

Correlation of dental status with cardiovascular diseases

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Introduction

Caries and periodontal disease are among the most common human dental diseases, affecting the population of the world. In addition to being a major cause of discomfort, disfigurement and tooth loss in the population, emerging evidence suggests that oral infections increase the risk for certain systemic diseases, such as heart disease, respiratory disease, and possibly other conditions [1].

An association between oral infections and systemic diseases has been suspected for centuries. In the 18th century, a Pennsylvania physician named Benjamin Rush was quoted as remarking that arthritis could be treated in some people after they had infected teeth extracted [7].

Over the past 70 years a number of astute clinicians in the field of dental medicine have observed and recorded the relationship between dental diseases and their systemic manifestations. The influence of systemic conditions on the oral environment, and especially on the periodontium, has long been recognized and supported by scientific evidence. However, an evidence base for the influence of dental diseases on overall systemic health has only recently begun to be established.

Several studies relate oral infections, including periodontal disease, to cardiovascular diseases (endocarditis, coronary artery disease, stroke and others). In studies, Beck et al. 1996, Mattila et al. 1995, DeStefano 1993 found that dental health was lower in cardiovascular disease patients than in control patients [2, 4, 5]. There is growing evidence that oral bacteria contribute to cardiovascular disease [3, 6].

The purpose of our study is to provide evidence that supports and strengthens the association and relationship between dental diseases and cardiovascular diseases.

1. To assess the dental status and the prevalence of systemic diseases in different age groups of Byelorussian population.

2. To compare the dental status of healthy population with the dental status of cardiovascular patients.

Materials and methods

Oral health examination and questioning of 631 inhabitants of Minsk was carried out using a prospecting method. The following age groups of the population were surveyed: 20-24, 25-30, 35-44 and 45-54 years old.

Survey data were recorded using the WHO criteria. For the evaluation of oral hygiene, OHI-S index (Green-Vermillion, 1964) was used. For the assessment of periodontal status, CPITN (Ainamo et al., 1982) and gingival index (GI, Loe-Silness, 1963) were applied.

The clinical study included 87 adults (40 males and 47 females) aged 40-55 with cardiovascular diseases – CVD (ischemic disease, hypertension II, no smoking) and 99 patients (43 males and 56 females) without systemic diseases.

After adjusting for age, social class, hypertension, education, smoking we assessed the oral status using the next criteria:

- missing teeth (M, DMFT);
- level of oral hygiene (OHI-S index);
- periodontal status (CPITN), gingival index (GI) and Loss of attachment (LA, Glavind & Loe, 1967).

Statistical analysis was carried out using ANOVA (SE, SD, t and p criteria).

Results and discussions

All surveyed patients had low and very low levels of oral hygiene, which increased from 3.0

OHI-S in 20-24 years old to 3.6 in 45-54 years old. The mean GI in 20-24 years old was 0.9, whereas in 45-54 years old – 1.2. These criteria increased among adult patients.

The incidence of periodontal diseases increased in the elderly group. CPITN scores, reflecting the periodontal status, were the following: the quantity of healthy sextants (CPITN „0“) – 0.8 in the 20-24 years old group, 0.5 in the 25-29 years old group and 0.2 in the 35-44 years old group. In the elderly people (45-54 y.o.) there were no more than 0.1 sextants with healthy periodontium. The average number of sextants with shallow pockets (pockets of 4 or 5 mm – CPITN „3“) was 0.20 ± 0.60 SD in 20-24 years old, 0.25 ± 0.63 SD – in 25-29 years old, 0.71 ± 1.20 SD – in 35-44 years old, 1.16 ± 1.70 SD – in 45-54 years old. The average number of sextants with deep pockets (pocket > 6 mm – CPITN „4“) was 0.06 ± 0.41 SD in 35-44 years old, while in 45-54 years old – 0.16 ± 0.7 SD.

The prevalence of systemic diseases was 18.4% in the 20-24 years old, 18.8% in the 25-30 years old, and 27.8% in the 35-44 years old. Physician's documented systemic diseases in the age group of 45-54 y. o. were 45.9% of which 12.1% corresponded to CVD (Table 1).

The prevalence of systemic diseases in different age groups significantly correlated with the prevalence of severe periodontal diseases. The intensity of periodontal and systemic diseases increased in the adult group (Figure 1).

The evaluation of oral status in patients with CVD and control group has shown statistically significant low level of oral health in patients with CVD as compared to control.

The patients with CVD had statistically insignificant low level of oral hygiene and statistically higher prevalence of gingivitis. In the group of CVD patients OHI-S was 3.31, GI – 1.23 and in the control group OHI-S was 3.25, GI – 0.95 (Table 2).

