

# The necessity of evaluation of prosthetic treatment of missing teeth caused by hard tissues of oral cavity diseases and injuries for students of Białystok universities

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## Abstract

**Introduction and objective.** The main aim of the research was to estimate the need for prosthetic treatment among students of three Białystok universities and to analyse the factors that may influence this need.

**Materials and method.** The research involved a group of 380 students attending three different Białystok universities: Medical University of Białystok, University of Białystok and Białystok University of Technology. The questionnaire comprised of 9 questions indicating such problems as: missing teeth, reasons for lack of the teeth, kind of treatment used or reasons why it was not administered, was used to collect the data. A Chi2 test was used to analyse relationships between investigated factors.

**Results.** Missing teeth were reported in 109 of the surveyed (28.7%). Orthodontic reasons and caries as a second reason were the most common causes for missing teeth occurrence. 19 students (17.4%) with missing teeth had prosthetic appliances. Those who had not undergone prosthetic treatment gave orthodontic reasons (21.4%) as the cause or subjective lack of need for treatment (18.4%). The occurrence of missing teeth did not statistically differ between universities.

**Conclusions.** The research showed a quantity drop in missing teeth occurrences when compared to research by other authors. Although it was observed that the number of missing teeth is decreasing, there are still too few people who fill them properly, which may suggest insufficient awareness of tooth loss consequences.

## Key words

state of dentition, prosthetic treatment, missing teeth

## INTRODUCTION

Contemporary dentistry should be based on prevention, aimed at blocking the development of caries and protecting the whole of one's dentition for as long as it is viable. In order to achieve this, certain preventive practices are needed, as well as raising of awareness concerning the factors damaging the tissues of the stomatognathic system.

Both qualitative and quantitative loss of teeth are observed even among children. Despite the fact that during the last few decades a substantial drop in the number of missing teeth has been observed, simultaneously it can be seen that the reasons for their occurrence tend to change from dental caries to orthodontic reasons, which is a good phenomenon. This is most likely caused by society's increasing awareness of the consequences ensuing from bad oral cavity health, including the actions preventing it. Unfortunately, this awareness is still very low and unsatisfactory. Regarding prosthetic needs, the main focus is directed towards the elderly and middle-aged individuals. However, prosthetic treatment also applies to teenagers and young adults, among them, the group of students – therefore educated people who should theoretically be fairly aware in the field of oral cavity health and state of stomatognathic system. The studies

carried out to-date show that almost 24% had missing teeth. In spite of this, as many as 70% of the examined felt no need for treatment [1].

It is worth noting that not undertaking prosthetic treatment in cases of missing teeth can create a lot of dangers, not only for other teeth, but for the whole stomatognathic system. The lack of even one tooth can cause atrophy of alveolar bone, and vertical and horizontal positional changes of the teeth limited the gap and opposed tooth without antagonist (Godon's symptom) [2, 3]. This leads to loss of tangent points and destruction of periodontal tissues [2]. Avoiding biting on the side with missing teeth results in overloading on the opposite side. These all factors can lead to occlusal trauma [2] and disorders in temporo-mandibular joints [4, 5].

## OBJECTIVE

The aim of this study was assessment of the need for prosthetic treatment among the students of Białystok universities.

## MATERIALS AND METHOD

The study was based on arbitrary opinion, reflecting the knowledge and experience of the examined on loss of teeth, reasons for their occurrence, as well as for their reconstructions. The reasons were established for undergoing prosthetic treatment, for denying it, and factors influencing

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the choice: access to dental care, social, economic and cultural factors.

A total of 380 students (237 women and 143 men aged 18 to 31) from Medical University, Białystok University and University of Technology participated in the study. Among them, the largest group (135 people) came from stationary studies at the Medical University: 58 students of dentistry and 77 majored in medicine. 128 participants were students at Białystok University: law students (stationary) – 75, national security students (non-stationary) – 38, administrative studies (stationary) – 15 people. The least numerous group were 117 students from Białystok University of Technology, 28 from the Department of Computer Science (non-stationary), 49 from the Construction Department (stationary) and 40 from the Administration Department (stationary).

