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## ANALYSIS OF THE FREQUENCY OF CERVICAL PATHOLOGY MANIFESTATION IN PERMANENT TEETH OF DIFFERENT GROUPS

Danylo Yakymovych, Zoriana Masna

*Cervical tooth lesions today belong to the most common dental pathologies characterized by a pronounced tendency to increase.*

**The aim** of our study was to determine the frequency of various types of cervical pathology in formed permanent teeth.

**Material and methods.** The randomized group of examined patients included 200 middle-aged individuals (100 males and 100 females). The examination included collecting anamnestic data and examining the oral cavity and teeth to identify cervical caries and non-carious lesions of cervical localization.

**Results.** Various types of cervical tooth pathology were found in 45 % of the total number of examined patients. The highest percentage among cervical lesions belongs to cervical caries (28.5 %). The frequency of cervical erosions is 16 %, and wedge-shaped defects - 13.5 %. Cervical caries and erosions are more often detected in males, while wedge-shaped defects are more common in females. In females, isolated cervical caries are most frequently manifested (36 %), and isolated wedge-shaped defects and erosions are less frequent (16 % and 17 % respectively). The least frequent manifestation in females is the combined lesion of teeth with wedge-shaped defects and erosions (5 %). In males, isolated cervical caries is most frequently detected (42 %), isolated erosions are nearly twice less common (23 %), and isolated wedge-shaped defects (8 %) and combined lesions of teeth with wedge-shaped defects and erosions (4 %) are the least frequent. All types of cervical pathology most often affect premolars, less often incisors, and least often molars.

**Conclusions.** 45 % of middle-aged individuals seeking dental care have cervical tooth lesions, with the highest percentage being cervical caries. Cervical caries and erosions are more common in males, while wedge-shaped defects are more common in females. All types of cervical pathology most often affect premolars and, least often, molars

**Keywords:** cervical tooth lesions, cervical caries, wedge-shaped defects, erosions, middle age

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### 1. Introduction

Cervical lesions of the teeth belong today to the most common dental pathologies, characterized by a pronounced tendency to increase [1, 2]. Most often among them, cervical caries of the teeth manifest, as well as non-carious lesions – wedge-shaped defects and erosions [2]. The causes of their occurrence and methods of prevention and treatment attract the attention of numerous researchers. According to various authors, general and local etiological factors of cervical tooth pathology include the patient's health status, the presence of background pathologies and metabolic disorders, dietary habits and the quality of food and water consumed, professional hazards and harmful habits, level of oral hygiene, degree of mineralization of hard tooth tissues and composition of oral fluid, as well as occlusion anomalies, presence or absence of antagonist teeth, improper prosthetics, tooth wear, pathology of the temporomandibular joint, etc. Udod O. A. and Fedishin M. M. (2023) associate the occurrence of periodontal lesions with the hygiene habits of patients [3], Zaverukha Ya. I. (2021) – with orthodon-

tic pathology and distribution of occlusal load on teeth [4], while Braylko N.M. (2020) emphasizes the importance of studying the stress-strain state in the periodontal region of teeth, particularly for the "filling-tooth" system [5]. Various researchers emphasize the importance of considering etiopathogenetic factors in the development of periodontal pathology when choosing methods of its treatment [6, 7].

However, according to Zabolotna I.I. and Honzitska O.S. (2009) [1], a large number of etiological factors cited in the literature are evidence of their secondary nature. The authors believe that none of them, or even their combination, are capable of destroying enamel, especially in the protected gingival cervical area, where direct trauma is practically impossible [1].

Inconspicuous at the initial stages and without receiving necessary treatment, cervical pathologies over time become a serious aesthetic and dental problem and can lead to significant damage or even loss of a tooth. Nascimento M. et al. (2016) [8] believe that effective prevention of cervical pathology requires not only identifying risk

factors for its development but also understanding their isolated or combined influence on the most vulnerable areas of certain groups of teeth. Therefore, conducting research in the conditions of clinical examination of the oral cavity to determine the causes and prerequisites for the occurrence of cervical pathology, its frequency, and features of localization is very important [2].

