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ORIGINAL ARTICLE

THE INFLUENCE OF STRESS ON FUNCTIONING OF MASSETER MUSCLE

WPŁYW STRESU NA FUNKCJONOWANIE MIĘŚNIA ŻWACZA

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ABSTRACT

Introduction

Stomatognathic system disorders are often presented in the context of emotional overload, which becomes more and more frequent among young people due to increased social pressure. Psychological stress can result in muscle, joints and teeth problems, and parafunctions are the most common signs and symptoms of this stress.

Aim

The aim of this study was to analyze the influence of psychological stress on masticatory organ motor system to show dysfunctions prevalence in a group of high school students, as well as dysfunction types and the most frequent symptoms associated with them.

Material and methods

A total of 53 high school students were asked to fill out a questionnaire and a PSS-10 perceived stress scale form. A clinical study was carried out, which included measuring temporomandibular joint range of motion, acoustic symptoms examination, investigating pain on pressure with an algometer on the masseter, temporalis and trapezius muscles, as well as oral mucosa observation, including observation of incisal surface of incisors and premolar nodules, in order to detect damage.

Results

The stress was present in the whole group. Among high school graduates, a lateral movement asymmetry was present in 5 cases. There was also a significantly larger tenderness of a left temporalis ($p = 0.01$) and a lower part of a right masseter ($p = 0.000024$) over the second graders group. The sophomores more often reported acoustic symptoms, sleep bruxism and awake teeth clenching. The tension of a muscle with the largest tenderness was only linked to the dental antagonists contact at rest ($p = 0.036$).

Conclusions

Temporomandibular disorders are commonly observed in people with chronic stress. The muscle tension increases along with the stressor duration. The largest muscle tenderness is present at the lower part of the masseter. Minor parafunctions are the most predisposing factors in the creation of a pathology. The most common symptoms are teeth grinding, pain in joints area, acoustic symptoms and tinnitus.

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Key words: temporomandibular joints, masticatory organ motor system, parafunctional activity, algometer, pressure pain threshold

STRESZCZENIE

Wstęp

Zaburzenia układu stomatognatycznego często prezentowane są w kontekście stanu przeciążenia emocjonalnego, które ze względu na zwiększoną presję społeczną, coraz częściej towarzyszy młodym osobom. Stres może wpływać na dolegliwości ze strony mięśni, stawów oraz uzębienia. Najczęściej wymienianymi objawami jego następstw są parafunkcje.

Cel

Celem pracy jest analiza wpływu stresu na układ ruchowy narządu żucia, ukazanie rozpowszechnienia dysfunkcji w grupie licealistów oraz ich typów i towarzyszących im najczęściej objawów.

Materiał i metody

W badaniu wzięło udział 53 licealistów, którzy wypełnili ankiety oraz skale oceny stresu PSS10. Przeprowadzono badanie kliniczne składające się z pomiarów zakresów ruchów żuchwy, badania objawów akustycznych, sprawdzenia bolesności uciskowej żwaczy, mięśni skroniowych oraz czworobocznych przy użyciu algometru, a także obserwacji błony śluzowej jamy ustnej oraz powierzchni siecznych siekaczy i guzków zębów przedtrzonowych w celu wykrycia ich uszkodzeń.

Wyniki

Stres występował w całej badanej grupie. Wśród maturzystów obecna była asymetria ruchów bocznych żuchwy u 5 osób. Występowała także istotnie wyższa tkliwość mięśnia skroniowego lewego ($p = 0,01$) oraz dolnej części żwacza prawego ($p = 0,000024$) w stosunku do drugoklasistów. Młodsza grupa częściej deklarowała objawy akustyczne, bruksizm nocny i dzienne zaciskanie zębów. Napięcie najbardziej tkliwego mięśnia wykazało związek jedynie z kontaktem zębów antagonistycznych w spoczynku ($p = 0,036$).

Wnioski

Objawy dysfunkcji w obszarze układu ruchowego narządu żucia występują powszechnie u badanej populacji osób dotkniętych stresem przewlekłym. Napięcie mięśniowe rośnie wraz z czasem oddziaływania stresorów. Największą tkliwość prezentuje dolna część żwacza. Czynnikami najczęściej predysponującymi do powstania patologii są drobne parafunkcje. Najbardziej powszechne objawy to starcie zębów, ból okolicy stawów, objawy akustyczne i szumy uszne.

