

ORTHOPEDIC SECTION

DOI 10.35220/2078-8916-2021-39-1-20-24

UDC 616-089.23.004 – 312 – 71:001.5.008.5

**S.V. Rachinsky, S.A. Schnayder, M.D.,
O.V. Labunets, Ph.D., T.V. Dieva, M.D.,
V. A. Labunets, M.D., Nomerovska E.E.**

State Establishment «The Institute of Stomatology
and Maxillo-Facial Surgery National Academy
of Medical Science of Ukraine»

**COMPARATIVE CHARACTERISTICS
OF THE ANATOMICAL
AND TOPOGRAPHIC STRUCTURE
OF DECAYED AND EXTRACTED TEETH
REQUIRING ORTHOPEDIC TREATMENT
IN URBAN AND RURAL RESIDENTS
OF DRAFT AGE IN THE ODESSA REGION**

ABSTRACT

An in-depth clinical dental examination was carried out for 170 males of draft age 18 – 20 years old among the urban and 162 – among the rural population of the Odessa region. It has been established that a significant majority of the volume of decayed and extracted teeth in this category of the population, both among the urban and rural population, subject to orthopedic treatment are the sixth chewing teeth and are respectively 48,1 % – 66.6 % and 77.7 % – 77,7 % on the upper and lower jaws. Then comes the fifth teeth, which among the urban population are extracted 2.5 times more than in the rural population and are, respectively, 26.0 % – 28.6 % and 11.1 % – 11.1 %. There is a more significant volume of extracted teeth in the upper jaw compared to the lower. In 100 % of cases, only partial defects of the dentition are recorded.

Key words: men of draft age, orthopedic morbidity, anatomical and topographic structure.

**С.В. Рачинський, С.А. Шнайдер, д.мед.н.,
О.В. Лабунець, к.мед.н., Т.В. Дієва, д.мед.н.,
В.А. Лабунець, д.мед.н., О.Є. Номеровська**

Державна установа «Інститут стоматології
та щелепно-лицевої хірургії Національної академії
медичних наук України»

**ПОРІВНЯЛЬНА ХАРАКТЕРИСТИКА
АНАТОМО-ТОПОГРАФІЧНОЇ СТРУКТУРИ
ЗРУЙНОВАНИХ І ВИДАЛЕНИХ ЗУБІВ,
ЯКІ ПОТРЕБУЮТЬ ОРТОПЕДИЧНОГО
ЛІКУВАННЯ У МІСЬКИХ І СІЛЬСЬКИХ
МЕШКАНЦІВ ПРИЗОВНОГО ВІКУ
В ОДЕСЬКІЙ ОБЛАСТІ**

АНОТАЦІЯ

Проведено поглиблене клінічне стоматологічне обстеження 170 осіб призовного віку чоловічої статі у віці 18 – 20 років серед міського і 162 серед сільського населення Одеської області. Встановлено, що пере-

важна більшість об'єму зруйнованих і видалених зубів у даній категорії населення, як серед міських так і сільських мешканців, які потребують ортопедичного лікування, становлять 6-ті зруйновані зуби і складають відповідно назагал 48,1 % і 66,6 % 77,7 % і 70,7 % на верхній та нижній щелепах. Потім йдуть п'яті зуби, які серед міського населення видаляються у 2, 5 рази більше ніж у сільського і складають відповідно 26, 0% і 28, 6 % та 11,1 % і 11,1 %. Спостерігається більш значний об'єм видалених зубів на верхній щелепі у порівнянні з нижньою. У 100 % випадків фіксуються тільки часткові дефекти зубних рядів.

Ключові слова: чоловіки призовного віку, ортопедична захворюваність, анатомо-топографічна структура.

The issue of dental orthopedic morbidity, its structure and intensity of development among young people in Ukraine, have always been relevant in the studies of domestic scientists in the field of orthopedic dentistry [1, 3, 4, 5, 6], especially recently [2, 7, 8, 9, 10]. However, most of this concerned the urban population. As for this category of the population in rural areas, such studies were very few and definite in adolescence 13 – 16 years old, even before the liquidation of district general hospitals and paramedic-obstetrician points in villages, where actually dental care was provided, including double oral cavity sanitation in schoolchildren and boarding schools. Considering the above, the relevance of the question raised in this study becomes even more acute and requires its practical solution, both from a scientific, practical and social point of view, especially among persons of draft age, given their further status as a serviceman.

