Occupational dental wear among El-Kubasis cement factory workers - An observational study

Mohammed I. Abdulla, B.D.S. [(1)]
Athraa M. Al-Waheb, B.D.S., M.Sc. [(2)]

ABSTRACT

Background: Loss of tooth structure may be due to tooth to tooth contact and presence of abrasive components in the work environment. The aim of study was planned to evaluate the occurrence of dental attrition among Cement factory workers.

Material and Method: The Sample included all workers chronically exposed to cement dust in the EL-Kubaisa cement factory (95 workers). A comparative group of workers (97) were non-exposed to cement dust was selected. All workers were males in gender with age range (25-55) years. The assessment of tooth wear was based on the criteria of smith and knight, 1984.

Results: The maximum tooth wear score for exposed workers was 84.2% while non exposed workers was 38.1%,with statistical differences between two groups was highly significant (P<0.01). The maximum tooth wear score among workers exposed to cement dust according to duration (<10years), (10-20 years) and >20 years) was (52.2 %), (92.3%) and (100%) respectively, with statistical differences was highly significant (P< 0.001). While the maximum tooth wear score among workers exposed to cement dust according to wearing mask was found to be statistically not significant (P> 0.05).

Conclusion: Work environment was related to dental wear.

Key word: Attrition, Cement dust, Cement factory worker. (J Bagh Coll Dentistry 2014; 26(2): 135-137).

الخلاصة:

المقدمة : إن فقدان بنية الأسنان قد يكون سببه الرئيسي هو تآكل الأسنان مع وجود مواد تساعد على الاحتكاك في بيئة العمل. إن الهدف من هذه الدراسة هو تقييم وقوع تآكل الأسنان بين عمال مصنع الاسمنت.

المواد و العمل : شملت العينة جميع العمال المعرضين بشكل مزمن لغبار الاسمنت في مصنع اسمنت كبيسة (95 عاملا) . مقارنة مع (97 عاملا) غير معرضين للغبار . جميع العمال ذكور و في الفئة العمرية (25-55) سنة. واستند تقييم تآكل الأسنان على معايير سميث و نايت ، 1984 .

النتائج : الحد الأقصى لدرجة تآكل الأسنان للعمال المعرضين للغبار كان 84.2 ٪ بينما العمال غير المعرضين للغبار كان 38.1 ٪ ، مع فروق ذات دلالة إحصائية بين مجموعتين كان كبيرا للغاية (P<0.01) . وكان أقصى درجة تآكل الأسنان بين العمال المعرضين لغبار الأسمنت وفقا لمدة (اقل من 10سنة) , (10- 20سنة) و (اكبر من 20 سنة) هو (52.2 %)، (92.3 ٪) و (100٪) على التوالي ، بفروق إحصائية عالية (P <0.01) . في حين تم العثور على الدرجة القصوى لتآكل الأسنان بين العمال المعرضين لغبار الأسمنت وفقا لارتداء الكمامات مع فرق غير معنوي (P>0.05).

الاستنتاج : بيئة العمل متعلقة بحالة تآكل الأسنان.

كلمات مفتاحيه : تآكل الأسنان , غبار الاسمنت ، عمال مصنع الاسمنت.

INTRODUCTION

Oral cavity injuries which occur as a direct result of an occupation are rather common. The injurious effects of occupational hazards may manifest themselves in the teeth, jaw bones, periodontal tissue, tongue, lips and oral mucosa. The effect of the various etiological agent depend on their specific chemical and physical properties [(1)]. Occupational hazards are major contributors to additional risk factors for disease. Industrialization of nations exposes its population to this risk. The working environment influences the health of an individual. The occupational diseases are caused by a pathologic adaptation of the individual to his working environment [(2)].

As abrasive components exist in several work environments, wasting diseases of teeth may be considered as an occupational dental disease. This dental condition has been reported in workers of Granite industry. Loss of tooth structure may be due to tooth to tooth contact and presence of abrasive components in the work environment [(2)].

As cement factory workers are exposed to cement dust and this dust contain different minerals like Silica, Iron and others elements, therefore, the present study was planned to evaluate the occurrence of dental attrition amongst Cement factory workers.

