

Małgorzata KANTOROWICZ<sup>1</sup>  
Iwona OLSZEWSKA-CZYŻ<sup>1</sup>  
Emilia KOLARZYK<sup>2</sup>  
Maria CHOMYSZYN-GAJEWSKA<sup>1</sup>

## Influence of diet on oral health in young adults – pilot study

<sup>1</sup>Department of Periodontology and Oral Medicine, Jagiellonian University, Medical College, Krakow, Poland  
Chief:  
Prof. dr hab. n. med. M. Chomyszyn-Gajewska

<sup>2</sup>Department of Hygiene and Dietetics, Jagiellonian University, Medical College, Krakow, Poland

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**Introduction:** Diet is a factor that can modify, among others, the course of caries, dental erosive lesions and periodontal disease. It is important to know the influence of diet on the clinical oral condition in young adults.

**Material and methods:** 20 women and 20 men aged 19–21 participated in the study. During a clinical examination of the patients the following clinical indices were estimated: Approximal Plaque Index (API), Bleeding on Probing (BOP) and DMFT indices. The frequency and quality of food products consumed were noted in a special questionnaire. Results with  $p \leq 0.05$  were considered statistically significant.

**Results:** The average API value for the female participants was 77.37%, BOP – 23.84% and DMFT – 9.9. The t-test results for independent samples showed that women who consumed meat and meat products two times a week or more, had statistically higher API ( $p = 0.01$ ) and BOP ( $p = 0.05$ ) values, than the mean value for these indexes. Women who consumed grain products and grain-based products two times a week or more, had higher API values compared to the mean value for this index ( $p = 0.02$ ).

The average API value for the male participants was 34.25%, BOP – 10.15% and DMFT – 9.05, respectively. Men who consumed milk and dairy products three times a week or less had statistically lower API ( $p = 0.05$ ) and BOP values ( $p = 0.02$ ), relative to the mean index values.

**Conclusions:** The chemical composition and texture of the food intake can affect oral health. Besides instruction in oral hygiene, doctors and dentists should also assess the eating habits of their patients.

### Introduction

Oral cavity is the first section of the gastrointestinal tract and one of its functions is the intake of food. The digestion process also starts there. The tooth loss can lead to a change in eating habits, which in turn increases the risk of certain systemic diseases. Therefore, maintenance of oral health is an important factor in the preservation of overall health [1].

**Wstęp:** Dieta jest czynnikiem modyfikującym przebieg próchnicy zębów, ubytków erozyjnych i chorób przyzębia. Ważna jest znajomość wpływu diety na stan jamy ustnej u młodych dorosłych.

**Materiał i metody:** Przebadano 20 kobiet i 20 mężczyzn w wieku 19–21 lat. Podczas badania klinicznego oznaczono następujące wskaźniki stomatologiczne: API (Approximal Plaque Index), BOP (Bleeding on Probing) i liczbę PUW. Częstość spożycia oraz preferencje żywieniowe oceniono w oparciu o Kwestionariusz Częstości Spożycia Produktów Spożywczych.

Za istotne statystycznie uznano  $p \leq 0,05$ .

**Wyniki:** Średnia wartość API w grupie kobiet wynosi 77,7%, BOP – 23,4% a liczba PUW 9,93. Kobiety spożywające dwa razy w tygodniu lub więcej mięso i wędliny cechuje wyższy statystycznie wskaźnik API ( $p = 0,01$ ) i BOP ( $p = 0,05$ ). Natomiast u kobiet spożywających dwa razy w tygodniu lub więcej produkty zbożowe i ich przetwory wyższy jest jedynie wskaźnik API ( $p = 0,02$ ). Średnia wartość API w grupie mężczyzn wynosi 34,25%, BOP – 10,15%, liczba PUW 9,05. Mężczyzn spożywających trzy razy w tygodniu lub mniej mleko i produkty mleczne cechuje niższa statystycznie wartość wskaźnika API ( $p = 0,05$ ) oraz BOP ( $p = 0,02$ ).

**Wnioski:** Skład chemiczny i konsystencja przyjmowanych pokarmów mogą wpływać na zdrowie jamy ustnej. Lekarze i lekarze dentyści powinni oprócz instruktażu higieny jamy ustnej, dokonać oceny nawyków żywieniowych swoich pacjentów.