Materials and methods of the study. Taking into account the above and in full compliance with the purpose of this scientific and practical research, we conducted an in-depth clinical dental examination of 170 male persons of draft age from 18 to 20 years among the urban population and 162 people among the rural.

The obtained data of the dental examination were registered in a special «Card of the examination of a dental orthopedic patient», developed in previous years at the Odessa research institute. It should be noted that according to the structure of this card, it provided for the fixation of the entire dental status of the examined person according to 3 main parameters, namely, «Dental therapeutic and surgical status», «Dental orthopedic and orthodontic status» and «The need for orthopedic and orthodontic treatment». At the same time, of all the main dental diseases, a special encoder was brought. All materials of dental examinations were subjected to the

appropriate grouping for each of the proposed research questions with their subsequent statistical processing to obtain arithmetic mean values, it was enough when conducting this kind of epidemiological studies, subject to the required number of surveyed persons, to obtain statistically reliable values. In this case, on the territory of Ukraine, it is at least 64 people in each studied age group [12]. Considering that we examined 332 people of draft age from 18 to 20 years old, it is quite sufficient to obtain the most probable results of the study. Separately, it

should be noted that it also fully coincides with the WHO requirements for conducting such studies.

Results of the study and discussion. So, based on the immediate need for information on an in-depth characteristic of the anatomical and topographic structure of teeth with destructible coronal part, subject to prosthetics and extracted teeth, and in view of their fairly applied and scientific significance regarding the causes and frequency of damage to certain teeth, exactly in this age group of the population, the results of the relevant studies on this issue shown by us in table 1.

Table 1

Anatomical and topographic structure of decaying teeth in men of draft age in Odessa region, which are subject to orthopedic treatment, %

Population	Jaw type	Dental formula															
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Urban	u/j	0.8	5.8	27.5	2.5	1.7	–	3.3	0.8	0.8	3.3	–	5.0	10.8	18.3	6.7	0.8
	l/j	–	13.0	3.0	8.0	1.8	–	–	–	–	–	–	1.0	3.0	32.0	7.0	–
Rural	u/j	–	6.5	21.5	17.8	0.9	–	–	–	–	0.9	–	2.9	12.2	29.0	8.4	–
	l/j	–	11.8	30.9	4.4	1.5	–	–	–	–	–	–	1.5	4.4	29.4	16.2	–

So, according to the indicators presented in the table, in general, both among urban and rural residents of a given age and gender, the largest volume of teeth with decaying coronal part of the teeth that need prosthetics falls on the 6th chewing teeth. So, in the upper jaw among the urban population, in general, the number of such teeth was 45.8 % of the total number of teeth on it. At the same time, on the left side of this jaw there were 18.3 %, and on the right – 27.5 %. On the lower jaw, this indicator is much higher and is determined at the level of 65.0 %, of which 32.0 % on the left and 33.0 % on the right. As for the rural population of this age group and sex, the distribution is as follows: on the upper jaw they amounted to 50.5 % (29.0 % on the left and 21.5 % on the right), on the lower jaw – 60.3 %, or 29.4 % on the left and 30.9 % – on the right, respectively.

If we go further in the chronology of the frequency of the number of teeth with decayed coronal part of hard tissues, subject to orthopedic treatment, then this indicator is followed by practically the 5th and 7th teeth in terms of the total amount of lesions, namely, among urban residents, the 5th teeth, which on the upper jaw are 24.1 % (10.8 % on the left and 13.3% on the right) and 11.0 % (8.0 % on the left and 3.0 % on the right) on the lower. In turn, this indicator among rural residents is, respectively, 30.0 % (17.8 % on the left and 12.2 % on the right) at the top and 8.8 % (4.4 % on the left and 4.4% on the right) at the lower. As for the 7th teeth, the distribution is as follows: among the urban population on the upper jaw it is 12.5 % (6.7 % on the left and 5.8 % on the right), on the lower – 20.0 % (7.0 % on the

left and 13.0 % on the right), and among the rural population it is, respectively, 14.9 % (8.4 % on the left and 6.5 % on the right) and 28.0 % (16.2 % on the left and 11.8 in the case).

