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Lower Arch Crowding In Relation To Periodontal Disease

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Abstract

A clinical examination was done to study the relationship between crowding and periodontal health status in lower anterior region. The occurrence of crowding was recorded in fifty adult males with class I angle occlusal relationship who have not been received orthodontic treatment before. The sample was divided into two groups: a crowded group of 25 males presented with crowding in the lower anterior teeth, and a normal group of 25 males presented with normal occlusal features and with no crowding.

Scaling (supra and sub gingival debridement) and polishing were done for all the subjects, plaque and gingival indices were scored before treatment, and then re-scored at one, two, three and four weeks after treatment.

It was found that the gingival index and plaque index are reduced in their value in the normal group, while the gingival and plaque indices tend to return to their original pretreatment values in the group of crowded lower anterior teeth and much faster than that of a normal group.

Introduction

Crowding of teeth is one of the most common forms of malocclusion [1] and occurs with a frequency of 40-58% [2,3] and it is most often observed in the lower incisor region [4].

A review of dental effects of malocclusion indicated that the relationship between tooth malposition and periodontal disease was not clearly established.

Numerous variables are considered to predispose and aggravate gingival and periodontal disease. Bacterial plaque which is considered as the major etiological factor in the development of chronic gingivitis may be more difficult to be removed from mal positioned teeth [5-7].

Some studies have demonstrated a relationship between malocclusion and malposition of teeth and periodontal disease [1,8-11].

Other studies, however, did not find such a causal link [12-13]. Many factors may account for these conflicting results [14-17].

The purpose of the present study is to evaluate the role of lower anterior teeth crowding in the inflammatory periodontal disease.

Materials and Methods

The subjects employed in this study were divided into two groups, one with crowding and one without.

The crowded sample was made up of 25 adult male subjects with class I angle's classification. [18] .All of them showed lower arch anterior crowding.

The uncrowded sample consisted of 25 adult male subjects with normal occlusion [19].

Table (1) shows the distribution of crowding through the entire sample.

The study sample consisted of fifty male subjects. The sample was restricted to male subjects to avoid sex differences in general and fluctuating hormone levels in particular).

The age of the subjects ranged between 20 to 30 years old with no previous history of orthodontic treatment. For crowded sample, subjects should have angle class I malocclusion with >4 mm of lower anterior segment crowding and for uncrowded sample, the sample should have normal occlusion.

Alginate impressions of upper and lower teeth were taken for all subjects. Model casts from impressions were then used to score the degree of lower anterior crowding which was determined from these casts by measuring the combined mesiodistal width of the mandibular incisors and subtracing the space available for those teeth [4].

The plaque index, and the gingival index were scored for the lower incisors and cuspid teeth [20].This was followed by scaling and polishing. All subjects were instructed to keep good oral hygiene with effectiveness plaque control.

The scoring for PI and GI was repeated four times after periodontal treatment as follows: one week, two weeks, three weeks and four weeks after treatment.

The Mann-Whitney V-test was used to analyze the data.

Results

Table 2 demonstrates the mean values of plaque and gingival indices for normal group scoring in pretreatment period, one, two, three and four weeks after treatment .It was found that the pretreatment score of mean plaque 2.01 and for gingival index was 2.11, this score tends to be reduced in both indices after treatment with an obvious reduction that appeared one week post treatment with more prominent reduction seen in mean plaque index 0.58 after one week.

Then they tend to increase to become 1.16 and 1.45 for both plaque and gingival indices respectively but, still appear with reduced values than the original value.

Table 3 shows the plaque and gingival indices mean in crowded group with their pre and post treatment groups. It has been found that the plaque index and gingival index were 2.42 and 2.48 respectively in pretreatment score, and they were reduced clearly after one week post treatment to become 1.7 and 1.81 for plaque and gingival index respectively, and then these scores tend to increase after the second week to become 2.39 and 2.45 for PI and GI respectively after the fourth week post treatment. This means that the plaque index tends to return to its pretreatment value much faster in the crowded group than in the normal group.

Table 4 shows that the pretreatment plaque index of the crowded group is significantly greater than that of the normal group at a significance level 0.01. The pretreatment gingival index of the crowded group is also significantly greater than that of the normal group at a 0.05 level of significance.

Table 4 also shows that the plaque index as the gingival index at one, two and three weeks post treatment were

not significantly different between the normal and the crowded groups.

The four week plaque and gingival indices showed a difference between the crowded and normal groups at a significance level 0.05

Table 5 presents the significance level for the changes in plaque and gingival indices after adjustment of pretreatment baseline level.

The difference between the crowded and normal groups was highly significant at four weeks after the periodontal treatment.

Discussion

The results of the present study demonstrated that crowding in the anterior segment of the lower arch is a predisposing factor for the initiation and progression of the periodontal disease. The direct cause for this finding may be related to the difficulty of keeping a good oral hygiene, due to improper proximal contacts.

The findings come in accordance with several authors [8,11,14,17,21] who found a convincing correlation between malalignment of the teeth and the loss of periodontal attachment.

Buckley [8] found a significant relationship between the crowding of mandibular incisors and periodontal disease.

He noted that a statistically significant relationship was found between irregular teeth, plaque, and gingivitis, and in 1981, Buckley reconfirmed his previous studies emphasizing the significant correlation between crowding, plaque, and gingivitis.

