The benefit of Ramfjord teeth to represent the full-mouth clinical attachment level in epidemiological study

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ABSTRACT

Background: Since the periodontal disease Index of Ramfjord (Ramfjord index) can potentially shorten the examination time by almost half, many studies evaluated Ramfjord teeth in predicting full-mouth periodontal status of an adult population. The aim of this study was to evaluate the benefit of Ramfjord teeth in predicting the full-mouth clinical attachment level of an adult population in patients attending the college of dentistry- Baghdad University.

Materials and methods: The study participants were 100 patients with age range from 30-60 years old which represent group zero. The patients were divided into three main groups according to the age of the patients. Group I and group II each of them composed of 30 patients while group III composed of 40 patients. In the first time clinical attachment level (CAL) was measured from the full mouth (FM) and then from the Ramfjord teeth (RT) (teeth number: 16, 21, 24, 36, 41, 44) in all groups. Clinical attachment level (CAL) was measured in millimeters using periodontal probe.

Results: The difference in the mean clinical attachment level measured from the full mouth (FM) and Ramfjord teeth (RT) by using paired t - test was non significant in all the groups. Also in all groups the correlation coefficient as well as beta coefficient was high.

Conclusion: The high agreement between Ramfjord teeth and full mouth CAL confirm the epidemiological validity of Ramfjord teeth to represent the full mouth.

Key words: Ramfjord teeth, Clinical attachment level, full-mouth examination. (J Bagh Coll Dentistry 2014; 26(2): 122-124).

الخلاصة

مؤشر رامفورد لامراض اللثة يمكن ان يقلل وقت الفحص الى النصف تقريبا، لذا الكثير من الدراسات قيمت اسنان رامفورد في توقع الحالة الصحية للثة لكامل الفم في السكان البالغين.

هدف هذه الدراسة كان لتقييم اسنان رامفورد في توقع مستوى الانسجة الرابطة لكامل الفم لدى السكان البالغيين من المرضى الذين يراجعون كلية طب الاسنان- جامعة بغداد.

المشاركين في هذه الدراسة كانوا مائة مريض، تتراوح اعمارهم من 30-60 سنة ويمثلون مجموعة الصفر. تم تقسيم المشاركين في هذه الدراسة الى ثلاث مجموعات رئيسية وفقا للعمر. المجموعة الاولى والثانية تتكون كل منهما من 30 مشارك بينما المجموعة الرابعة تتكون من 40 مشارك.

تم اولا قياس مستوى الانسجة الرابطة لجميع الاسنان في الفم (FM) ومن ثم قياس مستوى الانسجة الرابطة لاسنان رامفورد (RF) (اسنان رامفورد: 44،41،36،24،21،16) في كل المجموعات. تم قياس مستوى الانسجة الرابطة باستخدام مسبار اللثة.

الفرق بين معدل مستوى الانسجة الرابطة المقاس لكامل الفم (FM) ومستوى الانسجة الرابطة لاسنان رامفورد (RF) باختبار t كان غير مهم في كل المجموعات، قياسات معامل الارتباط ومعامل بيتا في كل المجموعات كانت عالية.

الموافقة العالية بين مستوى الانسجة الرابطة لاسنان رامفورد ولكامل الفم يؤكد صحة استخدام اسنان رامفورد لتمثيل كامل الفم في الدراسات الوبائية

INTRODUCTION

Most survey methods use full-mouth assessment of periodontal diseases, which involves the examination of 4 sites on all present teeth. Data from full-mouth examination are the gold standard for accurate assessment of periodontal disease. However, because of the restraints in time, logistic, and cost of full-mouth assessment, this clinical assessment of periodontal diseases is impractical in epidemiological surveys involving large population samples [(1)]. Therefore, the programs to examine part of teeth are proposed [(2)].

Since the Ramfjord index can potentially shorten the examination time by almost half, Mumghamba et al evaluated Ramfjord teeth in predicting full-mouth periodontal status of an adult population [(3)]. Partial recording of Indices of periodontitis have long been used in clinical and epidemiological studies to predict full-mouth situation [(4)].

