International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Evaluation of Tooth Wear among a Group of Dentists in Baghdad City

Wassan Jamal Obaid[1], Nadia Qasim Mutlak[2], Baydaa Ahmed Yas[3]

[1] B.D.S, M.Sc., Alamryia Specialized Center, Baghdad-Iraq.
Email: *dr_wassanjamal87[at]yahoo.com*

[2] B.D.S, M.Sc., Alamryia Specialized Center, Baghdad-Iraq.
Email: *dr.nadiaqasim[at]gmail.com*

[3] Assistant Professor, College of Dentistry, Uruk University, Baghdad-Iraq.
Email: *drbaydaaumusama[at]gmail.com*

Abstract: ***Background: tooth wear is a non-carious tooth substance loss by means other than dental caries or dental trauma. Tooth wear is a very common condition that occurs in about 97% of the population. Biomarkers of tissue damage as results of occupational physical demands could be used for detection of work-related tooth wear. The aim of this study was to assess tooth wear and, selected salivary biomarkers (Creatine kinase and C-reactive protein) and to find the relation among them. Subjects and Methods: Study participants consist of 112 dentists. They were selected from college of dentistry /Baghdad University, health care center in Bagdad city. They were of both gender and aged between 40-45 years. They should fit the study criteria. Self-administered were used to evaluate information. Tooth wear was examined the surfaces of all teeth were scored according to tooth wear index by Smith and Knight (1984). Stimulated saliva were collected from subsample (87) dentists drawn randomly from the total sample, for whom biochemical analysis (measurement of creatine kinase and C-reactive protein) were done. Results: Results that according to the type of tooth surfaces, occlusal surface record higher percentage with (94.6%) followed by the incisal surface (90.2%) and lowest surface is the lingual surface with (9.8 %). According to gender tooth wear was higher among female than male regarding all tooth surface types and for both jaws. Tooth wear according to arch type and tooth surface type by gender is shown in table (3-22) results showed that tooth wear in general in the whole mouth regardless arches and tooth surface type was higher among female (mean rank=58.8) than male (mean rank =50.9) but with non- significant differences (P>0.05). According to arch type in both maxilla and mandible, tooth wear recorded higher mean rank value among female than male but with non-significant differences (P>0.05). According to tooth surface type, in maxilla all tooth surfaces (buccal, incisal, occlusal and cervical) recorded higher mean rank value among female than male but with non-significant differences P>0.05, except for lingual surface tooth wear was higher among male than female also with non- significant differences (P>0.05). Conclusions: the result showed the tooth wear among dentists was because Dentistry is a stressful occupation stress factors are generally related to operational considerations, interpersonal relations and from hazord occurring in the dental office and in this study, there is a significant correlation between level of c –reactive protein and tooth wear.***

Keywords: Tooth wear, Creatine kinase, C-reactive protein.

1. Introduction

Tooth Wear

Also known as a non-carious tooth substance loss refers to loss of tooth substance by means other than dental caries or dental trauma [1]. Tooth wear is a very common condition that occurs in about 97% of the population. Review of Iraqi studies regarding the prevalence and severity of tooth wear is shown in (table 1). This is a normal physiological process occurring throughout life, but accelerated tooth wear can become a problem [2]. It results from the interaction of three processes (attrition, erosion and abrasion) which may occur in isolation or in combination [3]. The etiology of tooth wear is usually multifactorial and has been related to local, systemic factors, biological, mechanical, chemical and\or tribological factors [4, 5]. It is most important to consider that minor to moderate tissue loss is a normal feature of the aging dentition [6]. The increase in tooth wear leads to decreases in tooth dimension and results for over eruption of tooth or migration of tooth either incisally or occlusally, decrease of vertical dimension of occlusion and affect appearance [7]. With continuing wear process it will lead to pain, pulpal inflammation, necrosis, periapical pathology [8], and temporomandibular disorders [9].