The role of carbohydrates in the onset and development of caries and of acids in the formation of erosive dental defects is well known [2]. Besides caries, another growing problem is tooth loss caused by periodontal diseases (periodontopathies) [3]. Hence, more and more studies are evaluating the role of alimentation in these diseases [4–11]. Unsuitable eating habits can be a risk factor for chronic periodontitis and have a nega-

Adres do korespondencji:  
Maria Chomyszyn-Gajewska  
Department of Periodontology and Oral Medicine, Jagiellonian University, Medical College  
ul. Montelupich 4, 31-155, Cracow, Poland  
tel./fax: +48 (12) 4245420  
e-mail: mdgajews@cyf-kr.edu.pl

tive effect on the course of the disease [6]. Analyses of the role played by certain food components have proven that the content of calcium in food has a protective effect on the marginal periodontium tissues [6,12]. The consumption of dairy products can prevent caries throughout an individual's life, thanks to the content of calcium and casein phosphate [1]. Food components, such as magnesium, vitamins D, C and of group B, have also been shown to have a beneficial effect on the oral cavity by reducing its susceptibility to the disease and inflammation [13-17].

The physical character of diet has also an impact on oral health. Food with soft, sticky consistence causes poorer hygiene and as a consequence, dental caries and gingivitis. Thanks to chewing process, hard texture of food increases salivary flow rate, which helps to clean the oral cavity [1].

The objective of the present study was to assess the effect of certain food products on the oral health of young people.

### Material and methods

After obtaining the approval of the Bioethics Committee and the written consent of the project participants, a total of 20 women and 20 men aged 19-21 and studying at universities and colleges in Krakow were examined. The criteria used to select participants for the study were as follows: age and absence of chronic systemic diseases.

The following periodontal parameters were recorded: API (*Approximal Plaque Index*, Lange, 1977), BOP (*Bleeding on Probing*, Ainamo and Bay, 1975), and DMFT (D-decayed, M-missing, F-filled, T-teeth).

The API was measured by recording the presence or absence of dental plaque in approximal interdental spaces from the oral aspect for the first and third quadrants and from the buccal aspect in the second and fourth quadrants.

The BOP index was measured for the entire mouth by recording the presence or absence of bleeding up to 30 seconds after gentle probing with a manual dental probe. Each tooth was probed in six sites: mesio-buccal, mid-buccal, disto-buccal, mesio-lingual, mid-lingual and disto-lingual [18].

API and BOP are expressed as a percentage of approximal sites with plaque/bleeding sites in relation to all the sites examined.

DMFT – a caries prevalence index measuring the extent of an individual's dental caries.

The frequency of consumption and preferences for certain foods (during previous month before examination) were assessed using a modified Questionnaire of Food Products Frequency Intake. This questionnaire was validated and recommended by the National Food and Nutrition Institute in Warsaw, Poland. The examined food products were classified to 15 groups (Tab. I).

The consumption frequency of examined products was determined in 7 categories (ranks); these categories ranged from "I don't eat/drink it at all" to "I eat/drink it every day". For proper interpretation of obtained means of ranks the following ranges were approved: 1-1,49- I don't eat/

Table I

### Questionnaire on the frequency of consumption of certain foods.

Kwestionariusz Częstości Spożycia Produktów Spożywczych.

Product group	Name of product
1. Milk and dairy products	milk, milk-based soups; yoghurts, kefir; milk-based beverages; cottage cheese; rennet cheese
2. Eggs	Eggs
3. Meat and fish, including semi-meat dishes	pork, beef, veal; poultry; cured meats (ham, sausage); meat-based products (wieners, brawn, pate, blood pudding); fish; bigos (stewed sauerkraut with meat), tripe, pizza, etc.
4. Animal fats	pork fat, lard; butter; cream
5. Vegetable fats, including hydrogenated fats	olive oil; sunflower, soya bean oils, etc.; margarines
6. Raw fruit and vegetables	vegetables; fruit
7. Crisps and other savoury snacks	chips, crisps; packet soups
8. Fruit and vegetable juices	vegetable juices; fruit juices
9. Potatoes	potatoes
10. Pulses	peas, beans; soybean, lentils
11. Grain products and grain-based products	brown bread; grits, rice; pasta; wheat bread (buns, baguettes); white bread; semi-sweet bread
12. Sugar and confectionary	sugar, sweets, honey; jam, preserves; chocolate products; cakes, tarts
13. Sweet beverages	beverages such as: pepsi, cola etc; carbonated and non-carbonated
14. Alcoholic beverages	vodka; beer; wine
15. Other beverages	real coffee; tea; water (sparkling and still)

Table II

### T-test for independent samples in the case of women for API index.

Test T dla prób niezależnych w grupie kobiet dla wskaźnika API.

