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## The type and duration of use of removable dentures in seniors over 65 years of age from Lublin in Poland

### Abstract

**Introduction.** Age-related tooth loss causes an increasing need for prosthetic treatment. Maintaining a healthy masticatory system, as well as proper speaking functions is one of the main goals for prosthetic rehabilitation of the elderly.

**Aim.** The authors aimed at checking what types of moveable dentures people over 65, residents of nursing and family homes tend to wear and how long do they do it.

**Material and methods.** Some 240 people over 65 were looked at – 117 were residents of nursing homes in Lublin, while another 123 lived in their own family home. The authors took the following factors into consideration: type of denture, and how long were the dentures used.

**Results.** It appeared that movable dentures were used by some 57.26% of nursing home residents and 69.11% of people living in their family homes. Residents used mostly full denture, both in maxilla and mandible, respectively 71.05% and 67.14%. Similarly, seniors living at home had worn mainly full maxillary denture in 50.00% of cases, and full mandibular denture in 44.44% of cases. The mean time of using maxillary and mandibular dentures was longer in seniors residing in nursing homes (maxilla – 7.24 years, mandible – 7.48 years) than in persons living with their families (maxilla – 5.39 years, mandible – 4.63 years).

**Conclusion.** The supply of dentures in both groups of seniors is unsatisfactory. Most of the examined seniors have used the dental prostheses for too long.

**Keywords:** geriatric dentistry, elders, dentures, nursing homes.

DOI: 10.1515/pjph-2016-0007

### INTRODUCTION

During the last few decades there was a significant increase in life expectancy among the elderly population [1-5]. According to the data of 2002, there are about 600 million people aged 60 years and older living in the world, and this number is expected to grow to about 2 billion in 2050 [3]. These demographic changes mainly happen to developed countries, yet a lifespan increase can be observed in Poland as well. Many factors influence the increase in the number of elderly population. They include the development of modern medicine, the use of new methods of treatment and therapeutic measures as well as modern equipment and apparatus. Promoting a healthy lifestyle takes into account the proper, balanced diet, active outdoor activities, limiting the use of stimulants, drugs, alcohol and smoking, and contributes to improving the well-being and maintaining health for many years. The improvement of socio-economic and living conditions also contributes to the increase in longevity [1,2]. Not without significance is the impact of declining number of births of children in recent years [6,7].

The increase in the number of elderly people led to the necessity of paying more attention to issues of seniors. This pertains to issues related to socio-economic, political and health factors [3,4]. Hence, the interest in gerontology, geriatrics, and gero-

dentistry (a fresh invention of geriatrics) has increased. With the body's aging processes, many changes happen both to the face and the stomatognathic system. Many a time, pathological processes are superimposed on those of the physiological nature and are difficult to distinguish. Knowing them makes dental management easier. Periodontal diseases and caries and its complications are considered the main causes of the loss of teeth in the elderly [8]. As the result of an imbalance between the activity of osteoblasts and osteoclasts it promotes and accelerates bone atrophy and, concerns mainly the alveolar part of the mandibular body and maxillary alveolar ridge [1].

Teeth loss increases the demand for prosthetic treatment. There is a whole variety of the masticatory system reconstruction and rehabilitation methods, from the most commonly used, but not the most favorable removable partial and complete overlay dentures to the implant treatment. They are primarily aimed at restoration of normal chewing function, as well as articulation and aesthetic look.

### AIM

Evaluating the type and duration of using removable dentures in people over 65 years of age residing in Lublin regarding the place of living – nursing or family homes.