Table 1: Iraqi studies about tooth wear

Author	Sample	Origin	Type of study	Year	Result
Alobaidi and Ghafour	dental attrition among 5-11 years old children	Albu-etha village Baghdad/Iraq.	Cross sectional study	2005	(52%) of children with dental attrition, boys (55.9%) and girls (46.2%).
Al-Doory, and Al-Hadithy,	dental attrition among 5-11 years old children	Sulaimaniya city/ Iraq		2010	(78%) of children with dental attrition
Abdullah and Al-Mulla	Tooth attrition patterns in a group of Iraqi adults sample with different classes of malocclusion	Baghdad city /Iraq	A comparative study	2012	(64.2 %) had (score 0). (33.8%) had (score 1).
Mohammad and Ggharaib	tooth wear among (18-25) years old college students	Suleiman city/Iraq		2012	63.4% had (score 1).
Al-Azawi	tooth wear among institutionalized residents (50-89) years old	Baghdad city\ Iraq	Cross-sectional study	2014	Tooth wear in this study was 100%. Score2 (56.9%) score 3 (26%,) score 4 (17.1%.

Many factors effect on tooth wear like structure and hardness of enamel, load and duration of contact between opposing surfaces, the sequence of tooth eruption, occlusion, arch shape and craniofacial shape have also been implicated as factors affecting tooth wear [10]. And Other factors include Genetic factors, Periodontal diseases [11], Bruxism [12], Missing teeth, Extrinsic acids such as Acidic drinks or Medications and oral hygiene products and Intrinsic acids (gastric acids) which caused by Gastro-Esophageal Reflux Disease (GERD) gastro-esophageal reflux (hyperacidity) [12].

2. Subjects, material and methods

The sample for this study was consisted of 112 dentists of both gender aged 40-45 years. They were selected from specialized dental centers, Heath care Centers and Collage of dentistry/ Baghdad University. Informed consent and ethical approval was obtained for their examination. They should fulfill the selected criteria, They should be healthy and free of self-reported (Anemia, diabetes, heart disease and inflammatory conditions include arthritis), non- smoker, should not been injured in the last six years, should not have blood- borne disease, Should not be on excessive use(>81mg /daily) of Non-steroidal anti-inflammatory drugs, Should not be on lipid lowering medications, Should not have heavy exercises in the last two days, prior to the study or other physical activities beyond those required to perform their normal daily activities, should be without any medical history that compromise salivary secretary mechanisms, should not take any medications with xerostomic effect, should not wear any fixed or removable dental prosthesis and pregnant and women with significant gynecological problems or those during menstruation cycle should be excluded (25).

This study was carried out during the period between December 2015 and March 2016 in Baghdad. Each subject fills out questionnaire format (self-administered questionnaires).

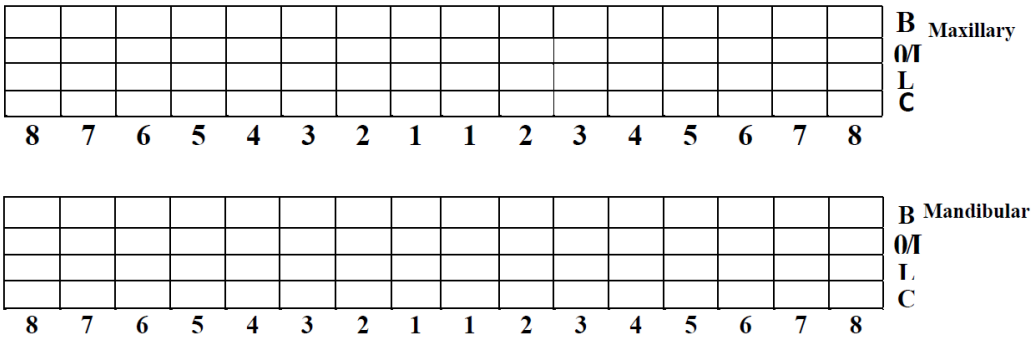
Then the Clinical examination was performed with the aid of dental mirror and dental prob. Teeth were dried using cotton rolls. The surfaces of all teeth were scored according to tooth wear index by Smith and Knight (1984) [13] as show in table (2, 3), with the following scores and criteria:

Scores	Criteria
0	No loss of enamel surface characteristic
	No loss of contour.
1	Loss of enamel
	surface characteristic
	Minimal loss of contour
2	Visible dentin less than one third of surface area
	Loss of enamel just exposing dentine.
	Defect less than 1 mm deep
3	Loss of enamel exposing dentine for more than one third of surface
	Loss of enamel and substantial loss of dentine.
	Defect less than 1-2 mm deep
4	Complete enamel loss - pulp exposure - secondary dentin exposure
	Pulp exposure or exposure of secondary dentine.
	Defect more than 2mm deep - pulp exposure - secondary dentine exposure.

