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EFFECTS OF SMOKING AND AGE ON THE VALIDITY OF PARTIAL DENTURE AFTER TWO YEARS OF USE: STATISTICAL STUDY

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ABSTRACT: Age and smoking cigarettes were found to contribute significantly to the lifetime of partial denture. Such an effect was determined by the use of the binary logistic regression model.

When smoking cigarettes is compared to age, age of the patient was found to contribute slightly higher (probably ignorable difference) to this matter.

Key words: Partial dentures, Smoking cigarettes, Logistic regression.

Introduction

Cigarette smoking has long been suspected to be associated with a variety of oral conditions including periodontal disease, bone loss, tissue loss, tooth loss, edentulism, peri-implantitis and dental implant failure[1].

Tooth loss and edentulism is more common in smokers than in non-smokers. Tooth loss in older adults occurs because of increased exposure to pathogenic bacteria. Smoking also predisposes patients to develop more severe periodontal disease[2,3].

Twenty years of research shows that cigarette smoking is probably a true risk factor for periodontitis. A smoker is 2 to 3 times as likely to develop clinically detectable periodontitis. In addition to increased prevalence, smokers also experience more severe periodontal disease[1].

Many research studies have shown that smoking can lead to higher rates of dental implant failure[3,4]. Senerby and Roos discussed determinants for success in osseointegrated oral implants, confirming that smoking may lead to higher implant failure rate[4].

Frequent studies have concluded that tobacco smokers are more likely to demonstrate gingival redness, hemorrhage and inflammatory enlargement (edema) than nonsmokers with similar oral hygiene habits. Others, however, have found no increased gingival bleeding in smokers, possibly because of the vasoconstriction produced by nicotine. Smokeless tobacco users likewise have no more gingivitis than nonusers, but this habit is well known to produce a characteristic painless

loss of gingival tissues in the area of tobacco contact. This gingival "recession" frequently includes bony destruction but is seldom associated with the inflammatory changes noted clinically in routine gingivitis. It may result from a combination of factors, including abrasion and the local tobacco-induced release of collagenase and other protein-destroying enzymes[5,6].

As a result of many research studies, previous smokers noticed to have a lower risk for periodontitis than current smokers. Smoking cessation will result in improved periodontal health and improve a patients chance for successful implant osseointegration[7,8].

A wide variety of mucosal changes have been noted in habitual users of smoked and smokeless tobacco. These changes most likely result from the many irritants, toxins, and carcinogens found naturally in cured or burned tobacco leaves, but may also arise from the mucosal drying effects, the high intraoral temperatures, intraoral pH changes, local alteration of membrane barriers and immune responses, or altered resistance to fungal and viral infections[5,9].

While the exact etiology of oral leukoplakia still eludes us, tobacco smoking is by far the most broadly accepted factor. Approximately 80% of leukoplakia patients are smokers and when large groups of adults are examined we find that smokers are much more likely to have leukoplakia than nonsmokers (23% vs. 4%). Pipe smokers and heavy cigarette smokers have greater numbers of lesions and larger lesions than other smokers, especially after many years of tobacco abuse. Sixty percent of smoke-induced leukoplakias, furthermore, disappear 6-12 months after affected patients stop smoking[5,10].

Nicotine in tobacco has been shown to reduce the blood flow in the mouth. Pipe smoking can be worse than cigarettes due to the higher temperatures generated in the upper jaw. Not only is smoking detrimental to implants, it is also bad for conventional bridgework[1].

A study examining the effect of oral-burn syndrome on dental implants indicated that there is a direct link between oral tissue loss and smoking. In addition, smoking had a significant impact on bone loss[11].

This study aims to investigate the effect of smoking cigarettes and age on the life time of partial dentures.

Patients and methods

During the period August the 1st 2004 to July the 31st 2005, hundred patients wearing artificial partial dentures were considered. The status of artificial partial denture was examined after at least two years of use. The partial denture is considered to pass the exam if it does not require any alteration and hence given the code of 1, otherwise the denture considered to be defected, and therefore given the code of 0.

