

# Correlation of dentine hypersensitivity (DH) with manifestations of psycho-emotional stress, its features in patients with cervical teeth pathology

Korelacja nadwrażliwości zębiny (DH) z objawami stresu psycho-emocjonalnego, jej cechy u pacjentów z patologią przyszyjkową zębów

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## KEY WORDS:

bruxism, temporomandibular disorders, non-carious cervical lesions, dentine hypersensitivity, hyperesthesia

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## HASŁA INDEKSOWE:

bruksizm, zaburzenia skroniowo-żuchwowe, niepróchnicowe zmiany przyszyjkowe, nadwrażliwość zębiny, przeczulica

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## Summary

**Introduction.** DH is a frequent complaint of dental patients accompanying cervical dental pathology.

**Aim of the study.** To determine DH prevalence in young people of Donetsk region of Ukraine; reveal the correlation between DH indicators and manifestations of psycho-emotional stress, its features in patients with cervical dental pathology.

**Material and methods.** A clinical examination of 272 patients aged 18-44 years was carried out to diagnose DH and cervical dental pathology. The information about presence of parafunctional habits, symptoms of temporomandibular disorders (TMD), complaints of overtiredness and frequent headache was entered into the developed

## Streszczenie

**Wstęp.** DH jest częstą dolegliwością pacjentów stomatologicznych towarzyszącą patologii przyszyjkowej zębów.

**Cel.** Określenie rozpowszechnienia DH wśród młodzieży z obwodu donieckiego na Ukrainie; ujawnienie korelacji pomiędzy wskaźnikami DH a przejawami stresu psycho-emocjonalnego, jego cechami u pacjentów z patologią przyszyjkową zębów.

**Materiał i metody.** Przeprowadzono badanie kliniczne 272 pacjentów w wieku 18-44 lat w celu zdiagnozowania DH i patologii przyszyjkowej zębów. Do opracowanego kwestionariusza wprowadzono informacje o występowaniu nawyków parafunkcyjnych, objawach zaburzeń skroniowo-żuchwowych (TMD), dolegliwościach

questionnaire. The level of personal anxiety was determined using Ch.D. Spielberger State-Trait-Anxiety-Inventory.

**Results.** Medium strength correlation between sex and DH prevalence and intensity has been determined. Direct correlation has been observed between TMD symptoms and the level of personal anxiety and habit of tooth clenching. Medium strength correlation has been determined between unilateral type of chewing and complaints of overtiredness and bruxism. In patients with erosion DH prevalence was in inverse correlation with age, and it was in direct correlation with habit of biting and licking lips. Its intensity in patients with cervical caries was directly correlated to age and parafunction of biting the mucous membrane of the cheeks. Medium-strength correlation has been observed between DH prevalence and the number of teeth with a wedge-shaped defect and combination of cervical pathology.

**Conclusions.** We suggest taking into account established correlations during history taking, clinical examination and treatment of a young dental patient, especially with cervical dental pathology in order to reduce DH prevalence and intensity and prevent its development.

związanych z przemęczeniem i częstymi bólami głowy. Poziom lęku osobistego określono za pomocą Ch.D. Inwentarz stanu-cechy-lęku Spielberga.

**Wyniki.** Określono średnią korelację siły między płcią a występowaniem i intensywnością DH. Zaobserwowano bezpośrednią korelację między objawami TMD a poziomem lęku osobistego i nawykiem zaciskania zębów. Stwierdzono korelację średniej siły między jednostronnym typem żucia a skargami na przemęczenie i bruksizm. U pacjentów z nadżerkami częstość występowania DH była odwrotnie proporcjonalna do wieku, natomiast bezpośrednio korelowała z nawykiem gryzienia i oblizywania ust. Jej nasilenie u pacjentek z próchnicą przyszyjkową było bezpośrednio skorelowane z wiekiem i parafunkcją nagryzania błony śluzowej policzków. Zaobserwowano średnią korelację między występowaniem DH a liczbą zębów z ubytkiem w kształcie klina i kombinacją patologii przyszyjkowej.