## MATERIAL AND METHODS

The study was conducted in Lublin, a city situated in south-east part of Poland (Europe). The population of the public care homes was analyzed for this study. The inclusion criteria were age over 65 or above and lack of signs of acute illness. All patients have been probed to maintain good contact with the environment and be physically and have been mentally fit to give their informed consent for participation in the study. It meant a total of 117 subjects who were included in this study. Of these, 57 were male and 60 female residents. An oral examination was performed by one dentist, using a mouth mirror and probe and revealed the presence of removable dentures. The type of used dentures (separately for maxilla and mandible) as partial denture or full denture was also confirmed. Situations where patients have dentures but do not use them were noted as well. After examination seniors were asked about the duration of having prosthetic dental restorations (separately for maxilla and mandible): 0-5 years; 6-10 years and over 10 years. Similar criteria were applied for the comparative group of patients aged 65+ years, attending University Dental Center, Medical University of Lublin seeking dental treatment but living in their family homes in Lublin. The group comprised 123 seniors, 63 men and 60 women. The study protocol was reviewed and fully approved by the Bioethics Committee of the Medical University of Lublin, Poland. The results were statistically analyzed and the chi-square test was performed to evaluate the differences. The results were considered significant at  $p < 0.05$ .

## RESULTS

The investigations showed that removable dentures were used by 57.26% of nursing home residents and by 69.11% of those living with the family (Table 1). The residents of nursing homes were most likely to use a complete denture in the maxilla, i.e. 71.05%, less frequently the partial one – 17.1% and 11.84% had dentures but were not using them. In the group of seniors living with their families also most frequently they used complete dentures. The residents of nursing homes and living with their families also in mandible most frequently were using complete dentures, respectively 67.14% and 44.44%. The statistical analysis proved significant differences in the type of used dentures in the maxilla and mandible between the groups (Table 2).

The research shows that that women living in nursing homes were using complete dentures in the maxilla more often – 70.73% compared to the women living with families – 49.02%. The differences were not statistically significant (Table 3). Yet, the male residents of nursing homes in Lublin were much more likely to use complete dentures in the maxilla (71.43%) than the respondents reporting to University Dental Center – 51.28% (Table 4) The statistical analysis confirmed significant differences in the type of used dentures in the mandible among the women from nursing homes and University Dental Center. The female residents of nursing homes were using complete dentures – 75.00% more often than the women living in their family homes- 42.86% (Table 3). However, the men reporting to University Dental Center in Lublin slightly more often were using partial dentures in the mandible – 37.50% than the men from nursing homes – 17.65% (Table 4).

The mean length of using the dentures in the maxilla among the residents of nursing home was 7.24 years, and was slightly longer than among the seniors living with their families – 5.39 years.

**TABLE 1. Number and percentage of people using removable dentures in study groups from regard to the place of residence.**

Group	Yes		No		Total	
	n	%	n	%	n	%
Nursing homes	67	57.26%	50	42.74%	117	100.00%
Family homes	85	69.11%	38	30.89%	123	100.00%
Total	152	63.33%	88	36.67%	240	100.00%

Statistical analysis:  $\text{Chi}^2=3.62$ ;  $p=0.06$

**TABLE 2. Number and percentage of subjects with regard to the use of dental prostheses in the maxilla and the mandible, and the place of residence.**

Type of denture	Maxilla				Mandible			
	Nursing homes		Family homes		Nursing homes		Family homes	
	n	%	n	%	n	%	n	%
Partial denture	13	17.11%	37	41.11%	14	20.00%	30	37.04%
Complete denture	54	71.05%	45	50.00%	47	67.14%	36	44.44%
Has – but does not use	9	11.84%	8	8.89%	9	12.86%	15	18.52%

Statistical analysis:  $\text{Chi}^2=11.29$ ;  $p=0.004^*$       Statistical analysis:  $\text{Chi}^2=8.02$ ;  $p=0.02^*$

**TABLE 3. Number and percentage of surveyed women with regard to the use of dental prostheses in the maxilla and the mandible and the place of residence.**

Type of denture	Maxilla				Mandible			
	Nursing homes		Family homes		Nursing homes		Family homes	
	n women	%	n women	%	n women	%	n women	%
Partial denture	10	24.39%	23	45.10%	8	22.22%	18	36.73%
Complete denture	29	70.73%	25	49.02%	27	75.00%	21	42.86%
Has – but does not use	2	4.88%	3	5.88%	1	2.78%	10	20.41%

Statistical analysis:  $\text{Chi}^2=5.58$ ;  $p=0.10$       Statistical analysis:  $\text{Chi}^2=10.21$ ;  $p=0.006^*$

