

Original papers

The effect of proper oral hygiene habits on oral cavity health

Wpływ właściwych zachowań dotyczących higieny jamy ustnej na jej zdrowie

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Abstract

Background. The condition of oral health among Polish patients is poor. The number of edentulous patients or those requiring major surgical procedures is growing. Improper health habits may affect oral hygiene.

Objectives. The objective of the study was to evaluate the effect of tooth brushing and visiting dentist to see if there are any pathological changes in the oral cavity.

Material and methods. Hundred and sixty-three patients underwent dental examinations comprised of the following elements: intraoral and extraoral examination, radiographs and a questionnaire about daily habits.

Results. Patients brushing teeth 3 times a day were mostly put in class 0–2 CPITN. API > 75% occurred most frequently in irregular teeth brushing (85%, $p = 0.07$). CPITN index from 0 to 2 was found mostly in patients attending the dentist once a year or more frequently (80 vs 64 vs 50%, $p = 0.014$). API index > 70% was significantly more common in patients visiting dentist irregularly (69 vs 55 vs 29%, $p < 0.001$). Most residual roots were also reported in patients who do not regularly brush their teeth (33%). Those patients have more frequent instances oral diseases requiring surgical treatment and suffer a greater risk of odontogenic inflammatory foci.

Conclusions. Irregular follow-up visits and irregular tooth brushing lead to the deterioration of oral health status and can enhance the risk of the necessity of surgical treatment.

Key words: oral hygiene, health habits, periodontal health

Słowa kluczowe: higiena jamy ustnej, nawyki higieniczne, zdrowie przyzębia

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Proper oral hygiene is an important element of maintaining proper health. Many researchers emphasize the connection between periodontal diseases and systemic diseases.^{1,2} Unfortunately, the condition of oral health among Polish patients is poor. Dental caries are still a major problem not only in Poland but also in many other countries. They concern a large number of adult patients.^{3–5} The prevalence of periodontal diseases is significantly different between countries,^{6–8} and they are still a major problem especially in older groups.³ Advanced periodontal disease, which can cause tooth loss is observed in 5–15% of people 35–44 years old.⁹ Among European countries, the lowest percentages of edentulous (below 20%) were found in Lithuania (14%), Austria and Iceland (15%) and highest 40% in Finland (41%), Slovakia (44%) and Bosnia and Herzegovina (78%). In Poland, we observe an increase in the proportion of edentulous people aged 35–44 years from 1.6 to 3.8%.¹⁰ The proportion of edentulous people aged 65–74 years in our country has reached 41.6%.¹¹ The potential reason for this situation is very poor oral hygiene.

Objectives

Epidemiological studies indicate that the majority of older people in Poland, as well as in other European countries and in the United States do not have the proper habits that allow them to maintain proper oral hygiene.^{12–14}

The aim of our study was to analyze the relationship between habits in maintaining proper oral hygiene and oral health.

Material and methods

The study included 163 patients scheduled for cardiac operations. Before the operation, patients underwent a dental examination comprised of the following elements: intraoral and extraoral examination and radiographs (the review of the pantomographic image). Patients also completed a questionnaire on their daily health habits for maintaining proper oral hygiene. The questionnaire focused on the frequency of tooth brushing and the number of visits to the dentists. The average age of patients in the study was 60 years. Thirty-four percent of patients were over 65 years. In this intraoral study we evaluated: Community Periodontal Index of Treatment Needs (CPITN), Approximal Plaque Index (API), the presence of gingival pocket above 6 mm, indications for professional oral hygiene, indications for conservative, endodontic and surgical treatment.

In radiographic study we evaluated the presence of periapical lesions (OKW), the presence of residual roots, impacted teeth, vertical and horizontal alveolar bone at-

Table 1. Frequency of brushing teeth and the frequency of visits to the dentists

Brushing teeth	3 times per day or more often	1 or 2 times per day	Irregularly
All group	12	84	4
Age < 65 years	14	82	4
Age > 65 years	6	90	4
Control visits to the dentist	Once a year, or more frequently	Once every 2–5 years	Irregularly
All group	40	26	34
Age < 65 years	44	24	32
Age > 65 years	33	31	36

All data are presented in percentages.

rophy, the presence of caries and indications for primary and re-endodontic treatment and the indications for surgical treatment. On the basis of all the completed studies, the authors assessed the presence of potential foci of inflammation in the oral cavity.

Statistical analyses were performed using STATISTICA v. 10. Categorical data was compared by the χ^2 test or the Fisher exact test if the expected number of observations in any cell was < 5. Continuous data is presented as mean \pm SD or median interquartile range and was compared using the analysis of variance or Kruskal-Wallis test, as appropriate. Values of $p < 0.05$ were considered to be statistically significant and all p -values are 2-sided.

Results

In the whole group, only 4% of patients do not brush teeth regularly. Most patients brush their teeth 1 or 2 times per day (84%) (Table 1). Only 12% of respondents in the age below 65 years of age brush their teeth more than 2 times a day (14%).