**Wnioski.** Sugerujemy uwzględnienie ustalonych korelacji podczas zbierania wywiadu, badania klinicznego i leczenia młodego pacjenta stomatologicznego, zwłaszcza z patologią przyszyjkową zębów, w celu zmniejszenia częstości występowania i nasilenia DH oraz zapobiegania jego rozwojowi.

## Introduction

More than half of the world's population aged 30-60 years complain of DH.<sup>1-4</sup> According to data,<sup>5</sup> even 24.5% of teenagers aged 15-19 years have symptoms of hyperesthesia. Modern studies show significant differences in its prevalence with a constant tendency to increase,<sup>2,4,6,7</sup> especially at the age of 30-40 years.<sup>8</sup> According to data,<sup>9</sup> it is related to the changes in the way of life (erosive nutrition) that lead to the development of tooth wear in young people. Other scientists<sup>1</sup> believe that

an impairment of the integrity of enamel and dentine as a result of injuries, pathological changes in dental hard tissues can increase the permeability of dentine and contribute to the development of symptoms of hyperesthesia. Recent studies indicate the role of daily tooth brushing, parafunctional habits, bruxism in enamel loss and dentine exposure and the subsequent DH development.<sup>2,6,10</sup> Horizontal occlusal forces resulting from chewing, bruxism and parafunctional activity create an area of support in the region of the tooth neck.<sup>3</sup> Therefore, stretching tension from chewing and

parafunctional habits causing tooth flexure is considered one of the main etiological factors of wedge-shaped defects (WSD).<sup>11</sup> Thus, development of DH is due to many reasons, one of which is cervical lesions of teeth.<sup>1,4,8,10,12-15</sup> In most clinical cases treatment of cervical pathology initially significantly reduces the symptoms of hyperesthesia, but six months later they recur in 20-30% of patients.<sup>12</sup> This is probably due to the multifactorial etiology of both cervical dental lesions and DH which is not effectively controlled.

The patients with hyperesthesia lasting more than six months complain of intense pain that becomes a constant stimulus capable of causing psychological and emotional discomfort reducing the quality of life.<sup>2,16-18</sup> According to data,<sup>19</sup> personal anxiety can be a favourable background for it. It is known that patients with a high level of anxiety complain of frequent headache, bad mood, sleep disorders and rapid overtiredness.<sup>20-22</sup> In the case of chronic psycho-emotional stress, persistent changes in the functioning of the maxillofacial system occur that are manifested in the form of hypertonus of masticatory muscles, bruxism, progression of the pathology of dental hard tissues<sup>16,20,23</sup> and they lead to an increase in the frequency and duration of parafunctional habits causing temporomandibular disorders (TMD).<sup>16,24</sup>

According to *Anokhina et al.*,<sup>16</sup> the manifestations of psychological distress are often identified in young people with a preserved maxillofacial dental apparatus, and in patients aged 45–50 years the psycho-emotional state more often does not provoke, but most likely, deepens the changes in the functioning of the maxillofacial dental system. Thus, in some cases, the presence of chronic psycho-emotional stress can be the cause of the disorders in the functioning of the organs of the maxillofacial dental system, and in others, a consequence of the presence of dental pathology when these diseases are primary in

relation to the disturbances in the patient's psycho-emotional state.<sup>25</sup> So, in our opinion, it is advisable to pay special attention to young people, in whom the identification of potential relationships between the manifestations of psychological stress and DH will contribute to the prevention of their development, reduction of the prevalence and intensity that will subsequently be able to improve the quality of life<sup>26</sup> and prevent the transition to a chronic course at an older age.<sup>6,9</sup> At the same time, epidemiological studies are of great importance because in addition to diagnostics of dental pathology they indicate specific etiological factors,<sup>19,27,28</sup> the influence of which will improve the management of clinical complaints and ensure the success of restorative treatment of cervical lesions of teeth.<sup>14</sup> According to *Yoshizaki et al.*,<sup>29</sup> analysis of DH indicators and their potential relationships in populations can serve as a guide for the implementation of specific preventive measures.

