ABSTRACT

Aim: The aim of this study was to evaluate the distribution of root filled teeth, apical periodontitis and apical periodontitis associated with root filled teeth in a Turkish population.

Subjects and Methods: A random sample of 1018 patients older than 15 years of age who required panoramic radiographs for routine examination procedures were included. A total of 25969 teeth were evaluated. One researcher evaluated all the radiographs. Apical periodontitis was assessed using the periapical index.

Results: There was no difference for the frequency of root filled teeth, teeth with apical periodontitis and root filled teeth with apical periodontitis between males and females. The frequency of root filled teeth, teeth with apical periodontitis and root filled teeth with apical periodontitis was greater in the molar teeth group and there was a significant difference. The frequency of teeth with apical periodontitis and root filled teeth was significantly greater in the 60+ age group. The frequency of root filled teeth with apical periodontitis was significantly greater in the 30-39 age group.

Conclusion: The rates of root filled teeth and root filled teeth with AP were comparable to other studies. Further research would be beneficial to assess the factors affecting the distribution of these conditions.

Distribution of Root Filled Teeth and Apical Periodontitis in a Turkish Population from Cappadocia Region

Kapadokya Bölgesinden Bir Türk Populasyonunda Kök Kanal Tedavisi Görmüş Dişler ve Apikal Periodontitis Dağılımı

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ÖZET

Amaç: Bu çalışmanın amacı, bir Türk populasyonunda kök kanal tedavisi, apikal periodontitis ve kök kanal tedavisi görmüş dişlerde apikal periodontitis dağılımını değerlendirmektir.


Sonuçlar: Kök kanal tedavisi görmüş dişlerin ve kök
INTRODUCTION

Apical periodontitis is an inflammatory response of periapical tissues mainly caused by several microorganisms present in the root canal system. The bacteria and their byproducts in the root canal may advance and infiltrate the periapical tissues.

Failure of root canal treatment is associated with inadequate root canal treatment. In many epidemiological studies, the poor quality of root canal treatment was associated with apical periodontitis. Recent developments in endodontics has led to a decrease in the rate of loss of teeth. As a result of these developments, teeth that previously thought to be extracted could survive in the oral cavity.

There are many epidemiological studies carried out to evaluate the prevalence of root filled teeth and teeth with apical periodontitis. In Turkey, there are studies to evaluate the quality of root fillings, but studies on the prevalence of apical periodontitis and root filled teeth are rare.

The purpose of the present study was to evaluate the prevalence of root fillings and apical periodontitis in a Turkish population from Cappadocia region. According to the literature, this is the first study investigating the incidence of root fillings and prevalence of apical periodontitis in this region.

SUBJECTS AND METHODS

The sample used for this study consisted of randomly selected individuals referred to Erciyes University, Faculty of Dentistry between December 2004 and November 2005. Panoramic radiographs of 1100 patients were evaluated. Thirty-eight patients younger than 15 years and 44 patients having less than 6 remaining teeth were excluded from the study. Final sample consisted of 1018 individuals. The panoramic radiographs of the 1018 Turkish patients with dental problems had originally been taken for routine examination and not for the investigation of root filling and distribution of apical periodontitis. It was not necessary to seek ethical approval as the panoramic radiographs were essential for the routine clinical evaluation of the patients. The panoramic radiographs were evaluated by one observer (Y.S.) using an illuminated viewer box. The third molars were excluded and the following criteria were recorded:

**KEYWORDS**
Root filled teeth, apical periodontitis, panoramic radiographs, Turkish population, Cappadocia region

**ANAHTAR KELİMELER**
Kök kanal tedavisi görmüş dişler, apikal periodontitis, panoramik radyograflar, Türk populasyonu, Kapadokya bölgesi
RESULTS

The total number of samples was 1018 and 581 were females and 437 were males. Distribution of female and male samples according to the age groups was given in Table I. The average number of teeth per patient was 25.51. There was no significant difference for the frequency of teeth with AP between females (2.66 %) and males (3.09 %) (p=0.243), for the frequency of root filled teeth between females (1.47 %) and males (1.38 %) (p=0.596) and for the frequency of root filled teeth with AP between females (46.57 %) and males (40.25 %) (p=0.457). Distribution of total number of teeth, teeth with AP, root filled teeth and root filled teeth with AP of the two sexes was given in Table II.

A statistically significant difference was found for the frequency of teeth with AP among anterior (1.85 %), premolar (2.30 %) and molar (5.17 %) groups (p<0.01). A statistically significant difference was found for the frequency of root filled teeth among anterior (0.73 %), premolar (1.83 %) and molar (2.21 %) groups (p<0.01). Also, there was a statistically significant difference for the frequency of root filled teeth with AP among anterior (42.52 %), premolar (41.91 %) and molar (46.66 %) groups (p<0.05). Distribution of total number of teeth, teeth with AP, root filled teeth and root filled teeth with AP regarding the tooth types was given in Table III.

In the 60+ group, frequency of teeth with AP (8.26 %) and root filled teeth (2.89 %) was more than the other age groups. There was a significant difference for the frequency of teeth with AP and the frequency of root filled teeth among the age groups (p<0.01). The frequency of root filled teeth with AP in the 60+ age group (57.14 %) was more than the other age groups. There was a statistically significant difference for the frequency of root filled teeth with AP among the age groups (p<0.05). Distribution of total number of teeth, teeth with AP, root filled teeth and root filled teeth with AP regarding the age groups was given in Table IV.

DISCUSSION

Epidemiological studies for the assessment of teeth with AP, root filled teeth and root filled teeth with AP may be useful to assess trends about endodontic treatment and success of endodontic treatment in different populations.

