

Influence of stage fright on activities and sensations within the vocal tract

Wpływ tremy na czynności i odczucia w obrębie traktu głosowego

Authors' Contribution:

A – Study Design
B – Data Collection
C – Statistical Analysis
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E – Literature Search
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ABSTRACT:

Introduction: Stage fright is a symptom of excessive emotional arousal, and it is commonly referred to as social anxiety. This type of anxiety results mainly from a sense of being judged by others in a given social situation.

Materials and Methods: We enrolled 27 female students, aged 22–30 years. We used two methods to examine the influence of stage fright on the activities and sensations within the vocal tract; namely, palpation assessment and the Vocal Tract Discomfort and Voice Quality questionnaire, which were performed twice, i.e., shortly after a presentation in front of an audience and after a normal conversation. The purpose of the study was to assess the impact of stage fright on actions and sensations within the vocal tract.

Results: Participants had significantly higher scores with regard to palpation assessment, discomfort, and voice quality after presentations in front of an audience than after normal conversations, indicating a negative impact of stage fright on the studied parameters.

Discussion: Stage fright significantly affects activities within the vocal tract structures such as the submandibular region, lateral pharyngeal walls, sternocleidomastoid muscles, and cricothyroid and thyrohyoid spaces; also, it affects jaw mobility and breathing patterns. In addition, stage fright induces negative sensations within the vocal tract such as burning, tension, dryness, jaw clenching, throat tightness, grunting, shallow breathing, voice tremor, hoarseness, and faltering voice. The feeling of discomfort during situations that elicit stage fright correlates with self-assessed voice quality.

KEYWORDS:

social anxiety, palpation assessment, voice quality, voice discomfort

STRESZCZENIE:

Wstęp: Trema jest objawem nadmiernego pobudzenia emocjonalnego. W wielu publikacjach słowo trema jest określane jako lęk społeczny. Ten rodzaj lęku wynika głównie z poczucia bycia ocenianym w danej sytuacji społecznej.

Materiały i metody: Badaniem objęto 27 studentek w wieku 22–30 lat. Do sprawdzenia wpływu tremy na czynności i odczucia w obrębie traktu głosowego zastosowano dwa rodzaje narzędzi badawczych: ocenę palpacyjną oraz Kwestionariusz Dyskomfortu Traktu Głosowego i Jakości Głosu. Ocena palpacyjna oraz badanie kwestionariuszem dyskomfortu traktu głosowego i jakości głosu były wykonane dwukrotnie: podczas indywidualnych występów publicznych oraz podczas neutralnej rozmowy. Celem badania była ocena wpływu tremy na czynności i odczucia w obrębie traktu głosowego.

Wyniki: Wyniki badania wykazały, że kobiety w trakcie prezentacji uzyskały istotnie statystycznie wyższą punktację oceny palpacyjnej, dyskomfortu oraz jakości głosu w porównaniu do osób w trakcie neutralnej rozmowy. Wyższa punktacja świadczy o negatywnym wpływie tremy na badane parametry.

Dyskusja: Trema wpływa istotnie na czynności w obrębie struktur traktu głosowego – okolicę podżuchwową, boczne ściany gardła, mięśnie M-O-S prawy i lewy, przestrzeń pierścienno-tarczową i tarczowo-gnykową, ruchomość żuchwy, tor oddechowy. Dodatkowo powoduje zwiększenie negatywnych odczuć w trakcie głosowym, takich jak: pieczenie, napięcie, suchość, uczucie zaciskania żuchwy i gardła, pochrząkiwanie, spływanie oddechu, drżenie głosu, chrypa, załamywanie głosu. Odczuwany dyskomfort podczas tremy koreluje z samooceną jakości głosu zgłaszaną przez studentki.

SŁOWA KLUCZOWE: lęk społeczny, ocena palpacyjna, jakość głosu, dyskomfort głosu

LIST OF ABBREVIATIONS

VTD *Vocal Tract Discomfort Scale*

INTRODUCTION

The term “stage fright” originates from Latin and means “to tremble, shake” [3]. Stage fright is “an emotional disorder that appears in front of an audience, and it is a symptom of excessive emotional tension and anxiety” [8]. Potential causes of tension during appearances in front of an audience include poor faith in one’s own skills, physical unattractiveness, social mismatch, feelings of rejection by important figures, fear of unknown situations, and experiencing strong and unpleasant emotions and anticipatory anxiety [1].