The purpose of the study was to determine DH prevalence in young people of Donetsk region of Ukraine; to reveal and analyze correlations between DH indicators and clinical manifestations of psycho-emotional stress and their features in patients with cervical dental pathology.

## Material and methods

The study involved 272 patients (174 women and 98 men) aged 18-44 years (average age 24.3±6.9 years). The selection criteria were young age according to the classification of the World Health Organization (WHO) (2017), the absence of harmful habits, peculiarities of household and employment history; permanent residence in the Donetsk region of Ukraine. With the aim of detailed medical history and comprehensive examination of patients, a special questionnaire/survey was developed which included the questions about the presence

of complaints of frequent headache and overtiredness that indirectly testify to chronic psycho-emotional stress<sup>20</sup> and parafunctional habits. The information on active sleep bruxism and the presence of clinical symptoms of TMD (according to Helkimo Clinical Dysfunction Index (HCIDI)<sup>30</sup>) was collected by means of personal interview by a trained investigator. A clinical examination of dental hard tissues for the presence of NCCL, cervical caries (CC) and DH was carried out by a dental practitioner. Diagnosis of hyperesthesia was carried out by probing tooth surfaces (tactile test) and air blast and cold water tests from a triple syringe.<sup>31</sup> The intensity of DH was assessed by the Visual Analogue Scale (VAS) being 0 “no pain” and 10 “most severe pain” and it was categorized as “mild” (1–2), “moderate” (3–7), or “severe” (8–10). The prevalence of hyperesthesia was estimated by the frequency of the individuals whose pain intensity was  $\geq 1$  on the VAS scale.

The diagnosis of NCCL was made according to the Tooth Wear Index (TWI) by B.G. Smith, J.K. Knight using a William’s periodontal probe (Trinity®).<sup>4,12</sup> Its use increases the sensitivity of the study that makes it possible to avoid underestimation of the state of dental hard tissues in the population.<sup>4</sup> NCCL were classified according to their morphology (WSD and erosion (E)).

In order to diagnose the psycho-emotional state personal anxiety was specified using Ch.D. Spielberger State-Trait-Anxiety-Inventory (STAI) with modification by Y.L. Khanina in points: up to 30 low level, 31-45 moderate level, 46 and above high level.

The study was performed in accordance with the principles of the Helsinki Declaration of the World Medical Association “Ethical Principles of Medical Research with the Involvement of a Human being as a Research Object”, Order No. 690 of the Ministry of Health of Ukraine (dated September 23, 2009). The study was approved by the Bioethics Committee of

Donetsk National Medical University (No 43, dated January 21, 2021). Prior to engaging in the study, all participants provided written informed consent.

Statistical analysis was performed using the Statistica 12.0 computer program (3BA94C4ED07A). When comparing average values in normally distributed populations, Student’s t-test was calculated. The differences were considered statistically significant at  $p \leq 0.05$ . Nominal data were compared using Pearson’s  $\chi^2$  test. In cases where the number of expected trials was less than 5, Fisher’s test was used to assess the level of significance of differences. The relationship between DH indicators was calculated using non-parametric Spearman’s rank coefficient ( $r$ ).

## Results

Cervical lesions of the teeth were diagnosed in 43.4% of the examined (72 women (41.4%) and 46 men (46.9%)): in 22.1% (60 patients) WSD, in 18.4% (50 patients) CC, in 5.5% (15 patients) E. All erosive defects were within the enamel. The combination of cervical pathology was observed in 7 people (2.6%): 5 cases E with WSD, 2 cases E with CC.<sup>32</sup> According to the results of the clinical examination, all patients were divided into five groups: I – with WSD ( $n=55$ ), II – with E of enamel ( $n=8$ ), III – with CC ( $n=48$ ), IV – with a combination of cervical teeth defects ( $n=7$ ), V – without cervical pathology ( $n=154$ ). Young people did not differ in age depending on the study group ( $p > 0.05$ ).