Sixty-six percent of respondents declare regular visits to the dentist. Most patients (40%) go to the dentist once a year or more frequently. With age, the frequency of regular visits decreases and in patients above 65 years the frequency reaches the level of 33% (Table 1).

We also compared the impact of tooth brushing frequency on oral hygiene. In the periodontal assessment we used the CPITN index (Community Periodontal Index of Treatment Needs). Patients brushing teeth 3 times a day were mostly in class 0–2 (84%), while half of the patients

Table 2. CPITN depending on frequency of teeth brushing

CPITN	The frequency of teeth brushing		
	3 times or more often a day	1 or 2 times a day	not at all
0–2	84	65	50
3–4	16	35	50

$p = 0.24$. All data are presented in percentages.

Table 3. Effect of teeth brushing frequency on oral hygiene

Variable	The frequency of teeth brushing			p-value
	3 times or more often a day	1 or 2 times a day	not at all	
API >75	32	49	85	0.07
The presence of inflammatory foci	63	82	83	0.1
Periradicular lesions	21	38	33	0.36
Gingival pockets > 6 mm	21	43	50	0.15
Residual roots	11	22	33	0.38
Professional hygienisation	58	50	59	0.9
Conservative treatment	16	41	50	0.094
Surgical treatment	32	44	83	0.08
Endodontic treatment	26	24	17	0.89

All data are presented in percentages.

who have declared that they do not brush their teeth regularly were in a class CPITN 3–4 (Table 2).

We evaluated the status of other parameters of oral hygiene such as API (Approximal Plaque Index). API > 75% occurred most frequently in patients who do not regularly brush their teeth (85%, $p = 0.07$) (Table 3). The difference in this parameter between the different groups was large and approached statistical significance. In this group, most patients had deep alveolar pockets above 6 mm (50%) and required professional oral hygiene procedures at dental office (59%). Most residual roots were also reported in patients who do not regularly brush their teeth (33%).

The lowest number of patients who experienced potential foci of inflammation was in the group that brush-

es their teeth 3 times a day (63%). The worst situation was in patients who did not brush their teeth regularly. Eighty-three percent of patients had potential foci of inflammation, half required urgent treatment in the field of dentistry and 83% required urgent surgery (extractions residual roots) (Table 3).

Also, the frequency of regular visits to the dental office affects the state of oral hygiene. CPITN index from 0 to 2 most was found in patients visiting dentist once a year or more frequently (80 vs 64 vs 50%, $p = 0.014$) (Table 4). In patients not brushing their teeth regularly, CPITN index was 3–4. These relationships were statistically significant ($p = 0.014$).

API index > 70 was significantly more common in patients visiting their dentist irregularly (69 vs 55 vs 29%, $p < 0.001$) (Table 5).

Eighty-eight percent of patients who do not visit the dentist regularly have the potential inflammation foci, 45% of patients have periradicular lesions and residual roots 31% (Table 5). Statistically significant least residual roots have patients going to the dentist once a year or more often (6%, $p = 0.001$). Most patients requiring urgent hygienic procedures (79%, $p = 0.007$) and urgent surgery (55%) were in the group of patients who did not have regular dental visits.

Table 4. CPITN depending on the frequency of dental control visits

CPITN	The frequency of control visits to the dentist		
	once per year	once every 3–5 years	it is not attending
0–2	80	64	50
3–4	20	36	50

$p = 0.014$. All data are presented in percentages.

Table 5. Effect of dental control visits frequency on oral hygiene

Variable	The frequency of control visits to the dentist			p-value
	once a year	once every 3–5 years	it is not attending	
API >75	29	55	69	< 0.001
The presence of inflammatory foci	77	76	88	0.29
Periradicular lesions	33	31	45	0.3
Gingival pockets > 6 mm	36	52	38	0.2
Residual roots	6	33	31	< 0.001
Professional hygienisation	48	56	79	0.007
Conservative treatment	30	48	40	0.18
Surgical treatment	30	52	55	0.013
Endodontic treatment	26	26	20	0.7

All data are presented in percentages.

Discussion

Oral hygiene status depends mainly on 2 factors: regular teeth cleaning (tooth brushing with fluoride toothpaste, dental floss after eating, toothpicks, interdental brushes, using liquid mouthwash) and the regular attendance for follow-up visits to the dentist.

There are frequently repeated allegations during public discussions such as “visits to the dentist are expensive” and “private health care requires additional funding”, but, according to research conducted in 2011 in Poland, only 22% of patients eligible for dental treatment reimbursement benefit from this option in centers that have signed contracts with the National Health Fund.¹⁵ Daily teeth cleaning habits are another factor. The price of toothpaste and toothbrushes is not high; the frequency of tooth brushing is not sufficient.

