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The problem of hypodontia in the student population of the Medical University of Lublin

Hypodontia is a kind of dental malformation involving a disturbance of the number of teeth as a result of dysfunction of the dental lamina (2). More specifically, the term "hypodontia" refers to the lack of one or a few teeth. "Oligodontia" describes a congenital lack of more than six teeth. "Anodontia", also called "toothlessness", is a complete absence of primary or secondary tooth buds, whereas "dental aplasia" is the term referring to the total lack of teeth, both primary and secondary, in one or both jaws (7, 10).

Hypodontia is more often found in girls (9, 11). It can be symmetrical or asymmetrical (5). It more often occurs in permanent dentition (1.6–6.5% acc. to different researchers) (11, 12) than in deciduous teeth (does not exceed 1%) (6). It is more often found in the maxilla than in the mandible. Hypodontia may present as a separate abnormality or may be concomitant with other developmental defects. The etiology of hypodontia is not completely clear. It is thought that occurrence of missing tooth buds is connected with (i) a dysfunction of the dental lamina; (ii) a trait accompanying an individual's phylogenetic development; (iii) a malformation within ectodermal tissue; (iv) genetic conditioning; (v) a familial tendency; and (vi) endocrine abnormalities (8).

A tendency to the atavism is manifested in the upper and lower third molar teeth, upper lateral incisor, lower second premolars, upper second premolars, lower mesial incisors. Hypodontia involving third molar teeth accounts for 0.2–25% of cases (10), or even 35%, according to some reports (4). The fact that hypodontia so commonly concerns the third molars persuaded researchers not to think about it as a defect. The prevalences of other missing teeth are as follows: missing teeth 35–45 account for 1–5%, teeth 12–22 for 0.5–3%, 15–25 for 1–2.5%, 31–41 for 0.5% (3).

Some Polish authors maintain that there has been a shift in hypodontia in Poland towards the upper lateral incisors: 20–26%; missing lower second premolars constitute 14–25%, upper second premolars 11–17% (1). According to foreign researchers, the prevalence of missing lower second premolars is 40–45%, of upper second premolars 20–30%, and of upper lateral incisors 20% (8).

The aim of the study was an assessment of the number of missing permanent teeth buds in the 21–25-year-old population of students of the Medical University of Lublin, Poland, on the basis of clinical examination and analysis of the students' panoramic dental X-rays.

MATERIAL AND METHODS

The study included a group of 74 students of the Medical University of Lublin, aged 21–25 years. Panoramic dental radiograms and clinical examinations were used for the purposes of the study. The relationship between the subjects' sex and the number, groups, and location of missing

permanent tooth buds was examined. We also assessed the presence and the number of persisting deciduous teeth in the locations of missing permanent teeth. The study did not concentrate on missing buds of third molar teeth.

RESULTS

We examined 74 people, 59 were women (79.73%) and 15 were men (20.27%). In nine patients (12.16%) missing permanent tooth buds were diagnosed, of which 88.89% were women (Table 1, Fig.1).

Table 1. Prevalence of hypodontia in the studied population

	No. of subjects	% of subjects
Subjects with hypodontia	9	12.16
Others	65	87.84
Total	74	100

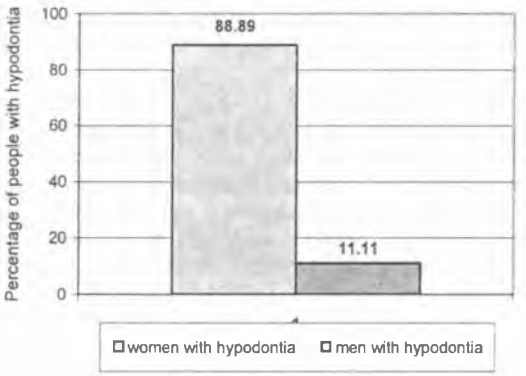

Fig. 1. Percentage of people with hypodontia according to sex

Table 2 shows the numbers and locations of missing buds in patients with hypodontia. The absence of 14 buds was noted. Missing buds more often occurred in the maxilla: eight teeth than in the mandible: six teeth. On the right, i.e. in the first and fourth quadrant of dentition, seven teeth were missing, and on the left, i.e. in the second and third quadrant, seven teeth were also absent. The average number of missing buds per person with hypodontia was 1.56 (average for the maxilla was 0.89 and for the mandible 0.67).