**The aim** of our study was to determine the frequency of different types of cervical pathology in permanent teeth.

## 2. Materials and Methods

A randomized group of examined patients included 200 adults seeking dental care at the Department of Therapeutic Dentistry and the Therapeutic Department of the Dental Center of Danylo Halytsky Lviv National Medical University. The research was conducted during the period of 2021–2022. The conducted examination included collecting anamnestic data and instrumental examination of the oral cavity and teeth to identify periodontal caries and non-carious lesions (wedge-shaped defects and erosions) of periodontal localization. Informed consent was obtained from the study participants. The age range of patients was 25–60 years for men and 22–55 years for women. The average age of the patients was 45–47 years old. It is also necessary to indicate the average age of the patients. To process the obtained data, statistical methods of summary and grouping, tabular and graphic methods, as well as the method of variation study were used. All examined patients were divided into two groups by gender (100 men and 100 women). Digital data were processed by determining the percentage fre-

quency of detection of each type of periodontal pathology and the proportion of permanent teeth affected by its various types among the total sample of patients, as well as separately in individuals of each gender, and graphically visualized.

The Bioethics Committee of Danylo Halytsky Lviv National Medical University (protocol No. 5 dated 22.06.2020) has determined that the research was conducted in accordance with the World Medical Association's Code of Ethics (Helsinki Declaration).

## 3. Results

Upon examination of the randomized patient group, various types of cervical tooth pathology were detected in 90 individuals, accounting for 45 % of the total number examined. Cervical pathology in males was detected in 48 % of the examined, while in females, it was found in 42 %. The highest proportion among the detected types of cervical pathology belonged to carious lesions - cervical caries was diagnosed in 28.5 % of the total number examined. The percentage of individuals with cervical erosions was 16 %, and wedge-shaped defects were found in 13.5 % of the individuals examined. Cervical caries was diagnosed in 31 % of examined males and 26 % of examined females, wedge-shaped defects in 12 % of males and 15 % of females, and erosions in 18 % of males and 14 % of females (Fig. 1). Comparison of the frequency of different types of cervical tooth pathology in individuals of different genders indicated that cervical caries and erosions were more frequently detected in males, while wedge-shaped defects were more common in females (Fig. 1).

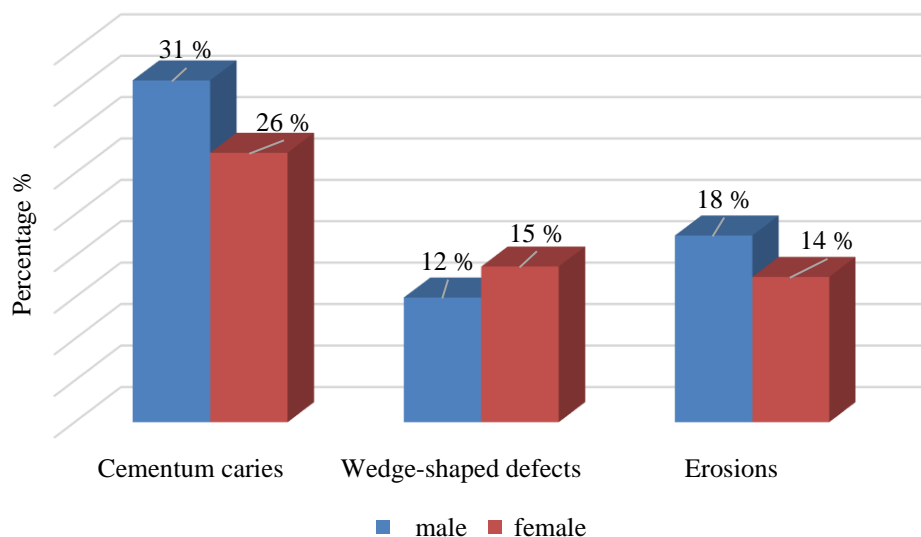


Fig. 1. Comparison of the frequency of different types of cervical pathology in adult males and females (%).