DH was determined in 38.2% of the examined (81 women (46.6%) and 23 men (23.5%)): in 75% of patients with E, in 71.4% of patients with combined cervical pathology, in 48.3% of patients with WSD, in 33.3 % of patients with CC, in 31.2% of patients without diagnosed cervical lesions of teeth. The symptoms of hyperesthesia were observed in 47.5% of

people with cervical dental pathology that was 1.5 times more frequent than in young people without it,  $p>0.05$ .

The average age of patients with DH ( $24.6\pm 6.7$  years) did not differ from the average age of all examined patients,  $p>0.05$ . The relationship between age and its development was not determined,  $p>0.05$ . The average duration of hyperesthesia complaints was  $2.95\pm 3.42$  years. DH bothered the patients without diagnosed cervical pathology longer, and it bothered the patients with E of enamel less ( $p>0.05$ ). Study groups did not differ in duration, prevalence and intensity of symptoms of hyperesthesia,  $p>0.05$ . A relationship between DH and NCCL depth was observed: WSD reliable ( $\chi^2=8.174$ ,  $p=0.043$ ); E unreliable ( $\chi^2=5.596$ ,  $p=0.061$ ). There was no correlation between the duration of its clinical symptoms and the depth of WSD and E ( $\chi^2=1.318$ ,  $p=0.725$  and  $\chi^2=2.329$ ,  $p=0.313$ , respectively). A moderate correlation was observed between the prevalence of DH and the number of teeth with WSD ( $r=0.404$ ) and

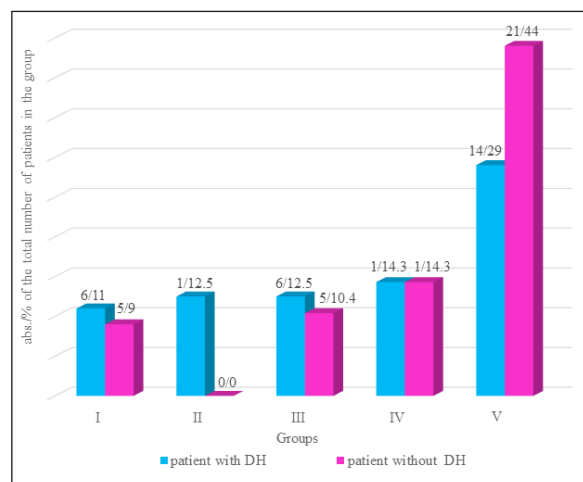
the combination of cervical lesions ( $r=0.320$ ),  $p\leq 0.05$ .

The symptoms of hyperesthesia were determined 3.5 times more often in women than in men ( $p>0.05$ ). In patients with E of enamel, DH was diagnosed only in women. Medium strength correlation was observed between sex and the prevalence ( $\chi^2=13.068$ ) and intensity ( $\chi^2=13.727$ ) of its symptoms,  $p<0.001$ .

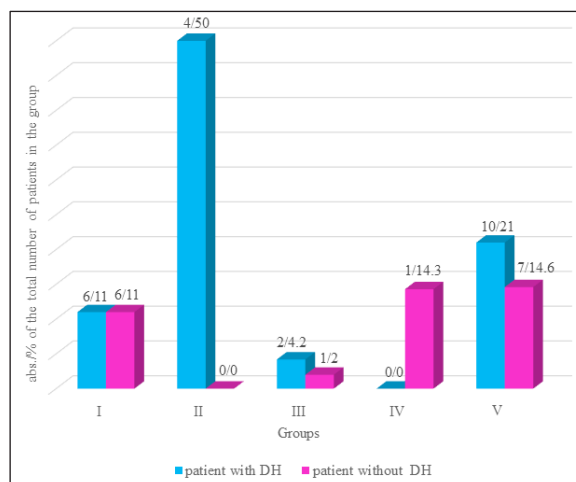
Average indicators of personal anxiety by research group are presented in Table 1. The obtained values corresponded to a moderate level in 58.1% of young people. A low level of personal anxiety was not determined in patients with combined pathology, and the average indicators corresponded to a high level of  $p>0.05$ .<sup>32</sup> Its values in groups (with the exception of Group I) were higher in the presence of DH, but the difference was not significant ( $p>0.05$ ). The correlation between the duration of hyperesthesia symptoms and high level of anxiety was weak and insignificant ( $\chi^2=2.556$ ,  $p=0.725$ ).