API	N	Mean	Standard Deviation	Standard Error of Mean	Significance level (p)	
Milk and dairy products	<= 3 times a week	14	72.0	24.6	6.6	0.85
	Almost everyday	6	69.3	34.0	13.9	
Eggs	less than once a week	10	70.7	28.8	9.1	0.94
	<= once a week	10	71.7	26.2	8.3	
Meat and processed meats	<= once a week	8	53.3	28.2	10.0	0.01
	<= 2 times a week	12	83.2	18.6	5.4	
Fish	less than once a week	9	82.6	18.5	6.2	0.10
	<= once a week	8	64.1	24.2	8.5	
Animal fats	<= 3 times a week	13	71.9	29.5	8.2	0.88
	almost everyday	7	69.9	23.1	8.7	
Vegetable fats	<= once a week	6	82.8	15.5	6.3	0.21
	<= 2 times a week	14	66.2	29.5	7.9	
Fruit, vegetables and tinned fruit and vegetables	<= once a week	9	65.7	30.3	10.1	0.42
	<= 2 times a week	11	75.7	24.1	7.3	
Grain products and grain-based products	<= once a week	10	57.2	29.1	9.2	0.02
	<= 2 times a week	10	85.2	15.3	4.8	
Sugar and confectionary	<= 3 times a week	12	80.0	23.2	6.7	0.07
	almost everyday	8	58.0	27.8	9.8	
Beverages of the following types Pepsi, Cola etc.	less than once a week	10	61.5	26.6	8.4	0.11
	>= once a week	10	80.9	24.5	7.7	
Alcohol	<= once a month	9	64.7	19.9	6.6	0.41
	<= 2 times a month	10	75.3	32.7	10.3	
Real coffee and tea	<= 6 times a week	5	84.6	14.5	6.5	0.20
	daily	13	65.2	30.3	8.4	
Water (sparkling and still)	<= 6 times a week	6	76.3	27.9	11.4	0.47
	daily	12	66.1	27.7	8.0	
Chips, crisps	less than once a week	10	63.2	33.3	10.5	0.29
	>= once a week	7	78.6	18.5	7.0	

\* - statistical significance  $p \leq 0.05$

N – size of group 20

Table III

T-test for independent samples in the case of women for the BOP index.

Test T dla prób niezależnych w grupie kobiet dla wskaźnika BOP.

BOP		N	Mean	Standard Deviation	Standard Error of Mean	Significance level (p)
Milk and dairy products	<= 3 times a week	14	26.1	10.8	2.9	0.20
	almost everyday	6	17.5	18.2	7.4	
Eggs	less than once a week	10	24.1	13.6	4.3	0.86
	>= once a week	10	23.0	14.2	4.5	
Meat and processed meats	<= once a week	8	16.4	8.0	2.8	0.05
	<= 2 times a week	12	28.3	14.6	4.2	
Fish	less than once a week	9	22.2	14.4	4.8	0.78
	>= once a week	8	24.0	11.2	4.0	
Animal fats	<= 3 times a week	13	21.4	15.2	4.2	0.34
	almost everyday	7	27.6	9.4	3.5	
Vegetable fats	<= once a week	6	28.7	13.1	5.4	0.28
	<= 2 times a week	14	21.4	13.6	3.6	
Fruit, vegetables and tinned fruit and vegetables	<= once a week	9	21.4	10.8	3.6	0.54
	<= 2 times a week	11	25.3	15.7	4.7	
Grain products and grain-based products	<= once a week	10	19.6	13.1	4.1	0.20
	<= 2 times a week	10	27.5	13.5	4.3	
Sugar and confectionary	<= 3 times a week	12	27.5	14.9	4.3	0.11
	almost everyday	8	17.6	8.9	3.1	
Beverages of the following types Pepsi, Cola etc.	less than once a week	10	19.1	11.5	3.7	0.15
	>= once a week	10	28.0	14.5	4.6	
Alcohol	<= once a month	9	22.4	11.9	4.0	0.86
	<= 2 times a month	10	23.6	15.8	5.0	
Real coffee and tea	<= 6 times a week	5	21.2	13.7	6.1	0.77
	daily	13	23.5	14.8	4.1	
Water (sparkling and still)	<= 6 times a week	6	21.2	13.4	5.5	0.96
	daily	12	21.5	12.4	3.6	
Chips, crisps	less than once a week	10	22.6	14.0	4.4	0.40
	>= once a week	7	28.0	10.3	3.9	

