Effect of over weight on teeth surrounding structures in sample of patients with regular teeth brushing
Asocial study in Erbil city

Shahida Rassul Hussein (B.D.S.,MSc)

(B.D.S.,MSc) lecturer; Dental department , Technical Medical institute , Erbil poly technique university, Erbil, Kurdistan, Iraq.

Email: ***dr.shahida.rasul@gmail.com*** **,** ***Shahidar@ epu.edu.krd***

الخلاصة

الخلفية والهدف: تعتبر السمنة عاملا مهما يرتبط بالأمراض المرتبطة بنمط الحياة، وتشير الدراسات إلى أن هذا العامل قد يكون مرتبطا أيضا بالتهاب اللثة. وكانت أهداف الدراسة الحالية هي دراسة تأثير السمنة على صحة اللثة ، من كلا الجنسين في (200) من السكان البالغين في مدينة أربيل.

الطريقة: تم تحديد مؤشر كتلة الجسم (200) مريض الذين كان تنظيف الأسنان بالفرشاة اليومية العادية. زيارة المراكز الطبية في أربيل. وشملت المتغيرات الاختبار السريري للصحة اللثة التي يؤديها الإبلاغ البلاك، ومؤشرات اللثة وعمق الجيب والركود اللثوي بين الجنسين.

النتائج: ذكرت الإناث البدينات يعني أكبر من الإبلاغ البلاك) و (ومؤشرات اللثة)، وعمق الجيب و والركود اللثوي من الذكور يعانون من السمنة المفرطة. مع وجود فروق ذات دلالة إحصائية في معدل انحدار الجنين (الإبلاغ البلاك) و (ومؤشرات اللثة) بين الإناث البدناء من السمنة المفرطة $P \leq 0.008$ و $P \leq .003$ ، ولكن لم يتم العثور على فروق ذات دلالة إحصائية بالنسبة للمجموعات الصحية وقبل البدناء لكلا الجنسين. ، أيضا بشكل ثابت لم توجد فروق ذات دلالة إحصائية على استئصال اللثة وعمق الجيب بين الذكور والإناث لكل المعلمات. وكشفت جميع مؤشرات الدراسة لدى الذكور والإناث عن وجود فرق معنوي كبير بين الفئات الصحية والمسبقة للبدناء، والمرضى الذين يعانون من السمنة المفرطة، والسمنة المفرطة والسمنة المفرطة على التوالي . $P \leq 0.000$

الاستنتاجات:وجدت الدراسة الحالية أن السمنة لها تأثير على صحة اللثة ولكن لها تأثير ضئيل على عمق الجيب اللثة.ايضا الإناث البدينات يعني أكبر من الإبلاغ البلاك) و (ومؤشرات اللثة)، وعمق الجيب و والركود اللثوي

الكلمات الرئيسية: السمنة، مؤشر لوحة، مؤشر اللثة، مؤشر كتلة الجسم، استئصال اللثة وعمق الجيب.

Abstract

Background and Objective: Obesity is an important factor associated with lifestyle-related diseases, and this factor may be related to periodontitis. Aims of the present study were to investigate the effect of obesity on gingival health ,pocket depth and gingival recession of both genders in Erbil city.

Methods: Body Mass Index (BMI) was determine for (200) patients who had regular daily tooth brushing; visiting Erbil medical centers. Clinical examination of the periodontal health was performed by reporting plaque, gingival indices, pocket depth and gingival recession among males and females individual.

Results: obese females reported the greater mean of PLI, GI, GR and PD than obese males; with statically significant differences of PLI and GI between obese males and obese females ($P \leq 0.008$ and $P \leq .003$) but statistically not significant difference was found for healthy and pre-obese groups for both genders. , also statistically not significant differences were found for gingival rescission and pocket depth between the male and

female groups for all parameters. all study parameters in male and female revealed a highly significant difference between healthy & pre-obese, healthy & obese and pre-obese &obese groups (P ≤0.000).

Conclusions:. The present study shows that obesity has an effect on gingival health but it has little effect on pocket health and gingival rescission. Obese females reported more gingivitis,gingival recession and pocket depth than male.