Table 1. The results of determining personal anxiety depending on the presence of DH

Groups	Presence of DH	The level of personal anxiety (abs./% of the total number of patients in the group)			Average indicators (Mean±SD)
		Low	Moderate	High	
I	present	2/3.6	21/38.2	6/11	40.80±9.20
	absent	8/14.5	5/9.1	13/23.6	41.80±10.70
II	present	1/12.5	3/37.5	2/25	42.20±11.52
	absent	0/0	2/25	0/0	35,30±2,50
III	present	2/4.2	11/22.9	3/6.25	39.40±6.85
	absent	5/10.4	21/43.75	6/12.5	38.25±7.71
IV	present	0	1/14.3	4/57.1	52.20±6.45
	absent	0	1/14.3	1/14.3	47.00±8.50
V	present	4/2.6	21/13.6	23/15	43.00±8.30
	absent	7/4.5	72/46.8	27/17.5	40.90±8.10



**Fig. 1. Prevalence of complaints of overtiredness depending on the presence of DH.**



**Fig. 2. Prevalence of complaints of frequent headache depending on the presence of DH.**

Average indicators of personal anxiety did not differ depending on the study group and the presence of DH ( $p>0.05$ ). There was no correlation between its level and duration of patients' complaints of hyperesthesia ( $r=0.1442$ ), prevalence ( $r=0.105$ ) and intensity ( $r=0.12$ ) of DH,  $p>0.05$ .

Based on the ideas of Zabolotna et al.,<sup>32</sup> 22% and 13.6% of young people complained of overtiredness and frequent headache, on average, during  $0.92\pm 1.77$  and  $1.15\pm 3.04$  years (Fig. 1, 2). The symptoms of hyperesthesia were determined 1.5 times more often in patients with headache than in patients without these complaints. The individuals of group IV diagnosed with DH did not complain of frequent headache. They were not more common or long-lasting in those examined with hyperesthesia (overtiredness ( $\chi^2=2.317$ ,  $p=0.128$ ) and frequent headache ( $\chi^2=1.781$ ,  $p=0.183$ )). There was no correlation between complaints of overtiredness and headache and: duration of DH ( $\chi^2=3.369$ ,  $p=0.067$  and  $\chi^2=2.128$ ,  $p=0.145$ , respectively) and the level of personal anxiety of young people ( $\chi^2=3.623$ ,  $p=0.164$  and  $\chi^2=0.477$ ,  $p=0.788$ , respectively). The relationship between the duration of

hyperesthesia symptom and the duration of complaints of overtiredness ( $r=0.055$ ) and frequent headache ( $r=0.031$ ) was insignificant ( $p>0.05$ ).

