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Prevalence of Chronic Apical Periodontitis Among Patients Referred to the Department of Endodontics at the Kermanshah School of Dentistry (2014–2015)

Występowanie przewlekłego zapalenia tkanek okołowierzchołkowych wśród pacjentów Zakładu Endodoncji Szkoły Dentystycznej Kermanshah w Iranie (2014–2015)

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Abstract

Background. A lot of research has been done on the prevalence of apical periodontitis in different populations, but there is no data on its prevalence in Iranian population, so there is not enough data about this condition and the factors associated with it.

Objectives. The current study was aimed to evaluate the prevalence of chronic apical periodontitis among the patients visiting the Department of Endodontics at the Kermanshah School of Dentistry.

Material and Methods. This descriptive cross-sectional study was carried out on 595 patients (252 men and 343 women) who were referred to the Kermanshah School of Dentistry in 2014–2015. First, the patients' demographic data was taken using a checklist. Then, an OPG x-ray of each patient was observed carefully and the location of chronic apical periodontitis in the jaws, the history of endodontic treatment, the presence of dental post, adequate and inadequate restorations and periapical index (PAI) were recorded on a checklist. The collected data was analyzed using SPSS-18 software.

Results. The prevalence of chronic apical periodontitis was reported to be 4.4%, which increased with age. It was higher in men than in women. The most common site of apical periodontitis was the maxilla and the highest incidence was reported for posterior teeth.

Conclusions. The findings of the current study indicate a high prevalence of chronic apical periodontitis due to the presence of post and a history of inadequate root canal treatment (**Dent. Med. Probl. 2016, 53, 4, 496–500**).

Key words: prevalence, chronic apical periodontitis, periapical index.

Słowa kluczowe: występowanie, przewlekłe zapalenie tkanek okołowierzchołkowych, wskaźnik tkanek okołowierzchołkowych.

Since the discovery of the high prevalence of chronic apical periodontitis in many countries as an important risk factor for public health, numerous epidemiologic studies have been conducted to analyze its prevalence and the factors associated with it [1–4]. Generally, it has been accepted

that the result of endodontic treatment is positively associated with the quality of root canal filling techniques, which consequently leads to sealing and preventing the penetration of bacteria into the root canal system. Epidemiologic studies have associated the prevalence of apical periodon-

titis among the public with the quality of root canal treatment. The data obtained from Scandinavian and other European countries has shown a high prevalence of apical periodontitis due to the poor quality of root canal treatment [5–11]. On the other hand, apical periodontitis usually occurs as a chronic disease and has few or no clinical symptoms [5, 12]. Therefore, it is essential to study the prevalence of this disease. Moreover, it is necessary to obtain data concerning the epidemiology of apical periodontitis in order to plan future treatments. Very few studies have been carried out about the prevalence of this disease, especially in the Iranian context.

Hence, the primary objective of the current study was to investigate the prevalence of chronic apical periodontitis in patients referred to the Department of Endodontics at the Kermanshah School of Dentistry. The second objective of the study was to analyze the correlation of chronic apical periodontitis with such factors as age, gender, education, systemic diseases, position of chronic apical periodontitis in the jaws, history of endodontic treatment, and presence of dental post.

Materials and Methods

This descriptive cross-sectional study was performed on 595 patients (252 men and 343 women). The study samples were randomly selected from among the people who were referred to the Kermanshah School of Dentistry for root canal treatment over a six-month period from 2014 to 2015. The patients' OPGs (orthopantomograms) were examined and evaluated by an endodontist. The radiographs of patients under 18 years old or with less than 10 teeth were excluded from the study. Further, damaged or poor-quality panoramic images were excluded from the study.

First, demographic data, including age, gender, education and the medical history of the patients were obtained using a checklist and then the OPG of each patient was carefully scrutinized. All OPGs were evaluated under appropriate conditions, where ambient brightness was controllable for observing the radiographs with maximum contrast.

The presence of dental post and history of endodontic treatment was also recorded on the checklist.

The collected data was analyzed using SPSS-18 software and chronic apical periodontitis was determined by calculation of the OR ("Odds ratio") index using univariate and multivariate logistic regression and controlling for the effects of possible confounding factors and other variables. $P < 0.05$ was considered significant.