**TABLE 4. Number and percentage of surveyed men with regard to the use of dental prostheses in the maxilla and the mandible, and the place of residence.**

Type of denture	Maxilla				Mandible			
	Nursing homes		Family homes		Nursing homes		Family homes	
	n men	%	n men	%	n men	%	n men	%
Partial denture	3	8.57%	14	35.90%	6	17.65%	12	37.50%
Complete denture	25	71.43%	20	51.28%	20	58.82%	15	46.87%
Has – but does not use	7	20.00%	5	12.82%	8	23.53%	5	15.63%

Statistical analysis:  $\text{Chi}^2=7.81$ ;  $p=0.02^*$       Statistical analysis:  $\text{Chi}^2=3.35$ ;  $p=0.19$

**TABLE 5. Average time (years) of the use of dental prostheses in the maxilla and the mandible in the study groups with regard to the place of residence.**

Group	Maxilla		Mandible	
	Average duration	Standard Deviation	Average duration	Standard Deviation
Nursing homes	7.24 years	5.82	7.48 years	6.30
Family homes	5.39 years	4.14	4.63 years	3.75
	Statistical analysis: Z=-1.78; p=0.07		Statistical analysis: Z=-2.70; p=0.007*	

The differences were not statistically significant. However the mean time of using dentures in the maxilla was statistically significantly longer (7.48 years) in the group of nursing home residents than among the seniors reporting to University Dental Center (4.63 years), (Table 5). The nursing home residents were most likely to use dentures in the maxilla for up to 5 years – 58.21%, however as much as 22.39% of the seniors were using the dentures for over 10 years, and 19.40% for 6-10 years. In the group of seniors living with their families also the majority used the dentures in the maxilla up to 5 years – 63.41%, however 26.83% of the patients for 6-10 years, and 9.76% for over 10 years. The statistical analysis did not confirm any differences in the duration of using dentures in the upper jaw between the groups. One woman living in a nursing home in Lublin has used a denture for some 30 years (Table 6). The respondents from the nursing homes most frequently were using dentures in the mandible for up to 5 years (60.66%), but as much as 24.59% were using dentures for over 10 years, and 14.75% of respondents were using dentures for 6-10 years. In the group of seniors living with their families, they were using significantly more frequently dentures in the mandible for 5 years – 74.24% and 19.70% of seniors were using their dentures for 6-10 years, and 6.06% for over 10 years. Four-times more residents of nursing homes were using their dentures for over 10 years as compared to the seniors living with their families. Statistical analysis confirmed significant differences in the duration of using dentures in the mandible between the groups. One of the nursing home residents was wearing her denture in the lower jaw for 30 years (Table 6).

## DISCUSSION

Teeth loss is considered to be one of the symptoms of body's ageing [4]. Usually, it affects the elderly population and requires some dentures/overlays to be used. Although the elderly population is more likely to retain their teeth, toothlessness remains serious problem among seniors. According to the data provided by the WHO, some 54.6% of people over 75 are toothless. Lack of the overlays or presence of inadequate dentures in case of total toothlessness, may cause psychological

trauma related to restriction in the ability to chew and may disorder body functions as well as favor oral health pathology [2,9].

The data presented here is different from data valid for other parts of Poland. For instance, in case of residents of nursing homes located in Szczecin and neighboring towns, most people were using partial removable dentures both in the maxilla – 66.4% and in mandible – 67.23%, while only some 31.2% used complete dentures in the maxilla and 29.41% in the mandible. A small proportion of seniors had cast partial dentures: 2.4% in maxilla and 3.36% in the mandible. Some 71.05% of the residents of nursing homes in Lublin used complete upper dentures, while 67.14% had complete lower denture. It is worth mentioning that no single respondent used a cast partial denture. These discrepancies might be caused by the fact that in case of the residents of nursing homes in Szczecin, toothlessness happened to some 20% of the respondents only, while some 56.41% of the residents of Lublin nursing homes had no teeth at all [10]. Yet, in Bydgoszcz, the proportion of nursing home residents using removable acrylic dentures was 81.40%. The authors of the study did not include individuals wearing cast partial dentures in the group [11]. In addition, some 70% of the residents of nursing homes in Poznań used partial or complete dentures [12]. Some similar results were found among the residents of nursing homes in Gdańsk – some 17.10% of seniors used partial denture in the maxilla, while another 19.00% used mandibular dentures. However, a two-fold lower number of complete dentures was confirmed: 35.20% of seniors had a complete denture in the maxilla and 28.60% – in the mandible [13]. Namiot et. al. have made some totally different findings – they noticed that some 26.20% of the respondents wore maxillary dentures and 29.70% wore mandibular dentures [14].