In many publications, the term “stage fright” is replaced the term social anxiety. This type of anxiety is specific because it results from a sense of being judged by others in a given social situation [7], which can be both helpful or paralyzing. Stage fright is accompanied by three groups of symptoms; namely, physiological, cognitive, and behavioral symptoms [9, 10, 11, 12].

Physiological, or somatic, symptoms reflect an arousal of the autonomic nervous system, and include cardiovascular responses, respiratory responses, gastrointestinal disorders, increased muscle tone, increased sweating, elevated body temperature, and sometimes vision or hearing impairment. In situations that elicit stage fright, our body releases the stress hormones - adrenaline and noradrenaline, into the blood. Consequently, the fight-or-flight response is activated [12]. Situations that elicit stage fright are perceived as a danger that must be overcome or escaped from.

Cognitive symptoms such as obsessive cognitive schemes, with for instance, ruminations regarding dramatic consequences of failure, also accompany stressful situations.

Finally, behavioral symptoms are those that are externally visible. They may include excessive gesticulation or tics. When observed by an audience, these symptoms may be interpreted as a lack of self-control of the speaker or a feeling of uncertainty with regard to their knowledge and skills [12].

Actions and sensations within the vocal tract are directly affected by the physiological symptoms of stage fright. Increased muscle tension in the neck and lumbar spine is transferred to external muscles and the internal laryngeal muscles, causing their dysfunction. When we feel that others are judging us, we

often try to inhibit some reflex bodily responses, which causes a “tight throat” symptom. This is a situation when we want to say something but feel that we are choking. Shallow breathing is another symptom of stage fright that affects voice quality and its volume. This results in weak phonation, making the message of the speaker less clear. Another consequence of stress are disorders of mucous secretion within the upper respiratory tract, which causes a characteristic feeling of dry throat. Inadequate lubrication of the vocal folds may cause their dysfunction. In addition, dryness is accompanied by grunting and a feeling of itchy throat. This, in turn, affects voice quality, for example, by causing hoarseness [13].

The main purpose of the study was to assess the impact of stage fright during performances in front of an audience on the activities and sensations within the vocal tract.

MATERIALS AND METHODS

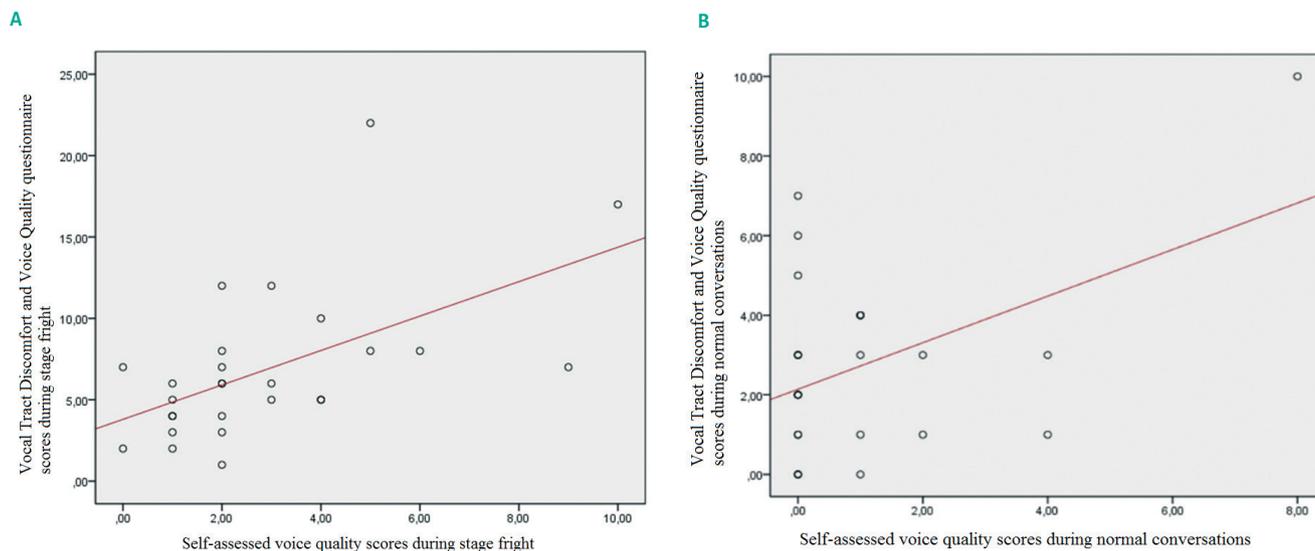
We included 27 women, aged 22-30 years (Mean = 22.7, SD ± 1.59). The group consisted of first-year graduate students of General and Clinical Logaoedics, Medical University of Warsaw, Warsaw, Poland. All studied women listened to at least one lecture on the principles of sound emission and voice hygiene. None of them showed signs of the common cold or fatigue during the study. Participants were informed of the course of the study, and gave informed consent.