Results

This study was carried out on 16,644 teeth. The prevalence of chronic apical periodontitis in the patients visiting the Department of Endodontics at the Kermanshah School of Dentistry in 2014–2015 was reported to be 4.4% (731 teeth).

The prevalence of chronic apical periodontitis in men (5.4%) was significantly higher than in women ($p < 0.001$, 99% CI = 1.065–1.686, OR = 1.34) (Table 1).

The risk of chronic apical periodontitis in patients aged 20–29 years was 2.009 times greater than that of the < 20 -year-old patients, revealing a significant difference ($p = 0.005$, 99% CI = 1.064–3.793, OR = 2.009).

The risk of chronic apical periodontitis in the 30–39-year-old patients was 4.43 times greater than that of the < 20 -year-olds, which showed a significant difference ($p = 0.001$, 99% CI = 2.895–9.684, OR = 5.294).

The risk of chronic apical periodontitis in the 40–49-year-old patients was 5.294 times greater than that of the < 20 -year-old patients, indicating a significant difference ($p = 0.001$, 99% CI = 2.895–9.684, OR = 5.294).

The risk of chronic apical periodontitis in the 50–59-year-old patients was 6.848 times greater than that of the < 20 -year-olds, which showed a significant difference ($p = 0.001$, 99% CI = 3.647–12.86, OR = 6.848).

The risk of chronic apical periodontitis in the > 60 -year-old patients was 11.604 times greater than that of the < 20 -year-olds, demonstrating a significant difference ($p = 0.001$, 99% CI = 6.011–22.398, OR = 11.604).

The risk of chronic apical periodontitis had an increasing rate according to age groups (Table 2).

The risk of chronic apical periodontitis in the patients with a high-school diploma and some education but less than a high-school diploma was 0.711 times greater than that of illiterate patients, however, no significant difference was found between them ($p = 0.042$, 99% CI = 0.462–1.094, OR = 0.711).

The risk of chronic apical periodontitis in the patients with a university education was 0.17 times greater than that of illiterate patients, indicating

Table 1. Prevalence of chronic apical periodontitis among men and women

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Gender
5.4	368	6809	male
3.7	363	9835	female

Table 2. Prevalence of chronic apical periodontitis in different ages

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Age
0.9	25	2646	< 20
1.8	108	6075	20–29
4.3	148	3469	30–39
6.6	173	2629	40–49
11.4	134	1172	50–59
21.9	143	653	> 59

Table 3. Prevalence of chronic apical periodontitis among different education levels

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Level of education
16.2	89	550	illiterate
8.8	74	841	primary education
6	43	719	secondary education
5.1	57	1122	high school
5	207	4116	diploma
2.8	261	9296	university education

Table 4. Prevalence of chronic apical periodontitis in patients with systemic diseases

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Systemic disease
3.4	16	470	asthma
14	118	842	cardiac
11.3	183	1614	hypertension
5.7	46	811	thyroid
9.2	101	1102	diabetes
15.6	52	333	renal
1.9	1	54	digestive
14.9	60	404	other
1.3	154	11014	no systemic disease

Table 5. Distribution of chronic apical periodontitis

Total		Molar		Premolar		Canine		Incisor		Tooth position
%	n	%	n	%	n	%	n	%	n	
59.4	434	13.3	97	15.2	111	6	44	24.9	182	maxilla
40.6	297	25.9	189	5.3	39	3.1	23	6.3	46	mandible
100	731	39.1	286	20.5	150	9.2	67	31.2	228	total

P-value < 0.001.

Table 6. Prevalence of chronic apical periodontitis among the patients with and without former endodontic treatment

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Former endodontic treatment
2.6	381	14799	no endodontic treatment
18.9	350	1845	endodontic treatment

Table 7. Prevalence of chronic apical periodontitis among the patients with and without post

Prevalence (%)	Number of teeth with chronic apical periodontitis	Number of investigated teeth	Presence of dental post
83.1	108	130	yes
3.8	623	16514	no

a significant difference ($p = 0.001$, 99% CI = 0.25–0.643, OR = 0.17) (Table 3).

The risk of chronic apical periodontitis in the patients with systemic diseases was 1.767 times greater than that of the patients without systemic diseases, which showed a significant difference between them ($p = 0.001$, 99% CI = 1.373–2.272, OR = 1.767) (Table 4).

