The evaluation of parodontium in medical students of The Medical University of Białystok according to CPITN index

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Abstract

Purpose: **The aim of the study was the evaluation of parodontium according to Community Peridental Index of Treatment Needs (CPITN) index in 455 students of The Medical and Dentistry Department of The Medical University of Białystok.**

Material and methods: **After the examination, the students filled a survey according to their own project concerning hygienic habits as well as smoking, sweet intake. The results underwent statistical analysis.**

Results: **There were 1334 (48.86%) sextants observed with healthy parodontium in the studied population. Gingivorrhoea was stated in 440 sextants (16.12%), more often in men than in women. Calculus was reveled in 790 sextants (28.94%) of the population. The number of sextants with code 3 was 1.76%. Sextants with shallow pockets were more numerous in women (37 sextants) than in men (11 sextants). Advanced changes in parodontium (code 4) were observed in 9 sextants (0.33%). On the basis of the analysis of treatment needs in the group of 455 students, it can be stated that only 24.62% of the examined subjects did not need parodontium treatment.**

Conclusions: **The diagnosis of parodontopathy and the factor that can have harmful influence on the parodontium tissues in young people is a superior criterion in the fight with irreversible parodontium changes in adults.**

Key words: CPITN, the condition of parodontium.

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Introduction

According to Górska [1], the first exponent of parodontopathy is the age. The series of epidemiological studies revealed that the course of the disease in elderly people is faster and the destructive changes in parodontium are more advanced than in young people. It can be connected with accumulative activity of dental plaque, organism senescence and thus, decreased immunity of the organism or intensified destructive processes. However, the disease seems to spread among young people and the problem is not issued properly. And it is well known that chronic changes in parodontium in adults have their roots in the period of childhood. Therefore, early diagnosis and determination of the effective factor are of great importance before irreversible changes in parodontium occur.

Material and methods

The examined group consisted of 315 students of The Dentistry Department and 140 4th-year-students of The Medical Department of The Medical University of Białystok. The subjects were of both sexes, in the age range from 18 to 32 years.

The students were examined in the period from December 2001 to the end of June 2002 in clinical rooms of The Conservative Dentistry and Parodontal Diseases Department of The Medical University of Białystok. The examination was carried out according to the guideline of The World's Health Organization [2], with the use of artificial light, the mirror, and standard bilateral periodontological probe. The probe is equipped with a blunt end with a minimetric scale (from 3.5 to 5.5 mm) used for measuring the depths of gingival pockets, and a sharp diagnostic probe.

Parodontium was evaluated using periodontological index of treatment needs (CPITN-Community Periodontal Index of Treatment Needs) [3,4]. For the convenience of the index, the oral cavity is divided into 6 sextants, which cover as follows: the molars and premolars at both sides of the arch that form

Table 1. **Parodontium condition of 455 subjects expressed with number (n), percentage (%), and mean number (x) of sextants with particular values of CPITN**