\* - statistical significance  $p \leq 0.05$ 

N – size of group 20

drink at all;  $1,5 < X < 2,49$  - I eat/drink once a month;  $2,5 < X < 3,49$  - I eat/drink 2 - 3 times a month;  $3,5 < X < 4,49$  - I eat/drink once a week;  $4,5 < X < 5,49$  - I eat/drink 3 times a week;  $5,5 < X < 6,49$  - I eat/drink 4 - 6 times a week;  $6,5 < X < 7,0$  - I eat/drink every day or several times daily.

#### Statistical analysis

We assessed how the frequency and quality of food products consumed, affect the above-mentioned indices and thus affects the condition of oral cavity.

The characteristics of the study sample were described using descriptive statistics. The results for the continuous variables are presented in the tables and based on the following values: size (n), mean (x), median (me), standard deviation (SD), minimum, maximum, skewness and kurtosis.

The normal distribution of continuous variables was assessed using the visual method as well as with the help of skewness and kurtosis measurements and the Kolmogorov-Smirnov and Shapiro-Wilk normality tests. The distributions of the categorised variables are presented in contingency tables and any differences were determined

using the  $\chi^2$  test.

For continuous variables with normal distribution, parametric tests were used. The two groups of independent variables were compared using the t-Student test. The influence of several characteristics on a dependent variable was assessed using simple regression and correlation coefficients. Results with  $p \leq 0.05$  were considered statistically significant.

#### Results

The mean API for the female participants was 77.37%, the mean BOP = 23.84% and the mean DMFT value = 9.93. The corresponding values for the men were as follows: API = 34.25%, BOP = 10.15%, DMFT = 9.05, respectively.

Women consuming meat and processed meats (cold cuts and sausages) two times or more a week had a statistically higher API ( $p = 0.01$ ) (Tab. II) and a statistically higher BOP index ( $p = 0.01$ ) (Tab. III) than the mean values for these indices. Women consuming grain products two or more times a week had a higher API than the mean value for the index ( $p = 0.02$ ) (Tab. II). The DMFT index for the women, measured according

to a t-test for independent samples, was not significant (Tab. IV).

Men consuming milk and dairy products three times or less a week had a statistically lower API ( $p = 0.05$ ) (Tab. V) as well as BOP ( $p = 0.02$ ) (Tab. VI) than the mean values of these indices for this group. Persons consuming alcoholic beverages two or more times a month had a statistically lower BOP index ( $p = 0.05$ ) than the mean values for this group (Tab. VI). Men consuming milk and dairy products three times or less a week had a statistically lower DMFT than the mean values for this index ( $p = 0.03$ ) (Tab. VII).

Changes in the API correlate significantly with sex and the frequency of consuming pepsi-type beverages and chips/crisps. The women had a 49.3% higher API index than the boys ( $p < 0.0001$ ), taking into account the impact of the frequency of consumption of pepsi-type drinks and chips/crisps. The increase in the frequency of consumption of pepsi-type drinks increases the API by 4.3% ( $p = 0.042$ ) for every consumption frequency rank for these beverages. An increase in the frequency of chip/crisp consumption lowers the API value by 4.6% ( $p = 0.037$ )

**Table IV**  
**T-test for independent samples in the case of women for the DMFT score.**  
 Test T dla prób niezależnych w grupie kobiet dla liczby PUW.