The prevalence of parafunctional habits was 50.7% (Table 2). They were single in more than half of the examined (58%). The unilateral type of mastication was determined more often among the parafunctions (in 28.4%). No connection was found between its development and the presence of extracted teeth ( $p=0.546$ ) and the period of their absence ( $p>0.05$ ). The habit of biting and licking lips was significantly more common in patients with WSD ( $p=0.025$ ), bruxism in patients with CC.<sup>32</sup> Direct correlation was observed between bruxism and the parafunctions of clenching teeth ( $\chi^2=26.815$ ,  $p<0.001$ ) and biting and licking lips ( $\chi^2=4.632$ ,  $p=0.032$ ).<sup>32</sup> Their development did not depend on the age, sex, presence of DH ( $p>0.05$ ). There was no relationship between the duration of parafunctional habits and the duration of symptoms of hyperesthesia ( $p>0.05$ ). The habit of nail biting was not determined in the patients of Group II, and clinical symptoms of bruxism were not detected in the patients of Group IV. In young people with DH the

Table 2. Prevalence of parafunctional habits and symptoms of TMD depending on the presence of DH

Factor	Presence of DH	Groups				
		I	II	III	IV	V
Biting and licking lips	present	4	1	2	1	7
	absent	6	0	4	0	20
Biting the mucous membrane of the cheeks	present	2	3	1	0	6
	absent	3	0	3	1	9
Nail biting	present	1	0	1	1	3
	absent	0	0	4	0	9
Tooth clenching	present	6	2	1	1	7
	absent	5	1	3	0	17
Unilateral type of chewing	present	7	1	6	1	13
	absent	7	0	6	0	21
Bruxism	present	1	0	1	0	4
	absent	4	1	10	0	0
Symptoms of TMD	present	9	1	7	3	18
	absent	9	1	18	1	23

following were absent: bruxism in Group II, parafunction to bite the mucous membrane of the cheeks in Group IV. In those examined with hyperesthesia, medium strength correlation was determined between the unilateral type of chewing and complaints of overtiredness ( $\chi^2=9.813$ ) and bruxism ( $\chi^2=5.292$ ),  $p=0.022$ . There was no correlation between the prevalence of parafunctional habits and the level of personal anxiety and complaints of frequent headache ( $p>0.05$ ). A weak direct correlation was observed between the presence of E enamel and the habit of tooth clenching ( $\chi^2=4.664$ ,  $p=0.031$ ).

TMD symptoms were diagnosed in 33% of the examined (less often in patients of Group II (25%), more often in patients of Group IV (57%)). The relationship between the duration

of DH and the duration of clinical symptoms of TMD was determined ( $r=0.3$ ,  $p<0.05$ ). In young people with hyperesthesia, a direct correlation was found between symptoms of TMD and the level of personal anxiety ( $\chi^2=13.798$ ,  $p=0.002$ ) and the habit of tooth clenching ( $\chi^2=5.594$ ,  $p=0.019$ ).

The results of the analysis of the relationship between DH and the investigated potential factors are presented in Table 3. In patients with E of enamel, the prevalence of hyperesthesia symptoms was in correlation: inverse with age, direct with the habit of biting and licking lips ( $p\leq 0.03$ ). A direct relationship between the intensity of DH and age and the parafunction of biting the mucous membrane of the cheeks was revealed in those examined with CC ( $p\leq 0.002$ ).

Table 3. The results of determining the relationship between the prevalence and intensity of DH and potential factors

Factor	Groups	Prevalence of DH		Intensity of DH	
		t / r	p-value	t / r	p-value
Age	I	r=-0.12	0.54	r=-0.16	0.39
	II	r=-0.36	0.02*	-	-
	III	r=-0.39	0.13	r=0.60	0.0013*
	IV	r=0.56	0.32	r=-0.39	0.51
	V	r=0.012	0.93	r=-0.13	0.36
Sex	I	t=0.28	0.78	t=0.68	0.50
	III	t=0.60	0.56	t=0.46	0.45
	IV	t=3.89	0.03	t=2.48	0.09
	V	t=0.40	0.69	t=0.37	0.71
Complaints of frequent headache	I	t=0.19	0.85	t=0.02	0.98
	II	t=0.23	0.84	-	-
	III	t=0.06	0.96	t=0.17	0.87
	V	t=0.98	0.33	t=0.27	0.79
Complaints of overtiredness	I	t=0.84	0.41	t=0.09	0.93
	II	-	-	t=0.85	0.46
	III	t=0.20	0.84	t=0.33	0.75
	IV	t=0.22	0.85	t=0.34	0.77
	V	t=0.08	0.94	t=0.32	0.75
Level of personal anxiety	I	r=0.11	0.57	r=-0.02	0.93
	II	r=0.63	0.17	-	-
	III	r=0.015	0.95	r=-0.31	0.24
	IV	r=-0.30	0.62	r=0.56	0.32
	V	r=-0.07	0.61	r=0.18	0.22
Biting and licking lips	I	t=0.07	0.94	t=0.21	0.83
	II	t=3.69*	0.03	-	-
	III	t=0.30	0.77	t=0.49	0.63
	IV	t=0.22	0.85	t=0.34	0.77
	V	t=0.02	0.98	t=0.27	0.79