Another two variables concerning age and smoking habit were considered as well. Smoking individuals were given the code of 1, and the non-smokers were given the code of 0.

The age of every patient were recorded to the nearest year. The information were gathered on a special form that was designed for this purpose.

Descriptive statistics were used in order to show the distribution of patients with respect to each of the three variables considered in this research work.

Binary logistic regression were used to detect whether or not smoking and age affect the status of the partial denture.

Methods used to evaluate the goodness of fit such as Hosmer-Lemeshow was used together with Chi-square as measure of Pearson and Deviance.

Sumers D, Goodman-Kruskal Gamma and Kendal-Tau-a were used respectively as measurements of concordance, disconcordance and ties[12].

Results

Figure 1 shows the distribution of the age for the individuals involved in this research work.

The mean age was found to be 61.69 years with a standard deviation of 4.75 years. The age ranged between 50 and 74 years.

Out of 100 patients, 36 (36%) patients were passed the examination of their partial dentures, and 64 (64%) were found to have partial dentures that need further alteration or even substitution.

Out of 100 patients 42 (42%) were found to be smokers, and 58 (58%) were found to be non-smokers.

The use of the binary logistic regression model for the data of this research work revealed that both age and smoking cigarettes contribute significantly to the status of partial dentures. That is, they both play the role of negative effect on the lifetime of the partial denture.

Tables 1-4 shows the result of the statistics used to approach the indication of the significant effect of both age and smoking habit on the lifetime of the partial denture.

Figure 1 shows the distribution of the observation by the leverage versus delta Chi-square which indicate the validity of the model.

Measure of association (Table 4) were obtained for all possible combinations of the cross-classified groups as found by the collected data.

Discussion

Logic would seem to indicate that tobacco use must have some effect on the gingival and periodontal structures. Tobacco contains, after all, several cytotoxic substances which have been shown to be secreted in salivary and gingival crevicular fluids. Smokers also have markedly more calculus than nonsmokers, and heavy smokers have more calculus than light smokers. Nicotine's well-known vasoconstriction effects have been shown to be strong in periodontal tissues, even in the face of elevated blood pressures, and gingival circulation has been shown to decrease by as much as 70% during the smoking of a cigarette. Tobacco smoking, furthermore, also suppresses human immune responses, including responses to oral microbial toxins. Oral leukocytes, especially neutrophils, have a diminished ability to move, to phagocytize, or to secrete enzymes in smokers[5,6].

The chemical dissolution of enamel has occasionally been reported in tobacco smokers and chewers, but only as a secondary consequence of using breath mints or as idiopathic cases. Erosion does not seem to be a serious problem and, in fact, chewers may be somewhat protected by the

natural alkalinity of smokeless tobacco[5,13,14].

Conclusions

Age is found to contribute slightly higher on the average lifetime of partial dentures when compared to the contribution of smoking cigarettes. This is probably due to the abuse or physical properties of the alloy which the partial dentures made of.

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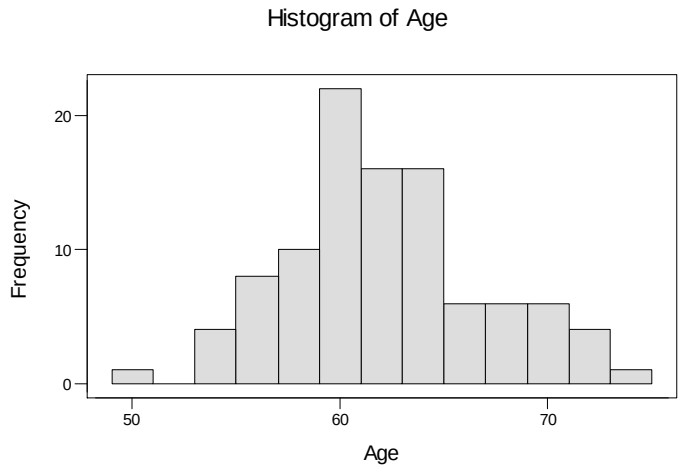

Fig.1. Frequency distribution of the age of patients.