Słowa kluczowe: staw skroniowo-żuchwowy, aktywność parafunkcjonalna, algometr, uciskowy próg bólu

Introduction

As shown in many studies, there is a strong dependence between an emotional overload and motor organ dysfunctions (Manfredini *et al.* 2009, Ferrando *et al.* 2012). Unfavorable emotional factors have a negative impact on the functioning of the whole organism. In this study, however, only the impact on the temporomandibular disorders was highlighted.

The most distinctive symptom of a psychogenic response of tissues is an increased muscle tension, progressing along with the stressors' influence. Central nervous system structures are responsible for emotions, which also have a varied effect on muscle tension and the autonomic system, which regulates the homeostatic behavior of the body, and drives reactions such as the fight-or-flight response (Okeson 2008).

Increased muscle tension may result in specific masticatory organ motor system ailments, among which one can distinguish muscular disorders (myalgia, trigger points, occlusal abnormalities), articular disorders (arthalgia, joint disc functional disorders, structural incompatibility of the temporomandibular joint (TMJ) resulting from, among others, incorrect joint fluid moisturizing, inflammatory changes) and teeth disorders (excessive mobility and grinding). Headache and tinnitus are other common symptoms (Okeson 2008).

The parafunctional activity is a symptom most often associated with discharging the emotional tension (Ziółkowska-Kochan *et al.* 2007, Makino *et al.* 2014, Marczak *et al.* 2017). It can be divided into occlusal parafunctions, such as teeth clenching and grinding, as well as non-occlusal parafunctions, which include, among others, non-physiological movements of the tongue, biting the cheeks, or gum chewing (Marczak *et al.* 2017). Their main effects include excessive clashing of the incisors of the teeth, pain in the face, neck, throat, arms, back, pain in the vicinity of the TMJ, tension headaches, tinnitus and even disturbed libido (Ziółkowska-Kochan *et al.* 2007, Makino *et al.* 2014).

Some researchers consider stress to be a completely subjective phenomenon, while others present it as an objective difference between the social expectations and the abilities of a person and the emotional resources possessed by him or her. There are many types of stressors, or stress-inducing factors, but they all trigger similar adaptive responses (Okeson 2008, Marczak *et al.* 2017). As one of the serious factors causing stress in children and adolescents in Poland, the need to deal with school examinations – Matura exam (for secondary school certificate) in particular – stands out. Nowadays, however, more important in the impact of stressors per unit is attributed not so much to their rank as to the ways of dealing with them (Ogińska-Bulik *et al.* 2014).

There are two main strategies to deal with emotions. The first one is to discharge the generated energy outside, and the second one, more destructive for the body – discharging it to the inside. It is associated with several somatic reactions, including increased muscular tension within the head and neck. In addition, inactivated muscular activity can be intensified in this case, manifesting itself as parafunctions (Okeson 2008), including bruxism, both sleep and awake, which occurrence, depending on the sources, falls on 38–50% of children and adolescents and over 12% adults (Ziółkowska-Kochan *et al.* 2007, American Academy of Pediatric Dentistry 2016, Yap *et al.* 2016, Gouw *et al.* 2018). The increased need to interfere in the psychological sphere is evidenced by the role of psychotherapy in alleviating somatic symptoms, widely presented in the literature (Tonello *et al.* 2014, Makino *et al.* 2014).

Temporomandibular disorders (TMD) appear more and more often in the context of young people. The percentage of adolescents with this type of problem is still growing, and the modern civilization stress is given as the frequent cause of this phenomenon (Marczak *et al.* 2017). It is associated with increased social expectations of an individual, among others in environments such as work or school (Mazzetto *et al.* 2014, Tonello *et al.* 2014, Marczak *et al.* 2017). According to some authors, the symptoms of temporomandibular joint disorders affect up to 80% of adolescents from 16 to 19 years of age (Marczak *et al.* 2017). Others report that the proportion of children and adolescents between 5 and 17 years old is 25%, with its rising with age and between 32 and 19% of girls between 16 and

19 years of age, and 9.7% of boys (American Academy of Pediatric Dentistry 2016). Authors claim, however, that among adolescents TMD symptoms are presented only by 2–7% of people (Wahlund *et al.* 2015).

