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*The influence of extracted teeth and loss of masticatory surface  
on the state of the temporomandibular joint*

Within the last few years we have observed a growing number of patients reporting TMJ disorders (2). It is connected, among others, with numerous general and local factors which disturb harmonious structure of face and of dental arches, as well as with a decrease of functional abilities which occur as an outcome of natural senescence processes. Molar and premolar teeth of maxilla and mandible take part in keeping correct height of occlusion. Proper occlusion determines physiological functioning of TMJ and *ipso facto* is the best prophylaxis of its functional disorders (7, 10). Morphological and functional optimum is characterised by the smoothness of the mandible's moves in all directions and depends on mutual support between upper and lower teeth when maxilla meets the mandible (8). This condition ensures that there are no pathological symptoms and signs in TMJ.

The aim of this work was to study the influence of extracted teeth and of masticatory surface lost on the condition and the functioning of the temporomandibular joint.

MATERIAL AND METHODS

Dento-epidemiological examination was conducted in the Chair and Department of Preventive Dentistry at the Medical University of Lublin among first time patients. The examination was performed with the use of mirror and bougie in the artificial light.

Data were entered into WHO based examination card (6), extended with evaluation of loss of mastication according to Rogowiec and lack of particular teeth in dental groups. Loss of mastication is a total of percentage of missing teeth with no antagonist. For example, the medial incisor with no antagonist equals to 4% of mastication loss, lateral incisor – 3%, canine tooth – 6%, premolar teeth – 7%, first molar tooth – 11%, second molar tooth – 12%. Eighth teeth were not taken into consideration in calculation.

The condition of the temporomandibular joint was estimated on the basis of interviews and clinical signs with the use of Helkimo index (9).

A random group of 178 patients was examined – 98 women and 80 men. They were divided into 3 age groups: I. 18–30 years of age, II. 31–45, III. 46–77. There were 100 persons in the first group (56.2%) – 54 women (54%) and 46 men (46%). There were 38 persons in the second group (21.3%) – 18 women (47.37%) and 20 men (52.63%). The third group consisted of 40 persons (22.5%) – 26 women (65%) and 14 men (35%) (Table 1).

Table 1. Study group with regard to age and gender

Gender \ Age	Age groups					
	I (18-30)		II (31-45)		III (46-77)	
	N	%	N	%	N	%
Men	46	46	20	52.63	14	35
Women	54	54	18	47.37	26	65
Total	100	100	38	100	40	100

n – number of persons in the study group

## RESULTS

After the analysis of the number and percentage of lost teeth in the groups according to gender and age it was found that both men and women in group I lost the similar number of lateral teeth (molar and premolar) in the maxilla (M 8.15%, W 7.41%). Men lost more molar teeth (10.87%) while women lost more premolar teeth (11.11%). Simultaneously, more lateral teeth in the mandible were lost by women (M 3.8%, W 6.94%), the majority of which were molars (12.04%). The number of lost front teeth (incisors and canine teeth) in this group was very small (1.23%) and applied only to incisors in the women's maxilla.

In age group II the loss of lateral teeth was bigger in men both in the maxilla (M 50%, W 36.11%) and in the mandible (M 35%, W 25%) and applied mostly to premolars in the mandible and to molars in the maxilla. Only men had front teeth missing (mandible – 13.33%, maxilla – 6.67%).

Table 2. Number and percentage of lost teeth in groups by gender and age

	Groups of missing teeth	Age groups											
		I				II				III			
		M		W		M		W		M		W	
		n	%	n	%	n	%	n	%	n	%	n	%
Maxilla	molars	20	10.87	8	3.7	30	37.5	22	30.56	44	78.57	50	48.08
	premolars	10	5.43	24	11.11	50	62.5	30	41.67	28	50	40	38.46
	molars + premolars	30	8.15	32	7.41	80	50	52	36.11	72	64.28	90	43.27
	canine teeth	0	0	0	0	4	10	0	0	2	7.14	14	26.92
	incisors	0	0	4	1.85	12	15	0	0	10	17.86	30	28.85
	canines + incisors	0	0	4	1.23	16	13.33	0	0	12	14.28	44	28.2
Mandible	molars	12	6.52	26	12.04	44	55	34	47.22	36	64.28	76	73.08
	premolars	2	1.09	4	1.85	12	15	2	2.78	6	10.71	42	40.38
	molars + premolars	14	3.8	30	6.94	56	35	36	25	42	37.5	118	56.73
	canine teeth	0	0	0	0	0	0	0	0	0	0	2	3.85
	Incisors	0	0	0	0	8	10	0	0	8	14.29	0	0
	canines + incisors	0	0	0	0	8	6.67	0	0	8	9.52	2	1.28

n – number of lost teeth

In group III the loss of lateral teeth in the mandible was bigger in men (M 64.28, W 43.27%), mostly with molars missing. The loss of lateral teeth in maxilla applied to women in most cases (M 37.5, W 56.73%), also with mostly molars missing. When analysing front teeth losses it was

noted that more of them was lost by women in the mandible (M14.28%, W 28.2%) and by men in the maxilla (M 9.52%, W 1.28%). Lack of front teeth in maxilla in men applied only to incisors. According to the collected data it was also noted that there were more lateral than front teeth missing, regardless of age group. Lateral teeth missing in most cases applied to maxilla, with the exception of age group III where there were more teeth lost by women in the mandible (Table 2).