Table 2. Number and locations of missing permanent teeth in subjects with hypodontia

Tooth type	No. of subjects with hypodontia n=9		
	number of teeth (N)	%	average bud absence per person
17	-	-	-
16	-	-	-
15	-	-	-
14	-	-	-
13	1	12.5	0.11
12	3	37.5	0.33
11	-	-	-
21	-	-	-
22	3	37.5	0.33
23	1	12.5	0.11
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
Total	8		0,89
47	-	-	-
46	-	-	-
45	1	16.67	0.11
44	1	16.67	0.11
43	-	-	-
42	-	-	-
41	1	16.67	0.11
31	1	16.67	0.11
32	-	-	-
33	-	-	-
34	-	-	-
35	2	33.32	0.22
36	-	-	-
37	-	-	-
Total	6		0.67
TOTAL	14		1.56

Table 3 presents the number and location of missing buds of permanent teeth with reference to sex. In women 13 buds were missing. In the maxilla the absence of eight teeth was observed: three right lateral incisors (37.50%), one right canine (12.50%), three left lateral incisors (37.50%) and one left canine (12.50%). In the mandible five missing buds were discovered: one right medial incisor (20%), one right second premolar (20%), one left mesial incisor (20%), and two left second premolars (40%). In men one missing bud was noted in the mandible: the left first premolar. Our findings concerning missing tooth buds from particular tooth groups are in agreement with the data reported in the literature. Study results seem to confirm the dentition formula predicted for the future: one incisor, one canine, one premolar tooth and two molars (2). On average, a woman has 1.63 missing buds, including 1.0 in the maxilla and 0.63 in the mandible; in men it is 1.00 in the mandible. In five subjects (55.56%) missing buds were detected only in the maxilla, and in four subjects missing tooth buds in the mandible only. No-one had missing buds both in the maxilla and in the mandible. These data are presented in Table 4.

Table 3. Number and locations of missing permanent tooth buds in the studied population with reference to sex

Tooth type	No. of subjects with hypodontia n=9					
	female n=8			male n=1		
	missing tooth buds			missing tooth buds		
	number (N)	%	average	number(N)	%	average
17	-	-	-	-	-	-
16	-	-	-	-	-	-
15	-	-	-	-	-	-
14	-	-	-	-	-	-
13	1	12.5	0.13	-	-	-
12	3	37.5	0.37	-	-	-
11	-	-	-	-	-	-
21	-	-	-	-	-	-
22	3	37.5	0.37	-	-	-
23	1	12.5	0.13	-	-	-
24	-	-	-	-	-	-
25	-	-	-	-	-	-
26	-	-	-	-	-	-
27	-	-	-	-	-	-
Total	8	-	1.0	0	-	0.0
47	-	-	-	-	-	-
46	-	-	-	-	-	-
45	1	20.0	0.25	-	-	-
44	-	-	-	1	100.0	1.0
43	-	-	-	-	-	-
42	-	-	-	-	-	-
41	1	20.0	0.125	-	-	-
31	1	20.0	0.125	-	-	-
32	-	-	-	-	-	-
33	-	-	-	-	-	-
34	-	-	-	-	-	-
35	2	40.0	0.25	-	-	-
36	-	-	-	-	-	-
37	-	-	-	-	-	-
Total	5	-	0.63	1	-	1.0
TOTAL	13	-	1.63	1	-	1.0

Table 4. Missing tooth buds in the maxilla and mandible in subjects with hypodontia

Missing buds	No. of subjects	% of subjects with hypodontia
In maxilla only	5	55.56
In mandible only	4	44.44
More missing buds in maxilla	-	-
More missing buds in mandible	-	-
Total	9	100

Table 5 shows the number of missing buds in one individual according to sex. The most frequent finding in this respect was two missing teeth: five subjects (6.76%). In three people (5.40%) one bud was missing. No-one lacked more than two permanent tooth buds.

The information in Table 6 concerns symmetricalness of hypodontia in the studied population of students. Missing tooth buds occur symmetrically in 55.56% of cases; in the maxilla only: 33.34%, and in the mandible only: 22.22%. In the sites of missing permanent buds in four women (5.40%) six persisting deciduous teeth were revealed. The study did not take missing buds of third molars into consideration.

Table 5. Number of missing teeth in an individual according to sex

Number of missing buds in an individual	Women	Men	Total	%
0	51	14	65	68.92
1	3	1	4	5.40
2	5	-	5	6.76
3	-	-	-	-
4	-	-	-	-
Total	59	15	74	100

Table 6. Symmetricalness of hypodontia in the population of students

Distribution of hypodontia		Number of subjects	% of subjects with missing buds	
Symmetrical	only in maxilla	3	33.34	55.56
	only in mandible	2	22.22	
	in both arches	-	-	
Asymmetrical		4	44.44	
Total		9	100	

DISCUSSION

In the studies conducted by Tokarska the percentages of missing buds in the maxilla are as follows: missing right incisor – 24.60% (average bud absence per person – 0.54), left lateral incisor – 24.60% (0.54), left first premolar – 13.90% (0.30), right second premolar – 13.10% (0.29), right and left canine – 3.70% (0.08) each. No missing buds of either mesial incisor were found. In our studies the highest percentage of missing maxillary buds was revealed in the case of both lateral incisors – 37.50% (0.33). The percentage of missing upper canine buds, both right and left, was 12.50% (0.11).