The prevalence rates of chronic apical periodontitis in maxillary and mandibular teeth were 59.4% and 40.6%, respectively, indicating a significant difference between them ($p = 0.001$) (Table 5).

The prevalence of chronic apical periodontitis in both maxillary and mandibular posterior teeth was 436 (59.7%) and in anterior teeth was 295 (40.3%). Also, the frequency of chronic apical periodontitis indicated a significant difference between the jaw and the position of the teeth (molars, premolars, canines and incisors) ($p < 0.001$) (Table 5).

The prevalence of chronic apical periodontitis in the patients with endodontic treatment was greater than those with no history of endodontic treatment, showing a significant difference ($p = 0.001$) (Table 6).

The risk of chronic apical periodontitis in the patients with dental post was 12.495 times greater than that of the patients with no post, demonstrating a significant difference between them ($p = 0.001$, 99% CI = 5.596 – 27.901, OR = 12.495) (Table 7).

Discussion

This cross-sectional study was carried out from September 2014 to February 2015 to analyze the prevalence of chronic apical periodontitis in patients referred to the Kermanshah School of Dentistry. The prevalence of this lesion in the present study was reported to be a total of 16,644 teeth (4.4%), which is partly in line with the results reported by some studies. The prevalence rates of chronic apical periodontitis in the studies of Kirkevang et al. [6], Dutta et al. [13], and Tereças et al. [14] were reported to be 3.4%, 5.8% and 5.9%, respectively. These differences can be attributed to the oral health status, socioeconomic conditions and lack of a regular plan for prevention and checkup of dental carries in the given societies, which can lead to advanced dental and periodontal complications.

The risk of chronic apical periodontitis in men was 1.34 times greater than in women, which showed a significant difference ($p < 0.001$) and was in agreement with the findings of Mukhaimer et al. [12] and Kirkevang et al. [6]. However, the results of Dutta et al. [13] and Tereças et al. [14] showed no significant difference between males and females.

The results of this study indicated that the prevalence of chronic apical periodontitis increased with age so that the risk of this lesion in patients over 59 years old was approximately 11.604 times greater than that of patients < 20 years old ($p < 0.001$), which is in line with the findings of Dutta et al. [13] and Kamberi et al. [15].

The risk of chronic apical periodontitis in the patients with university education was 0.401 times greater than that of the illiterate patients, indicating a significant difference ($p < 0.001$). None of the previous studies have shown a correlation between chronic apical periodontitis and education.

With regard to the distribution pattern of apical periodontitis, the most common area involved was the mandibular molar (25.9%). The frequency of chronic apical periodontitis in the maxillary

teeth (59.4%) was higher than that of the mandibular teeth (40.6%), which is in agreement with the results of previous studies [6, 16].

The prevalence of chronic apical periodontitis in teeth with endodontic treatment was higher than in the teeth without endodontic treatment, respectively 18.9% vs 2.6%. In this study, the prevalence of apical periodontitis was 18.9% in teeth with endodontic treatment, which is almost similar to the Dugas et al. [1] study in which he showed a prevalence of 26% and 39% in two Canadian populations, respectively. It should also be noted that the criteria for a diagnosis of apical periodontitis are different among different studies [17, 18].

The risk of chronic apical periodontitis in patients with dental post was 12.495 times greater than those without dental post. However, some studies have reported an increased prevalence of apical periodontitis in teeth restored with clamps [9]. In a study carried out by Tavares et al. [19], out of 458 teeth with dental post, 315 (65%) teeth were involved with chronic apical periodontitis. The results of De Moor et al. [8] showed that dental post is one of the most important factors in periapical position. Penetration of microorganisms into the space within the post may be due to inadequate cementation or a temporary crown with leakage.

Conclusion

The findings of the current study indicate the high prevalence of chronic apical periodontitis due to the presence of post and a history of root canal treatment. It was also shown that the maxillary and posterior teeth are more common locations. The risk of apical periodontitis increases with age. The prevalence was higher in men than in women and in patients with systemic diseases than in healthy people. These findings are indicative of an extensive need for improving root canal treatment in Kermanshah city by training students, running more retraining courses for general dentists and employing more endodontists.

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