

Tobacco Smoking and Dental Periapical Condition in a Sample of Saudi Arabian Sub-Population

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Abstract. The aim of this study is to investigate the possible influence of smoking on the prevalence of periapical lesions. A total of 98 individuals (20 smokers and 78 non smokers) participated in the study. The periapical condition was assessed radiographically for each dental root. The following information was recorded on a structured form for each subject: (a) number of teeth present; (b) number of teeth with root fillings (treated teeth) having identifiable periapical lesions and (c) number of teeth without root fillings (untreated teeth) having identifiable periapical lesions. The data was statistically analyzed using "t" test at $p < 0.05$. There was no significant influence of smoking on the prevalence of apical periodontitis in the presence or absence of endodontic treatment. The results of this study do not provide support to the assumption that tobacco smoking is associated with apical periodontitis.

Keywords: Apical periodontitis, Endodontics, Smoking.

Introduction

Tobacco smoking is widespread in Saudi Arabia, including more than one third of its population that continue to increase daily within the last 15 years^[1]. In general, males are heavy smokers than females, for cultural reason. Cigarette smoking is becoming an important public health problem among men in Saudi Arabia^[2]. The harmful effects of

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tobacco smoking on periodontal tissue have been demonstrated in several cross sectional and longitudinal studies^[3,4]. On this basis, it was assumed that it might be a risk factor for apical periodontitis (AP), leading to a negative influence on the apical periodontium of endodontically compromised teeth, facilitating the extension of the process of periapical bone destruction and/or interfering with healing and repair events following endodontic treatment^[5-6]. Consequently, an increased number and/ or size of periapical lesions would be expected in smokers^[5,6]. Kirkevang and Wenzel^[6] reported for the first time in an epidemiological study, the association between tobacco smoking and AP. Recently, several reports have also studied this association with contradictory results^[5,7-11].

Based on the assumption that smoking might exert an influence on apical periodontitis, the aim of the present explorative study was to investigate the possible association of smoking with the prevalence of periapical lesions.

Material and Methods

A total of 98 male individuals (20 smokers and 78 non smokers) in the age range between 20-60 years participated in the study. These individuals were randomly selected from new patients attending the Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia not seeking ER treatment. Medical history, age, and smoking habits were recorded during file registration. Patients were medically free from any systemic diseases. Then, radiographic examination took place at the Department of Oral Radiology, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. It also included a full survey of 16 intraoral projections of the dentition, five anterior and four posterior projections of the maxillary teeth, and three anterior and four posterior projections of the mandibular teeth^[12]. The radiographs were taken according to a standardized paralleling and long-distance technique, and the films (Kodak Ekta Speed E) were processed according to the manufacturer. From the full-mouth radiographic survey for all teeth, excluding third molars, were recorded and examined by one observer using a viewer and a light table in a dark room. The periapical condition was assessed for each dental root. Teeth were categorized as root filled if they had been filled with a radiopaque material in the root canal(s). The following information was recorded on a structured form for each

subject: (a) Number of teeth present; (b) number of teeth with root fillings (treated teeth) having identifiable periapical lesions and (c) number of teeth without root fillings (untreated teeth) having identifiable periapical lesions. Then, data were statistically analyzed using T-statistical test at p value < 0.05 .

Results

The mean value of the number of teeth and age were 24.65 and 35.94 in smokers and 24.58 and 33.72 in non smokers, respectively. T -test was used to evaluate the relation between smoking, and the number of teeth and age. There was no statistical significant difference between smoking and the number of teeth ($p = 0.953$), and between smoking and age ($p = 0.573$) (Table 1).

Table 1. Study population according to number of teeth, age, and smoking.

	N	No. of Teeth Per Person			Age		
		Mean	SD	p Value	Mean	SD	p Value
Smoker	20	24.65	3.28	0.953	35.94	12.66	0.573
Non smoker	78	24.58	4.41		33.72	15.14	

The frequency of patients having AP was 8.59% in smoker and 6.18% in non smokers. The frequency of patients having AP with RCT in smoker and in non smokers was 5.73% and 5.12%, respectively. The frequency of patients having AP without RCT was 0.95% in smoker and 1.46% in non smokers. T -test was used to evaluate the relation between the smoking and AP, AP with RCT, and AP without RCT. There was no statistical significant influence of smoking on the prevalence of AP ($p = 0.125$), AP with RCT ($p = 0.195$), and AP without RCT ($p = 0.418$) (Table 2).

Table 2. Prevalence of AP and AP with and without RCT in smokers and non smokers.