A lower proportion of persons using removable dentures than in our research was confirmed among the residents of nursing homes in other countries too. For instance, in Iran 47.1% [15] and Croatia, where the complete denture in maxilla was noted in 54% of the respondents and in the mandible – 42.4%, and a partial denture in maxilla was confirmed in 12.9% of seniors and in the mandible – 15.1% [16]. A higher number of individuals using removable dentures was noticed in nursing homes in Austria – 69% [17] and in Avon in Great Britain – 80.40%. In case of nursing homes located in Turkish capital, Ankara, some 55.5% of seniors had a complete, while 11.9% had no denture at all, even though they had no teeth [5]. However, in the residents of nursing homes in Germany (Berlin), 88.4% of them had a partial upper denture and 82.9% had a lower denture, while 75.1% had a complete upper denture and 58.4% – a lower denture [19]. Approximately 20% of

**TABLE 6. Duration of the use of dental prostheses in the maxilla and the mandible in the study groups with regard to the place of residence.**

Group	Maxilla				Mandible			
	<5 years	6-10 years	>10 years	Total	<5 years	6-10 years	>10 years	Total
	n %	n %	n %	n %	n %	n %	n %	n %
Nursing homes	39 58.21%	13 19.40%	15 22.39%	67 100.00%	37 60.66%	9 14.75%	15 24.59%	61 100.00%
Family homes	52 63.41%	22 26.83%	8 9.76%	82 100.00%	49 74.24%	13 19.70%	4 6.06%	66 100.00%
Total	91 61.07%	35 23.49%	23 15.44%	149 100.00%	86 67.72%	22 17.32%	19 14.96%	127 100.00%
	Statistical analysis: Chi <sup>2</sup> =4.84; p=0.09				Statistical analysis: Chi <sup>2</sup> =5.59; p=0.01*			

the residents of nursing homes in Australia did not use their dentures despite having them [20].

Judging by the authors' own research, it can be concluded that 69.11% of the surveyed population in Lublin had removable dental prosthetic restorations. Residents of nursing homes in Wrocław were much more likely to use removable overlay dentures – 89% [21]. In Bydgoszcz region, some 91.40% of the nursing homes population used dental prosthetic restorations. It is worth mentioning that as much as 27.10% of Bydgoszcz UTA students used cast partial dentures [11]. Patients admitted to University Dental Center in Lublin had no cast partial dentures. Patients of the Department of Conservative Dentistry, Medical University of Lodz reported similar results – 71% of them [22] used dental prosthetic restorations. In case of fit, independent residents of Kraków, it was 63.43% [23].