The two following methods were used to examine the impact of stage fright on the activities and sensations within the vocal tract: palpation assessment and the Vocal Tract Discomfort and Voice Quality questionnaire.

Palpation is a diagnostic method that involves the evaluation by touch of the size, shape, hardness, and position of a particular anatomical structure. It is part of the physical examination and is used, for instance, for assessing the abdomen, thorax, and neck.

The aims of the palpation assessment of the vocal tract were to:

- Assess muscular tension in the submandibular region, lateral pharyngeal walls, and sternocleidomastoid muscles. The investigator scored the tension as absent, mild, moderate, or strong.
- Classify breathing patterns as clavicular, thoracoabdominal, abdominal, or variable.
- Assess the size of the thyrohyoid and cricothyroid spaces; classified as normal or restricted.
- Evaluate jaw mobility during speaking; classified as correct or limited.



Ryc. 1. Istotny statystycznie związek pomiędzy uzyskaną punktacją w części dotyczącej dyskomfortu traktu głosowego a wynikami jakości głosu Kwestionariusza Dyskomfortu Traktu Głosowego i Jakości Głosu uzupełnionymi podczas: A. tremy po wystąpieniu publicznym, B. neutralnej rozmowy.

Tab. I. Palpation Assessment Score Sheet

KARTA OCENY PALPACYJNEJ					
SUBMANDIBULAR AREA TENSION	none 0 pts.		mild 1 pt.	moderate 2 pts.	severe 3 pts.
LATERAL PHARYNGEAL WALL TENSION	none 0 pts.		mild 1 pt.	moderate 2 pts.	severe 3 pts.
STERNOCLEIDOMASTOID MUSCLE TENSION	PP	none 0 pts.	mild 1 pt.	moderate 2 pts.	severe 3 pts.
	LL	none 0 pts.	mild 1 pt.	moderate 2 pts.	severe 3 pts.
THYROID SPACE SIZE	normal (1 cm) 0 pts.			restricted 1 pt.	
CRICOTHYROID SPACE SIZE	normal 0 pts.			restricted 1 pt.	
BREATHING PATTERN	clavicular 2 pts.		thoracoabdominal 0 pts.	abdominal 2 pts.	variable 1 pt.
JAW MOBILITY	normal 0 pts.			restricted 1 pt.	

The palpation assessment score ranged from 0-17 points, with "0" indicating absent tension in the submandibular space, lateral pharyngeal walls, and sternocleidomastoid muscles, as well as proper respiratory pattern, normal jaw mobility, and normal size of the cricothyroid and thyrohyoid spaces.

The investigator was a speech therapist with experience in palpation assessment and manual therapy with the Mathieson method. The palpation assessment was performed under supervision of a physician specialized in audiologist-phoniatry.

After the palpation assessment, the investigator reported the results in the Vocal Tract Palpation Assessment score sheet, which was created for the purposes of this study (Tab. I).

In all participants, the palpation assessment was performed twice. First, during individual presentations in front of an audience (at the campus of the Medical University of Warsaw); the examination was conducted at the beginning of the presentation, up to 3-5 minutes after its commencement. Second, the same type of assessment was repeated 2 to 7 days after the

presentation, during an interview with the investigator in a different room that was unrelated to the previous study site. The testing conditions were the same for both assessments. During the first assessment, all participants gave their presentation in a non-air-conditioned room, without any voice enhancing equipment. The presentations took about 8 minutes each, and were given while standing. All women had sufficient time to prepare themselves for the presentations, which were given with an accompanying slide show. The number of listeners was similar during all study procedures. During the second assessment, all students talked to the investigator on neutral subjects, and received sweets as a thank you, which elicited a positive mood. The assessment was performed in a standing position.

As with the palpation of the neck and respiratory tract, the Vocal Tract Discomfort and Voice Quality questionnaire was completed by the respondents twice. Initially, it took the respondents up to 10 minutes, and took place after presentations in front of an audience. The questionnaire was completed for the second time after a conversation on neutral subjects, and at the same time, the palpation assessment was also performed. The assessed symptoms included in the questionnaire were voice discomfort and self-assessed voice quality.

