

The effect of dental educational level in adults (18–25 years old) with crowded teeth on the plaque and gingival conditions

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ABSTRACT

The aim of the present study was to evaluate the relation between crowding, plaque and gingival conditions according to the level of dental education of the Iraqi adults.

The sample was divided primarily into two groups: The first group was collected from dental students whom dentally well educated, while the second group was collected from other population whom dentally non educated (industrialist). Each group was subdivided into two groups according to the presence or absence of crowding, so that four groups were obtained (educated participants with non crowded teeth, educated persons with crowded teeth, non educated participants with non crowded teeth and non educated participants with crowded teeth).

The results of this study indicated that the dental educational level is positively affecting on the gingival health in both crowded and normal occlusion. However, regardless of the level of education, plaque accumulation and gingivitis are significantly higher in the crowded teeth sample.

Key Words: Crowding, gingivitis, plaque, socioeconomics.

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INTRODUCTION

There are different opinions regarding the relationship between crowding of teeth, plaque and gingival condition as well as destructive periodontal disease.⁽¹⁾ These different opinions are at least partly due to the multitude of variables, such as participant differences in motivational patterns for the oral hygiene maintenance,⁽²⁾ age range and sex of the subjects, oral regions affected (maxillary versus mandibular, anterior versus posterior), systemic health conditions, experimental designs, application of statistics and different diagnostic criteria.^(3,4)

Difficulty in maintaining oral hygiene

can result in a greater accumulation of the dental plaque which is considered a primary etiologic agent in inflammatory periodontal disease. Improper proximal contact leads to narrowing of embrasures and disruption of the periodontal disease susceptible “col”. This leads to gingivitis, periodontitis and possibly pathologic tooth migration.^(3, 5, 6)

The most important factors affecting dental health are the education and motivation of participants to maintain a level of oral cleanliness compatible with maintaining sufficient periodontal support to retain teeth.⁽⁷⁾

Bacterial plaque that forms on the

surfaces of teeth is generally regarded to be the primary etiologic factor in the onset of plaque-associated gingivitis; a high level of plaque control is of considerable importance in the prevention of both dental caries and periodontal disease.⁽⁸⁾

A lack of interproximal space (crowding) would appear to offer a local environment conducive to plaque accumulation and the onset of disease. Correlations between crowding, gingivitis, quantity of plaque and increased probing depth have been shown,⁽⁹⁻¹¹⁾ but these reports contrast with the work of other authors who were unable to demonstrate a clear relationship between crowding and periodontitis.⁽¹⁾

So, this study was designed to evaluate the relationship between crowding, plaque and gingival conditions according to the level of dental education of the Iraqi adults.

MATERIALS AND METHODS

The size of the sample was 248 participants. The sample was selected from the students of the College of Dentistry, Mosul University (educated group), while the non educated group was collected from other population (industrialists). The sample age was between 18–25 years with Class I Angle's classification.⁽¹²⁾ The sample was divided into four groups:

- 1) Educated participants with non crowded teeth.
- 2) Educated participants with crowded teeth.
- 3) Non educated participants with non crowded teeth.
- 4) Non educated participants with crowded teeth.

The criteria for sample selection included:

- 1) Iraqi population of Mosul City.

- 2) Age 18–25 years.
- 3) Middle socioeconomic class.
- 4) No systemic disease.
- 5) No history of orthodontic treatment.
- 6) Normal nasal breathing.
- 7) Presence of full complement of permanent dentition (with the exception of third molar).
- 8) Angle Class I malocclusion with >4mm crowding for the crowded sample as evaluated by clinical examination, and normal occlusion for the uncrowded sample.
- 9) Score "0" or "1" calculus accumulation to avoid the effect of calculus on plaque accumulation and gingivitis.

The plaque index by Silness and Løe (1964),⁽¹³⁾ and the gingival index by Løe and Silness (1963)⁽¹⁴⁾ were used to examine all the teeth buccally and lingually or palatally using plane mouth mirrors, WHO periodontal probes, cotton and disinfectant solution. These measurements were made by one researcher.

Statistical analysis included calculation of mean plaque and gingival indices scores, and Student's t-test to determine the differences between the groups at 5% level of significance.

RESULTS AND DISCUSSION

Table (1) showed the distribution of the participants into the four groups. The size of the sample was 248 participants. Group 1 educated with crowding 68 students, 38 males and 30 females. Group 2 educated without crowding 66 students, 31 males and 35 females. Group 3 not educated with crowding 54 participants, 30 males and 24 females. Whereas group 4 not educated without crowding 60 participants, 34 males and 26 females.