CPI		The age of subjects in years															
		18	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**30**	**32**	**Woman**	**Men**	**Totality**
Number of subjects		1	22	85	38	71	138	60	20	11	3	3	2	1	315	140	455
Sextant number		6	132	510	228	426	828	360	120	66	18	18	12	6	1890	840	2730
0	N	6	74	245	120	198	375	200	59	39	2	10	6	0	955	379	1334
	%	100.0	56.06	48.04	52.63	46.47	45.28	55.55	49.17	59.09	11.11	55.55	50.0	0	50.54	45.11	48.86
	X	6	3.36	2.88	3.16	2.79	2.72	3.33	2.65	3.18	0.66	3.33	3	0	3.03	2.71	2.89
1	N	0	25	97	26	61	148	35	25	13	3	5	0	2	294	146	440
	%	0	18.95	19.10	11.40	14.31	17.87	9.72	20.83	19.70	16.67	27.78	0	33.33	15.56	17.38	16.12
	X	0	1.13	1.14	0.68	0.86	1.07	0.58	1.25	1.18	1	1.66	0	2	0.93	1.04	0.97
2	N	0	29	142	69	148	258	87	29	11	9	0	6	2	518	272	790
	%	0	21.97	27.85	30.26	34.74	31.15	24.16	24.17	16.67	50.0	0	50.0	33.33	27.41	32.38	28.94
	X	0	1.32	1.67	1.81	2.08	1.87	1.45	1.45	1	3	0	3	2	1.64	1.94	1.75
3	N	0	2	6	2	8	18	7	2	1	2	0	0	0	37	11	48
	%	0	1.51	1.18	0.88	1.87	2.17	1.94	1.67	1.51	11.11	0	0	0	1.97	1.31	1.76
	X	0	0.09	0.07	0.05	0.11	0.13	6.11	0.1	0.09	0.66	0	0	0	0.12	0.08	0.30
4	N	0	0	0	0	0	3	3	1	0	2	0	0	0	7	2	9
	%	0	0	0	0	0	0.36	0.83	0.83	0	11.11	0	0	0	0.38	0.24	0.33
	X	0	0	0	0	0	0.02	0.05	0.05	0	0.66	0	0	0	0.02	0.01	0.02
X	N	0	2	20	11	11	26	28	4	2	0	3	0	2	78	31	109
	%	0	1.51	3.92	4.83	2.58	3.14	7.78	3.33	3.03	0	16.67	0	33.33	4.14	3.69	3.99
	X	0	0.09	0.23	0.28	0.15	0.20	0.46	0.2	0.18	0	1	0	2	0.25	0.22	0.31

4 lateral groups, and the frontal teeth (from the canine to the canine) – 2 frontal groups. A sextant does not undergo the clinical examination if there are at least 2 fully functional teeth. Single teeth are considered as adjacent groups. The evaluation of the parodontopathy (Community Periodontal Index, CPI) is carried out in the 5-stage scale – code 4: pocket – when there is a parodontal pocket with the depth of 6 mm or more; code 3: pocket – the parodontal pocket of 3.5-5.5 mm in depth; code 2: calculus – when there are calculus over- and/or subgingival or overhanging fillings; code 1: bleeding – if gingivorrhoea occurred during or after the sextant probing; code 0: healthy – healthy parodontium.

The following categories of treatment need (TN) correspond to above mentioned codes CPI: TN 0 – there is no need of treatment; TN 1 – points to the necessity of the training of the oral cavity hygiene; TN 2 – points to the necessity of the training of the oral cavity hygiene, scaling and the removal of overhanging fillings and crowns at the edge of the gingiva; TN 3 – the training of the oral cavity hygiene is necessary, scaling, the removal of overhanging fillings and crowns at the edge of the gingiva and complex treatment.

After the treatment, the students filled up the survey, constructed by them, which concerned hygienic habits (the frequency of toothbrushing, the kind of movements while toothbrushing, the frequency of the toothbrush change, the use of additional hygienic equipment) as well as smoking, sweet intake, and susceptibility to stressful factors.

Mann-Whitney test and Chi^2 Pearson test were used for the evaluation of statistical differences between particular features and their significance.