The analysis of the examination results of patients with cervical pathology revealed that both carious and non-carious lesions can occur either in isolation or in combination in various scenarios. Isolated cervical caries were found in 20 males and 15 females, constituting 42 % and 36 % of males and females with cervical lesions, respectively. Isolated wedge-shaped defects were detected in 4 males (8 %) and 7 females (16.5 %), while erosions were found in 11 males (23

%) and 7 females (16.5 %) (Fig. 2 and 3). Additionally, multiple cervical caries were diagnosed in 9 individuals (5 males and 4 females), multiple wedge-shaped defects in 1 male, and multiple erosions in 11 individuals (5 males and 6 females).

The combination of different types of cervical pathology was observed in 26 individuals, including 13 males and 13 females. Combined lesions of cervical caries and wedge-shaped defects were found in 5 males

(10 %) and 6 females (14 %), cervical caries and erosions in 6 males (13 %) and 5 females (12 %), while wedge-

shaped defects and erosions were observed in 2 males (4 %) and 2 females (5 %) (see Figs. 2 and 3).

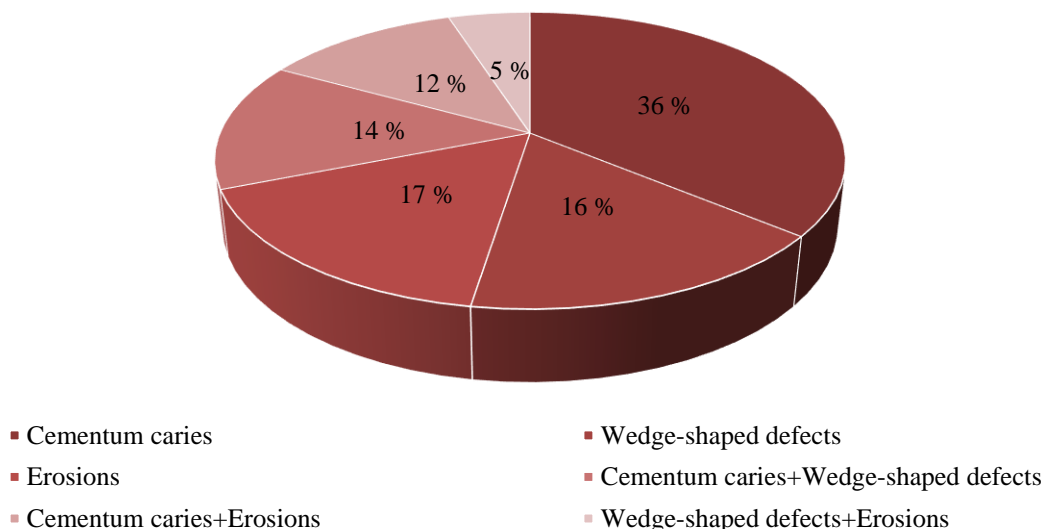


Fig. 2. Frequency of isolated and combined cementum lesions in females (%)