Keywords*: obesity, plaque index, gingival index, BMI, gingival resection and Pocket depth,*

Introduction:

Periodontal disease is a chronic inflammatory disease for which several susceptibility and risk factors are suggested. [1] It is a widespread condition worldwide and conceder as a major public health problem for developed and developing countries. [2] Periodontitis is inflammatory disease characterized by periodontal pockets resulting from an attachment loss, which progressively can lead to loss of the teeth. Tooth loss is one of a worldwide public health problem caused mainly by dental caries and periodontal disease, especially in later adulthood, with effects on quality of life. [3]Many systemic diseases and disorders have been concerned as risk factors in different forms of periodontal disease such as (reduction in a number of functional PMNs, cardiovascular disease, diabetes Mellitus, use of medication and hormonal change. [1,4]

Evidence propose that obesity associated with periodontal disease seems to exist, as several studies have observed this association in different life-course stages, since childhood to adulthood. [5] Obesity is the fastest growing health-related problem in the world. [6]A various studies have found a strong association between obesity and clinical and pathological aspects of periodontal disease. [7] An accepted explanation for this relation may come from the fact that adipose tissue is an active endocrine organ that secretes numerous cytokines, or protein mediators, collectively known as adipokines. These inflammatory mediators have an effective role in both inflammation and immune responses associated with periodontal disease. [8]The aims of the study were to:

Patients and method:

The total sample composed of 200 individuals (98 females and 102 males) adult people were seeking dental treatment at medical centers, Ministry of Health present in different regions in

Erbil city.

Patients with medical history, receiving anti-inflammatory pills or nutritional supplements, undergoing weight loss therapy, pregnant and lactating women and those receiving periodontal therapy six months before were excluded from the study.

The patients were also asked about thier body weight, height, the frequency of tooth brushing (patients with regular daily tooth brushing were selected); they were selected randomly for examination by one examiner (the authors).

The clinical examinations were performed in the dental clinic of medical centers. The plaque index by Silness J& Löe [9], gingival index by Löe H& Silliness [10]. Gingival recession was recorded according to the P.D. Miller Jr. classification of marginal tissue recession[11]. pocket depths were recorded by calibrating probe and the depth: recorded as the distance from the gingival margin to the bottom of the pocket using calibrated periodontal probe graduated in mm, considering a healthy sulcus < 3mm. [12,13]

BMI was used to clarify overall obesity (kg/m2). It was calculated using each participant's weight in kilograms divided by the square of height in meters. As recommended by WHO, the international classification for adults (WHO) was followed: patients were categorized as healthy, preobese, and obesity are <18.5 kg/m2, 18.50 - 24.99 kg/m2, 25.00 – 29.99 kg/m2, ≥30.00 kg/m2 respectively. [13,14,15]

The examination was perform by using plane mouth mirrors, WHO periodontal probes to detect the dental plaque and gingival health cotton and disinfectant agent were also used.

Examination of teeth was selected by Ramfjord [16] were used for the examination of six teeth which represent six segments of the jaw, upper right 1st molar, upper left central incisor and upper left 1st premolar, lower right 1st premolar and central incisor and lower left 1st molar. A patient who had less than 20 teeth were excluded from the study.The statistical analysis of the data was carried out by using (SPSS) version was17 .This includes (nova and independant two sample t-test):

To determine the effect of weight on periodontal health among patients with regular daily tooth brushing of both genders.

Results:

Table (1) shows descriptive statistics for all parameters in all study groups including; means, , number, percentage, minimum & maximum values.

Table (1): Descriptive Statistics for all parameters in all study groups of both gender

gender	index	group	no	min	max	mean ±sd
MALE	PLI*	healthy	42	0	2	0.75 ± 0.47
		preobese	43	0	1.90	0.61±0.51
		Obese	17	0	1.30	0.61 ±0.44
	GI*	healthy	42	0	3	0.87±0.75
		preobese	43	0	1.50	0.85±0.52
		Obese	17	0	1.30	0.72±0.41
	GR*	healthy	42	0	2	0.71±0.64
		preobese	43	0	2	0.77±0.75
		Obese	17	0	2	0.94±0.75
	PD*	healthy	42	1	3.10	2.19±0.41
		preobese	43	1	3.50	2.19±0.55
		Obese	17	1	3.30	2.15±0.78
FEMALE	PLI	healthy	39	0	1.6	0.68±0.51
		preobese	41	0	3	0.81±0.71
		Obese	18	.16	2.25	1.09±0.55
	GI	healthy	39	0	2.3	0.69± 0.70
		preobese	41	0	1.80	0.82±0.61
		Obese	18	.3	2.6	1. 25±0.57
	GR	healthy	39	0	1	0.31±0.47
		preobese	41	0	2	0.66±0.73
		Obese	18	0	2	0.99±0.85
	PD	healthy	39	1.10	2.90	2±0.51
		preobese	41	1	3.30	2.07±0.6
		OBESE	**18**	**1.30**	**3.95**	2.51±0.73