DMFT		N	Mean	Standard Deviation	Standard Error of Mean	Significance level (p)
Milk and dairy products	<= 3 times a week	14	11.9	5.1	1.4	0.60
	almost everyday	6	10.7	3.8	1.5	
Eggs	less than once a week	10	10.8	3.7	1.2	0.49
	>= once a week	10	12.3	5.6	1.8	
Meat and processed meats	<= once a week	8	11.9	4.3	1.5	0.81
	>= 2 times a week	12	11.3	5.1	1.5	
Fish	less than once a week	9	11.7	4.7	1.6	0.95
	>= once a week	8	11.5	5.7	2.0	
Animal fats	<= 3 times a week	13	10.3	3.6	1.0	0.11
	almost everyday	7	13.9	5.9	2.2	
Vegetable fats	<= once a week	6	28.7	13.1	5.4	0.60
	>= 2 times a week	14	21.4	13.6	3.6	
Fruit, vegetables and tinned fruit and vegetables	<= once a week	9	12.7	4.0	1.3	0.35
	>= 2 times a week	11	10.6	5.2	1.6	
Grain products and grain-based products	<= once a week	10	11.6	4.6	1.5	0.96
	>= 2 times a week	10	11.5	5.0	1.6	
Sugar and confectionary	<=3 times a week	12	11.8	4.7	1.4	0.75
	almost everyday	8	11.1	4.9	1.7	
Beverages of the following types Pepsi, Cola etc	less than once a week	10	10.9	4.9	1.6	0.55
	>= once a week	10	12.2	4.6	1.5	
Alcohol	<= once a month	9	11.3	5.9	2.0	0.98
	>= 2 times a month	10	11.4	3.7	1.2	
Real coffee and tea	<=6 times a week	5	15.4	4.7	2.1	0.31
	daily	13	9.9	4.2	1.2	
Water (sparkling and still)	<=6 times a week	6	12.5	5.8	2.4	0.41
	daily	12	10.6	3.8	1.1	
Chips, crisps	less than once a week	10	10.4	4.4	1.4	0.74
	>= once a week	7	11.1	4.4	1.7	

\* - statistical significance  $p \leq 0.05$

N – size of group 20

for every consumption frequency rank for such chips/crisps.

Differences in BOP values correlate significantly with sex and the frequency of consumption of pepsi-like beverages and chips/crisps. The women had a 20.9% higher BOP than the men ( $p < 0.0001$ ) when measuring the impact of the frequency of consuming vegetable fats, pepsi-like beverages and chips/crisps.

An increase in the frequency of pepsi-type beverage consumption raised the BOP by 2.5% ( $p = 0.016$ ) for each rank of consumption frequency measured for these beverages.

An increase in the frequency of chips/crisps consumption lowered the BOP index by 2.8% ( $p = 0.009$ ) for each rank of consumption frequency measured for these food items.

An increase in the frequency of vegetable fat consumption reduced the BOP index by 2.9% ( $p = 0.005$ ) for each rank of consumption frequency measured for these fats.

There was a strong correlation between changes in DMFT values and frequency of

egg consumption. Increased frequency of egg consumption led to a decline of 1.25 in the DMFT index ( $p = 0.008$ ).

A significant correlation exists between changes in a participant's DMFT index and the frequency of egg consumption. The increase in the frequency of eating eggs causes a decrease in the value of DMFT of 1.25 ( $p = 0.008$ ) for every rank of the frequency of consumption of these eggs.

#### Discussion

The literature includes a number of studies examining the influence of alimentation on oral health. The role of diet on periodontitis requires further study. It has been proven that consuming foods rich in Omega-3 fatty acids can modify inflammatory processes in periodontitis [19-22]. Metabolites of unsaturated n-3 fatty acids can block damage to tissue induced by neutrophils, and not only in the case of periodontitis [9,23,24]. The main source of Omega 3 unsaturated fatty acids is found in vegetable oils, e.g. rapeseed, soya beans and linseed oil as well as in fish and marine mammals, egg yolks, soya beans and walnuts. Saturated fatty

acids, mainly present in animal products, i.e. meat, butter and pork fat should be avoided, because they can be synthesised in the human body, which means that they are not essential components of our food. Iwasaki et al. forwarded the hypothesis that the consumption of such acids in large amounts accelerates the progression of periodontitis. They demonstrated a correlation between the supply of saturated fatty acids and the development of periodontitis in older Japanese non-smokers [25].

In the present study young women consuming meat and cured meats two times or more a week had higher API and BOP indices than the mean values for these indices. In this group there is a greater likelihood of periodontitis occurring in the future. The consumption of the following wholegrain products carries a lower risk of periodontitis: wholegrain bread, wholemeal flour, cereals, wholemeal pasta, unrefined rice and groats/grits [10]. In our study women consuming grain products two times or more a week have a higher API, but these same products had no effect on periodontal inflammation (BOP), presumably due to the

Table V

T-test for independent samples in the case of men for API index.