A modified Vocal Tract Discomfort (VTD) questionnaire was used to determine the symptoms reported by students during voice formation. For the purposes of the study, we modified the original VTD self-assessment tool, which evaluates the frequency and severity of 8 symptoms. In this study, we included 6 items from the VTD questionnaire, and created the Vocal Tract Discomfort and Voice Quality questionnaire. The questionnaire was supplemented with additional 12 items, five of which concerned vocal discomfort. The items were responded to on a 4-point scale (none, mild, medium, severe) (Tab. II). The scores of the modified VTD questionnaire ranged from 0-33 points, with "0" indicating a lack of complaints with regard to the vocal tract and "33" indicating the maximum severity of symptoms. The scores of the Vocal Tract Discomfort and Voice Quality Scale ranged from 0- 21 points, with "0" indicating a lack of voice quality complaints and "21" indicating the maximum severity of symptoms.

RESULTS

Statistical analysis was performed using the IBM SPSS Statistics 22 package. We used the repeated measured t-test to test differences in the dependent variables between the two measurements. For ordinal scale variables, we used the non-parametric equivalent of the t-Student test, i.e., the Wilcoxon test. For nominal variables, we used the McNemar test. The equal-

Tab. II. Vocal Tract Discomfort and Voice Quality Questionnaire

	SYMPTOMS	SEVERITY			
		0 PTS.	1 PTS.	2 PTS.	3 PTS.
VOCAL TRACT DISCOMFORT ASSESSMENT	1 Burning [...]	none	mild	moderate	severe
	2 Tension [...]	none	mild	moderate	severe
	3 Dryness [...]	none	mild	moderate	severe
	4 Pain [...]	none	mild	moderate	severe
	5 Itching [...]	none	mild	moderate	severe
	6 Lump-in-the-throat feeling [...]	none	mild	moderate	severe
	7 Nuchal rigidity	none	mild	moderate	severe
	8 Jaw clenching	none	mild	moderate	severe
	9 Throat tightening	none	mild	moderate	severe
	10 Grunting	none	mild	moderate	severe
	11 Shallow breathing	none	mild	moderate	severe
	12 Hoarseness	none	mild	moderate	severe
VOICE QUALITY ASSESSMENT	13 Temporary voice absence	none	mild	moderate	severe
	14 Voice tremor	none	mild	moderate	severe
	15 Changes in voice pitch	none	mild	moderate	severe
	16 "Airy" voice	none	mild	moderate	severe
	17 Weak voice	none	mild	moderate	severe
	18 Voice faltering	none	mild	moderate	severe

ities of counts in the examined groups were checked with the chi-squared test.

The following descriptive statistics were used: the arithmetic mean (M) and standard deviation (SD). For nominal variables, frequency analysis was performed (N,%). $P < 0.05$ was considered statistically significant.

Initially, we evaluated the internal consistency of the palpation assessment. The Alfa-Cronbach score for the palpation assessment of the vocal tract was 0.77. During a neutral conversation, significantly more participants reported a lack of discomfort within the following structures: the submandibular space, lateral pharyngeal walls, and sternocleidomastoid muscles.

Based on the McNemar test, there were also statistically significant differences with regard to the size of the thyrohyoid and cricothyroid spaces, as well as jaw mobility.

During neutral conversations, we found significantly more indicators of a normal size of the thyrohyoid and cricothyroid spaces, as well as normal jaw mobility.

Tab. III. Assessment of muscle tension in the submandibular areas, lateral pharyngeal walls, and right and left sternocleidomastoid muscles. Palpation assessment variables that differed significantly between measurements – during presentations in front of an audience and during normal conversations.

Variable	Palpation Assessment of the Vocal Tract during a presentation in front of an audience				Palpation Assessment of the Vocal Tract during normal conversations			
	None	Mild	Moderate	Sever	None	Mild	Moderate	Sever
	%	%	%	%	%	%	%	%
Submandibular area**	7,4	18,5	44,4	29,6	55,6	33,3	11,1	0
Lateral pharyngeal walls**	7,4	7,4	59,3	25,9	66,7	33,3	0	0
Right sternocleidomastoid muscle*	11,1	18,5	51,9	18,5	63	33,3	3,7	0
Left sternocleidomastoid muscle*	7,4	25,9	51,9	15,8	59,3	40,7	0	0

*p<0,01; **p<0,001

Variable	Palpation Assessment of the Vocal Tract during a presentation in front of an audience		Palpation Assessment of the Vocal Tract during a normal conversation	
	Normal	Restricted	Normal	Restricted
	%	%	%	%
Cricothyroid space*	33,3	66,7	81,5	18,5
Thyrohyoid space*	33,3	66,7	77,8	22,2
Jaw mobility**	29,6	70,4	59,3	40,7

*p<0,01; **p<0,05

In addition, based on the chi-squared test, there were statistically significant differences with respect to the breathing patterns during normal conversations and after presentations in front of an audience, $\chi^2(2) = 14.89$; $p < 0.01$.