According to Ogińska-Bulik, frequency of TMD appearance strongly depends on the stress model of individual psychological resilience. The model of pre-examination stress (i.e. condition faced by students prior to school exams) includes two phases: exam preparation and exam confrontation, which is particularly characterized by emotional multiplicity (Ogińska-Bulik *et al.* 2014), and the period immediately preceding the exam is considered to trigger the greatest response to stress (Ringeisen *et al.* 2018).

Aim

The aim of this work is to analyze the impact of stress on TMD in high school graduates. The study is going to present how widespread the phenomenon of TMJ area dysfunction among young people in relatively good health exists, subjected to such an intensive stress stimulus as the maturity exam in secondary school in Poland. In addition, it is significant to show the types of disorders and signs of emotional discharge presented most often by the subjects. An important issue discussed in this work is also the dynamics of the development of disorders in this area based on a comparison of two age-similar groups.

Material and methods

Research group was consisted of 53 people. The study participants were divided into two groups. The first consisted of 25 high school graduates, including 14 girls and 11 boys between the 18 and 19 years of age, while the remaining persons were a control group, which included 28 second graders, including 21 girls and 7 boys, aged 17–18 years. The subjects were pupils of biological and chemical classes of Adam Mickiewicz High School number 8 in Poznań, Poland. All study participants were characterized by good overall health status. Participation in the study was voluntary and preceeded by detailed information on its process and applicable rules. Adult learners themselves expressed their written consent to participate in the study, while persons who were under the age of 18 were obliged to provide their parents' written consent.

Conducting the study was preceded by a lecture aimed at raising the awareness of high school students about disorders of the temporomandibular joints, explanation of the process of the experiment, and encouraging participation provided by the Author of this study.

To implement the goals set in the study, appropriate research tools were used to facilitate the acquisition of necessary data and their collection, i.e. a questionnaire, a stress assessment scale, a clinical trial form, as well as an algometer evaluation and a metal ruler. The survey was characterized by indirect measurement. Each of the respondents received one hard copy of the questionnaire, which was filled independently and confidentially. It contained 17 disjunctive closed questions regarding subjective feelings including the symptoms and habits in masticatory organ motor system.

In addition, the respondents were asked to fill in the PSS10 subjective scale of perceived stress, in which it was necessary to indicate the frequency of specific emotional states occurrence in their lifetime, assigning them values from 0 to 4, where 0 meant 'never', and 4 – 'very often'.

In the next stage, a clinical study was carried out, which included measurements of ranges of motion in the TMJ, examination of acoustic symptoms, pressure soreness and oral mucosa observation, including observation of incisal surface of incisors and premolar nodules, in order to detect damage. Movement ranges were examined in the reclining position on the couch, using a metal ruler with a millimeter scale. The vertical movement of the maximum active opening of the mouth and horizontal movements, including the lateral, side-to-side left and right movements, and

the front mandible protrusion were considered. The vertical measurement was made in this case between the mesial-distal center of the incisal edge of the central lower incisor and the lip-secant edge of the opposing upper incisor. The lateral movements were measured by the value of the mesial-distal movement of the central lower incisor, relative to the neutral position of the mandible in both directions. In this case the symmetry was more important than the value of the obtained measurements. The results are presented in SI units of measure (millimeters). In this part of the study, the painfulness of movements was also determined only as a quantitative value.

The occurrence of acoustic symptoms was checked both during the vertical movements, which means the mandible abduction and adduction, as well as horizontal movements, i.e. lateral, side-to-side left and right movements. The research was done by placing the fingers of the person checking the TMJ area of the examined person during the implementation of the indicated activity.

The compressive pain threshold, for objectivity, was examined using an algometer. The instrument was applied in eight designated points, usually occupied by trigger points, preceded by a palpation examination. The pressure areas are symmetrically the anterior temporal muscle, the upper and lower parts of the masseter and the descending part of the trapezius muscle. The algometer head was each applied to the tissues at an angle of 90 degrees, using increasing pressure, until the first discomfort sensation, signaled by the examined person. The obtained result was given in the force unit (kilogram per square centimeter).

The final stage was the observation of the oral cavity, in which the incisal surfaces of the incisors, premolar nodules, cheeks, gums and tongue were subjected to evaluation.

In order to calculate the measures of central tendencies and verify the statistical hypotheses regarding the used quantitative scales, appropriate tests of differences for independent groups, available in version 13 of the Statistica Package, were carried out. The compliance of variables with the parametric distribution was calculated using the W Shapiro-Wilk test. The calculations are based on 95% confidence intervals. Then, for the graphs inconsistent with the parametric distribution, the Mann-Whitney U-test was performed, while for the parametric distributions the F-Fisher test was performed, in which homogeneity of the variance and the T-test were determined.