In Japan, some 67% of people used dental prosthetic restorations [24], in Lithuania 32% [25] and in Sri Lanka 22% (Negambo) [26] and 18% (Moratuwa) [27]. Among the respondents from India, 8.3% of seniors used complete dentures in one or both dental arches, 6.5% – partial dentures, while 67.6% did not have any dental prosthetic restorations [28]. In contrast, 73.1% of the population of south-eastern Brazil (Batucatu) used a complete upper denture and 43.3%, – the lower one while 4.6% – a partial upper denture, and 12.6% – the lower one [29]. Just as in our study, quite a large group of people using dental prosthetic restorations for more than 10 years was noted among the residents of Szczecin nursing homes: 25.6% of seniors had upper denture and 26.05% – the lower one. Prostheses in the upper jaw most frequently were used for 6-10 years – 37.6% of respondents, and in the lower jaw up to 5 years – 38.65% of the respondents [10]. Residents of Lublin nursing homes most frequently used dental prosthetic restorations up to five years in both the maxilla – 58.21% and in the mandible – 60.66%, while the average duration of using dental prostheses in the maxilla was 7.24 years and in mandible – 7.48 years. The average lifetime of dental prosthetic restorations longer than in our study was reported among the residents of nursing home from Poznań and the surrounding area, in whom it was 11 years – ranging from 1 up to 40 years [30], as well as in 2 of nursing homes in Bydgoszcz – 12.80 years [11]. Duration of using dental prostheses by residents of nursing home in Gdansk ranged from 0.5 years to 52 years. Dentures used for up to five years accounted for 28.5%, from 6 to 10 years – 37.10%, for 11 – 20 years – 27.6%, and over 20 years – 6.7% [13]. One of the residents of Lublin nursing homes had a complete upper and lower denture for 30 years. In Croatia, 39.6% of nursing home residents were using dentures for more than 15 years, and only 6.5% – for up to 5 years [16], while in Germany (Berlin) 15.6% of seniors were using dental prosthetic restorations for more than 30 years, 20.8% for 21-30 years, and only 26.3% had dentures for less than 10 years [19]. Among nursing home residents in Turkey (Istanbul) 26% of people had dentures for more than 8 years [31].

Seniors living in their family homes in Lublin, most frequently were using dental prosthetic restorations up to five years in both the maxilla (63.41%) as well as in the lower jaw (74.24%), and the average time was 5.39 years for the maxilla and 4.63 years for mandible. On average, patients of the Outpatient Clinic and Department of Geriatrics, University Hospital in Bydgoszcz – 9.20 years [11], in patients of the Department of Prosthodontics of Pomeranian Medical Uni-

versity in Szczecin – 13 years for women, and 8 years and 6 months for men [32] and also in subjects from Greece – 11.5 years in the range of 1 – 34 years [33] used dental prostheses longer than the subjects of our study. Students of UTA in Bydgoszcz used dental prosthetic restorations similarly to Lublin residents – for 4.60 years on average [11]. Patients admitted to the Department of Prosthodontics, Wrocław Medical University, reported to have used dental prosthetic restorations from 4 to 20 years [21], similarly to patients from Białystok – 1-24 years [34]. Residents of Kraków used prostheses for much shorter – 3-10 years [35]. In contrast, a higher proportion of people using dental prosthetic restorations for more than 10 years was observed in seniors from the north-eastern macro region of Poland: for more than 15 years – 14.4%, for 11- 15 years – 15.1%, for 5 -10 years – 33.2 % and less than 5 years only 37.3% [36].

The results presented above revealed that both the supply of dentures and their quality in both groups of seniors are unsatisfactory. The presence of removable overlay dentures primarily testifies to a lack of financial resources for the implementation of favorable dental prosthetic restorations, but more expensive. Prostheses overlaying in a non-physiological manner transmit chewing forces to the base and can contribute to the formation of bone atrophy, deterioration of the prosthetic base, pathological changes in the mucous membrane or loosening of teeth retained in the mouth [21,35]. Prolonged use of dental prostheses is worrying. It results in a detrimental effect on the tissues of the oral cavity [30]. Long-term use of dental prosthetic restorations causes a loss of their stability, the lack of aesthetic look and increase in patient dissatisfaction. According to the literature, duration of using removable overlay dentures should be about 5 years (for 3-8 years) [12,14]. After this period, dental prosthetic restorations require relining or replacement with new ones due to the material wear and atrophic changes occurring within the prosthetic base [37].

Teeth loss makes it necessary to provide patients with immediate prosthetic care, in order to restore proper chewing function, esthetic look and well-being. Yet, the dental care is often influenced by the patient's motivation, general condition as well his socio-economic context. The maintenance of long-term, satisfactory functions of dental prosthetic restorations is affected by many factors, such as proper manufacture of prostheses, care for other natural teeth, periodontium and mucous membranes, the principles of oral hygiene and the appropriate use of dentures, i.e. control visits, cleaning and storage.

## CONCLUSIONS

1. The supply of dentures in both groups of seniors is unsatisfactory.
2. It is observed too long use of dental prostheses in examined elderly from Lublin.

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