	AP with RCT			AP without RCT			Total (AP)		
	N	%	p Value	N	%	P Value	N	%	P Value
Smoker	24	5.73	0.195	4	0.95	0.418	28	6.68	0.125
Non smoker	102	5.12		29	1.46		131	6.58	

Discussion

Males are more likely to smoke than females, and in addition are likely to be heavy smokers^[9]. The subjects included in this cross-

sectional study were adult male patients attending for the first time the dental service of the Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. Periapical radiography was used to evaluate the presence of AP. Previous studies have also used periapical radiographs^[6,11,13,14]. Periapical regions of all the teeth, excluding only third molars, were radiographically evaluated. Thus, the results report accurately the periapical status of the subjects^[8].

There were no significant differences in the number of teeth per person between smokers and nonsmokers. This result is in agreement with Segura-Egea *et al.* study. On the contrary, other investigators found a higher prevalence of edentulism among smokers^[15,16]. The study carried out by Lang *et al.*^[17] concluded that the number of missing teeth was a good indicator of oral health status. In the present study the mean of remaining teeth number in patient mouth was 24.65 in smokers and 24.58 in non smokers. Accordingly, it can be considered that the oral health status of smokers and nonsmokers was comparable. Also, both smoking and non smoking patients included in this study were from the same age group. The mean age was 35.94 for smokers and 33.72 for non smokers which indicate that both groups were comparable.

The frequency of AP per person in smokers and non smokers were 8.59% and 6.18%, respectively. The frequency of AP per person in teeth with RCT was 5.73% in smokers and 5.12% in non smokers. The total number of teeth with AP and the frequency of teeth with AP in other studies varies from 0.6%^[18] to 12%^[19]. Recently, Sunay *et al.*^[20] have reported that on teeth examined in a sample of Turkish adults, 4.2% had visible periapical radiolucencies. The range is wide, probably due to the variation among populations examined.

The main purpose of the present study was to investigate the possible influence of smoking on the prevalence of AP. The results showed that the prevalence of AP in smokers was not statistically significant compared to control subjects ($p > 0.01$). These results are in agreement with the results reported by Bergström *et al.*^[5], and Marending *et al.*^[7]. They studied the impact of many patient-related factors with the outcome of root canal treatment and reported that smoking had negligible impact^[5,7]. On the contrary, other studies have found a statistical association between smoking and AP^[6,8-10].

Several studies^[6,8,13] assessed the periapical condition by radiographic methods without any clinical examination, and it is recognized that apical inflammation can be present in the absence of radiographic signs^[9]. This has been demonstrated in histological evaluation of maxillary teeth^[21]. Several orthopedic studies^[22,23] found that bony healing was slower in smokers than in nonsmokers. This suggests that the delay in healing may result in an over-representation of the disease in the smoking group in their studies. The number of AP in root filled teeth between both groups did not differ significantly. If smoking had an effect on bone healing, more lesions would be expected around root filled teeth in smokers. That counts against the effect of smoking on bone healing. This finding is in agreement with the results of the study carried out by Segura-Egea *et al.*^[8] and contradicts the results of Krall^[10], which suggest that smoking may have a causal role in the development of lesions that result in root canal treatment. More studies will be necessary to evaluate the effect of smoking in healing of present apical periodontitis after proper root canal treatment.

Conclusion

The present observations do not favor the assumption that tobacco smoking is associated with apical periodontitis. However, the investigation was a cross-sectional by design and the conclusion should be regarded as temporary until it is confirmed by long-term observations.

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تدخين التبغ و حالة ذروية الأسنان في عينة من المملكة العربية السعودية من الفئات السكانية الفرعية

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المستخلص. كان الغرض من هذا البحث دراسة إمكانية تأثير التدخين على انتشار الآفات الذروية. فقد اختير في هذه الدراسة ٩٨ فردًا (٢٠ مدخنًا و ٧٨ غير مدخن). وتم تقييم حالة ذروية جذور الأسنان والأنسجة المحيطة بذروة كل جذر بواسطة الأشعة السينية. تم تسجيل المعلومات لكل مريض على النحو التالي: (أ) عدد الأسنان الحالية، (ب) عدد الأسنان التي تحتوي على حشوات الجذر (الأسنان المعالجة) والتي بها آفات ذروية (ج) عدد الأسنان التي لا تحتوي على حشوات الجذر (الأسنان غير المعالجة) والتي بها آفات ذروية. تم عمل تحليل إحصائي للبيانات باستخدام اختبارات عند درجة حرية أكبر من ٠,٠٥. وقد أظهرت النتائج أنه لم يكن هناك تأثير كبير للتدخين على مدى انتشار الآفات الذروية في وجود أو غياب المعالجة اللبية. ونستنتج من ذلك أن نتائج هذه الدراسة لا تدعم افتراض أن يرتبط تدخين التبغ مع انتشار الآفات الذروية.