Table 2: Personal and occupational information:

Name Date
Age
Gender 1) male 2) female
How many years or months have you doing your present job?
On average how many hours a week do you work?
How much do you weight?
How tall are you?
Are you left handed or right handed? 1. Right handed 2. Left handed
Marital status?
Number of children?
Number of patients per day?
Do you work at a private clinic?
General dentist or specialist?

Table 3: Tooth Wear Index (Smith and Knight, 1984)



B=--------, O=----------, I=---------, L=---------, C=---------

Scores	Criteria	
0	No loss of enamel surface characteristic No loss of contour.	B,L,O,I C
1	Loss of enamel Surface characteristic Minimal loss of contour	B,L,O,I C
2	Visible dentin less than one third of surface area Loss of enamel just exposing dentine. Defect less than 1 mm deep	B,L,O,I C

3	Loss of enamel exposing dentine for more than one third of surface Loss of enamel and substantial loss of dentine. Defect less than 1-2 mm deep	B,L,O,I C
4	Complete enamel loss - pulp exposure - secondary dentin exposure Pulp exposure or exposure of secondary dentine. Defect more than 2mm deep - pulp exposure - secondary dentine exposure.	B,L,O,I C

Then stimulated saliva were collected from subsample drown randomly from the total sample that was consisted of 87 dentists of both gender. Saliva collection was performed according to the instruction cited by Tenovuo and Lagerlof (29). Then biochemical analysis were performed to measure salivary Creatine kinase and C - reactive protein by using enzyme –linked sorbent assay (ELISA). All the laboratory works were done in poisoning consultation center, Gazi Al-Hariry hospital.

Statistical analyses were done by using IBMSPSS version 23 computer software (Statistical Package for Social Sciences) in association with Microsoft Excel 2016. Most of the outcome (response) variables were non-normally distributed variables. Such variables can be described by median and interquartile range. Statistical tests used were (Mann-Whitney) and Kruskal-Wallis test in addition to Spearman's rank linear correlation coefficient. An estimate was considered statistically significant if its P value was less than a α level of significance of 0.05.

3. Results

The total sample consist of 112 dentist females form two third of the total sample with 70.5% while males constituted 29.5%. Results in Table (4) and Figure (1) showed that according to the type of tooth surfaces, occlusal surface record higher percentage with (94.6%) followed by the incisal surface (90.2%) and lowest surface is the lingual surface with (9.8 %).

According to gender tooth wear was higher among female than male regarding all tooth surfaces types and for both jaws.

Tooth wear according to arch type and tooth surface type by gender is shown in table (5) results showed that tooth wear in general in the whole mouth regardless arches and tooth surface type was higher among female (mean rank=58.8) than male (mean rank =50.9) but with non- significant differences (P>0.05).

According to arch type in both maxilla and mandible, tooth wear recorded higher mean rank value among female than male but with non-significant differences (P>0.05).

According to tooth surface type, in maxilla all tooth surfaces (buccal, incisal, occlusal and cervical) recorded higher mean rank value among female than male but with non-significant differences P>0.05, except for lingual surface tooth wear was higher among male than female also with non- significant differences (P>0.05).

For the mandible (occlusal, incisal and cervical) surfaces recorded higher mean rank value among female than male with non- significant differences P>0.05, while buccal and lingual surfaces revealed equal mean rank values among male and female with non- significant differences (P>0.05).

Tooth wear according to dentist's characteristics was showed in table (6). Tooth wear had higher mean rank (60.4) in the specialist than general dentist (49.7) but with no statistical differences (P>0.05), according to working in private clinic the higher mean rank value was in negative category with (57.7) than positive category (55.5) with non- significant differences (P>0.05).