Results

The condition of parodontium and treatment needs were evaluated with the use of the Community Periodontal Index of Treatment Needs (CPITN). The assessment of 2730 sextant condition (455x6) was presented in *Tab. 1*. There were 109 sextants (3.99%) excluded from the study. The mean number of sextants excluded was highest in a 32-year-old person and equaled 2. In the examined population, 1334 sextants showed healthy parodontium (48.86%), the least number was observed in the group of 27-year-old subjects (11.11%), as compared to an 18-year-old person (100%) and 26-year-old participants (59.09%). Women had slightly higher percentage of sextants with healthy parodontium (50.54%) comparing men (45.11%). Gingivorrhoea was revealed in 440 sextants (16.12%), more frequently in men than in women. This parameter was higher in subjects of 28 and 32 years of age in comparison with the group of 24-year-old students. Calculus was stated in 790 sextants (28.94%) and the mean was 1.75 per person. The lowest mean sextant number with code 2 was observed in people of 26 years of age (1) comparing with 27- and 30-year-old subjects (3). Women had slightly lower number of sextants with calculus than men. The number of sextants with code 3 was highest in 27- and 23-year-old students while 21-year-old ones presented the lowest number. More sextants with shallow plaque were observed in women (37 sextants) than in men (11 sextants). Advanced changes in parodontium (code 4) were seen in 9 sextants (0.33%) and they concerned 0.38% of women (7 sextants) and 0.24% of men (2 sextants) in the age-groups of 23-25 and 27 years.

While analyzing the treatment needs among 455 students

Table 2. **Parodontium treatment needs in 455 examined subjects**

Categories of treatment needs		The age of subjects in years															
		18	19	20	21	22	23	24	25	26	27	28	30	32	Woman	Men	Totality
Number of subjects		1	22	85	38	71	138	60	20	11	3	3	2	1	315	140	455
TN 0 (CPI 0)	N	1	12	20	7	12	27	23	6	2	0	1	1	0	86	26	112
	%	100.0	45.45	23.53	18.41	16.90	19.57	38.33	30.0	18.18	0	33.33	50.0	0	27.30	18.57	24.62
TN 1 (CPI 1)	N	0	3	9	3	4	16	2	4	3	0	2	0	0	28	15	43
	%	0	13.64	10.59	7.89	5.63	11.59	3.33	20.0	27.27	0	66.67	0	0	8.89	10.71	9.45
TN 2 (CPI 2+3)	N	0	7	56	28	55	94	34	10	6	2	0	1	1	199	98	297
	%	0	40.91	65.88	73.68	77.46	68.12	56.67	50.0	54.55	66.67	0	50.0	100.0	63.18	70.10	65.27
TN 3 (CPI 4)	N	0	0	0	0	0	1	1	0	0	1	0	0	0	2	1	3
	%	0	0	0	0	0	0.72	1.67	0	0	33.33	0	0	0	0.63	0.71	0.66

(*Tab. 2*), we could observe that only 24.62% of the examined group did not required the treatment of the parodontium, more women (27.30%) than men (18.57%). The category TN0 of treatment needs was seen in 18-, 19-, 30-, and 24-year-old people. The improvement of the oral cavity hygiene (TN1) was required by 9.45%, with 8.89% of women and 10.71% of men, the least in 24-year-old subjects, the most in 30-year-old ones. The second category of needs (TN2) concerned the largest number of the examined students (65.27%), mostly aged 22 and 32 years. The lower percentage of students requiring dental deposits removal was observed in women than in men. The complex treatment of parodontium (TN3) was needed by 0.66% of the examined group, 2 women and 1 man, aged 23, 24, and 27 years. The analysis showed significant statistical differences between the parodontium condition and the sex and age of the examined subjects.

As the data showed, most students brushed their teeth twice a day (219 subjects) while 216 (mainly the students of The Dentistry Department) 3 times a day. The data are statistically significant.

The most frequent way of brushing teeth was the use of fixed movements. This way was applied by 250 people, 187 preferred circular movements, 7 – sweeping ones, and 11 – horizontal movements (exclusively the students of The Medical Department). The data are statistically significant.

Most of the examined group (237) changed their toothbrushes regularly, every 3 months and 117 subjects less than every 3 months. The data are statistically significant. Toothpicks were used by 97 people, and the dental floss – 292 – most subjects were of dentistry students.

The examined students were susceptible to stress. It concerned 249 people. The data are statistically significant. Most of them did not smoke cigarettes (360), and 5 people smoked 1 cigarette a day. Ten cigarettes a day were smoked by 90 people. The data are statistically significant. Sweets were consumed by 223 people every several day and only 9 did not eat sweets at al.