An online questionnaire consisting of 9 questions was used for the study (Tab. 1). The participants were asked about missing teeth, using prosthetic restorations, and reasons for denying prosthetic treatment. There were also questions indicating factors influencing loss of teeth, such as frequency of dental visits and place of residence.

Statistica 10.0 software (StatSoft Inc., 2011) was used for statistical analysis. Analysis of correlations between certain factors was performed with the use of chi-squared test for independence.

## RESULTS

The proportion of respondents by gender, universities and domicile are shown in Figures 1–3. 62% of respondents were female, 38% male. 35% of respondents were students of the Medical University, 34% – Białystok University, and 31% – Białystok University of Technology. In 79 cases, the respondents came from the countryside, in 163 cases they came from towns with a population of less than 300,000 inhabitants, and in 138 cases, from cities with over 300,000 inhabitants (Fig. 1). The youngest participants in the study was over 18 years old and the oldest 31. The average age was 21.2 years, representing a value very close to the median – 21 years.

Results of the survey questionnaire showed that almost a third (28.7%) of the participants had missing teeth (Tab. 1). In 78% of cases, the first lack in dentition occurred before the age of 20 years, 37.6% in the age group 16–20 years, 32.1% at 11–15 years, and in 8.3% under the age of 10 years. The most common reasons were: treatment due to orthodontic-related indications (35.8%), caries (33.9%) and mechanical trauma (23.9%). The use of dentures was reported by 17.4% of students with missing teeth. The largest group among them were those with veneers (42.2%). The next most numerous collectivity are users of inlays or dowel-cores (21.1%), followed by users of bridges (15.9%). Just as frequently, students claimed crowns, chrome-cobalt removable partial dentures and removable partial dentures (10.6%). None of the respondents used complete dentures or prosthetic restorations supported on implants. When asked about the most important functions of restorations addressed to all respondents, the one indicated most often was to improve the function of the stomatognathic system and the improvement of chewing (75.0%). The next in terms of popularity were to improve the aesthetics (57.4%) and pronunciation (28.2%). At the same time, every fifth respondent (21.8%) listed the three proposed categories.

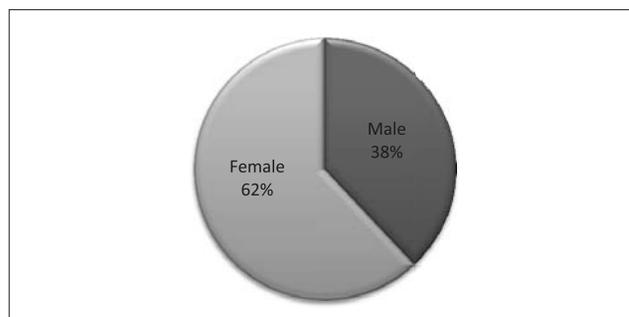


Figure 1. Percentage of men and women in the studied population

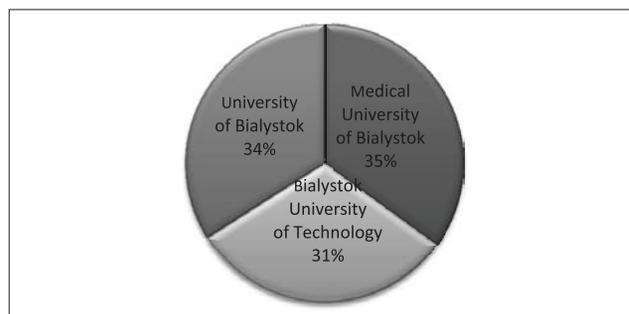


Figure 2. Percentage of students from three Białystok universities among the examined population

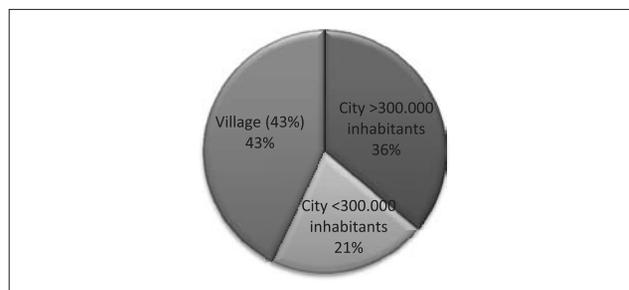


Figure 3. Percentage of people living in the countryside, cities with less and more than 300 thousand inhabitants in the examined population

Not using prosthetic restorations despite missing teeth was declared by 82.6% of the respondents. The most common argument here was current orthodontic treatment (24.1%). Almost one in five respondents (18.4%) admitted that they did not feel the need for prosthetic treatment. The next most common causes were economic (11.5%) and difficulty in choosing the right restoration (9.2%). Among other answers, which accounted for almost a third of all responses, were: not having missing teeth which, given an earlier declaration of their occurrence, indicated the most probable difficulties with understanding any of these questions.