Table (7) shows that according to duration of work per year higher mean rank of total tooth wear was (60.6) in the category with 21+ but with non- significant differences (P>0.05), regarding working hours in a week the total tooth wear had higher mean rank (58.4) in the category with 41+hours of work per week with non- significant differences (P>0.05).

According to body mass index higher mean rank value was (61.5) in the overweight category with non- significant differences (P>0.05).

According to workload the total tooth wear had high mean rank 68.6 with the category with 11+ patients per day with non- significant differences (P>0.05).

Regarding correlation of tooth wear with dentist characteristics there was a weak positive non-significant correlation (P>0.05).

Table 4: Distribution of dentists with tooth wear according to tooth surface type and arch type by gender

Tooth surface type	Female N=79		Male N=33		Total N=112	
	No.	%	No.	%	No.	%
Buccal	21	26.6	7	21.2	28	20
Occlusal	77	97.5	29	87.9	106	94.6
Incisal	72	91.1	29	87.9	101	90.2
Lingual	6	7.6	5	15.2	11	9.8
Cervical	24	30.4	7	21.2	31	27.7
Maxilla	77	97.5	29	87.9	106	94.6
Mandible	77	97.5	29	87.9	106	94.6
Overall	78	98.7	29	87.9	107	94.6

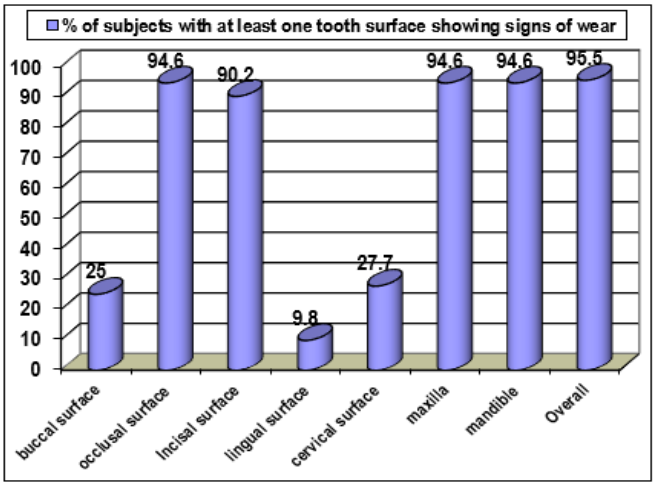


Figure 1: Distribution of dentists regarding tooth wear according to surfaces

Table 5: Tooth wear according to gender:

Arch	Surface	Female			Male			Statistical differences			
		No.	Median	Mean Rank	No.	Median	Mean rank	U-test	w-test	Z-test	P-value
Maxillary Arch	Buccal	79	0	57.2	33	0	54.8	1247	1808	-0.47531	0.63
	Occlusal	79	4	60.3	33	3	47.5	1005	1566	-1.93021	0.05
	Incisal	79	4	58.1	33	4	52.7	1176.5	1737.5	-0.82095	0.41
	Lingual	79	0	55.4	33	0	59.2	1214	4374	-1.10667	0.27
	Cervical	79	0	56.9	33	0	55.5	1271	1832	-0.31765	0.75
	Total	79	0	58.7	33	7	51.2	1127	1688	-1.12901	0.26
Mandibular Arch	Buccal	79	0	56.5	33	0	56.5	1303.5	1864.5	0	1
	Occlusal	79	4	57.6	33	4	53.8	1213	1774	-0.5882	0.56
	Incisal	79	5	59.4	33	4	49.5	1074	1635	-1.48053	0.14
	Lingual	79	0	56.5	33	0	56.5	1303.5	1864.5	0	1
	Cervical	79	0	57.8	33	0	53.4	1200	1761	-0.99006	0.32
	Total	79	10	59.2	33	8	49.9	1087	1648	-1.38587	0.17
Maxillary and mandibular surfaces	Total	79	10	58.8	33	15	50.9	1118.5	1679.5	-1.18154	0.24