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Ramfjord index had a strong correlation with the full-mouth index in recording plaque, gingivitis, and other periodontal indicators like the probing pocket depth but due to the site-specificity of periodontal diseases, a part of the teeth does not fully reflect the status of full-mouth teeth [(5)]. So that different index teeth be selected depending on the purpose of survey so as to not only assesses both the incidence and severity of the disease correctly, but also improve the sensitivity and reduce the bias [(6)].

MATERIALS AND METHODS

The patients participated in this study were referred to the department of Periodontics in college of dentistry Baghdad University. The patients include 100 male which represented by group (0). All the patients were suffered from chronic periodontitis which affect people mostly after the age of 30; the samples were divided into three main groups according to the age of the patients in which group (I) include 30 patients with an age range of (30-40) years, group (II)

include 30 patients with an age of (>40-50) years while group (III) include 40 patients with an age more than 50 years.

Clinical attachment level (CAL) was measured in millimeters using William periodontal probe with Williams's markings from the cemento-enamel junction to the bottom of the pocket/sulcus. The measurements were made at four surfaces of each tooth. The distance was measured indirectly by subtracting the distance from the gingival margin to the cemento-enamel junction from probing pocket depth. In some cases when there was gingival recession, loss attachment was measured by adding the distance from the gingival margin to the cemento-enamel junction to the probing pocket depth. The level of the cemento-enamel junction could be determined by feeling it with probe.

In some situation were the cemento-enamel junction was totally obliterated by:-

1. Full crown coverage.
2. Disto- occlusal, mesio-occlusal or MOD fillings were extended below cemento-enamel junction.
3. Badly carious tooth, were extending mesially or distally below the cemento-enamel junction.
4. Heavy calculus covers the teeth.

In these situations the tooth was excluded. If the patient had a Ramfjord tooth/teeth missing, he was excluded from the study. In the first time clinical attachment level (CAL) was measured from the full mouth (FM) and then from the Ramfjord teeth (RT) in all groups. The mean CAL per tooth was calculated by summing the measurements per tooth and dividing by the number of measurements. Mean CAL for full mouth was calculated by summing the mean CAL per tooth and dividing by the number of the teeth. While the mean CAL for Ramfjord teeth was calculated by summing the mean CAL per tooth for the Ramfjord teeth (teeth number: 16, 21, 24, 36, 41, 44) and dividing them by the number of the Ramfjord teeth, if the Ramfjord tooth was missing the case was ignored.

The statistical analyses used in this study were a paired t-test to compare the difference in the mean CAL measured from the full mouth (FM) versus Ramfjord teeth (RT). In addition to that Pearson correlation coefficients between the mean CAL calculated from the full mouth measurement and from the Ramfjord teeth were conducted and then a linear regression analysis (β coefficient) with the full mouth mean CAL as the outcome variable and the Ramfjord teeth mean CAL as independent variable were conducted .

RESULTS

Descriptive statistics which include mean and standard deviation of CAL for each group were shown in table (1).

The difference in the mean of CAL measured from the full mouth (FM) and Ramfjord teeth (RT) by using paired t-test were non significant in all the groups as shown in table (2) the $p>0.05$ non significant. The correlation between the mean CAL calculated from the full mouth and Ramfjord teeth was 0.75 in the 1st age group and was 0.92 in the 2nd age group, while it was 0.86 in the 3rd age group, in the all previous groups the correlation coefficient were strong (+)ve, as shown in the table (3).

We then conducted a linear regression analysis with the full mouth mean CAL as the outcome variable and the Ramfjord teeth mean CAL as the independents variable in each group, the β coefficient for the mean CAL measured by Ramfjord teeth to predict the full mouth was ranged between 0.70 and 1.06, the result were positive for the all groups which mean it is a significant result, as shown in table (4).