In several epidemiological studies, either panoramic\(^{17,18}\) or full-mouth periapical radiographs\(^{10,19}\) were used. Panoramic radiographs cause a lower radiation dose for the patient than full-mouth radiographs\(^{20,21}\). Although, the resolution of periapical radiographs are higher than panoramic radiographs, panoramic radiographs are useful in general interpretation when the patient first attended the clinic\(^{22}\). Therefore, in the present study, patients who were exposed to panoramic radiographs initially for general ex-
### TABLE I

**Distribution of female and male samples regarding the age groups**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>90 (15.50 %)</td>
<td>52 (11.89 %)</td>
<td>142 (13.95 %)</td>
</tr>
<tr>
<td>20-29</td>
<td>240 (41.30 %)</td>
<td>166 (37.98 %)</td>
<td>406 (39.88 %)</td>
</tr>
<tr>
<td>30-39</td>
<td>116 (19.96 %)</td>
<td>95 (21.73 %)</td>
<td>211 (20.72 %)</td>
</tr>
<tr>
<td>40-49</td>
<td>81 (13.94 %)</td>
<td>57 (13.04 %)</td>
<td>138 (13.55 %)</td>
</tr>
<tr>
<td>50-59</td>
<td>41 (7.05 %)</td>
<td>55 (12.58 %)</td>
<td>96 (9.43 %)</td>
</tr>
<tr>
<td>60+</td>
<td>13 (2.25 %)</td>
<td>12 (2.78 %)</td>
<td>25 (2.47 %)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>581 (57.07 %)</td>
<td>437 (42.93 %)</td>
<td>1018</td>
</tr>
</tbody>
</table>
amination without exposing the participants to further radiation.

In several studies using panoramic radiographs, widening of the periodontal ligament more than two times than a healthy periodontal ligament was considered as apical periodontitis. In other studies, PAI was used on panoramic radiographs. In this study, also PAI was used to score the periapical status on panoramic radiographs.

Some epidemiological studies on the subject are based on selected specific age groups. Eriksen et al., selected 35 years old patients. Marques et al., evaluated samples between 30 and 39 years of age. Sidaravicius et al., used samples between 35 and 44 years of age. This could be for standardization of the age of attendents. In some other studies general populations were evaluated. In the studies of Buckley and Spangberg and Saunders et al., dental school patients were evaluated. In this study, a regional population requiring dental examination was evaluated.

The rate of female patients (57.07 %) was more than the rate of male patients (42.93 %) as in the studies of Sunay et al., Jimenez-Pinzon et al. and Georgopoulou et al. This may indicate that, for the selected population, females are more interested in their dental health and care about dental examination.

Distribution of the age groups shows that, the rate of the younger age groups constituted the majority of the sample. This is similar to the studies of De Moor et al., Weiger et al. and Jimenez-Pinzon et al. This may be because younger people seek dental treatment more frequently than the older ones.

In the present study, the mean number of teeth was 25.51. This is in agreement with the studies of Kirkevang et al., Marques et al. and Eriksen et al., PAI scores greater than 3 are used as apical periodontitis. It is stated that, a PAI score smaller than 3 may represent a stable condition in a root filled teeth and a score greater than 3 in association with a nonendodontically treated tooth requires endodontic treatment. Similarly, a score greater than 3 in connection with a root filled teeth generally requires retreatment.

The distribution of root filled teeth in this study was 1.43%. This rate seems to be low and is similar to the studies of Marques et al. (1.5%), Loftus et al. (2.0%), Eriksen et al. (1.3%). In the present study, the incidence of AP in connection with root filled teeth was 43.96%. Some of the radiolucencies defined as AP may represent healing lesions in root filled teeth. This is a limitation for these kind of epidemiologic studies. However, the high rate of AP in root filled teeth may result from inadequate endodontic treatments performed by general dentists. This rate is rather low when compared to the studies of Saunders et al. (58.1%) and Hülsmann et al. (60%), which were conducted in dental school patients and the high rate of AP in root filled teeth in these studies can be attributed to inadequate root canal treatments performed by dental students. However, there are studies presenting lower rates of AP in connection with root filled teeth. In the study of Soikkonen et al., there was a low rate of AP in connection with root filled teeth (16%). Also, in the study of Marques et al., patients were selected from an Urban area and the rate of AP in root filled teeth was 21.7%. The authors attributed this low rate to extraction of unsuccessfully treated teeth in their country. In the current study, the prevalence of AP in nontreated teeth was 2.84%. This indicates a need for root canal treatment in these patients.

In this study, the distribution of teeth with AP, root filled teeth and root filled teeth with AP were higher in molar teeth and there was a significant difference between the tooth groups. The reason why more teeth with AP are encountered in the molar region may be that these teeth are more...
susceptible to caries and usually caries in the molar region are deep and hard to notice. Thus, also the prevalence of endodontic treatment in molars is also higher than the other tooth groups. Anatomic variations encountered within the root canal system in molar teeth makes an adequate root filling hard and may effect the outcome of treatment. Because of these factors, the rate of AP in connection with root filled teeth may be higher in the molar region. The data obtained in several studies are parallel to these findings\textsuperscript{10,19,28}. In contrast, Sunay et al\textsuperscript{15}, reported the highest incidence of teeth with AP and root filled teeth in the premolar group.

In the current study, the rate of teeth with AP and root filled teeth was higher in the 50-59 and 60+ groups. This data is parallel to the findings of Kabak et al\textsuperscript{18} and Georgopoulou et al\textsuperscript{28}. The reason for this was probably the longer exposure time to factors that increase the pulpal damage as stated by Kirkevang et al\textsuperscript{10}. The rates of root filled teeth and root filled teeth with AP were comparable to other studies. Further research would be beneficial to assess the factors influencing the periapical health and the success of root canal treatment.

REFERENCES