Table 3. cont.

Factor	Groups	Prevalence of DH		Intensity of DH	
		t / r	p-value	t / r	p-value
Biting the mucous membrane of the cheeks	I	t=0.13	0.90	t=0.29	0.78
	II	t=1.79	0.17	-	-
	III	t=1.28	0.22	t=3.91	0.002*
	V	t=0.04	0.97	t=0.07	0.95
Habit of nail biting	I	t=0.91	0.37	t=0.71	0.49
	III	t=0.77	0.45	t=0.65	0.53
	IV	t=0.21	0.85	t=0.77	0.50
	V	t=0.71	0.48	t=0.32	0.75
Habit of tooth clenching	I	t=0.22	0.83	t=0.08	0.94
	II	t=0.39	0.72	-	-
	III	t=0.28	0.78	t=0.65	0.53
	IV	t=0.22	0.85	t=0.34	0.77
	V	t=0.27	0.79	t=0.44	0.66
Unilateral type of chewing	I	t=0.46	0.65	t=0.18	0.85
	II	t=0.36	0.74	-	-
	III	t=0.13	0.90	t=0.08	0.94
	IV	t=0.21	0.85	t=0.77	0.52
	V	t=0.08	0.94	t=0.23	0.82
Bruxism	I	t=0.28	0.78	t=0.31	0.76
	III	t=0.84	0.42	t=0.19	0.85
	V	t=0.04	0.97	t=0.30	0.77
Symptoms of TMD	I	t=0.58	0.56	t=0.33	0.75
	II	t=0.88	0.44	-	-
	III	t=0.03	0.97	t=0.21	0.84
	IV	t=0.45	0.70	t=0.81	0.50
	V	t=0.20	0.84	t=0.27	0.79

p – statistically significant differences; \* – ( $p \leq 0.05$ ); r – Spearman coefficient; t – Student's test

## Discussion

The conducted study determined the prevalence of cervical pathology of both carious and non-carious etiology,<sup>32</sup> which is described only in some papers.<sup>33</sup> The majority of NCCL were wedge-shaped, which corresponds to the results obtained by other authors.<sup>29</sup> Based on the data by *Teixeira et al.*<sup>26</sup> the morphology of the defects is usually associated with the predominance of certain etiological factors in the cervical area.

The prevalence of DH among young people of Donetsk region in Ukraine coincides with the results of epidemiological studies conducted in different countries of the world.<sup>4-6,27</sup> Some differences are probably related to the age of the examined, their socio-economic and cultural factors, dietary and hygiene habits and the difference in the criteria used to diagnose clinical symptoms of hyperesthesia and the exclusive reliance on the questionnaire data as opposed to reliable clinical parameters in addition to the patients' case histories.<sup>2,4</sup>