Results

The analysis of the obtained results proves that psychological stress was present in the whole studied population, however, it is characterized by various intensities. In the questionnaire, intense of stress was reported by slightly more high school graduates (84%) than second graders (79%), while according to the PSS-10 results, stress concerned a larger percentage of both groups, with 96% among high school graduates and 93% with low stress concerns 4% of high school graduates and 7% of second graders, moderate stress: 84% of high school graduates and 82% of second grade students, while high stress: 12% of high school graduates and 11% of second graders. An important issue was also the fact that respondents reporting a lack of intense stress in the survey, according to the scale, were characterized by moderate stress.

Movement measurements ranges made it possible to detect some differences between the two groups. The mean value of maximum active opening of the oral cavity and forward movements were similar in both cases, while the asymmetry of the lateral movement ranges, by which the difference in movements was greater than 2 millimeters, was observed mainly among high school graduates. The exact results including pain symptoms are presented in Table 1.

An important parameter examined was the presence of acoustic symptoms, which was declared by clearly more questioned sophomores, whereas these results were not

Table 1. Range of TMJ movements recorded in studied groups

Research groups	M±SD – MAO [mm]	Pain – No. of ppl.	ASM > 2mm – No. of ppl.	Pain – No. of ppl.	M±SD – PM [mm]	Pain – No. of ppl.
Graduates	46.8 ± 7.7	2	5	0	4.84 ± 0.7	0
Sophomores	47.5 ± 2.8	2	1	0	4.1 ± 0.7	1

(M – mean, SD – standard deviation, MAO – maximal active opening, ASM – asymmetry of side movement, PM – protrusive movement)

confirmed in the clinical examination, which provided convergent data in both groups with a slight majority of high school graduates. Detailed percentages are given in Table 2.

of secondary school graduates and 43% of second grade students, while on the gums in 4% of both high school and secondary school students. The total percentage of high school

Table 2. Acoustic symptoms expressed in percentages

Research groups	Questionnaire		Clinical examination				
	Crack-ling	Friction	Ab-duction	Ad-duction	Left side	Right side	Total
Graduates	28	8	24	28	20	24	64
Sophomores	39	11	25	21	25	21	50

Muscular soreness was significantly higher among high school graduates in the case of the left temporal muscle (p = 0.01) and the lower part of the right masseter (p = 0.00002). The remaining results did not show the statistical significance. The average values of the forces causing the pain sensation in individual muscles are presented in Table 3.

students presenting changes in the group of high school graduates was 76%, while in the second-grade group – 61%.

In the questionnaire, the pain in the area of the masticatory organ motor system was declared by more second graders (75%) than high school graduates (48%), with a distinct predominance of pain occurring once (36%

Table 3. Mean pain threshold [kg/cm^2] with standard deviation and statistical significance revealed with algometer's studies

Research groups	LT	RT	ULM	URM	LLM	LRM	LTr	RTr
Graduates	1.55 ± 0.65	1.55 ± 0.4	1.35 ± 0.1	1.26 ± 0.6	1.54 ± 0.2	1.1 ± 0.7	2.39 ± 2.3	2.3 ± 1.8
Sophomores	2.24 ± 1.5	1.97 ± 2.3	1.76 ± 0.6	1.72 ± 1.6	1.66 ± 1.4	2.1 ± 0.2	2.56 ± 2	2.21 ± 1.8
p-value	0.01	0.09	0.19	0.12	0.23	0.000024	0.83	0.86

(LT – left temporalis, RT – right temporalis, ULM – upper left masseter, URM – upper right masseter, LLM – lower left masseter, LRM – lower right masseter, LTr – left trapezius, RTr – right trapezius)

Detection of oral damages made it possible to diversify both groups mainly in terms of clashing of premolars in 60% of the high school students and 39% of second graders and changes in the surface of the tongue, occurring in 12% of high school graduates and in none of the second graders. Others from the observed changes were also frequent, but they did not differ significantly between groups. Changes in the incisors were observed in 20% of high school graduates and 21% of second graders, on the cheeks in 52%

of high school graduates and 57% second-graders). Recurrent pain was reported by 12% of high school graduates and 14% of second graders, while permanent pain only occurred in 4% of second graders and in none of the secondary school graduates.