They are followed at a fairly considerable distance by the 4th teeth – 7.5 % (5.0 % on the left and 2.5 % on the right) among the urban population on the upper jaw and 4.0 % on the lower (1.0 % and 3.0 %, respectively), and among the rural 3.8 % on the upper (2.9 % and 0.9 %) and 3.0 % on the lower (1.5 % and 1.5 %). This is followed by the 2nd teeth – 6.6 % and the 1st – 1.6 %, and only among urban residents of this gender and age. There are practically no teeth with a similar volume of destruction of hard tissues of their coronal part among the canines and incisors in the urban population on the lower jaw and these teeth, both on the upper and lower jaws among the rural population.

When analyzing the information received, it is necessary to focus especially on constant attention during preventive clinical reviews of this population category on the 6th, 5th and 7th teeth, despite their high degree of hard tissues damage and the rapidity of the clinical course of their destruction, it says again and again about the need for their dispensary registration and constant dynamic observation.

Information about the anatomical and topographic structure of the extracted teeth is not only interesting and important from different points of view. Taking into account this situation, we also carried out relevant studies to determine the anatomical and topographic state of the extracted teeth among this category of the population of Ukraine, the data of which are presented in table 2.

Based on the materials presented in the table, first of all, it should be shown that both in the total volume of decaying teeth, the coronal part of which is subject to orthopedic treatment, and in the number of extracted teeth, the leading place is again occupied by 6th teeth, both among the urban and rural

population. So, according to table 2, the number of extracted 6th chewing teeth among urban residents in the upper jaw reaches 48.1 % (30.4 % on the right and 17.7 % on the left) of the total volume of extracted teeth on this jaw, and on the lower – 66.6 % (33.3 % and 33.3 %, respectively).

Table 2

Anatomical and topographic structure of extracted teeth in men of draft age in Odessa region, %

Population	Jaw type	Dental formula															
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Urban	u/j	–	4.3	30.4	13.0	130	–	–	–	–	–	–	4.3	13.0	17.7	4.3	–
	l/j	–	4.8	33.3	14.3	–	–	–	–	–	–	–	–	14.3	33.3	–	–
Rural	u/j	–	5.6	44.4	11.1	–	–	–	–	–	–	–	–	–	33.3	5.8	–
	l/j	–	11.1	33.3	–	–	–	–	–	–	–	–	–	11.1	44.4	–	–

As for the rural population, in persons of draft age in the upper jaw their removal were 77.7 % (44.4 % and 33.3 % of the right to the left), and 77.7 % at the lower (33.3 % and 44.4 %, respectively). Next, in chronological order, there are 5 teeth and also both among the urban and rural population, namely, on the upper jaw among urban residents, this indicator is 26.0 % (13.0 % on the left and 13.0 % on the right), and at the lower – 28.6 % (14.3 % and 14.3 %, respectively).

In the rural population, this position is as follows, on the upper jaw they are extracted in 11.1 % of cases (11.1 % on the left and 0 % – on the right), and on the lower 11.1 %, with their relative absence on the left on this jaw.

Compared to the 6th and 5th teeth, the percentage of removal of the 4th and 7th teeth is extremely insignificant, and only at the expense of the urban population. Separately, it should be shown that extracted canines and incisors among urban residents, and extracted canines, incisors and 4 teeth among rural people of draft age are not observed at all.

Analyzing the data obtained on this issue, the following should be noted. It seems to us that such a number of extracted teeth, especially premolars under the age of 20, is absolutely unjustified and did not understandable from a professional medical point of view, especially since at this age of extracted teeth because of complications of parodontitis does not exist at all, but only due to complications of caries, that is, diseases, with the proper organization of the provision of dental care and the professionalism of dentists, need to be cured at this age in almost 100% of cases, in our opinion.