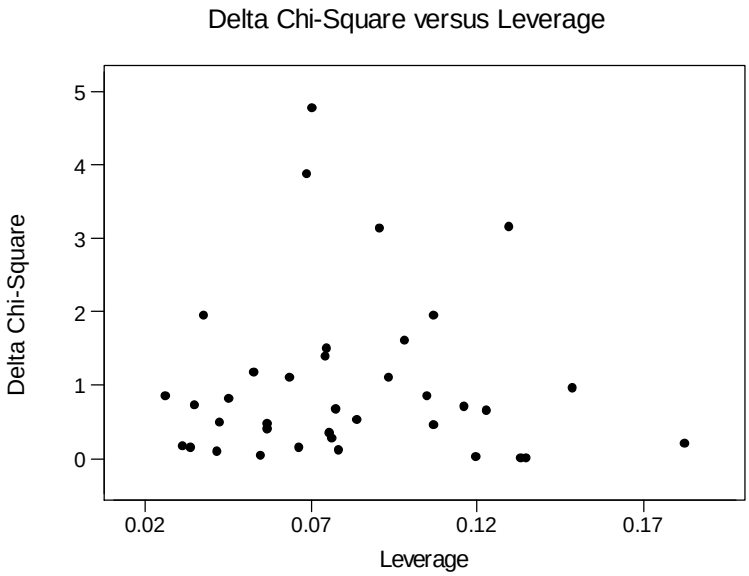

Fig.2. The distribution of the leverage versus delta Chi-square.

Table 1. Table of binary logistic regression

Predictor	Coefficient	St. Dev.	Odds		95% CI		
			Z	P	Ratio	Lower	Upper
Constant	5.580	3.086	1.81	0.071			
Smoking 1	0.8660	0.4394	1.97	0.049	2.38	1.00	5.63
Age	-0.10655	0.05023	-2.12	0.034	0.90	0.81	0.99

Log-Likelihood = -60.429

Test that all slopes are zero: G = 9.825, DF = 2, P-Value = 0.007

Table 2. Goodness-of-Fit Tests

Method	Chi-Square	D.F.	P
Pearson	33.663	34	0.484
Deviance	40.042	34	0.220
Hosmer-Lemeshow	10.995	7	0.139

Table 3. Table of Observed and Expected Frequencies:

Value	Type	Group									Total
		1	2	3	4	5	6	7	8	9	
1	Obs.	0	3	8	4	4	2	5	6	4	36
	Exp.	1.7	2.9	3.8	4.1	4.1	4.2	6.0	5.7	3.4	
2	Obs.	12	10	6	9	7	8	7	4	1	64
	Exp.	10.3	10.1	10.2	8.9	6.9	5.8	6.0	4.3	1.6	
Total		12	13	14	13	11	10	12	10	5	100

Table 4. Measures of association between the response variable (partial denture status) and predicted probabilities.

Pairs	Number	Percentage	Summary Measures	
Concordant	1501	65.1	Somers D	0.33
Discordant	736	31.9	Goodman-Kruskal Gamma	0.34
Ties	67	2.9	Kendalls Tau-a	0.15
Total	2304	100.00		

تاثير التدخين و العمر على صلاحية اطقم الاسنان الجزئية بعد سنتين من الاستخدام: دراسة احصائية

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الخلاصة

لقد وجد ان عاملي العمر و التدخين يسهمان بشكل جوهري في التاثير على فتـــرة اســـتخدام اطقـــم الاسنان الجزئية. لقد تم تحديد هذا التاثير من خلال استخدام نموذج الانحدار اللوجستي الثنائي، و لقد وجد ان عمر المريض يسهم بشكل اعلى نسبيا من التدخين على فترة استخدام اطقم الاسنان الجزئية.