A much larger number of respondents reported awake teeth clenching than parafunctional sleep activity. Clenching during the day only in the last 6 months was reported by 16% of high school graduates and 21% second-grade students, while in the long-term:

16% of high school graduates and 14% of second-grade students. In the last six months, the sleep bruxism has been observed only 4% of high school graduates and 7% of second graders, whereas its appearance in the previous period is declared by 11% of second graders and none of the high school graduates. In addition, part of the younger group surveyed indicates a feeling of pain or numbness in the morning (29%), but none of the high school graduates reports it. In addition, the appearance of jaw lock was reported by 12% of high school graduates and as much as 25% of second graders, and the resulting problems with food consumption occurred in 11% of second graders and in none of the high school graduates.

Symptoms such as tinnitus were also commonly reported by respondents, the presence of which was observed by 60% of high school graduates and 61% of second graders, headaches occurring in the last 6 months in 16% of high school graduates and 11% second graders, as well as those lasting for over 6 months. Forty percent of high school graduates and 57% second graders, contact of antagonistic teeth at rest in 16% of high school graduates and 54% of second grade students and minor parafunctions occurring in even 72% of high school graduates and 93% of second graders. In addition, high school students also reported predisposing factors such as frequent gum chewing by 48% of high school graduates and 32% second grade students, orthodontic treatment in 64% of high school graduates and 82% second grade students, as well as third molars extraction in 4% of high school graduates and 15% second graders.

In people examined that were experiencing high stress (3 secondary school graduates and 3 second graders), according to the PSS-10 scale, the results were varied, while only one person had no acoustic symptoms. Also, only one threshold of the left temporal muscle, examined with an algometer, turned out to be higher than the average in individual groups, while there were no statistically significant differences in muscle tenderness between people with high and moderate stress. In addition, 5 out of 6 people declare the presence of minor parafunctions in the questionnaire, of which 4 are observable changes in the oral cavity.

Factors predisposing to the development of TMD, which are not the result of emotional tension, such as chewing gum or previous orthodontic treatment, did not, according to the results, significantly affect the pressure soreness of the right lower masseter, showing the greatest tenderness among the muscles examined.

The intraoral habits and daily teeth clenching on the right lower masseter tension were also not significant, whereas the contact relationship of antagonistic teeth at rest with the tension of the above-mentioned muscle ($p = 0.036$) turned out to be significant. Data showing the relationship between the given factors and the right bottom masseter tension are presented in Table 4.

Table 4. Relevance of particular factors to the tension of the right lower masseter

	Chewing gum	Orthodontic treatment	Biting	Daily jaws clenching	Antagonistic teeth contact	Tinnitus
p	0.09	0.89	0.8	0.38	0.036	1

Discussion

The clinical trial provided a lot of valuable information on differences in the health condition of the masticatory organ motor system of secondary and secondary school students. Differences characterized by statistical significance were shown by a worse functional status of the masticatory organ motor system in the group of students of the final year, which, however, was not confirmed in the questionnaire, in which the second graders reported much more often symptoms such as pain or crackling. This may indicate specific differences in the accepted

criteria for assessing one's own health within both groups. The reason for the discrepancy of this type may be the subjectivism characterizing the part of the study using the questionnaire as a research tool. It is completed by each of the respondents independently, in contrast to a clinical examination performed by one person in all participants of the study, which makes them more objectivized. As we can conclude, the second graders probably adopted more stringent criteria, and thus, similar standards could be applied in the scale of stress assessment, characterized by the same subjectivism. This could have affected the small diversity of the emotional state according to the questionnaire used. Often the lack of reliability of subjective scales is indicated, often in the context of the VAS scale, as pointed out by Kubasik *et al.* (2015).

Although the level of stress was not varied in both groups, the time of its interaction in the face of the upcoming matriculation examination was probably longer in the matriculation group, which could affect the intensity of some of the presented symptoms. According to Okeson, persistent stress is a factor in the conditioning, which causes the evaluation of diseases (Okeson 2008). In addition, as Jancelewicz mentions, under the influence of stressors, the adaptation of the organism is reduced (Jancelewicz 2010).

The limited movement of jaw abduction is found when it is less than 40 millimeters, but the normal range ranges from 53 to 58 millimeters, therefore the average in both groups was slightly undervalued, but in line with the standard (Okeson 2008).