Considering the latter, from our point of view, we need inalienable measures to radically reform and improve the organization of dental care for this category of the population of our country, both among the urban and rural population.

Apparently, the data on the structure of the extracted teeth, depending on the type of jaw and the status of the population, are also acquiring practical significance, the indicators of which are presented in table 3.

Table 3

The structure of the total volume of extracted teeth in men of draft age in the Odessa region, depending on the type of jaws, per 1000 people

Population	Jaw type	Number of extracted teeth	Ratio, %	Ratio in absolute indicators
Urban	u/j	135.3	52.5	1.1
	l/j	123.4	47.5	1.0
Rural	u/j	111.1	66.7	2.1
	l/j	55.5	32.3	1.0

An in-depth analysis of the data given in the table showed a rather significant difference in the volume of extracted teeth in persons of draft age in the Odessa region between the upper and lower jaws. At the same time, the vast majority of extracted teeth in the upper jaw are clearly observed, both among urban and especially among rural residents.

So, the number of extracted teeth among persons of draft age up to 20 years in this region is 135.3 among the urban and 123.4 among the rural

population per 1000 people of this age, which amounted to 52.5 % and 47.5 %, respectively, and correlates as 1.1 to 1.0. A particularly significant difference in this indicator is observed among rural residents, namely, 111.1 teeth are extracted on the upper jaw, and 55.5 teeth on the lower jaw, each 1000 persons of this population category, respectively, amounted to 67.7 % and 32.3 % and correlates as 2.1 to 1.0, that is, on the upper jaw, they are extracted 2.1 times more than on the lower jaw. If we take in

general the volume of extracted teeth in the upper jaw and among the urban and rural population and compare it with a similar indicator in the lower jaw, then their ratio is fixed from 1.4 to 1.0, that is, in persons of draft age in this region, it is generally extracted 1.4 times more teeth in the upper jaw.

By the way, a similar trend is recorded among these individuals in the Western region of our country, presented in previous articles [7, 8].

In orthopedic dentistry, sound engineering and materials science, the data on the topography of dentition defects, with their partial absence, are quite significant, both from the scientific and especially practical points of view. It should be noted that this indicator is officially proposed to be calculated according to the Kennedy classification, according to which there are 4 corresponding classes. Despite this, table 4 provides data on this issue.

Table 4

Topography of dentition defects in men of draft age in Odessa region, according to Kennedy, %

Population	Defect classes							
	1st		2nd		3rd		4th	
	u/j	l/j	u/j	l/j	u/j	l/j	u/j	l/j
Urban	–	–	–	–	44.7	52.6	2.7	–
Rural	–	–	–	–	72.2	27.8	–	–

Analyzing the materials given in the table, it should be shown that in this region of our country, both among the urban and rural population in the researched age category and gender, partial defects in the dentition of the 3rd class according to Kennedy are almost completely observed. At the same time, only among urban residents, such defects of the 4th class are recorded in an extremely insignificant number and account for only 2.7 % of their total volume.

If we consider this issue in order to determine certain types of orthopedic treatment for a given topography of dentition defects in the studied population category, then they quite need only permanent prosthetics of various types, depending on the individual clinical situation and financial capabilities of patients.

Conclusions. 1. Comparative analysis of the anatomical and topographic structure of decayed and extracted teeth requiring orthopedic treatment among urban and rural male residents of draft age showed, both in the 1st and 2nd cases, the overwhelming majority of such lesions among the sixth teeth, regardless of their social status.

2. It draws attention to the rather significant, given the very young age of the surveyed, the volume of removed premolars, that is, teeth, with proper organization and planning of this category of the population of dental care, which can be cured in almost 100 % of cases, is completely unjustified.

3. We believe that the main reason for such a situation in persons of draft age is not a medical factor, but the uncertainty of certain government agencies in organizing the provision and financing of this category of the country's population.

4. Taking into account their further status as a serviceman, we propose to solve the issue of guaranteed dental care at the state level with their inclusion in the benefit groups of the population for the provi-

sion of medical gratuitous assistance, in accordance with Article 7 of the "Fundamentals of Ukrainian legislation on healthcare".