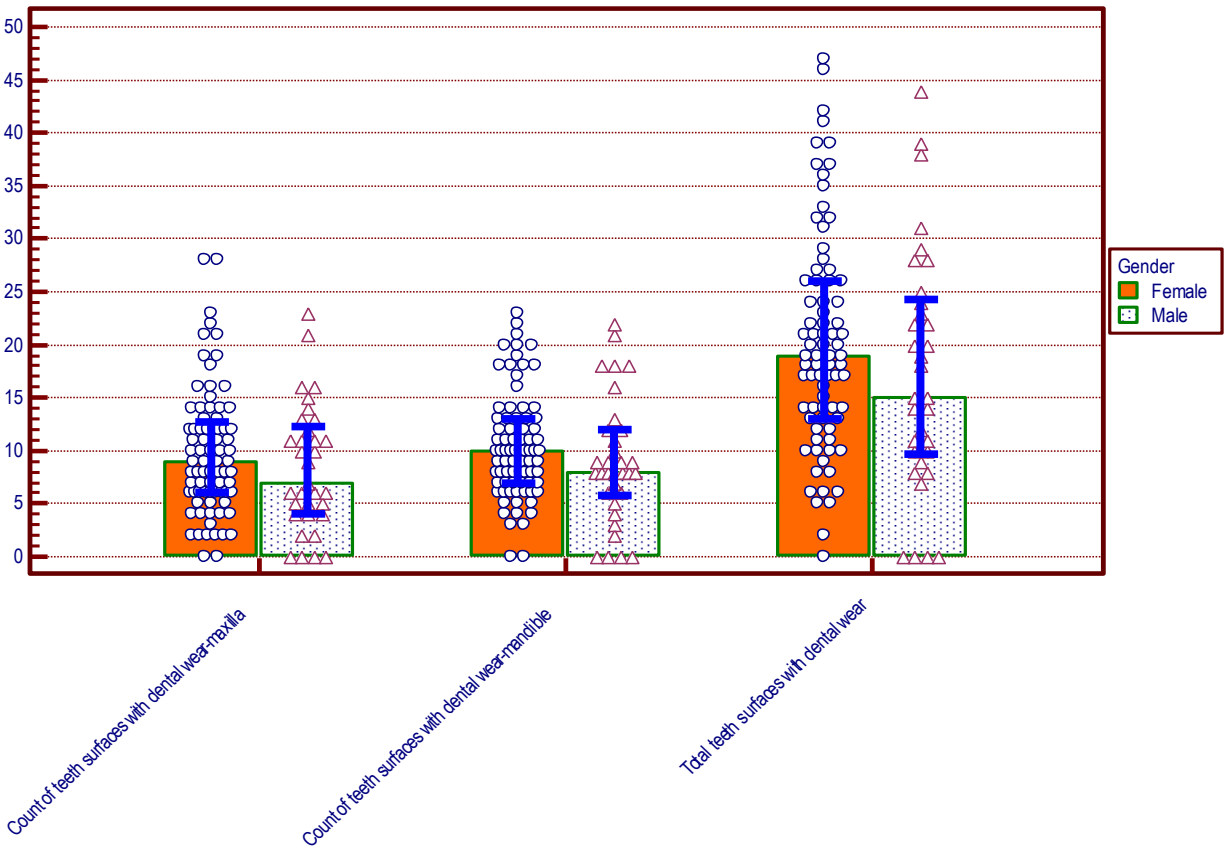


Figure 2: Distribution of tooth wear according to gender

Table 6: Salivary biomarkers (creatine kinase and c reactive protein according to gender

Parameter	Female			Male			Statistical differences			
	No.	Median	Mean rank	No.	Median	Mean rank	U-test	w-test	Z-test	P-value
CPK	76	474.1	46.1	20	416.3	37	529	739	-1.42239	0.15
C-RP	76	1.91	49.2	20	1.58	26.5	320.5	530.5		0.001**