***PLI means plaque index GI=gingival index. GR=gingival recession PD=pocket depth.**

In more detailed comparative Table 2 for study parameters in female showed that differences in mean PLI, GI, GR, and PD were statistically highly significant between

healthy & preobese groups, healthy & obese groups and between preobese & obese groups.

Table 2: compared study of all parameter means in females

indeces	Groups	Mean ±SD	P-value*
PLI	Healthy-pre obese	1.11±0.33	0. 002
	Healthy- obese	2.25±0.52	0.001
	Pre obese -obese	2.16±0.22	0.0003
GI	Healthy-pre obese	1. 31±0.35	0.0005
	Healthy- obese	1.33±0.54	0.006
	Pre obese -obese	1.36±0.22	0.0003
GR	Healthy-pre obese	1.21±0.31	0 .000
	Healthy- obese	1.22±0.53	0.0001
	Pre obese -obese	1.26±0.23	0.009
PD	Healthy-pre obese	2.19±0.35	0.002
	Healthy- obese	2.20±0.54	0.0016
	pre obese -obese	2.24±0.22	0.0001

***p≤ 0.005 considers significant difference**

On the other hand (Table 3) showed that all study parameters in male were revealed highly statistically difference in mean PLI, GI, GR, and PD between healthy & pre obese, healthy & obese and preobese &obese groups respectively .

Table 3: compared study of all parameter means in males

indeces	Group	Mean ±SD	P-value
PLI	Healthy-pre obese	1. 21 ±0.33	0.006
	Healthy- obese	2.22 ±0.53	0.001
	Pre obese -obese	2.10 ±0.23	0.0002
GI	Healthy-pre obese	1.21 ±0.33	0.001
	Healthy- obese	1.22 ±0.53	0.0001
	Pre obese -obese	1.25 ±0.24	0.000
GR	Healthy-pre obese	1.21 ±0.35	0.003
	Healthy- obese	2.31 ±0.52	0.0001
	Pre obese -obese	2.26 ±0.23	0.000
PD	Healthy-pre obese	2. 18 ±0.33	0.0002
	Healthy- obese	2.29 ±0.53	0.0004
	pre obese -obese	2.34 ±0.23	0.002

Table (4) showed the all study parameters on a gender bases. This table indicated that the differences between matched groups of male & female were not significant for both study parameters, with exceptions of this rule has been observed, (the difference in PLI of obese male and female, GI between obese male and female, and healthy male with healthy female GR were significant.

Table 4: comparison for study parameters between female and male

indices	Groups	Mean ±SD	P-value
PLI	Healthy male -healthy female	0.80 ±0.74	0.353
	pre obese male- pre obese female	0.78 ±0.74	0.155

	obese male-obese female	0.70 ±0.56	0.008
GI	Healthy male- Healthy female	0.72 ±0.94	0.118
	Pre obese male Pre obese female	0.66 ±0.74	0.832
	obese male -obese female	0.52 ±0.54	0.003
GR	Healthy male- Healthy female	0.94 ±0.90	0 .003
	Pre obese male- Pre obese female	0.77 ±0.92	0.502
	obese male -obese female	0.60 ±0.85	0.818
PD	Healthy male- Healthy female	0.65 ±0.74	0.125
	Pre obese male-Pre obese female	-0.64 ±0.80	0.330
	obese male-obese female	-0.82 ±0.81	0.160

Discussion:

Obesity is the result of interaction among genetic, immunological, nutritional, psychological, environmental and socioeconomic factors. Prevalence of obesity has increased in recent years, and they are considered as factors associated with other chronic diseases related to the reduction in quality of life and increase inmortality[17]. In addition to relating obesity to general chronic diseases, several authors have also performed studies to identify the association between overweight and/or obesity and alterations in the mouth such as periodontal disease[18]. Obesity may also influence periodontal disease status by increasing lipid and glucose blood levels, which may have deleterious consequences for the host response by altering T cells and monocyte/macrophage function, as a result increasing cytokine production [19]. Exercise capacity, which is closely associated with obesity, has been shown to be related to periodontal disease[20].