Table 1: Descriptive statistics of CAL for each group

Descriptive statistics	Group 0 No=100		Group I 30-40		Group II 40-50		Group III >50	
	F.M	R.T	F.M	R.T	F.M	R.T	F.M	R.T
Mean	2.88	2.82	2.54	2.48	2.62	2.54	3.34	3.28
±SD	0.076	0.079	0.11	0.099	0.099	0.11	0.126	0.133

Table 2: t-test and significant difference of mean CAL for each group

Groups	t-test	P-value	Sig
Group 0	1.81	0.073	NS
Group I	0.816	0.42	NS
Group II	1.789	0.084	NS
Group III	0.93	0.355	NS

Table 3: Correlation Coefficient between F.M and R.T of mean CAL for each group

Groups	r
Group 0	0.888
Group I	0.755
Group II	0.925
Group III	0.865

Table 4: Linear regression of F.M and R.T for mean CAL at each group

Groups	slope B	Linear regression equation
Group 0	0.923	y=0.154+0.924x
Group I	0.701	y=0.699+0.701x
Group II	1.06	y=-0.256+1.07x
Group III	0.916	y=0.217+0.916x

DISCUSSION

The study based on CAL measurement in patients have chronic periodontitis of different age groups, the results show non significant differences between Ramfjord teeth and full mouth at different age groups using paired t- test.

The other results show strong (+ve) correlation between Ramfjord teeth and full mouth at different age groups. The beta coefficient which was used to assess prediction of the full-mouth mean CAL by Ramfjord teeth mean CAL was high. The high agreement between Ramfjord teeth and full mouth mean CAL proves the epidemiological validity of Ramfjord teeth to represent the full mouth. This was disagree with Fleiss et al, who found that the Ramfjord teeth are inadequate alternatives of the rest of the mouth for epidemiologic studies of periodontitis [7], so that the assessment of Ramfjord teeth was not as suitable for evaluation of either disease extent or prevalence [2].

But this study was in agreement with Mumghamba et al, Silness and Røynstrand, and Najah et al [3,5,8]. They concluded that there is high agreement between Ramfjord teeth and full mouth. Partial-mouth examinations with appropriate adjustment of Ramfjord index teeth data may be useful for assessing periodontal disease progression in longitudinal population studies of human periodontitis [9]. So these results support the use of Ramfjord teeth procedure to conserve time, limit cost and reduce patient and examiner fatigue, while providing maximal clinical information [2].

REFERENCES

1. Kingman A, Albandar JM. Methodological aspects of epidemiological studies of periodontal diseases. Periodontol 2000; 29:11-30.
2. Dowsett SA, Eckert GJ, Kowolik MJ. The applicability of half mouth examination to periodontal disease assessment in untreated adult populations. J Periodontology 2002; 73(9): 975-81.
3. Mumghamba EG, PitiPhat W, Matee MI, Simon E, Merchant AT. The use fullness of using Ramfjord teeth in predicting periodontal status of a Tanzanian adult population. J Clin Peiodontol 2004; 31:16-8.
4. Hunt RJ. The efficiency of half mouth examination in estimating the prevalence of periodontal disease. Journal of dental research 1987; 66: 1044-8.
5. Silness J, Røynstrand T. Partial mouth recording of plaque, gingivitis and probing depth in adolescents. J Clin Periodontol 1988; 15:189-92.
6. Zhang J. Applicability of community periodontal index teeth and random half-mouth examination to gingival bleeding assessment in untreated adult population in Beijing. Chin Med Sci J 2012; 27: 41-5.
7. Fleiss JL, Park MH, Chilton NW, Alman JE, Feldman RS, Chauncey HH. Representativeness of the Ramfjord teeth for epidemiologic studies of gingivitis and periodontitis. Commun Dent and Oral Epidemiol 1987; 15(4): 221-4.
8. Najah A, Seham S, Fadhil R. The usefulness of Ramfjord teeth to represent the full-mouth pocket depth in epidemiological study. J Baghdad Coll Dent 2010; 22(2): 272-5.
9. Rams TE, Oler J, Listgarten MA, Slots J. Utility of Ramfjord index teeth to assess periodontal disease progression in longitudinal studies. J Clinical Periodontology 1993; 20(2):147-50.