** high significant 0.01

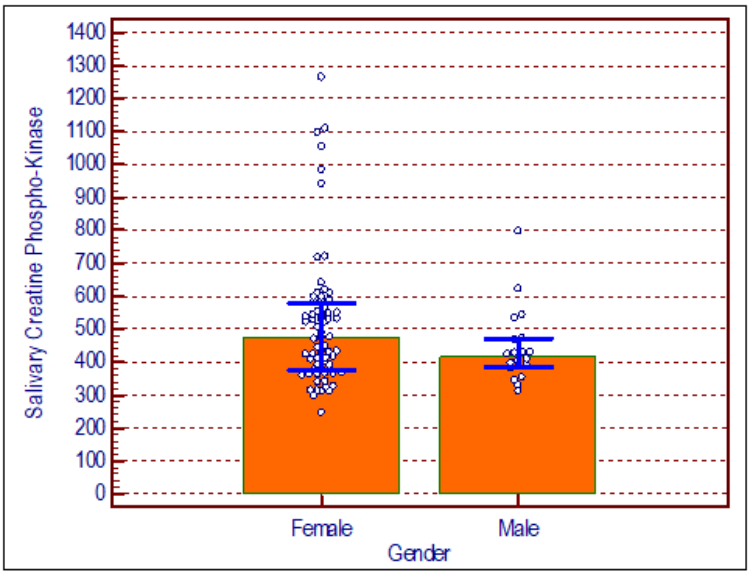


Figure 3: creatine kinase according to gender

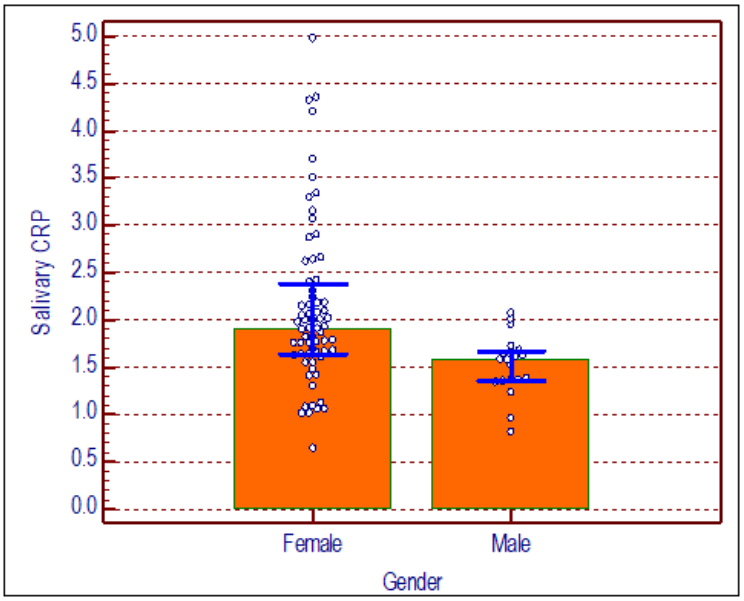


Figure 4: c- reactive protein according to gender

Table 7: Tooth wear according to Specialty and Working in private clinic

			Maxilla	Mandible	Total
Specialty	General	No.	41	8	17
		Median	8	41	41
		Mean rank	49.7	50.1	49.7
	Special	No.	71	10	20
		Median	10	71	71
		Mean rank	60.4	60.2	60.4
Statistical differences		U-test	1175.5	1192.5	1176.5
		W-test	2036.5	2053.5	2037.5
		Z-test	-1.69496	-1.59319	-1.68628
		p-value	0.09	0.11	0.09
Working in private clinic	Negative	No.	51	10	19
		Median	9	51	51
		Mean rank	58.2	57.1	57.7
	Positive	No.	61	9	18
		Median	8	61	61
		Mean rank	55.1	56	55.5
Statistical differences		U-test	1468	1525	1493.5
		W-test	3359	3416	3384.5
		Z-test	-0.51237	-0.17872	-0.36248
		p-value	0.61	0.86	0.72

