The relationship between the severity of malposition of the frontal teeth and periodontal health in age 15-21 and 35-44

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SUMMARY

Introduction. In the recent past there has been an increase in the number of adults seeking orthodontic treatment therefore special attention to periodontal status of these patients needs more careful evaluation. Periodontal considerations in adult orthodontic treatment are increasingly important as patients become older. The aim of the study was to assess the interrelationship between the severity of malposition of frontal teeth with periodontal health considering to age in Latvian population. Methods. The data were analyzed from a detailed crossectional study in Latvian population. Selected samples consisted of two age groups: 15-21 (n=323) and 35-44 (n=286) years old. For the assessment of periodontal health CPI scores was analyzed for upper frontal sextant. For assessment of malocclusion 2 components of ICON index were used: upper arch crowding and incisor overbite. The differences in the distribution of ICON index and CPI index between age groups were tested using Pearson χ^2 test. Statistical significance of the differences in the mean values was tested using t-test. Possible interaction between above mentioned indexes was tested by means of analysis of variance. Results. Upper arch crowding and incisor overbite severity increase with age was statistical significant. There was statistically significant interrelation between upper arch crowding degree and incisor overbite and CPI scores severity in the age 15-21 and was not in the age 35-44. However comparing higher degree of the crowding and overbite severity to percent of subjects with bleeding, calculus and periodontal pockets greater percents of measurements were in older group. Conclusions. 1. Severity of upper arch crowding and overbite statistically significant increased with age with remarkable increasing of periodontal problems. 2. Interrelation between severity of upper arch crowding, incisor overbite and CPI scores was statistically significant in age group 15-21.

Key words: malocclusion, occlusal indices, periodontal health.

INTRODUCTION

In the recent past there has been an increase in the number of adults seeking orthodontic treatment

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therefore special attention to periodontal status of these patients needs more carefull evaluation. It is important factor in the planning of interdisciplinary treatment [4, 16, 17].

Periodontal considerations in adult orthodontic treatment are increasingly important as patients become older, regardless of whether periodontal problems were a motivating factor for orthodontic treatment. [2, 10, 12]. Previous literature contained several reports about the relationship between the characteristics of malocclusion and periodontal disease [1, 8].

Much of the evidence has been also obtained from epidemiological studies but there are many conflicting and often contradictory reports [3l, 8].

However there is not enough systematic data of interrelationship between malocclusion and periodontal status in the age aspect, considering the severity of malocclusion particularly in the region of frontal teeth, what is important motivating factor for uptake orthodontic treatment as these teeth are relevant for facial esthetic.

The aim of the study was to assess the interrelationship between the severity of malposition of frontal teeth and periodontal health considering to age in Latvian population.

MATERIALS AND METHODS

The data were analyzed from a recent detailed crossectional study in Latvian population. The size of the study sample was calculated according to the age and gender distribution of individuals in the general population of Latvia. Samples were randomly selected based on the data from the Latvian Central Bureau of Statistics. The study was carried out in seven urban and rural regions of Latvia.

Selected samples consisted of two age groups:
- 15-21 years old n=323,
- 35-44 years old n=286.

Both periodontal and orthodontic measurements were taken for these sample groups.

For the assessment of periodontal health CPI scores was analyzed for upper frontal sextant (Community Periodontal Index (CPI)) [1]. The index of tooth (d11) in an upper anterior sextant should be probed and the highest score must be recorded, to evaluate CPI index. The scores are: 0 – healthy; 1 – bleeding observed; 2 – calculus detected; 3 – pocket 4-5 mm; 4 – pocket 6 mm or more; X – excluded sextant; 9 – not recorded. According to recorded scores appropriate periodontal treatment should take place. The interarch and intraarch relationship was assessed on the anterior sextant (teeth 13 to 23) depending on the occlusal traits of interest using ICON (The Index of Complexity Outcome and Treatment Need) [6]. Wee looked for crowding and overbite.

Three calibrated examiners screened all the subjects using ICON and CPI. For the analyses we used only two components of the ICON – crowding in frontal region of upper arch and overbite – as there was severe teeth loss in buccal segments in age group 35-44.

The differences in the distribution of ICON index and CPI index between age groups were tested using Pearson χ^2 test. Statistical significance of the differences in the mean values was tested using t-test. Possible interaction between above mentioned indexes was tested by means of analysis of variance.

Study was approved by Rigas Stradins University Ethical committee.

RESULTS

Majority of observed individuals in both age groups had a light crowding in upper arch – less than 2 mm (Table 1). Higher proportion of individuals with level 1 (2.1-5 mm) severity of upper arch crowding was observed in age group 15-21. Level 2 severity (5.1-9 mm) was more prevalent in older age group. Overall there was statistically significant increase of upper arch crowding with age.

Table 1. Upper arch crowding in age groups 15-21 and 35-44

Crowding	Age group	
	15-21 (n=323)	35-44 (n=286)
0 (<2mm)	69.97%	75.87%
1 (2.1-5mm)	29.02%	13.99%
2 (5.1-9mm)	0.31%	9.44%
3 (9.1-13mm)	0.31%	0.70%

P<0.0001

Table 2. Incisor overbite in age groups 15-21 and 35-44

Overbite	Age group	
	15-21 (n=323)	35-44 (n=286)
0 (up to 1/3 tooth)	34.67%	44.21%
1 (1/3-2/3 coverage)	65.02%	42.11%
2 (2/3 up to full covered)	0.31%	12.63%

P<0.0001

Table 3. Relationship between upper arch crowding and CPI scores in age group 15-21 years