Our study deals with using the clinical parameters (plaque index and gingival index, gingival recession and pocket depth), on normal weight, pre-obese, and obese subjects between males and females individuals; who with healthy systemic condition, using the body mass index (BMI) and enter parametric comparison.

As shown in the table (1)females reported the greater mean of PLI.GI,GR and PD (1.09 for female &0.61 for male, 1.25 for female & 0.72 for male, 0.99 for female &0.94 for male and2.51 for female&2.15 for male) than male respectively :we found a significant difference obtained between only obese male and obese female for plaque index and gingival index

respectively (P ≤0.008 and P≤.003) as shown in table (4). These results match with results of other study done by [21,22]which indicate that subjects with overweight-obesity were associated with the gingivitis index (p=0.0050).

This is because the dietary habits and increasing in the frequency of food eaten among obese individuals in addition to the type of food in which containing more sugar that affects the formation of dental plaque and gingivitis. ; but statistically, no significant difference of gingival recession and pocket depth between obese male and the obese female was reported respectively (P ≤0.818 and P≤..160).

In table (1) we can observe that mean gingival rescission among obese (male =0.94 < 1 and female = 0.99 < 1) while mean pocket depth among obese (male =2.15 its < 3 and female =2.51 <3).this may be due to that the only cases of the present study were select when regularly brush their teeth every day .other study by [23,24] indicate that PPD and CAL were equal to (2.82 +/- 0.4 versus 2.56 +/- 0.36, P < 0.002 and 1.98 +/- 0.5 versus 1.63 +/- 0.335, P < 0.000 respectively) between compare group.

Also in the present study as shown in(Table 2) female reported that differences in PLI, GI, GR, and PD were highly significant between healthy & preobese groups , healthy & obese groups and between preobese & obese groups.

One of the studies included 706 subjects aged 30 to 65years from southern Brazil, and the authors reported an association between obesity and periodontitis in females but found no association between overweight and periodontitis in both sexes [25,26]

Another study by CF et al [27], suggests that the topographic distribution of body fat in females might predispose them to periodontal disease.

It has been reported that in a Scandinavian population of 878 women and 719 men, with a total 1597 subjects aged 20 to 95 years, no association was found between loss in the level of epithelial insertion and obesity measured by BMI [28].

On the other hand (Table 3) showed that all study parameters in male revealed highly significant difference between healthy & pre-obese, healthy & obese and pre-obese &obese groups respectively .while another study by Linden et al 29investigated whether there was an association between obesity and periodontitis in a homogeneous group of 60-70-year-old Western European men, and showed that obesity was associated with a higher percentage of sites with a probing depth of >5 mm (4.8,3.4, P= 0.01)**.**

Conclusion: regular daily tooth brushing, oral hygiene protection ,oral checking up and promoting educational program of subjects with over-weight is important in order to prevent oral changes**.** Maintaining good oral hygiene and normal body weight and oral checking up can decrease the overall inflammatory effect, thereby reducing the risk for development of periodontal disease**.**

References:

1. Kinane DF,Marshall GJ:Periodontal disease of systemic manifestation :Aust Dent J 2001;46:(1):2-12.

2. Petersen PE, Ogawa H. The global burden of periodontal disease: towards integration with chronic disease prevention and control.Periodontol 2000 2012;60:15-39.

3. Van Dyke TE, van Winkelhoff AJ. Infection and inflammatory mechanisms. J Clin Periodontol 2013;40:1-7.

4. Martos R, Marton I. Correlations between dental-oral infections and cardiovascular disease. Fogorv *Sz* 2008;10:101-5.

5. Nascimento GG, Seerig LM, Vargas-Ferreira F, Correa FO, Leite FR, Demarco FF. Are obesity and overweight associated with gingivitis occurrence in Brazilian schoolchildren? J Clin Periodontol
2013;40:1072-1078.

6. Haenle MM, Brockmann SO, Kron M, Bertling U, Mason RA, Steinbach G, and others. Overweight ,physical activity, tobacco and alcohol consumption in across-sectional random sample of German adults. *BMC* Public Health 2006; 6:233–7.