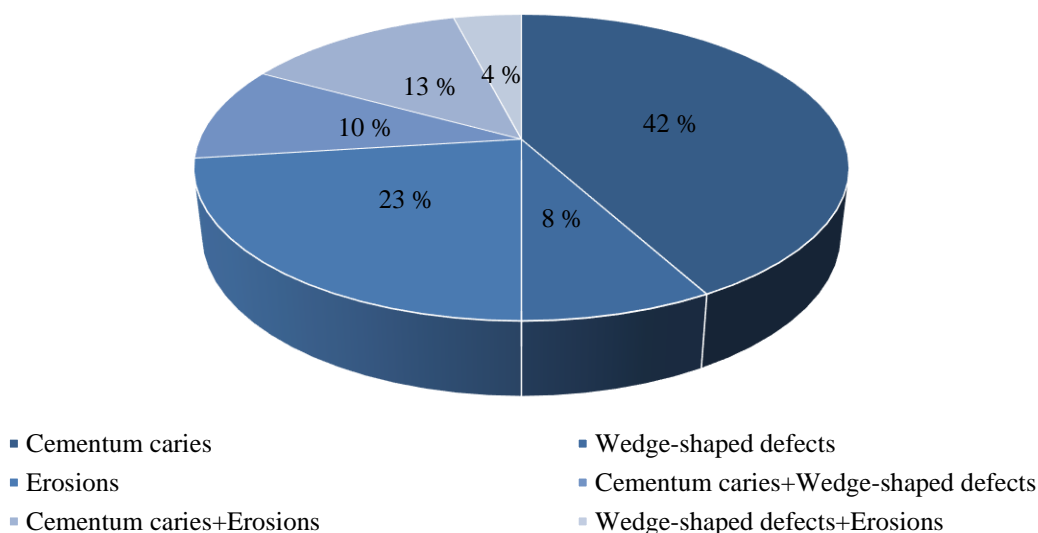


Fig. 3. Frequency of isolated and combined cementum lesions in males (%)

The obtained data indicate that isolated pathology is more common in females than combined, with cervical caries showing the highest manifestation frequency (36 %), while wedge-shaped defects and erosions are encountered half as frequently (16 % and 17 % respectively). The least frequent manifestation in females is the combined lesion of teeth with wedge-shaped defects and erosions (5 %) (see Fig. 3).

In males, cervical caries exhibit the highest manifestation frequency (42 %), while erosions are encountered almost half as frequently (23 %). Isolated wedge-shaped defects (8 %) and combined lesions of teeth with

wedge-shaped defects and erosions (4 %) have the lowest manifestation frequency in males.

The analysis of the frequency of cervical area lesions in different tooth groups revealed that all types of investigated pathology most commonly affect premolars, followed by incisors, which are encountered half as frequently, while molars are least affected.

The frequency of lesions involving wedge-shaped defects and erosions is also low, but the frequency of lesions in this tooth group with cervical caries is the same as the frequency of lesions in incisors (Fig. 4).