REFERENCES

1. Klityns'ka O.V., Molchanov Ju.O., Djachuk K.G., Rozluc'ka V.Z. Osoblyvosti poshyrennja karijesu zubiv u shkoljariv starshyh klasiv mista Uzhgoroda. *Molodyj vchenyj.* 2015;10 (2):170-172. [in Ukrainian]
2. Mochalov Ju.O. Klinichne obgruntuvannja vdoskonalennja likuvannja zubiv z defektamy tverdyh tkanyh v umovah rozvytku importozamishhennja plombuval'nyh materialiv: avtoref. dys. na zdobuttja naukovogo stupenja d-ra medychnyh nauk. spec. 14.01.22 – «Stomatologija», 14.02.03 – «Social'na medycyna». Uzhgorod; 2020:47. [in Ukrainian]
3. Muntjan L.M., Jur A.M. Chastota vynykennja, poshyrenist' vtorynyh chastkovykh adentij ta shhelepnyh deformacij u osib molodogo viku. *Ukrai'ns'kyj stomatologichnyj al'manah.* 2010;5:25-26. [in Ukrainian]
4. Labunec' O.V. Klinichne obgruntuvannja rann'ogo ortopedychnogo likuvannja malyh vključenych defektiv zubnyh rjadiv u molodomu vici: avtoref. dys. na zdobuttja naukovogo stupenja kand.med.nauk za spec. 14.01.22 – «Stomatologija» Odesa, 2015:20. [in Ukrainian]
5. Ozhogan Z.R., Vdovenko L.P. Osoblyvosti klinichnoi' kartyny defektiv zubnyh rjadiv u osib molodogo viku. *Dental'ni patologii.* 2006;36(28-31):19-21. [in Ukrainian]
6. Dragomyreckaja M.S., Kolesnyk T.V., Lepskij V.V. Stomatologicheskyj status molodezhy Ukraїny. *Ukraynskyj stomatologicheskyj al'manah (Materialy nauk-prakt. Konferencii' z mizhnar. uchastju. Suchasni pytan'nja ortodontii'. Misce ortodontii' sered stomatologichnyh special'nostej. Poltava 12-13 kvitnja 2012 r.: tezy dop.).* 2012;2:54-56. [in Ukrainian]
7. Rachynsk'kyj S.V., Shnajder S.A., Labunec' O.V., Dijeve T.V., Labunec' V.A. Anatomico-topografichna charakterystyka zubiv i defektiv zubnyh rjadiv, shho pidljagajut' ortopedychnomu likuvannju u osib pryzoynogo viku Ivano-Frankivs'koi' oblasti. *Visnyk stomatologii.* 2019;2:32-36. [in Ukrainian]
8. Rachynsk'kyj S.V., Shnajder S.A., Labunec' O.V., Dijeve T.V., Labunec' V.A. Stomatologichna ortopedychna zahvorjuvanist' u cholovikiv pryzoynogo viku Ivano-Frankivs'koi' oblasti. *Arhiv klinichnoi' medycyny.* 2020;2(26):46-48. [in Ukrainian]
9. Labunec' O.V., Rachynsk'kyj S.V., Shnajder S.A., Dijeve T.V., Labunec' V.A. Obgruntuvannja medychnoi'

social'noi' neobhidnosti ta ekonomichnoi' docil'nosti reformuvannja ta planuvannja stomatologichnoi' ortopedychnoi' dopomogy molodi Ukraïny. Architecture Medical Science Technical Science. 2020;30(82):41-48. Cressi. [Warszawa, in Poland]

10. **Semenov E.Y., Sennykov O.N.** Nuzhdaemost' y obespechennost' molodogo naselenija Ukraïny v stomatologicheskij pomoshhy. Visnyk stomatologii'. 2016;3:45-47. [in Ukrainian]

11. **Labunec' V.A.** Rozrobka naukovyh osnov planuvannja stomatologichnoi' ortopedychnoi' dopomogy na suchasnomu etapi iï rozvytku: avtoref. dys. na zdobuttja naukovogo stupenja d-ra medychnyh nauk. Kyïv; 2000:37. [in Ukrainian]