Discussion

Parodontopathy occurs as a consequence of disorders of balance between potentially pathogenic microorganisms in parodontium pockets and local or systemic immune mechanisms of the host [5]. The role and importance of the parodontium are understandable if we consider that the damage of this part of the mastication organ can lead to dentition loss. Poor hygiene of the oral cavity, smoking, stress, malnutrition, acquired general diseases are the factors that undergo the control. There are also factors that are not under control, like age, sex, heredity, and the race. Those factors are not the cause of the disease however, they can cause higher susceptibility to an early or more severe course of the disease.

It was known already in the early 1970s that the cause of parodontopathy is a bacterial plaque [6], which can damage host's tissues directly or through inflammatory mediators. The students of The Dentistry Department were more aware of the negative effect of dental plaque on dentition and parodontium than the students of The Medical Department.

Smoking is one of the most important risk factors in parodontopathy. It is strictly connected with the advancement of the disease, the number of teeth lost, periodontopathy recurrence, as well as worse outcome of the treatment. According to Górska [7], there are three basic mechanisms of harmful effect of tobacco on parodontium: direct damage of parodontium tissues, healing process delay, and immune mechanism disorder. Our study also showed that coexisting smoking damages parodontium condition. Calculus and pathological pockets were stated in smokers more frequently.

The importance of stress in pathomechanism of parodontopathy may be connected with hygienic habits neglect, malnutrition, and frequent smoking in the period of psychic tension [7]. Stress can modulate the immune and inflammatory response, through the increase in corticosteroid levels as well as reduce gingival perfusion. The study confirmed the negative effect of stress on the oral cavity hygiene.

According to Konopka, it is difficult to investigate the role of the diet in isolation from other environmental factors affecting parodontium. However, malnutrition, including micro- and

macroelement and vitamins deprived diets influences interaction between bacteria pathogenic for parodontium and host's immune reaction [5]. A high-carbohydrate diet affects directly supragingival dental plaque occurrence and phagocytic activity of neutrophil granulocytes. Therefore the students were asked how often they consume sweets as they influence the amount and composition of the plaque. The majority of the medical students consumes sweets rarely thus this factor is hardly to be taken into consideration in our studies.

Other studies revealed that men are more predisposed to parodontopathy than women. Górska suggests the connection with poorer oral cavity hygiene, higher susceptibility to addictions, and seldom appointments at the dentist's [1]. Our study also presented better results as far as women are concerned. Genetic risk factors may modify host's immune and inflammatory response, which enhance pathogenic potential of dental plaque and lead to parodontopathy. A proper genotype conditions susceptibility and resistance to the development of parodontopathy. Patients with a positive genotype are prone to have larger progression of parodontium tissue damage under the influence of bacterial plaque. However, such studies require the use of appropriate genetic tests.

The examination of parodontium condition of the students of The Medical University of Białystok were also carried out in 1991 and 1995 [8,9]. The former revealed 39.9% of healthy parodontium in the examined group and gingivorrhoea and calculus – in 59.15%. Only one person (a male-fifth-year-student of the Dentistry Department) had CPI=3. The latter study, concerning the students of The Dentistry Department, showed healthy parodontium in 49.5% of the examined group, gingivorrhoea in 20.0%, gingivorrhoea and calculus in 24%, and pathological pockets of 3.5-5.5 mm in depth – in 6.5%. The condition of parodontium of the students in 1991 was definitely worse than that of 1995 and 2001.

On the basis of the results it can be said that the parodontium condition of the students is satisfactory, however, requiring hygiene improvement and dental deposits removal. It seems that the young age of the group has an impact on the results.

Conclusions

The diagnosis of parodontopathy and recognition of harmful factors affecting parodontium tissues in young people is a superior criterion in fight with irreversible changes in adult parodontium.

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