During neutral conversations, as compared to the stressful situation, significantly more participants reported features of the thoracoabdominal breathing pattern (Tab. V). During presentations in front of an audience, the clavicular and abdominal breathing patterns were observed.

Based on the t-student test, there was a statistically significant difference with regard to the total palpation score between the two measurements, $t(26) = 9.62$; $p < 0.001$. During presentation in front of an audience, participants had significantly higher palpation scores (10.89 ± 4.13) than during neutral conversations (3.11 ± 2.04).

Tables VI and VII present the number and percentage of participants with particular scores in the Vocal Tract Discomfort and Voice Quality questionnaire. During neutral conversations, as compared to presentations in front of an audience, significantly more people reported a lack of discomfort in terms of tension, dryness, jaw clenching, throat tightening, shallow breathing, voice tremor, hoarseness, and voice faltering. Based on the repeated measures t-test, the total score in the Vocal Tract Discomfort and Voice Quality questionnaire – the part regarding vocal tract discomfort,

Tab. IV. Cricothyroid space and thyrohyoid space sizes, jaw mobility and palpation assessment variables that differed significantly between the two measurements – during presentations in front of an audience and during normal conversations.

BREATHING PATTERN	THORACO-ABDOMINAL	VARIABLE	CLAVICULAR OR ABDOMINAL
	%	%	%
During presentations	14,8	37	48,1
During normal conversations*	66,7	7,4	25,9

*p<0,01

was significantly different between the two study conditions, $t(26)=4.62$; $p < 0.001$. The scores regarding vocal tract discomfort were higher after presentations in front of an audience (6.85 ± 4.6) than during neutral conversations (2.7 ± 2.32).

Based on the t-student test, there was a significant difference in the total score in the Vocal Tract Discomfort and Voice Quality questionnaire – the voice quality part, between the two study conditions, $t(26) = 3.65$; $p < 0.01$. Participants had significantly higher voice quality scores after presentations in front of an audience (2.89 ± 2.44) than during neutral conversations (0.96 ± 1.81).

The Pearson's correlation analysis showed statistically significant associations between the following variables:

Tab. VI. Vocal Tract Discomfort and Voice Quality questionnaire scores (discomfort part) during presentations and normal conversation, and variables that differed significantly between the two measurements.

			BURNING [*]	TENSION ^{***}	DRYNESS ^{**}	PAIN	LUMP-IN-THE-THROAT FEELING	NUCHAL RIGIDITY	JAW CLENCHING ^{**}	ZACISKANIE ŻUCHWY ^{**}	THROAT TIGHTENING ^{**}	GRUNTING [*]
VOCAL TRACT DISCOMFORT AND VOICE QUALITY QUESTIONNAIRE (DISCOMFORT PART) DURING STAGE FRIGHT	None	%	77,8	14,8	29,6	88,9	66,7	74,1	59,3	63	55,6	37
	Mild	%	4,8	33,3	40,7	7,4	22,2	18,5	33,3	25,9	29,6	37
	Mode-rate	%	3,7	48,1	14,8	3,7	7,4	7,4	7,4	7,4	14,8	26
	Severe	%	3,7	3,7	14,8	0	3,7	0	0	3,7	0	0
VOCAL TRACT DISCOMFORT AND VOICE QUALITY QUESTIONNAIRE (DISCOMFORT PART) DURING NORMAL CONVERSATION	None	%	96,3	51,9	66,7	92,6	88,9	81,5	66,7	92,6	96,3	48,1
	Mild	%	3,7	40,7	33,3	3,7	3,7	18,5	22,2	7,4	3,7	44,4
	Mode-rate	%	0	7,4	0	3,7	7,4	0	11,1	0	0	7,4
	Severe	%	0	0	0	0	0	0	0	0	0	0

*p<0,05; **p<0,01; ***p<0,001

Vocal Tract Discomfort and Voice Quality score (vocal tract discomfort part) and self-assessed voice quality after presentations in front of an audience, $r = 0.56$; $p < 0.01$. The higher the voice discomfort, the higher the self-assessed voice quality (Fig. 1a).