MATERIALS AND METHODS

Sample

The survey took place in 2012-2013. The present study was conduct in EL-Kubaisa cement factory located in AL-Anbar governorate. The Sample included all workers chronically exposed to cement dust in the EL-Kubaisa cement factory (95 workers) and who were working in department where cement dust exposure was present with duration at least 5 years. A comparative group of (97) workers who were non-exposed to cement dust was selected randomly from other department non-expose to cement dust. All workers were males in gender with age range (25-55) years.

Methods

Oral examination of all workers was done in room in cement factory using artificial light. The

(1)M.Sc. student, Department of Pedodontics and Preventive dentistry, College of Dentistry, Baghdad University.
(2)Professor, Department of Pedodontics and Preventive dentistry, College of Dentistry, Baghdad University.

assessment of tooth wear was based on the criteria of smith and knight, 1984. This index was chosen due to easily comparable and widely use. The present study was carried out according to duration in work and wearing mask.

Data analysis

Data were translated into a computerized data base structure. The data base was examined for errors using range and logical data cleaning methods. Statistical analyses were done using SPSS version 20 computer software (Statistical Package for Social Sciences) in association with Excel version 5. Pearson's chi-square test was used to test the differences between different groups. For all of the tests, a p value of < 0.05 was considered to be statistically significant.

RESULTS

The study sample consisted of 192 workers (95 exposed to cement dust) and (97 non-exposed). The study subjects were ranging from ages (25-55) years. Tooth wear was assessed using criteria of Smith and Knight 1984. Result concerning the maximum tooth wear score of the total sample (exposed and non-exposed) illustrated in Table (1). The maximum tooth wear for exposed workers was 84.2% while non exposed workers was 38.1%, with statistical differences between two groups was highly significant (P< 0.01). Table (2, 3) shows that the maximum tooth wear score among exposed workers according to duration of current employment (<10years), (10-20 years) and (>20 years) was (52.2 %), (92.3%) and (100%) respectively and according to wearing mask (never), (sometime) and (always) was (76.2%), (86.2%) and (88.9%) respectively. With statistical differences among exposed workers according to duration was highly significant (P<0.001) and no significant differences according to wearing mask (P> 0.05).

Table 1: Distribution of study subject (workers exposed and non-expose to cement dust) according to maximum tooth wear score.

Maximum Tooth wear Score	Expose to cement dust				P (Chi-Square)
	Non expose		Expose		
	No.	%	No.	%	
Score – 0	24	24.7	5	5.3	0.001*
Score – 1	2	2.1	0	0.0	NS**
Score – 2	34	35.1	9	9.5	0.001
Score – 3	37	38.1	80	84.2	0.001
Score – 4	0	0.0	1	1.1	NS

***High Significant at P<0.01, df=1,**
****Not Significant at P>0.05 ****

Table 2: Distribution study subjects (workers exposed to cement dust) according to maximum tooth wear score and duration of current employment.

Maximum TW Score	Duration of current employment						P (Chi-Square)
	<10years		10-20years		>20years		
	No.	%	No.	%	No.	%	
Score 0	5	21.7	0	0.0	0	0.0	0.001*
Score 1	0	0.0	0	0.0	0	0.0	**
Score 2	6	26.1	3	5.8	0	0.0	0.001
Score 3	12	52.2	48	92.3	20	100	0.001
Score 4	0	0.0	1	1.9	0	0.0	NS
Total	23	100	52	100	20	100	-

***High Significant at P<0.01, df=2 ,**
**** Can not calculated**

Table 3: Distribution of study subject (workers exposed to cement dust) according maximum tooth wear score and wearing mask

Maximum TW Score	Never		Sometime		Always		P (Chi-Square)
	No.	%	No.	%	No.	%	
Score 0	1	4.8	4	6.2	0	0.0	NS*
Score 1	0	0.0	0	0.0	0	0.0	**
Score 2	3	14.3	5	7.7	1	11.1	NS
Score 3	16	76.2	56	86.2	8	88.9	NS
Score 4	1	4.8	0	0.0	0	0.0	NS
Total	21	100	65	100	9	100	