In the examined population the average lack of bud per person was 0.89, whereas in Tokarska's studies it was 2.19. According to Tokarska, the percentage of missing buds of the right lateral incisor in the maxilla in women was 25.30% (average per person – 0.56), in men 23.10% (0.49). For the right lateral incisor it was 24.70% (0.55) in women and 24.40% (0.51) in men. For the upper right canine it was 3% (0.07) in women and 5.10% (0.11) in men. In the case of the upper left canine the percentages were 3.60% (0.08) for women and 3.80% (0.08) for men. The average bud absence in the maxilla per person in women was 2.21, in men 2.11. In our population missing maxillary tooth buds occurred only in women. The highest percentage was discovered for both lateral incisors, i.e. 37.50 % (0.33). Both upper canines accounted for 12.50% (0.11). No missing buds of the remaining teeth were discovered.

In Tokarska's studies the highest percentages of missing buds in the mandible were those of the right first molar, i.e. 23.00% (0.44), and the left second premolar: 22.50% (0.43). Respective

values for the other teeth were: left mesial incisor – 8.50% (0.15), right mesial incisor – 6.60% (0.16), right first premolar – 1.90% (0.04). The average absence of buds in the mandible per person was 1.90. Own studies revealed the highest percentage, i.e. 33.32%, for the lower left second premolar, 16.67% of missing lower left mesial incisor, and the same of lower right mesial incisor, as well as lower right first and second premolar. The average absence of buds in the mandible was 0.67.

In the available literature on the subject, the percentage of missing lower right second premolar tooth in women was 23.70% (0.41), in men 22.0% (0.49). The absence of the lower left second premolar accounted for 24.40% (0.43) of missing buds in women and 19.50% (0.43) in men. The remaining values, respectively: lower left mesial incisor – 9.20% (0.16) for women, 7.30% (0.16) for men; lower right mesial incisor – 5.30% (0.09) for women, 8.50% (0.19) in men; lower right first premolar – 0.80% (0.01) for women, 22.0% (0.49) for men. The average number of missing mandibular buds per woman was 1.73, and per man 2.22 (8). In our population of women, the missing lower right second premolar accounted for 20.00% (0.125) of cases, with the same results for the lower right and left mesial incisors. Missing lower left second premolar occurred in 40.00% (0.25) of cases. In men the absence of one tooth bud was revealed, i.e. lower right first premolar. The average number of missing buds in the mandible in women was 0.63 and in men 1.0.

Such a large discrepancy of results between our studies and those conducted by Tokarska is probably due to the fact that our study involved a smaller population of subjects.

CONCLUSIONS

1. The prevalence of hypodontia in the studied population of students was 12.16%.
2. This abnormality occurred more often in women than in men.
3. No differences were noted in the prevalence of hypodontia depending on side. Hypodontia was more often diagnosed in the maxilla than in the mandible.
4. The most common finding was two missing buds in an individual.
5. The number of teeth absent due to hypodontia on the right and left was comparable.
6. In half the cases hypodontia occurred symmetrically.

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SUMMARY

The aim of the study was to evaluate the prevalence of missing permanent tooth buds in the examined 21–25-year-old population of students of the Medical University of Lublin, Poland. The authors examined 74 people and analysed their panoramic dental radiograms. Hypodontia was diagnosed in 12.16% of the examined students, more often in women than in men. There was no difference in the prevalence of hypodontia with reference to the side of mouth. There were more cases of hypodontia in the maxilla than in the mandible. The most common finding was two missing tooth buds. In half the cases hypodontia occurred symmetrically.

Problem hipodoncji w populacji studentów Akademii Medycznej w Lublinie

Celem pracy była ocena częstości brakujących zawiązków zębów stałych w badanej populacji studentów Akademii Medycznej w Lublinie w wieku 21–25 lat. Autorzy przebadali 74 osoby oraz dokonali analizy zdjęć pantomograficznych badanych osób. U 12,16% badanych studentów rozpoznano hipodoncję, częściej u kobiet niż u mężczyzn. Nie zanotowano różnicy pomiędzy częstością występowania hipodoncji po stronie prawej i lewej. Najczęściej brakowało dwóch zawiązków zębów. W połowie przypadków hipodoncja występowała symetrycznie.