71.8% of respondents reported visiting a dentist at least once a year, and 28.2% – less than once a year. Participants visiting a dentist less than once a year declared the lack of subjective need for visits (68.9%), followed by economic reasons (26.2%). An obstacle to the smallest number of respondents was shame (1.9%) or forgetting an appointment (1.9%).

Statistically important were the results where the calculated probability  $p$  was true for inequality  $p < 0.05$ . This tests ascertained the relationships between the following factors:

- university/gender/age/place of residence and frequency of dental visits;

**Table 1.** Questionnaire results

<b>1. Do you have missing teeth?</b>		
28.7%	a) yes	
71.3%	b) no	
<b>2. At what age you have your first lack in dentition? (in permanent teeth)</b>		
8.3%	a) younger than 10	
32.1%	b) 10-15 years	
37.6%	c) 16-20 years	
8.3%	d) more than 20 lat	
13.7%	e) can't remember	
<b>3. Reason for the occurring loss of teeth:</b>		
33.9%	a) caries	
23.9%	b) mechanical damage	
35.8%	c) orthodontic treatment	
5.5%	d) genetic disease	
3.7%	e) no tooth germs	
9.2%	f) don't know	
<b>4. Do you use prosthetic restorations?</b>		
17.4%	a) yes	
82.6%	b) no	
<b>5. If you do not use prosthetic restorations why is that? (Concerning those who have missing teeth and do not use prosthetic restorations)</b>		
24.1%	a) orthodontic reasons	
18.4%	b) don't feel the need for it	
11.5%	c) economic reasons	
9.2%	d) can't choose the best method for treatment	
6.9%	e) don't know	
29.9%	f) other*	
*for those who declare not having missing teeth, due to probably misunderstanding of the previous questions		
<b>6. If you use prosthetic restorations what type are they?</b>		
21.1%	a) coronal inlay or dowel-core	
42.2%	b) veneer	
10.6%	c) crown	
10.6%	d) bridge	
10.6%	e) chrome-cobalt removable partial denture	
10.6%	f) removable partial denture	
0.0%	g) complete denture	
0.0%	h) prosthetic reconstruct supported on implants	
15.9%	i) don't know	
<b>7. What do you think, what is the most important function of prosthetic reconstruct?</b>		
57.4%	a) enhanced aesthetics	
75.0%	b) better organ function/mastication	
28.2%	c) better pronunciation	
6.3%	d) don't know	
<b>8. How often do you visit the dentist?</b>		
28.2%	a) less than once a year	
71.8%	b) at least once a year	
<b>9. What is the cause of your visiting the dentist less than once a year?</b>		
68.9%	a) I don't feel the need to	
26.2%	b) economic reasons	
4.9%	c) fear	
3.9%	d) insufficient access to the dental care	
2.9%	e) lack of time	
2.9%	f) I have healthy teeth	
1.9%	g) shame	
1.9%	h) forgetting my appointment	

**Table 2.** Frequency of dental visits depending on university

Frequency of visits	Medical University		University in Białystok		University of Technology	
	n	%	n	%	n	%
less than once a year	26	19.3%	36	28.6%	41	35.7%
at least once a year	109	80.7%	90	71.4%	74	64.3%
sum	135	100.0%	126	100.0%	115	100.0%
chi-squared test	(χ <sup>2</sup> = 8.5; df=2; p=0.0141)					

**Table 3.** Gender and frequency of dental visits

Frequency of visits	Women		Men	
	n	%	n	%
less than once a year	51	21.9%	52	36.4%
at least once a year	182	78.1%	91	63.6%
sum	233	100.0%	143	100.0%
chi-squared test	(χ <sup>2</sup> = 9.3; df=1; p=0.0023)			