Analysing the percentage of the loss of mastication in the study groups it was noted that the greatest percentage of the loss of mastication was in age group III (61.19%). It was similar for both men and women. In age group II loss of mastication applied more to men (48.90%). It was 10% bigger than in women. In age group I the differences between genders were inconsiderable, bigger in women (10.07%) (Table 3).

Table 3. Loss of mastication in the study group in percentage

Age groups	Gender	Per cent of mastication loss	Total per cent of mastication loss
I	M	8.87	9.47
	W	10.07	
II	M	48.90	43.84
	W	38.78	
III	M	61.00	61.19
	W	61.38	

The level of TMJ dysfunction in men and women in different age groups is shown in Table 4. It was noted that the level of dysfunction of temporomandibular joint grew with age. The first level of TMJ dysfunction was higher in women than in men and tended to grow with age. The greatest percentage differences between men and women were noticeable in the middle age group. The second level of TMJ dysfunction was noticed only in the older female group.

Table 4. Level of TMJ dysfunction and its percentage with regard to gender and age of the study group

Level of TMJ dysfunction	Age groups											
	I				II				III			
	M		W		M		W		M		W	
	n	%	n	%	n	%	n	%	n	%	n	%
0	40	86.96	46	85.19	16	80	12	66.67	1	71.43	16	61.54
1	6	13.04	8	14.81	4	20	6	33.33	4	28.57	8	30.77
2	0	0	0	0	0	0	0	0	0	0	2	7.69
3	0	0	0	0	0	0	0	0	0	0	0	0

n – number of persons in the study group

## DISCUSSION

Lack of molar teeth is a very serious problem of disorders in side support areas (1). They cause considerable lowering of occlusion height which results in the fact that correct configurational arrangement of the mandible in relation to maxilla is disturbed. Additionally, an increase in tension of masseter muscle occurs, which causes pain and their malfunction (5). Those changes in the mastication organ influence TMJ. They result in TMJ discomforts, which is manifested with cracks, local and remote pains as well as mandible deviations during the opening moves (1, 2, 3).

We were trying to determine whether there is a correlation between lack of lateral teeth and of teeth with no antagonist on the condition of TMJ. The result is that there are more molar and premolar teeth missing in the maxilla in men in all age groups while women had more extracted teeth in the mandible, except for the middle age group (II).

The percentage of loss of mastication grows with age. It is connected with the following conditions: aging of human body, general diseases and oral cavity local diseases, insufficient care for teeth by older patients and malfunctioning of dental care. It has influence on the condition of TMJ. The percentage of the examined persons who had no changes in TMJ gets smaller with age; it is lower in women than in men. The first level of TMJ dysfunction grows with age and is bigger in women than in men. The second level of TMJ dysfunction was noticed only in the older female group. The research findings on the condition of TMJ are very similar to the lack of lateral teeth in the studied age groups, considering both genders. It might seem though that more significance and influence on creating TMJ dysfunctions comes from lack of molar teeth in the mandible. Gender is of the similar importance – TMJ dysfunctions were observed in women more often than in men.

As there is no one opinion on this subject in the available literature and the influence on TMJ dysfunctions is pluricausal, it seems that dento-epidemiological examinations are also an important contribution to etiologic-therapeutic reflections on TMJ diseases.

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#### SUMMARY

The aim of the study was to evaluate the association between the number of extracted teeth and loss of masticatory surface on the condition and function of TMJ. The study group consisted of 178 persons – 98 women and 80 men. It was divided into 3 groups with regard to age and gender. It was observed that in all age groups men lost more molar teeth than women. Both genders lost more lateral teeth in the maxilla compared to the mandible; only in one female group more premolars and molars were missing in the mandible. The highest percentage of the loss of masticatory surface was observed

in the groups of oldest women and men. The level of TMJ dysfunction was growing with age and was greater in females. The research findings of the condition of TMJ are very similar to the lack of lateral teeth in the studied age groups, considering both genders.

#### Wpływ usuniętych zębów i utraconej powierzchni żucia na stan stawu skroniowo-żuchwowego

Celem pracy było zbadanie wpływu liczby usuniętych zębów i powierzchni utraty żucia na stan i czynność ssz. Zbadano 178 pacjentów, w tym 98 kobiet i 80 mężczyzn. Badanych podzielono na trzy grupy wiekowe oraz ze względu na płeć. Mężczyźni w każdej grupie wiekowej utracili więcej zębów trzonowych niż kobiety. U obu płci znacznie więcej zębów bocznych brakowało w szczęcie niż w żuchwie, jedynie w grupie kobiet więcej zębów trzonowych i przedtrzonowych brakowało w żuchwie. Największy procent utraty powierzchni żucia dotyczył grupy najstarszych badanych mężczyzn i kobiet. Stopień dysfunkcji ssz zwiększał się z wiekiem badanych i był większy u kobiet. Wyniki badań stawu ssz kształtują się podobnie jak braków zębów bocznych w badanych grupach wiekowych z uwzględnieniem płci.