Waerhag [21] concluded that the crowding may predispose to premature loss of attachment on the adjacent teeth as well as the downward progression of subgingival plaque, which may cause even more periodontal damage

Mangoury [11] and Wennstrom [17] noted an obvious correlation between crowding and periodontal status.

On the other hand, our findings come in contrary with the findings of Gould and Picton [12] and Kats [13].

It must be noted that many of these studies used a combination of gingival inflammation, pocket depth, and tooth mobility to measure the periodontal status, however; there are no consistent correlation among these different pathologic changes, [22] combining them into a single measure of periodontal disease is of questionable validity in seeking the effect of a specific form of malocclusion on periodontium.

Difficulty in maintaining good oral hygiene can result in a greater accumulation of dental plaque which is considered as primary etiologic factor in inflammatory periodontal disease. Improper proximal contact leads to narrowing of embrasures and this leads to gingivitis, periodontitis, and possibly pathologic tooth migration. [5,7]

The progressive nature of these conditions presents a valid condition for all orthodontic elimination of mandibular anterior crowding as an integral part of preventive periodontics.

References

1- Hellgern A. The association between crowding of teeth and gingivitis. Trans Europ.Orthodont. Soc.1956;134-256.
2- Geiger AM. Occlusal studies in 188 consecutively treated cases of periodontal disease. Amer. J. Orthod. 1962;48:330-60.
3- Sutcliffe P. Chronic anterior gingivitis an epidemiological study in school children. Brit. Dent.J.1968 ;125:47-55.
4- Richardson ME. Late lower arch crowding in relation to primary crowding. Angle Orthod.1982;52
5- Lindhe J. Clinical periodontology and implant dentistry .4th ed. Copenhagen Munksgaard.2003;pp:563-88.

6- Carranza FA, Newman MG. Clinical periodontology 10th edition 2007:554-64.
7- Hall WB. Decision making in periodontolgy.3rd ed.1999 pp.138-9.
8- Buckley LA. The relationship between malocclusion and periodontal disease. J. Periodont.1972;43:415-7.
9- Gieger AM. Weasserman BH. Turgton LR. Relationship of occlusion and periodontal disease:partix. Incisor inclination and periodontal status. Angle Orthod.1974;46:99-110.
10- Shefter GJ, Fall WT. Occlusal relations and periodontal status in human adults. J. periodont. 1984;55:368-75.
11- El-Mangoury NH, Gaafar SG, Mostafa YA. Mandibular anterior crowding and periodontal disease. Angle Orthod. 1987;85:35-8.
12- Gould MSE, Picton OCA. The relationship between irregularities of the teeth and periodontal disease: a pilot study. British Dental J. 1966;121:20-3.
13- Katz RV. An epidemiological study of the relationship between various states of occlusion and the pathological conditions. Dental Res. 1977;3:433-9.
14- Ainamo J. Relationship between malalignment of teeth and periodontal disease. Scand. J .Dent. Res. 1972;80:104-10.
15- Shaw WC, Addy , McRoy C. Dental and social effects of malocclusion and effectiveness of orthodontic treatment: a review. Comm. Dent. Oral Epidemiol. 1980;8:36-45.
16- Griffith GS, Addy M. Effects of malalignment of teeth in the anterior segments on plaque accumulation. J Clinic. Periodont. 1981;8:481-90.
17- Wennstrom J, Stockland BL, Nymans, Thilander B. Periodontal tissue response to orthodontic movement of teeth with infrabony pockets. Am. J. orthod. 1993;103:313.
18- Angle EH. Classification of malocclusion .Dent. Cosmos 1998;412-48.
19- Graber TM. Orthodontics: principles and practice.2nd ed. Philadelphia:WB Saunders Company 1972.pp.180-203.
20- Loe H. The gingival index, the plaque index and relation index system. J Periodont. 1966;38:610-6.
21- Waerha J. Eruption of teeth into crowded position, loss of attachment, and down growth of subgingival plaque. Am. J.Orthod. 1980;78:453-9.
22- Wasserman BH, Geiger AM, Turgeon LR. Relationship of occlusion and periodontal disease part VII .Mobility. J.Periodont. 1973;44:572-8.

Table 1:The distribution of sample according to crowding

Number of subjects	Crowding (in mm)
5	7
7	6
10	5
3	4
25	0

Table 2:Mean plaque and gingival indices for normal group pre-and post treatment

Index	Pre treatment	Post treatment			
		1 week	2 weeks	3 weeks	4 weeks
Mean PI	2.01	0.58	1.02	1.08	1.16
Mean GI	2.11	1.07	1.09	1.09	1.45

Table 3:Mean plaque and gingival indices for crowded group pre-and post treatment

Index	Pre treatment	Post treatment			
		1 week	2 weeks	3 weeks	4 weeks
Mean PI	2.42	1.70	1.98	2.21	2.39
Mean GI	2.48	1.81	2.01	2.31	2.45

Table 4:Significance level between the normal and crowded groups for plaque and gingival indices

Index	Pre treatment	Post treatment			
		1 week	2 weeks	3 weeks	4 weeks
Mean PI	0.01	N.S	N.S	N.S	0.05
Mean GI	0.05	N.S	N.S	N.S	1.45

Table 5:Significance level for the changes in plaque and gingival indices' after adjustment of pretreatment baseline level

Index	Pretreatment 1 week post treatment	Pretreatment 2 weeks post treatment	Pretreatment 3 weeks post treatment	Pretreatment 4 weeks post treatment
PI	N.S	N.S	N.S	0.05
GI	N.S	N.S	N.S	0.05