7. Al-Zahrani MS, Bissada NF, Borawskit EA. Obesity and periodontal disease in young, middle aged, and older adults. J Periodontol 2003; 74: 610-5.

8. Page RC: The role of inflammatory mediators in the pathogenesis of periodontal disease. J Periodont Res1991; 26:230.

9. Silness J, Löe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand. 1964; 22: 121-135.

10. Löe H, Silness J. Periodontal disease in pregnancy. I. Prevalence and severity. Acta Odontol Scand. 1963; 21: 533-551.

11. Miller P D Jf. A Classification of Marginal tissue Recession. J Periodontal Res Dent 1985; 5: 9

12. Patino-Marin N, Martinez F, Loyola-Rodriguez JP, Tenorio-Govea E, Brito-Orta MD, Rodriguez-Martinez M. Anovel procedure for evaluating gingival perfusion status using laser-doppler flow metry. J Clin Periodontol 2005;32:231-237.

13. Patino-Marin N, Martinez F, Loyola-Rodriguez JP, Tenorio-Govea E, Brito-Orta MD, Rodriguez-Martinez M. Anovel procedure for evaluating gingival perfusion statususing laser-doppler flowmetry. J Clin Periodontol 2005;32:231-237.

14. Khader YS, Bawadi HA, Haroun TF, Alomari M, TayyemRF. The association between periodontal disease and obesity among adults in Jordan. J Clin Periodontol 2009;36:18-24.

15.World Health Organization. Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation. World Health Organization Technical Report Series, World Health Organization, Geneva 2000; 1: 894– 253, .

16.Ramfjord SP :indices for prevelance and incidence of periodontal disease .J Periodontal .1959 ;30:51-59.

17. Patiño Marín N, Loyola Rodríguez JP, Medina Solis CE,Pontigo Loyola AP, Reyes Macías JF, Ortega Rosado JC,Aradillas García C. Caries, periodontal disease and toothloss in patients with diabetes mellitus types 1 and 2. Acta Odontol Latinoam. 2008;21:127-133.

18. Wood N, Johnson RB, Streckfus CF. Comparison of body composition and periodontal disease using nutritional ssessment techniques: Third National Health and Nutri-tion Examination Survey (NHANES III). J Clin Periodontol2003;30:321-327.

19. Gurpreet Kaur, N.D.Gupta Lata Goyal obesity and periodontal disease. I ndian J Dent Scienc 2010; 2: 5: 33-5.

20. Merchant A T, Pitiphat W, Rimm EB, Joshipura K. I ncreased physical activity decreases periodontitis risk in men. Eur J Epidemiol 2003; 18: 891–8.

21. Khader YS, Bawadi HA, Haroun TF, Alomari M, TayyemRF. The association between periodontal disease and obesity among adults in Jordan. J Clin Periodontol 2009;36:18-24.

22.Jorge A Z , Soledad D P , Nuria P M ,Juan P L . relation ship between obesity and periodontal disease in Maxcico . Acta Odontol. Latinoam. 2010; 23: 204-209.

23. Sarlati F, Akhondi N, Ettehad T, Neyestani T, Kamali Z. Relationship between obesity and periodontal status in a sample of young Iranian adults. Int Dent J. 2008;58(1):36-40.

24. Dalla Vecchia CF, Susin C, Rösing CK, Oppermann RV, Alban-dar JM. J Periodontol. Overweight and obesity as risk indicators for periodontitis in adults. J Periodontol 2005;76:1721-1728.

25. Giri DK, Kundapur PP,Bhat GS,2Bhat KM,Guddattu V. Periodontal disease and obesity in an Indian population.Nepal Journal of Medical Sciences 2013;2(2):144-9.

26. Kongstad J, Hvidtfeldt UA, Grønbaek M, Stoltze K, Holm-strup P. The relationship between body mass index and periodontitis in the Copenhagen City Heart Study. J Peri-odontol 2009;80:1246-1253.

27. Dalla Vecchia CF, Susin C, Rösing CK, et al. Overweight and obesity as risk indicators

for periodontitis in adults. J Periodontol 2005;76:1721-8.

28. Linden G, Patterson C, Evans A, Kee F .Obesity and periodontitis in 60-70-year-old men. J Clin Periodontol 2007;34:461-466.