**Table 4.** Most important function of prosthetic restoration, according to each university

Function	Medical University		University in Białystok		University of Technology		p
	N	%	n	%	n	%	
enhanced aesthetics	68	50.4%	79	61.7%	71	60.7%	p=0.1212
better mastication	112	83.0%	92	71.9%	81	69.2%	p=0.0259
better pronunciation	48	35.6%	33	25.8%	26	22.2%	p=0.0486
sum	135	100.0%	128	100.0%	117	100.0%	

**Table 5.** Most important function of prosthetic restoration, according to gender

Function	Women		Men		p
	n	%	n	%	
enhanced aesthetics	145	61.2%	73	51.0%	p=0.0530
better mastication	181	76.4%	104	72.7%	p=0.4268
better pronunciation	76	32.1%	31	21.7%	p=0.0292
sum	237	100.0%	143	100.0%	

- university/gender/age/place of residence and teeth loss;
- university/gender/age/place of residence and answer the question about the most important function of prosthetic restoration.

Given the results, only the following relationships can be concluded:

- university and frequency of dental visits;
- gender and frequency of dental visits;
- the most important function of the prosthetic restoration stated and the university;
- the most important function of prosthetic restoration stated and gender.

These were statistically significant and therefore there were correlations between them. For other correlations, the results of irrelevant factors of chi-squared test were obtained which showed no dependence between them. Moreover, the relationship between the prevalence of missing teeth and gender of respondents was close to the threshold – more often it was the males who reported teeth loss (Tab. 2–5).

## DISCUSSION

According to the subject literature, there are many studies concerning students' dentition, but these studies usually aimed at medical university students, most often those studying dentistry. Moreover, the authors mainly focused

on the assessment of the state of dentition as related to DMF index while disregarding prosthetic needs. This is the reason for the presented study of the students of three different Białystok universities from the point of their prosthetic needs.

In the current study, missing teeth were detected in 109 of the students, a total of 28.7%. This number is still better compared to the study from the 1990s in which loss of teeth occurred in as many as in 41.2% of the students in 1994 [6] and 40% in 1999 [7] among the students of Pomorska Medical Academy in Szczecin, northern Poland. A higher percentage of people with missing teeth was also noted among Białystok dentistry students in 1995–52.3% [8] and Lublin University students in the same year – 48.42% [9]. However, Rusiniak-Kubik et al. in their studies observed loss of teeth among 24% of the people examined [10]. It is worth pointing out that unlike the students in the current study, the examined groups from the above-quoted publications were students of dentistry, who should have had better dentition, compared to other students. Surprisingly, the percentage of people with missing teeth was as low as 14.5%, ascertained in 1990 among the male students of Szczecin Marine Academy [11]. Only one publication concerning other universities was found in the literature, where teeth losses were observed only among 24% of the students, which is significantly lower than in the presented study [1]. Comparing the results obtained by foreign authors, like the ones concerning Mexican students in 2008, the occurrence of missing teeth amounted to 34.2% [12], while among medical students in Nigeria – 14.3% [13]. In the current work, the most common cause of teeth loss indicated by the respondents were orthodontic indications (35.8%), followed by dental caries (33.9%). In Akinboboye et al. [13], the first cause was caries (48.6%). Given the fact that in the current study a large number of people took advantage of prosthetic treatment, it can be concluded that the slight increase in the amount of missing teeth, compared to previous publications [1, 10], was due to the growing interest in orthodontic treatment, and raised the level of awareness of the benefits of having a proper occlusion, which should be regarded as a positive phenomenon.

Given the prevalence of teeth loss association with the tested characteristics, chi-squared test showed a result close to borderline significance only associated with gender of the respondents. In men, loss of teeth occurs more frequently, which is not consistent with studies conducted so far that indicate increased prevalence of missing teeth in women [6, 8, 9, 14, 15]. There were no connections between the missing teeth, and the place of residence, as noted in other publications, in which the countryside has performed a higher percentage of missing teeth [8, 16]. This may indicate the improving access to dental care and increased awareness in small towns and villages. Additionally, the evaluated frequency of dental visits was not related to the student's place of residence.