The article was submitted to the editorial office 17.02.21



DOI 10.35220/2078-8916-2021-39-1-24-30

UDC 616-036.8+616-083.28/.29:616.716.4

S.A. Sapalov

Zaporizhzhya State Medical University,
Department of Propaedeutic and Surgical Dentistry

CLINICAL EFFICIENCY OF DIFFERENT TYPES OF PROSTHETICS OF EDENTULOUS MANDIBLE DEPENDING ON THE TYPE OF ITS ATROPHY

ABSTRACT

The article presents the results of the comparative clinical and functional study of the effectiveness of prosthetics in 300 patients with edentulous mandibles depending on the type of atrophy and design of denture fixation (by using closing valve or due to fixation on locator- and ball-abutments). It has been established that the use of "classic" complete removable dentures is the most effective in type I of the edentulous mandible, when under the condition of satisfactory function of dentures it is possible to prevent progressive atrophy of the bone tissue of the prosthetic bed. Whereas, in types II, III and IV, a similar clinical effect is possible only due to additional mechanical fixation on implants. The obtained data correspond to the results of previous studies of stress-strain states.

Keywords: complete absence of teeth on mandible, alveolar bone atrophy, complete denture prosthesis, dental implantation, clinical efficiency.

С. О. Сапальов

Запорізький державний медичний університет,

КЛІНІЧНА ЕФЕКТИВНІСТЬ РІЗНИХ ВИДІВ ПРОТЕЗУВАННЯ БЕЗЗУБОЇ НИЖНЬОЇ ЩЕЛЄПИ В ЗАЛЕЖНОСТІ ВІД ТИПУ ЇЇ АТРОФІЇ

АНОТАЦІЯ

В статті представлені результати порівняльного клініко-функціонального дослідження ефективності

протезування 300 хворих з повною відсутністю зубів на нижній щелепі в залежності від типу її атрофії та виду фіксації протезу (за рахунок клапану, що замикає, або завдяки фіксації на локатор- та бол-абатментах). Встановлено, що застосування «класичних» повних знімних конструкцій найбільш ефективно при I типі нижніх беззубих щелеп, коли за умови задовільної функції зубних протезів вдається запобігти прогресуючій атрофії кісткової тканини протезного ложа. Тоді як подібний клінічний ефект при II, III та IV типах можливий лише завдяки додатковій механічній фіксації протезів з опорою на імплантати. Отримані дані відповідають результатам попередніх досліджень напружено-деформованих станів.

Ключові слова: повна відсутність зубів на нижній щелепі, атрофія альвеолярної частини, повне знімне протезування, дентальна імплантація, клінічна ефективність.

Dental implantation, which is now widely used in dental practice, has to some extent solved the main problem of prosthetic treatment of patients with complete absence of teeth that is the difficulty of fixation, stabilization and balance of dentures [1]. However, it is not a panacea for edentulous patients, because the wide use of intraosseous implants is hampered by the very common among the elderly and senile persons significant atrophy of the residual ridge and reduced bone mineral density of alveolar bone caused by involution processes [2]. At the same time, according to our clinical observations, on the one hand removable dentures with fixation on implants provide greater effectiveness of prosthetic treatment in terms of quality of life, fixation of dentures and functional efficiency, on the other hand they are a reason of atrophy of the distal alveolar parts of mandibles, that worsens the anatomical and topographic conditions for re-prosthetics [3].

To study this contradiction, we conducted studies of the distribution of stress-strain states in prosthetics of complete defects of the lower dentition with "classic" removable lamellar dentures and overdentures supporting on intraosseous implants [4]. It was found that the distribution of stresses and strains is determined by the shape of the alveolar part, which is described in Keller's classification. Additional fixation of removable dentures on intraosseous implants leads to a significant increase in stress in the alveolar bone. This is in line with the result of the research [5], where they demonstrated a significant increase in stresses and strains in the simulation model of the mandible in the manufacture of overdentures supporting on implants. According to the authors' data it leads to progressing bone resorption.