Table (1): Distribution of the participants into the groups

Groups	With Crowding		Without Crowding		Total	
	Male	Female	Male	Female	Male	Female
Educated	38	30	31	35	69	65
	68	68	66	66	134	134
Non Educated	30	24	34	26	64	50
	54	54	60	60	114	114
Total	68	54	65	61	133	115
	122	122	126	126	248	248

Mean plaque index scores for the four groups were recorded in Table (2). They were 0.1809, 0.1702, 1.509 and 1.850 respectively. The differences between group 1 and group 2 and between group 3 and group 4 were statistically highly significant. The differences between group 1 and group 3 and between group 2 and group 4 were statistically very highly significant. This means that crowded teeth have a significant effect on plaque accumulation, and the main cause of increasing plaque accumulation is related to low educational level. So that, gingival condition is aggravated as the level of dental education is decreased. This is in agreement with other studies carried out in Iraq.^(15, 16)

Table (3) showed mean gingival index scores for the four groups. They were 0.1504, 0.300, 1.609 and 1.892 respectively. The differences between group 1 and group 2, and between group 3 and group 4 were statistically highly significant. The differences between group 1 and group 3 and between group 2 and group 4 were statistically very highly significant. Again, the educational level has a direct effect on inducing gingival inflammation and then

aggravated by crowded teeth. This is agreed with Makani.⁽¹⁷⁾

From these results, we can reach to the fact that educated participants without crowded teeth have less plaque accumulation and less gingival inflammation than those educated participants with crowded teeth and non educated participants with or without crowded teeth. Educated participants may care more with their health and appearance. Therefore they may brush their teeth more regularly and more frequently than non educated and may use different methods of interdental cleaning aids such as dental floss, tooth picks, interdental brush and mouth rinse. Other studies^(16, 18) obtained the same results.

The presence of crowded teeth may induce plaque accumulation and gingivitis. So that, a significant differences were found between the crowded and non crowded groups regarding plaque and gingivitis in both educated and non educated groups. This means that crowding has a direct effect on inducing plaque accumulation and gingivitis but not more than the effect of educational level.

Table (2): Differences in the mean plaque index scores between the groups

Groups	With Crowding		Without Crowding		t-test	Significance
	Mean	± SD	Mean	± SD		
Educated	0.1809	0.0196	0.1702	0.0211	3.05	HS
Non Educated	1.509	0.267	1.850	0.181	-8.06	HS
t-test	-41.00		-74.93			
Significance	VHS		VHS			

SD: Standard deviation, HS: Highly significant difference, VHS: Very highly significant difference.

Table (3): Differences in the mean gingival index scores between the groups

Groups	With Crowding		Without Crowding		t-test	Significance
	Mean	± SD	Mean	± SD		
Educated	0.1504	0.0237	0.300	0.171	-7.14	HS
Non Educated	1.609	0.177	1.892	0.205	-7.82	HS
t-test	-67.18		-47.45			
Significance	VHS		VHS			

SD: Standard deviation, HS: Highly significant difference, VHS: Very highly significant difference.

Tables (4) and (5) showed the differences in plaque accumulation and gingivitis between males and females in each group. In most of the groups, females reported less plaque and gingival indices scores than males. However, the differences were slight

and statistically not significant. Different studies carried out in Iraq and other countries reported the same results,⁽¹⁷⁻¹⁹⁾ because females care more with their health and appearance than males.

Table (4): Differences in the mean plaque index scores between males and females in each group

Group	With Crowding				Without Crowding			
	Sex	Mean ± SD	t-test	Significance	Sex	Mean ± SD	t-test	Significance
Educated	M	0.1858 ± 0.0187	1.68	NS	M	0.1742 ± 0.0211	1.48	NS
	F	0.1777 ± 0.0211			F	0.166 ± 0.0207		
Non Educated	M	1.537 ± 0.268	0.84	NS	M	1.847 ± 0.178	-0.45	NS
	F	1.475 ± 0.266			F	1.868 ± 0.177		

M: Male; F: Female; SD: Standard deviation; NS: No significant difference.

Table (5): Differences in the mean gingival index scores between males and females in each group

Group	With Crowding				Without Crowding			
	Sex	Mean ± SD	t-test	Significance	Sex	Mean ± SD	t-test	Significance
Educated	M	0.1532 ± 0.0222	1.06	NS	M	0.303 ± 0.174	0.14	NS
	F	0.1470 ± 0.0255			F	0.297 ± 0.171		
Non Educated	M	1.603 ± 0.171	-0.27	NS	M	1.897 ± 0.205	0.23	NS
	F	1.617 ± 0.188			F	1.885 ± 0.209		

M: Male; F: Female; SD: Standard deviation; NS: No significant difference.

CONCLUSIONS

The presence of crowded teeth may be a source of increasing plaque accumulation and then increasing gingival inflammation. However, this depends primarily

on the educational level of the participant himself/herself.

Educated participants, without crowded teeth, have better oral hygiene than educated participants with crowded teeth and

non-educated participants with or without crowded teeth. Also, sex is not an important factor of increasing or decreasing plaque accumulation and gingivitis between participants with the same educational level.

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