In the conducted study a frequent combination of cervical pathology with DH was determined, and that corresponds to literary sources.<sup>4,13,26,27,31</sup> Hyperesthesia symptoms were reported by 31.2% of the examined without diagnosed cervical pathology of the teeth, their duration of DH was longer than in individuals with E of enamel ( $p > 0.05$ ). In our opinion, it indirectly indicates a more intense pain in the presence of cervical lesions of the teeth that becomes the reason for patients to seek dental care early. Although DH causes pain and discomfort, it is likely that young people develop adaptive mechanisms to maintain normal performance of daily activities.<sup>4</sup> There are known studies in which correlation between cervical pathology, hyperesthesia and gingival recession was determined.<sup>2,4,12,26</sup> These potential connections were not considered in the present work, but they are planned to be clarified in future

publications. Timely diagnosis, successful prevention and treatment of gingival recession can reduce the prevalence and intensity of DH long term.<sup>12,34</sup>

According to data,<sup>4,9,31</sup> the percentage of the teeth with DH and NCCL increases significantly with age and is associated with a higher probability of their tooth wear. It is also known<sup>26,29</sup> that there is a direct correlation between age, non-carious pathology and symptoms of hyperesthesia. The conducted analysis revealed that in patients with E enamel the prevalence of symptoms of hyperesthesia was in inverse correlation, and in patients with CC the intensity of DH was in direct correlation with age ( $p \leq 0.05$ ). We believe that this is due to the examination of only young people. But it was determined that women were diagnosed with DH more often. This is consistent with the results,<sup>5,6</sup> which indicate the development of symptoms of hyperesthesia in women from an earlier age.<sup>8</sup>

The clinical picture of DH in patients with cervical dental pathology had a number of differences. A significant relationship between the depth of WSD and the development of symptoms of hyperesthesia has been found ( $p \leq 0.05$ ). The analysis of literary sources confirms the influence of the depth and morphology of NCCL on the intensity of DH and their correlation.<sup>26</sup> The conducted study showed that complaints of hyperesthesia from temperature stimuli were most common among young people. Other authors have also determined that cold is the most frequent stimulus (in 88%) that causes pain.<sup>6</sup>

The prevalence of TMD symptoms among examined young people corresponds to the results of modern studies; according to them, this indicator varies from 26.68%<sup>4</sup> to 87.93%.<sup>35</sup> It is also reported that the most vulnerable are people aged 20-40 years.<sup>16</sup> A relationship between TMD and the level of personal anxiety and tooth clenching has been found in

patients with DH. According to data,<sup>21,35</sup> TMD symptoms are associated with headache and reduced sleep quality, and they are correlated with the general indicator of anxiety, levels of depression, stress and quality of life.<sup>30,36</sup> The results obtained<sup>37</sup> showed a significant relationship between the presence of NCCL, tooth clenching and nail biting, as well as TMD diagnosis. According to *Rusu Olaru et al.*,<sup>38</sup> the main etiological factors of NCCL are bruxism (in 4.76%) and nail biting (in 14.28%). The conducted study has determined the correlation between the unilateral type of chewing and complaints of overtiredness and bruxism. The prevalence of bruxism among the examined was 7.7%, according to *Thetakala et al.*,<sup>23</sup> 31.6%,<sup>27</sup> 38%. It is known that bruxism is an etiological factor of NCCL,<sup>27,39</sup> in particular WSD,<sup>3</sup> and a permanent individual trait associated with tooth wear.<sup>40</sup> But clinical practice shows that not all patients with abfraction lesions have occlusal wear (bruxism or tooth clenching) and, conversely, not all who have occlusal wear have NCCL.<sup>12</sup> It is known that bruxism is strongly correlated with DH.<sup>6,20</sup> The authors did not determine the difference in the prevalence of clinical symptoms of bruxism in patients with and without hyperesthesia ( $p > 0.05$ ).

The conducted research had some limitations. First, 64% of those examined were women; secondly, the sample was represented by young patients who lived in a defined geographic region. All this limits the generalization of the obtained results.

## Conclusions

During the collection of anamnesis, clinical examination and treatment of a young dental patient, we suggest paying attention to possible manifestations of psycho-emotional stress that can affect the development, prevalence and intensity of DH. The established correlations and their features in individuals with cervical

pathology of the teeth make it necessary to carry out further research in order to develop effective therapeutic and preventive measures.

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