In a study conducted in Poland, in a group of over 600 patients older than 65 years, almost 80% brush their teeth 1 or 2 times a day. Only 3% brush their teeth three times a day, and as many as 20% do not regularly brush their teeth.¹⁴ However, in a study conducted in 2009, in the United Kingdom, 75% of patients brush their teeth twice a day or more frequently and only 3% do not brush their teeth regularly.¹⁶ In our study, 94% of patients brush their teeth at least once a day, and only 4% brush their teeth regularly. The ratio of patients brushing their teeth regularly depends on age. Additional training for older adults in long-term care facilities should be introduced into the everyday practice.¹⁷

This data is comparable with the data from the Ministry of Health. According to available data, more than 97% of Małopolska residents brush their teeth once a day or more often. Compared to the data from all of Poland (90% of people brush their teeth once or twice a day and more than 8% do not brush regularly), patients in our region take great care of their oral hygiene.¹⁸

The regularity of brushing teeth has an influence on good oral hygiene status. Among adults aged 35–44 years in Poland, in recent years there has been an increase in the proportion of people with healthy periodontium from 12.7% in 1998 to 14.1% in 2002.

However, in Sweden, the prevalence of moderate periodontal disease fell from 44.8% to 15.7% in the overall study population, while the percentage of patients with advanced periodontal disease has remained almost the same in 1983 and 2008 (7.4 and 9.2%).³ In our study, half of the patients regularly brushing their teeth have an index CPITN 3 or 4. In the group of patients brushing their teeth 3 times a day, only 16% had CPITN 3 or 4. It follows that patients who less often brush their teeth have bigger periodontal treatment needs.

The situation is similar when comparing the other parameters of oral hygiene status. Patients brushing their teeth frequently (3 times per day or more often) have a better indicator of the API (only 32% of the API is > 75%), fewer patients have pockets greater than 6 mm

(21%) and this group of patients has the least potential for foci of inflammation in the oral cavity (63%). Irregular brushing leads to poor oral hygiene status (API > 75 were 85% and 83% of patients in this group have the potential foci inflammations in the mouth).

Also the medical needs are evaluated in these groups. In patients not brushing their teeth regularly, half require medical treatment while more than 80% of the patients required surgical treatment. While those who brush their teeth 3 times daily had significantly less need for maintenance treatment (16 vs 50%, $p = 0.094$) and surgical (32 vs 83%, $p = 0.08$). Therefore, the majority of patients who irregularly brush their teeth have infectious foci in the oral cavity, which can affect the development of many systemic diseases. The correlation between oral pathologies and systemic diseases has long been proven. In a study of the English population, 64% of adults who at least twice a day brushed their teeth have visible bacterial plate compared with 94% of those patients who confess to teeth brushing at least once a day, or not at all. Men are more likely than women to have plaque (71 vs 61%) and also constitute a higher percentage of patients requiring treatment for their teeth (27 vs 20%).¹⁶ This is proof that irregular brushing in many cases is not sufficient. The development of lesions in the mouth causes the need for regular visits to the dentist. Data from the Ministry of Health, including more than 2000 patients, showed that in 2010 almost 60% of respondents visited a dentist at least once in the last year.¹⁸ In our study, 40% of patients go to the dentist once a year or more frequently and over a third do not attend regular check-ups. This has an impact on the state of oral hygiene. Half of the patients with CPITN 3 or 4 do not regularly visit a dentist and every fifth examined visits once a year. Patients who do not visit a dentist regularly have frequent apical changes (45 vs 33%), significantly more residual roots (31 vs 6%, $p < 0.001$) and significantly more hygienic require treatment (79 vs 48%, $p = 0.007$) compared to patients visiting the dentist once a year. In this group, significantly more patients have APIs > 70 (69% vs 55% vs 2% vs 9%, $p < 0.001$) and a greater percentage of patients present potential inflammatory foci (88 vs 77%) and are significantly more likely to require surgical treatment (55 vs 30 vs 52%, $p = 0.013$). In summary, we conclude that the irregular dental visits cause the deterioration of oral health and a statistically significant increase in the number of patients requiring dental treatment.

In a study of 6,000 patients living in England, in 2009, almost 2/3 (61%) of adults said that the reason for going to the dentist is a check-up. Twenty-seven percent said they visit only as a result of a toothache.¹⁶ Adult patients who said they report to the dentist for a check-up visit rarely had visible bacterial plate (61%) than those who report to the dentist only when pain occurs (76%).

Oral health is a fundamental component of health and physical and mental well-being; and therefore, great emphasis should be put on proper health habits.¹⁹

Summing up the results of our study, we can conclude that irregular brushing promotes poor oral hygiene and, consequently, increases the need for dental treatment, especially surgical treatment. Patients brushing teeth 3 times a day or more often had the best oral hygiene. Irregular follow-up visits to the dentist also affect the deterioration of oral hygiene. Patients avoiding regular visits have significantly greater medical needs, more often had residual roots, needed surgery and exhibited a greater risk of occurrence odontogenic inflammatory foci. Patients who arrange for follow-up visits at least once a year have lowest amount of potential foci of inflammation and the best oral hygiene.

From an economic point of view, more frequent tooth brushing and regular visits to the dentist reduce the need for dental treatment in subjects, and thus reduce financial spending on dental services for patients.

Therefore, it is important to conduct population-based studies that will determine treatment needs of society and identify the range of the most necessary educational campaigns among patients.

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