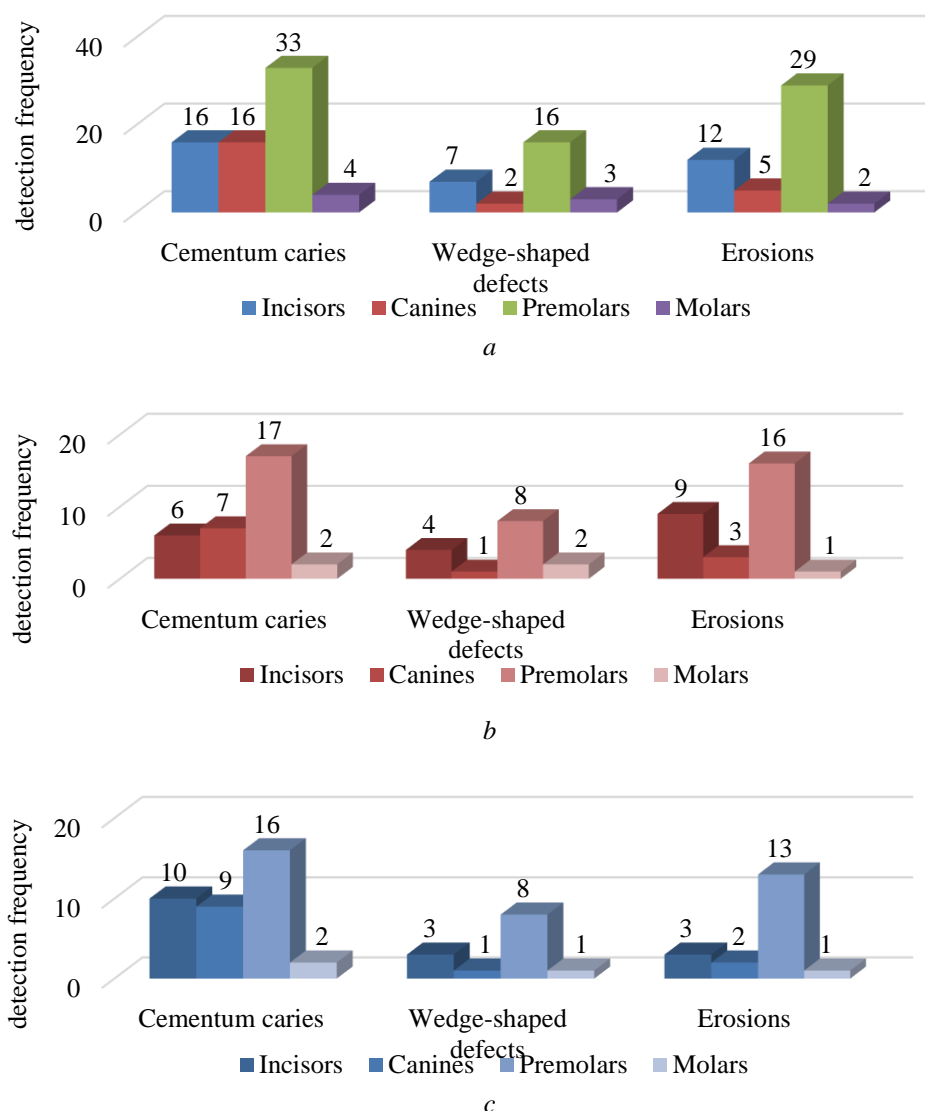


Fig. 4. Frequency of detection of periodontal caries and non-carious lesions in the periodontal area of teeth in different groups: *a* – in the randomized sample of mature individuals; *b* – among males; *c* – among females.

Multiple carious and non-carious processes are most commonly localized in the cervical areas of premolars and incisors, with equal frequency affecting teeth of the upper and lower jaw, regardless of the side and predominantly asymmetrically.

**4. Discussion**

The obtained results of the study allowed us to establish significant variability both in the forms of cervical pathology and in the teeth affected by it in examined mature individuals. The established frequency of manifestation of periodontal pathology slightly differs from the literature data. Specifically, Zabolotna I. I. and Hontsitska O. S. (2009) indicate that the frequency of enamel erosions detection (47.25 %) is more than twice the frequency of wedge-shaped defects detection (19.57 %), while our data indicate practically the same frequency of manifestation of these pathologies. In our opinion, this can be explained by the selection of the examined individuals - patients from dental departments seeking dental care were included in the study's working group. The established frequency of manifestation of cervical pathology slightly differs from the literature

data, which, in our opinion, can be explained by the selection of examined individuals – the working group of individuals examined by us within the study included patients of dental departments seeking dental care. Other studies might have included individuals undergoing routine or screening examinations. Other reasons for the difference in the obtained data could be the residence area of the examined individuals or the formation of the working group with additional inclusion or exclusion criteria (orthodontic pathology, partial adentia, harmful habits, etc.). The highest vulnerability to cervical pathology of premolars, as revealed by the results of our study, coincides with the data of other authors, as well as the lowest frequency of its occurrence in molars [9, 10]. The results of our research also coincide with the findings of Mazur I. P., Suprunovych I.M. (2018) regarding the more frequent detection of erosions in the periodontal area in males than in females [10].