Asymmetry occurring in the form of the difference in lateral movements of the mandible appeared in few of the subjects but dominated in high school graduates. Among the factors that may influence the asymmetry, the extraction of third molars is certainly excluded, as none of these people declared going through it, while the effect of chewing gum and minor parafunctions, which occur in most of them, seems significant, and also Makino and others mention the sidedness (Makino *et al.* 2014).

According to algometrical research carried out by Wilk *et al.*, The trapezoidal muscle pain threshold in young, healthy people (between 20 and 30 years) varies between 3.61 and 4.20 kilograms per square centimeter, while the average of own research turned out to be significantly lower, although similar in both groups, which may indicate a reduced pain threshold (Wilk *et al.* 2015). The research carried out by Packer *et al.* provided very divergent data on masseter and temporal muscle, in a group of women between 18 and 40 years of age, in whom TMD symptoms were found. Algometrical examination showed the threshold of masseter pain in the range of 0.4–0.6 kilograms per square centimeter, while in the temporal muscle the measurement values varied between 0.4 and 0.8 kilograms per square centimeter (Packer *et al.* 2014). However, it should be remembered that the examined group was homogeneous in terms of gender, while in the female population there is a reduced pain threshold in relation to the male population (Nomura *et al.* 2007). On the other hand, own research had a mixed group. In addition, the group presented consisted of members diagnosed with TMD. It should also be noted that according to Fisher, values below 3 kilograms per square centimeter are incorrectly low (Kubasik *et al.* 2015). Gouw *et al.* conducted an algometer study on a mixed group of 24 people suffering from bruxism. The average pain threshold of their masseters was 2.6 or 2.8 kilograms per square centimeter depending on the group, and although they were people struggling with a specific problem, their results were significantly higher than in the own research (Gouw *et al.* 2018).

Okeson presents the effect of stress on increased nocturnal masseter activity, which is consistent with the results obtained (Okeson 2008). The phenomenon of numbness of the TMJ area in the morning reports more people than the occurrence of sleep bruxism episodes, which may indicate a lack of awareness of presenting this type of

parafunctions. In children up to 17 years of age, nocturnal bruxism and daily jaw clenching are observed in 38% (American Academy of Pediatric Dentistry 2016), whereas the own study showed that these phenomena occur in as many as 45%, with the group consisting of people 17–19 years old, and according to Gouw *et al.*, the phenomenon of bruxism significantly decreases with age (Gouw *et al.* 2018). This indicates a high prevalence of these parafunctions in the study group.

According to statistical calculations, the lack of connection of non-stress factors, such as orthodontic treatment or third molar extraction, with the right lower masseter tone – the muscle with the lowest mean pain threshold, significantly more tensed in the group of high school graduates, may indicate an increased interference of psychogenic factors. The tension of this muscle is correlated, however, by the lack of a resting gap between occlusal surfaces of opposing teeth at rest, which, as Marciniak *et al.* points out, is associated with disorders of physiological balance of muscles, leading to impairment of their function (Marciniak *et al.* 2015). Although there was no statistically significant effect of the right lower masseter volume on the presence of tinnitus, it is certainly a symptom commonly reported in the study group. It is reported by 60% of respondents, which is a relatively high percentage compared to Bezerra Rocha *et al.*, which draws attention to the presence of this phenomenon in 10–15% of the adult population. It presents a close relationship of noise with the presence of trigger points within the muscles of the head, neck and shoulder girdle, including the temporal muscles, masseter and trapezius muscles (Rocha *et al.* 2012).

Due to a small research group in this paper, it is difficult to explain the significantly greater tenderness of the left temporal muscle and the lower right masseter muscle in the group of graduates compared to the group of sophomores. A further research should be extended by increasing the size of the group, as well as by performing an additional orthodontic evaluation.

Conclusions

Among people struggling with chronic stress, the occurrence of dysfunction symptoms within the masticatory organ motor system is common. With increasing lengthening time of stressors, muscle tension can be observed. The greatest sensitivity to stressors is characterized by the lower part of the masseter, which is part of the muscle with the lowest pain threshold and presents the greatest difference in tenderness within both presented above age groups. A factor predisposing to the occurrence of dysfunctions in the area of masticatory organ motor system, presented most often by people with a high level of stress, are minor parafunctions, such as biting the lips or cheeks, while the most common symptoms that indicate the resulting pathology is the grinding of tooth incisors, pain in the masticatory organ motor system area, acoustic symptoms, as well as tinnitus.

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