Test T dla prób niezależnych w grupie mężczyzn dla wskaźnika API.

API		N	Mean	Standard Deviation	Standard Error of Mean	Significance level (p)
Milk and milk products	<=three times a week	19	32.4	17.6	4.0	0.05
	almost daily	1	70.0	.	.	
Eggs	<= once a week	9	37.9	23.6	7.9	0.46
	>= two times a week	11	31.3	15.0	4.5	
Meat and Meat Products	<=once a week	6	32.5	16.3	6.7	0.80
	>= two times a week	14	35.0	20.6	5.5	
Fish	less than once a week	9	6.8	7.4	2.5	0.15
	>=once a week	11	10.9	4.9	1.5	
Saturated fats	<=three times a week	19	34.2	19.6	4.5	0.93
	almost daily	1	36.0	.	.	
Unsaturated fats	<= once a week	17	34.7	20.3	4.9	0.81
	>= two times a week	3	31.7	12.0	6.9	
Fruits, vegetables and preserves	<= once a week	17	36.6	19.1	4.6	0.19
	>= two times a week	3	20.7	14.2	8.2	
Grain products and grain-based products	<= once a week	18	34.3	20.1	4.7	0.96
	>= two times a week	2	33.5	3.5	2.5	
Sugar and sweets	<=three times a week	19	34.4	19.6	4.5	0.87
	almost daily	1	31.0	.	.	
Pepsi/Cola type drinks	less than once a week	6	27.7	9.4	3.9	0.32
	>= once a week	14	37.1	21.6	5.8	
Alcohol	<= once a month	8	43.5	18.9	6.7	0.08
	>= two times a month	12	28.1	17.2	5.0	
Coffee and tea	<=six times a week	17	33.3	19.1	4.6	0.61
	daily	3	39.7	21.7	12.5	
Mineral water (carbonated and non-carbonated)	<=six times a week	0a	.	.	.	
	daily	20	34.3	19.0	4.3	
Chips, crisps	less than once a week	9	37.0	19.6	6.5	0.57
	>= once a week	11	32.0	19.2	5.8	

\* - statistical significance  $p \leq 0.05$ 

N – size of group 20

age of the respondents. The men consuming milk and dairy products had lower API and BOP indices and a lower DMFT score.

The NHANES III (Third National Health and Nutrition Examination Survey) study, which gathered data on the general and dental health of the American population as well as on their nutritional habits, included an analysis of dairy product consumption. People with chronic periodontitis consumed fewer dairy products compared with healthy persons. Moreover, the disease was more prevalent in participants with a low calcium content in their food consumption [6]. The protective action that micro- and macroelements contained in milk and food products have on periodontal tissue has been confirmed by other researchers [4,5]. In addition to calcium, milk and dairy products are also an important source of phosphorus, magnesium, potassium, zinc, protein and vitamin D. Calcium is believed to have an indirect impact on oral health and periodontal tissue through its role in regulating bone density in the skeleton and alveolar process. It is also an essential factor in wound healing [6,12,17,26].

One alarming trend is the increasing consumption of sugar among teenagers and young adults. Studies show that the share of soft drinks in total sugar consumption has doubled over the past 20 years [2]. A preliminary analysis of food preferences in women and men aged 19 – 21 shows the negative impact of pepsi-type soft drinks on oral health. They have higher API and BOP indices. On the other hand, a correlation exists between lower BOP indices and the consumption of alcoholic beverages. This contradicts a study by Tezal et al. which showed that higher alcohol consumption leads to an increase in symptoms of periodontitis [27]. This may be due to the age of the persons we included in our study as well as the size of the study group. It appears, however, that restricting the consumption of non-alcoholic beverages and replacing them with non-sparkling mineral water will have a positive effect on dentition and the tissue surrounding teeth.

#### Conclusions

Rational nutrition not only plays a role in the development of general systemic dise-

ases, but also has an effect on oral health. Besides instruction in oral hygiene doctors and dentists should also assess the eating habits of their patients. The new educational program about nutrition was prepared for dental students of Jagiellonian University.

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Table VI

T-test for independent samples in the case of men for BOP index.