Table 8: Tooth wear according to personal and occupational characteristics

Dentists Characteristics	Category	Maxilla			mandible			Total		
		No.	Median	Mean rank	No.	Median	Mean rank	No.	Median	Mean rank
Body mass index	Normal< 25	32	8	48.6	32	8	47.4	32	17	47.7
	Over weight (25- 29.9)	50	11	61.3	50	11	61.5	50	21	61.5
	Obese 31+	30	10	57	30	10	57.9	30	20	57.7
Statistical differences	Chi square	2.995304			3.783111			3.582959		
	P-value	0.22			0.15			0.17		
Correlation coefficient	r	0.103			0.119			0.117		
	P-value	0.28			0.21			0.22		
Duration of work as dentists /year	<15	24	8	52.1	24	10	54.9	24	1824	53
	16-20	42	9	53.7	42	9	54.2	42	18	54
	21+	46	10	61.3	46	10	59.4	46	20	60.6
Statistical differences	Chi square	1.777135			0.634034			1.240741		
	P-value	0.41			0.73			0.54		
Correlation coefficient	r	0.123			0.082			0.109		
	P-value	0.2			0.39			0.25		
Working hours in week	<30	38	9	56.2	38	10	54.1	38	18	54.9
	31-40	42	9	55.9	42	9	57.1	42	19	56.5
	41+	32	10	57.6	32	10	58.5	32	20	58.4
Statistical differences	Chi square	0.055499			0.335301			0.198064		
	P-value	0.97			0.85			0.91		
Correlation coefficient	r	0.07			0.107			0.098		
	P-value	0.46			0.26			0.3		
Work load	Small< 5	22	10	54.9	22	9	55.2	22	21	55.8
	Medium 5-10	68	8	53	68	9	53.5	68	18	52.8
	Large 11+	22	12	69	22	10	67.1	22	23	68.6
Statistical differences	Chi square	4.120341			2.99007			3.967333		
	P-value	0.13			0.22			0.14		
Correlation coefficient	r	0.148			0.122			0.137		
	P-value	0.12			0.2			0.15		

Relation of tooth wear salivary biomarkers:
Correlation of tooth wears salivary biomarkers (creatin kinase and C - reactive protein is shown in Table (9).

Results showed that total teeth surfaces with dental wear revealed weak positive significant correlation (P<0.05) with C - reactive protein level.

Regarding count of teeth surfaces with dental wear it has been found that tooth surface wear (maxilla) recorded weak positive significant correlation (P<0.05) c –reactive protein level.

Concerning mandibular teeth surfaces with dental wear recorded weak positive non-significant correlation (P>0.05) with salivary biomarkers (creatine kinase and c-reactive protein).

Table 9: Relation of tooth wear and salivary biomarkers

Parameter	Salivary creatine kinase	Salivary C-reactive protein
Count of teeth surfaces with dental wear maxilla	r=0.132 P=0.22	r=0.238 P=0.026*
Count of teeth surfaces with dental wear mandible	r=0.102 P=0.34	r=0.203 P=0.06
Total teeth surfaces with dental wear	r=0.122 P=0.26(NS)	r=0.23 P=0.032*

*Significant (P<0.05)
**Highly significant (P<0.01)

4. Discussion

The result showed the most affected surface is the occlusal with94.6 % followed by the incisal with90.2 % this agree with the finding of Chang, 2002 [14] who found that the most affected surfaces by wear was the occlusal surface, but disagree with Al-Azawi 2014 [15], this could be attributed to contacts Para function (grinding and clenching of teeth) which affecting the occlusal surfaces [16]. These surfaces can be regarded as the masticating or chewing area of the tooth while the incisal surface is commonly used for nonmasticatory functions, such as holding nails or pins and tearing or opening objects, these all may explain the increase of wear in occlusal surfaces.

Results showed that total tooth wear values were was almost the same between arches ,this finding is in disagreement with others [16]. Who found wear in mandible is more. the possible explanation of tooth wear among dentists was because Dentistry is a stressful occupation [17], stress factors are generally related to operational considerations ,interpersonal relations and from hazord occurring in the dental office these factors cause the dental wear to increase among dentists but the wear was mostly minimum because they are educated and know the effect of tooth wear and the habits that can lead to it and they avoided in their life.