In our opinion, the predominance of isolated forms of cervical pathology found on individual teeth indicates the influence of local factors on the affected tooth, including inadequate distribution of pressure during articulation movements due to partial adentia, violations of occlusal

plane, or temporomandibular joint dysfunction, as well as during teeth cleaning. From this perspective, local factors can also include professional characteristics, harmful habits, or even therapeutic procedures involving constant or prolonged contact of teeth of certain groups with foreign objects (mouthguards, caps, braces, clasps, veneers, etc.). On the other hand, the significant frequency of multiple and combined lesions by carious and non-carious forms of cervical pathology in teeth of different groups suggests its dependence on general factors – patient's metabolic background, environmental and professional hazards, level of mineralization of hard tooth tissues and composition of oral fluid, improper choice of dental hygiene products, including the composition and abrasiveness of toothpaste and the hardness of toothbrushes.

Modern literature contains results of numerous clinical, radiological, morphological, biochemical, and immunological studies, based on which complex conclusions can be drawn regarding the criteria for determining risk groups for the development of cervical lesions of hard tooth tissues. In particular, Zabolotna I. I. (2020, 2021) developed a methodology for predicting the occurrence of periodontal pathology of hard tooth tissues based on parameters of oral fluid [2, 11], while Zaverukha Ya. I. (2021) consider individuals with disturbances in occlusal load distribution to be at risk [4]. However, the possibility of differentiating this group of pathological lesions by genesis and developing methods for their effective prevention requires further in-depth and more detailed study of the features and regularities of their development and course, as well as the characteristics of the structure of those groups of teeth that are most susceptible to them.

**Limitations of the study.** The age range of patients. The study did not include men younger than 25 years and older than 60 years and women younger than 22 years and older than 55 years.

**Prospects for further research.** The study of the prevalence of cervical pathology and the features of the structure of its localization areas, typical for teeth of different groups in mature individuals, can become a theoretical basis for increasing the effectiveness of existing methods and developing new methods of its prevention.

## 5. Conclusions

1. The frequency of cervical pathology among mature individuals is 45 % (48 % in males, 42 % in females).

2. The highest proportion of investigated cervical lesions belongs to cervical caries (28.5 %). The frequency of periodontal erosions is 16 % and of wedge-shaped defects – 13.5 %.

3. Cervical caries and erosions are more common in males, while wedge-shaped defects are more common in females.

4. Among females, among the studied pathologies, isolated cervical caries have the highest manifestation rate (36 %), and isolated wedge-shaped defects and erosions are twice as common (16 % and 17 %, respectively). The lowest manifestation rate in females is a combined lesion of teeth with wedge-shaped defects and erosions (5 %).

5. In males, among the studied pathologies, isolated cervical caries has the highest detection rate (42 %), isolated erosions are nearly twice less common (23 %), isolated wedge-shaped defects have the lowest manifestation rate (8 %), and combined lesions of teeth with wedge-shaped defects and erosions have the lowest rate (4 %).

6. All types of investigated cervical pathology most commonly affect premolars, less commonly incisors, and least commonly molars. The frequency of lesions in molars with wedge-shaped defects and erosions is also insignificant, but the frequency of lesions in this group of teeth with cervical caries is the same as the frequency of lesions in incisors.

7. Multiple carious and non-carious processes most often affect the cervical areas of premolars and incisors, are found with the same frequency in the upper and lower jaws, regardless of the side, and are predominantly asymmetric.

## Conflict of interests

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this article.

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The study was conducted without financial support.

## Data availability

Data will be made available on reasonable request.

## Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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**Danylo Yakymovych**, Assistant, Department of Therapeutic Dentistry, Danylo Halytsky Lviv National Medical University, Pekarska str., 69, Lviv, Ukraine, 79010

**Zoriana Masna\***, Doctor of Medical Sciences, Professor, Department of Operative Surgery with Topographic Anatomy, Danylo Halytsky Lviv National Medical University, Pekarska str., 69, Lviv, Ukraine, 79010

*\*Corresponding author: Zoriana Masna, e-mail: masna.zz@gmail.com*