Test T dla prób niezależnych w grupie mężczyzn dla wskaźnika BOP.

BOP		N	Mean	Standard Deviation	Standard Error of Mean	Significance level (p)
Milk and milk products	<=three times a week	19	9.1	8.0	1.8	0.02
	almost daily	1	30.0	.	.	
Eggs	<= once a week	9	11.0	8.9	3.0	0.72
	>= two times a week	11	9.5	9.6	2.9	
Meat and Meat Products	<=once a week	6	11.3	6.6	2.7	0.71
	>= two times a week	14	9.6	10.1	2.7	
Fish	less than once a week	9	7.7	5.8	1.9	0.28
	>=once a week	11	12.2	10.9	3.3	
Saturated fats	<=three times a week	19	10.5	9.2	2.1	0.50
	almost daily	1	4.0	.	.	
Unsaturated fats	<= once a week	17	11.5	9.1	2.2	0.12
	>= two times a week	3	2.7	4.6	2.7	
Fruits, vegetables and preserves	<= once a week	17	11.5	9.2	2.2	0.12
	>= two times a week	3	2.7	2.3	1.3	
Grain products and grain-based products	<= once a week	18	11.1	9.1	2.1	0.19
	>= two times a week	2	2.0	2.8	2.0	
Sugar and sweets	<=three times a week	19	10.7	9.0	2.1	0.26
	almost daily	1	.0	.	.	
Pepsi/Cola type products	less than once a week	6	9.7	6.9	2.8	0.88
	>= once a week	14	10.4	10.1	2.7	
Alcohol	<= once a month	8	15.0	11.6	4.1	0.05
	>= two times a month	12	6.9	5.4	1.5	
Coffee and tea	<=six times a week	17	9.4	8.0	1.9	0.36
	daily	3	14.7	15.1	8.7	
Mineral water (carbonated and non-carbonated)	<=six times a week	0a	.	.	.	
	daily	20	10.2	9.1	2.0	
Chips, crisps	less than once a week	9	12.9	8.3	2.8	0.23
	>= once a week	11	7.9	9.4	2.8	

\* - statistical significance  $p \leq 0.05$ 

N – size of group 20

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Table VII

T-test for independent samples in the case of men for DMFT score.

Test T dla prób niezależnych w grupie mężczyzn dla liczby PUW.

DMFT		N	Mean	Standard Deviation	Standard Error Mean	Significance (p)
Milk and milk products	<=three times a week	19	8.4	5.7	1.3	0.03
	almost daily	1	22.0	.	.	
Eggs	<= once a week	9	11.9	6.9	2.3	0.07
	>= two times a week	11	6.7	5.0	1.5	
Meat and Meat Products	<=once a week	6	6.8	5.6	2.3	0.32
	>= two times a week	14	10.0	6.6	1.8	
Fish	less than once a week	9	6.8	7.4	2.4	0.15
	>=once a week	11	10.9	4.9	1.5	
Saturated fats	<=three times a week	19	9.1	6.5	1.5	0.87
	almost daily	1	8.0	.	.	
Unsaturated fats	<= once a week	17	9.7	6.7	1.6	0.33
	>= two times a week	3	5.7	2.5	1.5	
Fruits, vegetables and preserves	<= once a week	17	10.0	6.3	1.5	0.11
	>= two times a week	3	3.7	3.8	2.2	
Grain products and grain-based products	<= once a week	18	9.2	6.7	1.6	0.81
	>= two times a week	2	8.0	0.0	0.0	
Sugar and sweets	<=three times a week	19	9.1	6.5	1.5	0.87
	almost daily	1	8.0	.	.	
Pepsi/Cola type products	less than once a week	6	6.8	3.5	1.4	0.32
	>= once a week	14	10.0	7.1	1.9	
Alcohol	<= once a month	8	11.4	5.8	2.1	0.19
	>= two times a month	12	7.5	6.4	1.9	
Coffee and tea	<=six times a week	17	8.9	6.7	1.6	0.86
	daily	3	9.7	4.7	2.7	
Mineral water (carbonated and non-carbonated)	<=six times a week	0a	.	.	.	
	daily	20	9.1	6.3	1.4	
Chips, crisps	less than once a week	9	9.2	6.3	2.1	0.92
	>= once a week	11	8.9	6.7	2.0	

\* - statistical significance  $p \leq 0.05$ 

N – size of group 20