Among the 109 people who revealed the presence of dental lesions, 19 of them (17.4%) admitted to having prosthetic restorations. This is a higher result than in studies by Akinboboye et al. [12], where the missing teeth were filled with 11.4% of respondents. Among the prosthetic restorations most commonly used by our respondents are veneers (8 people) and inlays or crown-root inlays (4 persons). In addition, there were individuals with other types of dentures – a crown, removable partial denture, chrome-cobalt removable partial denture, or a bridge. These results are consistent with studies

by Kasperski et al. [1]. This kind of prosthetic restorations may indicate that respondents more often have single lack in dentition in the posterior segment of the dental arch that do not enforce rapid replenishment due to aesthetic reasons. Among those who withdrew from the treatment, the most common reason was orthodontic indications (24.1%), which once again indicates the popularity of this field of dentistry. In studies by Kasperski et al. [1] concerning the same question, the most common response was subjective lack of need for treatment (70.0%), and orthodontic considerations played a much smaller role (4%). In the publication of Akinboboye et al. [12], the largest group of respondents (45.2%) did not undergo treatment because they did not mind the absence of the tooth. Other reasons stated were ignorance of treatment, lack of awareness about prosthetic treatment, and a small group (6.5%) pointed out economic reasons [12].

The question about the most important function of prosthetic appliances indicated that despite the fact that currently a strong emphasis is placed on aesthetics dentition, the most essential factor, as in previous years [1], is to improve the function of the stomatognathic system.

## CONCLUSIONS

The research showed a quantity decrease in missing teeth occurrences when compared to previous studies by other authors. It is important to note that extractions after orthodontic treatment do not cause missing teeth occurrence.

However, the presented study shows that knowledge of the younger generation concerning prosthetic treatment and the consequences of its absence is still not satisfactory – a small part of students with missing teeth replaced them. In order to change this situation, it is necessary to build up society's awareness by education, promotion and preventive action in the field of prosthodontics.

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# Ocena potrzeb leczenia protetycznego braków zębowych spowodowanych schorzeniami twardych tkanek jamy ustnej oraz urazami wśród studentów białostockich uczelni

## Streszczenie

**Wprowadzenie i cel pracy.** Liczne badania wskazują, że już młode osoby z powodu braków w uzębieniu potrzebują interwencji protetycznej. Jednak niska świadomość na temat negatywnych zmian zachodzących w układzie stomatognatycznym już po utracie jednego zęba powoduje, iż leczenie protetyczne często nie jest podejmowane. Celem naszej pracy była ocena potrzeb leczenia protetycznego wśród studentów trzech białostockich uczelni.

**Materiał i metoda.** Badaniem objęto grupę 380 studentów z trzech białostockich uczelni: Uniwersytetu Medycznego, Uniwersytetu w Białymstoku oraz Politechniki. Posłużono się ankietą własnego autorstwa składającą się z 9 pytań, które dotyczyły między innymi obecności braków w uzębieniu, przyczyn ich wystąpienia, czy też rodzaju zastosowanego leczenia. Do analizy związków między badanymi cechami wykorzystano test  $\chi^2$ .

**Wyniki.** Braki w uzębieniu zgłosiło 109 ankietowanych (28,7%). Najczęstszą przyczyną ich wystąpienia okazały się wskazania ortodontyczne, a następnie próchnica. 19 studentów (17,4%) z brakami zębowymi posiadało uzupełnienia protetyczne. Osoby, które nie podjęły się leczenia protetycznego, za najczęstszą przyczynę takiego stanu wskazały względy ortodontyczne (24,1%) lub też subiektywny brak potrzeby leczenia (18,4%). Występowanie braków w uzębieniu nie było statystycznie różne pomiędzy uczelniami.

**Wnioski.** Wyniki pracy ukazały spadek występowania braków zębowych w porównaniu do wcześniejszych badań. Mimo, iż obserwuje się spadek braków zębowych, to niewiele jest osób uzupełniających te braki, co może świadczyć o niedostatecznej świadomości dotyczącej następstw płynących z utraty zębów.

## Słowa kluczowe

stan uzębienia, leczenie protetyczne, braki zębowe