggest that there is a relationship between AP and root abnormality. However, we believe that larger-scale and more genetically-focused studies are needed to examine whether or not root form abnormalities are a risk factor for aggressive periodontitis.

References

1. Ranney RR. Classification of periodontal diseases. Periodontology 2000 1993;2:13-25.
2. Tonetti MS, Mombelli A. Early-onset periodontitis. Annals of periodontology 1999;4:39-53.
3. Albandar JM, Tinoco EM. Global epidemiology of periodontal diseases in children and young persons. Periodontology 2000 2002;29:153-176.
4. Susin C, Albandar JM. Aggressive periodontitis in an urban population in southern Brazil. Journal of periodontology 2005;76:468-475.
5. Stein JM, Machulla HK, Smeets R, Lampert F, Reichert S. Human leukocyte antigen polymorphism in chronic and aggressive periodontitis among Caucasians: a meta-analysis. Journal of clinical periodontology 2008;35:183-192.
6. Offenbacher S, Barros SP, Beck JD. Rethinking periodontal inflammation. Journal of periodontology 2008;79:1577-1584.
7. Meng H, Xu L, Li Q, Han J, Zhao Y. Determinants of host susceptibility in aggressive periodontitis. Periodontology 2000 2007;43:133-159.
8. Hou GL, Tsai CC. The morphology of root fusion in Chinese adults (I). Grades, types, location and distribution. Journal of clinical periodontology 1994;21:260-264.
9. Ross IF, Evanchik PA. Root fusion in molars: incidence and sex linkage. Journal of periodontology 1981;52:663-667.
10. Gher ME, Vernino AR. Root morphology--clinical significance in pathogenesis and treatment of periodontal disease. J Am Dent Assoc 1980;101:627-633.
11. Armitage GC. Periodontal diagnoses and classification of periodontal

diseases. Periodontology 2000 2004;34:9-21.

12. Aren G, Guven Y, Guney Tolgay C, Ozcan I, Bayar OF, Kose TE, et al. The prevalence of dental anomalies in a turkish population. Journal of Istanbul University Faculty of Dentistry 2015;49:23-28.
13. Ababneh KT, Taha AH, Abbadi MS, Karasneh JA, Khader YS. The association of aggressive and chronic periodontitis with systemic manifestations and dental anomalies in a jordanian population: a case control study. Head & face medicine 2010;6:30.
14. Chung YM, Jeong SN. Analysis of periodontal attachment loss in relation to root form abnormalities. Journal of periodontal & implant science 2013;43:276-282.
15. Vieira AR, Albandar JM. Role of genetic factors in the pathogenesis of aggressive periodontitis. Periodontology 2000 2014;65:92-106.
16. Gomes RR, Fonseca JAC, Paula LM, Acevedo AC, Mestrinho HD. Dental anomalies in primary dentition and their corresponding permanent teeth. Clin Oral Investig 2014;18:1361-1367.
17. Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics 2009;135:328-335.
18. Takeshita WM, Chicarelli M, Iwaki LC. Comparison of diagnostic accuracy of root perforation, external resorption and fractures using cone-beam computed tomography, panoramic radiography and conventional & digital periapical radiography. Indian journal of dental research : official publication of Indian Society for Dental Research 2015;26:619-626.
19. Qiao M, Xu L, Meng HX, Tian Y, Zhang L, Feng XH. [Alveolar bone loss in nuclear families of aggressive periodontitis and the heredity of root shape]. Zhonghua kou qiang yi xue za zhi = Zhonghua kouqiang yixue zazhi = Chinese journal of stomatology 2013;48:577-580.
20. Stratul SI, Roman A, Surlin P, Petrutiu SA, Buiga P, Mihu CM. Clinical and histological characterization of an aggressive periodontitis case associated with unusual root canal curvatures. Romanian journal of morphology and embryology = Revue roumaine de morphologie et embryologie 2015;56:589-596.
21. Choy K, Pae EK, Park Y, Kim KH, Burstone CJ. Effect of root and bone morphology on the stress distribution in the periodontal ligament. American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics 2000;117:98-105.
22. Grossmann Y, Sadan A. The prosthodontic concept of crown-to-root ratio: a review of the literature. J Prosthet Dent 2005;93:559-562.
23. Zelada G, Varela P, Martin B, Bahillo JG, Magan F, Ahn S. The effect of rotational speed and the curvature of root canals on the breakage of rotary endodontic instruments. Journal of endodontics 2002;28:540-542.
24. Hou GL, Tsai CC, Huang JS. Relationship between molar root fusion

and localized periodontitis. J Periodontol 1997;68:313-319.

25. Hamasha AA, Al-Khateeb T. Prevalence of fused and geminated teeth in Jordanian adults. Quintessence international (Berlin, Germany : 1985) 2004;35:556-559.