Table 1. Prevalence of systemic diseases in different age groups of population (%)

Age (years)	N	Gastric diseases, %	Cardio-vascular diseases, %	Diabetes, %	Other, %	Systemic diseases in general, %
20-24	152	8.2	1.6	2	6.6	18.4
25-29	150	12.5	2.1	0	4.2	18.8
35-44	144	11.4	6.5	2.5	7.4	27.8
45-54	185	20.5	12.1	6.0	7.3	45.9

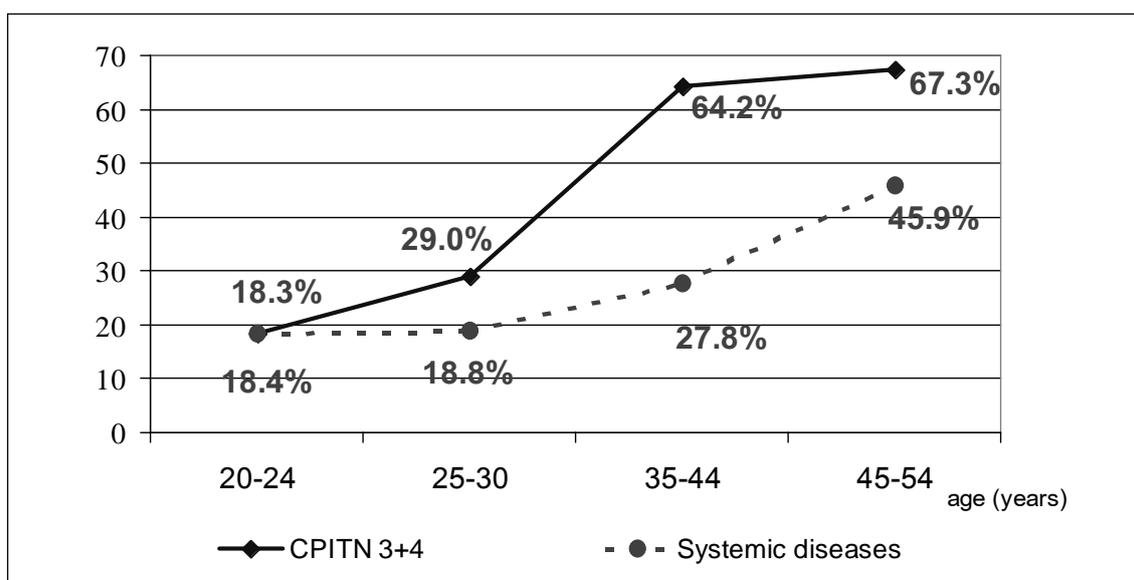


Figure 1. Prevalence of severe periodontal (percentage of subjects with pockets „CPITN 3+4“) and systemic diseases in different age groups

Table 2. Evaluation of oral hygiene and gingivitis in patients with CVD and in healthy subjects

Group	Average OHI-S (mean ± SD)	Average GI (mean ± SD)
Healthy	3.25 ± 0.89	0.95 ± 0.30
CVD	3.31 ± 0.65	1.23 ± 1.60
p	p > 0.05	p < 0.001

Table 3. Number of missing teeth in patients with CVD and in healthy subjects

Group	Average missing teeth (mean ± SD)	Average DMFT (mean ± SD)
Healthy	6.2 ± 2.9	14.4 ± 7.3
CVD	7.2 ± 3.7	14.8 ± 7.7
p	p < 0.05	p > 0.05

Table 4. Comparison of periodontal status of patients with CVD and healthy subjects

Group	CPITN (mean ± SD)		Loss of attachment (mean ± SD)
	„3“ (shallow pocket)	„4“ (deep pocket)	„1“ (4-5 mm)
	Healthy (control)	0.80 ± 0.37	0.13 ± 0.65
CVD	1.45 ± 0.87	0.29 ± 0.45	1.70 ± 1.37
p	p < 0.001	p < 0.05	p < 0.001

The number of missing teeth was associated with cardiovascular diseases. In the group of CVD patients, DMFT was 14.8, where missing teeth comprised 7.2 and in control group DMFT was 14.4 with missing teeth – 6.2 (Table 3).

This investigation revealed that the average number of sextants with shallow pockets in patients with CVD was 1.45, whereas in control – 0.80. The mean number sextants with loss of attachment of 4-5 mm (LA „1“) in patients with CVD was 1.70, whereas in the control group – 0.89. The mean number of CPITN „4“ in patients with CVD was 0.29 and 0.13 – in control (Table

4). The differences between CVD and control groups were statistically significant.

Conclusions

1. The prevalence of systemic diseases in different age groups is significantly correlated with the prevalence of severe periodontal disease.

2. The evaluation of oral status of the population reveals the statistically significant low level of oral health in patients with CVD as compared to control.

References

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