***Not Significant at P> 0.05, ** Can not calculated**

DISCUSSION

The Smith and Knight [3] Index was used in this study for the assessment of the prevalence of tooth wear among workers of EL-Kubasia cement factory. This index was chosen for its easily comparison and it's also widely use. In present study maximum tooth wear score among workers exposed to cement dust in EL-Kubasia cement factory was found to be much higher (84.2%) compared to non exposed (38.1%). Statistically high significant differences between exposed and non-exposed workers were shown in the present study. This is may be due to that the workers may develop disorder of teeth because of exposure to chemical substance, organic or inorganic, specific to their occupation [4]. The cement factories provide an environment which may contain abrasive particles in form of silica and other minerals dust. Abnormal tooth surface loss in form attrition or abrasion could be squealed to occupational exposure. Petersen and Gormsen have termed such effect on dentition as occupational disease [5]. The result of present

study is agreed with study done by EL-Ghandour [6] on Rabak cement factory workers in Sudan the prevalence of attrition was 84.85% and study reported by Sood et al [2] on ceramic factory workers the prevalence of attrition was 84.36% and higher than recorded by Tuominen [7] on stone and cement factory attrition was 72.2 %. The differences in these finding may be related to wide range of tooth wear indices used and the variation in diagnostic criteria [8].

Currently there is no agreed consensus on universally acceptable tooth wear index for quantifying tooth wear [9]. These factors complicate the evaluation of whether a true increase in prevalence is being reported. Therefore conclusion from prevalence studies should be considered with caution [10]. In present study maximum tooth wear score among exposed workers was found (84.2%). Statistically high significant differences (P<0.01), this is may be due to dust of abrasive quality such as cement may collect on occlusal surface of teeth, produce friction and cause damage to the teeth and generalized attrition. Such condition found among cement stand workers, grinders, stone cutters and miners [4].

Excessive dental wear reported in a study in Danish Granit Industry [11], which has been attributed to the abrasive component of the work environment. In present study dental wear increase with increase duration of current employment among exposed workers. Less than 10 years was 78%, 10-20 years was 97% and more than 20 years was 100%. This relation was found to be statistically high significant in present study (P<0.01). This agreed with study done by Ptersen and Henmar [11] on Danish Granit workers they reported workers with duration less than 10 years tooth wear was 64% while the workers with duration more than 10 years tooth wear was 87%. The increase severity of tooth wear attributed to increase duration of exposure to cement dust. Maximum tooth wear among exposed workers according to wearing mask was no significant (P< 0.05), this may be attributed that wearing mask not protect the mouth from dust of cement, because of the mask that wearing in factory not systemically (not manufactory for this purpose) therefore it isn't affective to prevent tooth wear.

As conclusion; dental wear among workers exposed to cement dust higher than non exposed workers statistically high significant differences between two groups. The prevalence and severity of tooth wear increased with increasing duration and this relation was found to be statistically highly significant. Work environment was related to dental wear.

REFERENCES

1. Lammert K, Seifert H. Stomatologie and Arbeitsmedizin VEB Verlag Volk and Gesundheit, Berlin 1979.
2. Sood M, Blaggama A, Blaggama V, Sharma N. Occupational dental wear among ceramic factory workers–An Observation study. JIDA 2011; 5(4):472-3.
3. Smith B, Knight J. An index for measuring the wear of teeth. Br Dent J 1984; 156(12): 435-8.
4. Gupta B. Occupational Diseases of Teeth. J Soc Occup Med 1990; 40: 149-52.
5. Petersen P, Gromsen C. Oral condition among Germany battery factory workers. Comm Dent Oral Epidemiology 1991; 19: 104-6.
6. EL-Ghandour I. The effect of cement dust on the periodontal health of workers in Rabak cement factory. Master thesis, College of Dentistry, Khartoum University, 2006.
7. Tuominen M, Tuominen R. Tooth surface loss and associated factors among factory in Finland and Tanzania. Community Dent Health 1992; 2:143-50.
8. Bardsley P, Taylor S, Milosevic A. Epidemiological studies of tooth wear and dental erosion in 14 year old children in North West England. Part 1: The relationship with water fluoride and social deprivation. Br Dent J 2004; 197:413-6.
9. Bartlett D, Dugmore C. Pathological or physiological erosion is there relationship to age. Clin Oral Investing 2008; 12: 27-31.
10. Pardsley P. The evaluation of tooth wears indices. Clin Oral Investing 2008; 12: 15-9.
11. Petersen P, Henmar P. Oral conditions among workers in the Danish granite industry. Scand J Work Environ Health 1988; 5: 328-31.