Regard gender tooth wear was more in female than male This agree with Mohammed and Garib, 2012 [18]. This may be because female reported more stress than male because they suffer from the role strain between job stress and family responsibilities. Wilson, 1998 [19] or from the study female represent the highest percentage of the sample or because

from the result they had more musculoskeletal complaints and from the result there is a positive significant correlation between tooth wear and musculoskeletal complaints.

In this study there is a significant correlation between level of c –reactive protein and tooth wear more than with kreatine kinase enzyme.

Further studies are needed about this subject and the limitation of the study could be the relatively small numbers of the subjects when compared to other studies.

References

[1] Kaidonis JA. Oral diagnosis and treatment planning: part 4. Non-carious tooth surface loss and assessment of risk. British dental journal. 2012 Aug 25;213(4):155-61.
[2] Suchetha A, Sravani K, Mundinamane DB, Chandran N. Tooth Wear-A Literature Review. Indian Journal of Dental Sciences. 2014 Dec 1;6(5).
[3] Bartlett D, Dugmore C. Pathological or physiological erosion—is there a relationship to age?. Clinical oral investigations. 2008 Mar;12:27-31.
[4] Guidoni G, Swain M, Jäger I. Enamel: from brittle to ductile like tribological response. Journal of Dentistry. 2008 Oct 1;36(10):786-94.
[5] Khan F, Young WG. The multifactorial nature of toothwear. Toothwear: The ABC of the Worn Dentition. 2011 Aug 12:1-5.
[6] Ganss C. Definition of erosion and links to tooth wear. InDental Erosion 2006 (Vol. 20, pp. 9-16). Karger Publishers.
[7] Lussi A, Jaeggi T, Zero D. The role of diet in the aetiology of dental erosion. Caries research. 2004;38(Suppl. 1):34-44.
[8] Oginni AO, Agbakwuru EA, Ndububa DA. The prevalence of dental erosion in Nigerian patients with gastro-oesophageal reflux disease. BMC oral health. 2005 Dec;5:1-6.
[9] Kaidonis JA. Tooth wear: the view of the anthropologist. Clinical oral investigations. 2008 Mar;12:21-6.
[10] Davies SJ, Gray RJ, Qualtrough AJ. Management of tooth surface loss. British dental journal. 2002 Jan;192(1):11-23.
[11] Al-Zarea BK. Tooth surface loss and associated risk factors in northern saudi arabia. International Scholarly Research Notices. 2012;2012(1):161565.
[12] Wang GR, Zhang H, Wang ZG, Jiang GS, Guo CH. Relationship between dental erosion and respiratory symptoms in patients with gastro-oesophageal reflux disease. Journal of dentistry. 2010 Nov 1;38(11):892-8.
[13] Smith BG, Knight JK. An index for measuring the wear of teeth. Br Dent J. 1984; 156(12):435-438.
[14] Chang BJ. Ergonomic benefits of surgical telescope systems: selection guidelines. Journal of the California Dental Association. 2002 Feb 1;30(2):161-9.
[15] Al-Azawi MG, El-Samarrai SK. Distribution of Tooth Wear among Institutionalized Residents (50-89 Years Old) in Baghdad City\Iraq: Cross-Sectional Study. Journal of Baghdad College of Dentistry, 2014 Mar; 325(2212):1-4.
[16] Al-Hiyasat AS, Khasawneh SF, Khader YS. Tooth wear among psychiatric patients: prevalence, distribution, and associated factors. International Journal of Prosthodontics. 2006 Jul 1;19(4).
[17] Goldman and Lee. Goldman's Cecil Medicine (24th Ed.). Philadelphia: Elsevier Saunders. p. 54. ISBN 1437727883, 2011.
[18] Mohammad DN, Garib BT. The prevalence of tooth wears among (18-25) years old college students in Sulaimani city. Journal of Zankoy Sulaimani-Part A (JZS-A). 2012 Oct 1;14(1):1.
[19] Bartlett DW, Coward PY, Nikkah C, Wilson RF. The prevalence of tooth wear in a cluster sample of adolescent schoolchildren and its relationship with potential explanatory factors. Br Dent J. 1998;184(3):125-129.