CPI	Crowding			
	0 (<2 mm)	1 (2.1-5 mm)	2 (5.1-9 mm)	3 (9.1-13 mm)
0 (healthy)	58.41%	57.14%	-	-
1 (bleeding)	30.53%	40.00%	100%	-
2 (calculus)	11.06%	8.42%	-	100%

n=323, p=0.038

Table 4. Relationship between upper arch crowding and CPI scores in age group 35-44 years

CPI	Crowding		
	0 (<2 mm)	1 (2.1-5 mm)	2 (5.1-9 mm)
0 (healthy)	13.36%	7.50%	11.11%
1 (bleeding)	14.75%	12.50%	0.00%
2 (calculus)	35.94%	42.50%	40.74%
3 (pockets 4-5mm)	22.12%	27.50%	33.33%
4 (pockets >6mm)	8.29%	7.50%	11.11%
9 (excluded)	5.53%	2.50%	3.70%

n=286, p=0.749

Table 5. Relationship between upper incisor overbite and CPI scores in the age group 15-21 years

CPI	Overbite		
	0 (up to 1/3 tooth)	1 (1/3-2/3 coverage)	2 (2/3 up to full covered)
0 (healthy	59.82%	54.29%	0.00%
1 (bleeding)	26.79%	37.14%	0.00%
2 (calculus)	13.39%	8.57%	100%

n=323, p=0.01

Table 4. Relationship between upper incisor overbite and CPI scores in the age group 35-44 years

CPI	Overbite		
	0 (up to 1/3)	1 (1/3-2/3 coverage)	2 (2/3 up to full coverage)
0 (healthy)	12.70%	13.33%	8.33%
1 (bleeding)	14.29%	13.33%	11.11%
2 (calculus)	31.75%	44.17%	33.33%
3 (pockets 4-5mm)	26.19%	20.00%	25.00%
4 (pockets >6mm)	9.52%	7.50%	8.33%
9 (excluded)	5.56%	1.67%	13.89%

n=286, p=0.322

As well there was statistically significant increase of the severity of incisor overbite with age (Table 2). The prevalence of the severity level 2, where overbite was 2/3 up to full covered, was significantly higher in older age group.

The relationship between upper arch crowding and CPI index is shown in Table 3.

There was statistically significant inter-relation between CPI parameters and severity level of crowding scores of CPI index and therefore periodontal health was getting worse as crowding increases. In the age group 15-21 CPI scores 3; 4 (periodontal pockets) were not observed.

In the age group 35-44 years. (Table 4) situation accordingly to CPI index and upper arch crowding level is not unequivocal, and there was not statistical significant relationship between these two parameters. However in this age group comparing with the age group 15-21 increased scores of CPI index (periodontal pockets) with the increase of crowding severity was observed, but this trend was not statistically significant.

Statistically significant relationship between overbite and CPI scores in the age 15-21 was found (Table

5). As the overbite gets deeper the periodontal health was worsening.

Relationship between upper incisor overbite was not statistically significant in older age group 35-44 (Table 6). However, the prevalence of CPI index scores 3; 4 (periodontal pockets) for the same level of overbite was higher than in age group 15-21.

DISCUSSION

Several studies have been carried out to evaluate interrelation between malocclusion and periodontal status [3, 7, 9, 14, 15]. Mainly certain features of malocclusion have been analyzed in different age groups and considered as one of the factors aggravating periodontal health. The likely sequence is that crowded and irregular teeth facilitate the accumulation of bacterial plaque and this indirectly contributes to gingival inflammation [1, 5].

Our findings show that in general with high statistical significancy upper arch crowding and overbite severity increases with age. There is evidence to show that the degree of crowding of the frontal teeth has an effect on the prevalence of gingivitis in the age group 15-21 and periodontal problems in age group 35-40, although it was assessment only for upper frontal teeth. However comparing higher degrees of the crowding and overbite severity with the percent of subjects with bleeding, calculus and periodontal pockets, greater percents of measurements are in older age group. Clinical experience indicates that an inadequate vertical overlap may develop with the loss of buccal segment teeth. The sequelae of such situation may, among others, the loss of vertical dimension and pressure on anterior teeth or gingival bite injuries [13]. Ainamo also in his study has found that incisor and canine areas were the only areas where a positive association between malocclusion and periodontal disorders was found [1]. However

Geiger at all in their study have stated that crowding of individual teeth were not associated with periodontal destruction [7].

Our findings are in accordance with the same data in literature concerning periodontal situation in general. Morarity at all has studied that up to the late thirties there is nearly a straight line relationship between periodontal pocketing and age, in contrast the prevalence of mucogingival problems peaks in the twenties [11]. Periodontal problems are rarely a major concern during orthodontic treatment of children and adolescents, because periodontal disease usually does not arise at an early age and because tissue resistance is higher in younger patients [12].

The results of our studies differ as the methods used for the parameter assessment are different as well as samples. We measured the values of the upper frontal teeth in the selected groups of population, in age 15-21 and 35-44. For the analyses of malocclusion we used ICON (The Index of Complexity, Outcome and Treatment Need). As there was severe loss of teeth in the buccal segments in age group 35-44, only two components-crowding in upper frontal region and overbite- was used.

Even though the results of our investigation do not show statistically significant interrelation between upper arch crowding and incisor overbite and periodontal health in the age group 35-44, severity degree increase of periodontal problems and increase of respective malocclusion indicate that orthodontic treatment in this age group could be much more complicated.

CONCLUSIONS

1. Severity of upper arch crowding and overbite statistically significant increased with age with remarkable increasing of periodontal problems.

2. Interrelation between severity of upper arch crowding, incisor overbite and CPI scores was statistically significant in age group 15-21.

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