Self-assessed voice quality during neutral conversations and vocal tract discomfort scores of the Vocal Tract Discomfort and Voice Quality questionnaire during the same condition, $r = 0.46$; $p < 0.05$. The lower the self-assessed voice quality, the lower the voice discomfort in the Vocal Tract Discomfort and Voice Quality questionnaire (Fig. 1B).

DISCUSSION

Our findings show that there is a close relationship between stage fright and the activities and sensations within the vocal tract. Stage fright caused significantly worse palpation assess-

ment scores in comparison to the condition of neutral conversation. In addition, participants had higher scores in the Vocal Tract Discomfort and Voice Quality questionnaire during the condition that elicited stage fright. This means that they assessed their voice during public speaking poorly, and experienced more discomfort in the vocal tract. Moreover, the symptoms that were reported initially exacerbated.

The palpation assessment of the vocal tract showed statistically significant differences between the two study condition with regard to all the studied parameters such as sternocleidomastoid muscle tension, submandibular space tension, lateral pharyngeal wall tension, size of the thyrohyoid and cricothyroid spaces, jaw mobility, and breathing patterns.

The study showed that the tension of the muscle of the lateral pharyngeal walls and the submandibular space were the most common symptoms of stage fright in the assessed partici-

Tab VII. Vocal Tract Discomfort and Voice Quality questionnaire scores (voice quality part) during presentations and normal conversation, and variables that differed significantly between the two measurements..

			Shallow breathing**	Temporary voice absence	Voice tremor***	Changes in voice pitch	"Airy" voice	Weak voice	Hoarseness*	Voice Faltering*
Vocal Tract Discomfort and Voice Quality questionnaire during stage fright	None	%	55,6	96,3	29,6	59,3	100	85,2	48,1	59,3
	Mild	%	37	3,7	44,4	40,7	0	14,8	37	29,6
	Moderate	%	7,4	0	18,5	0	0	0	11,1	7,4
	Severe	%	0	0	7,4	0	0	0	3,7	3,7
Vocal Tract Discomfort and Voice Quality questionnaire during normal conversations	None	%	85,2	100	92,6	66,7	100	96,3	74,1	92,6
	Mild	%	14,8	0	7,4	25,9	0	3,7	18,5	7,4
	Moderate	%	0	0	0	7,4	0	0	7,4	7,4
	Severe	%	0	0	0	0	0	0	0	0

*p<0,05; **p<0,01; ***p<0,001

pants. In addition, the difference in the tension of muscles of the lateral pharyngeal wall between the two study conditions was most significant ($p < 0.001$, $Z = 4.4$). This suggests that the lateral pharyngeal wall muscles are most susceptible to tension during situations that elicit stage fright. Similar results were reported by Mathieson et al. [4]. Those authors evaluated patients with increased extralaryngeal muscle tension, and showed that the mean values of palpation assessment were highest for laryngeal resistance against lateral pressure ($M = 4.1$). The values were measured prior to therapy. The authors explain that this condition results from tension of the muscle of the lateral pharyngeal wall.

It is noteworthy that on average about 35% of the examined women had a mildly increased tension in all studied muscles, and 7% had moderately increased tension already during a neutral conversation. Increased muscular tension may be due to spinal defects, poor posture, and prolonged exposure to

stress. Persistent muscle tension compensates for posture defects, which enables proper balance.

The size of the thyrohyoid and cricothyroid spaces during presentations in front of an audience and neutral conversations was statistically different. After presentations, as much as 66.7% of the participants had restriction in both spaces. This is related to an increased tension of the external laryngeal muscles, which causes and an upward movement of the larynx. In turn, this movement reduces the thyrohyoid space. According to Roy N. et al., misalignment of the vocal tract organs impairs the equality and efficiency of voice [6]. This is in line with our study as voice quality in our participants also deteriorated.

The tension caused stage fright manifests with dysfunction of facial muscles and the mandible. The difference in jaw mobility between the two conditions in our study was statistically significant. A significantly larger number of participants had lim-

ited jaw mobility during presentations in front of an audience than during neutral conversations. A similar relationship was demonstrated by H. Kenehira et al. [2]. They found a relationship between stress and the occurrence of temporomandibular joint disorders in 3225 patients who completed questionnaires regarding the impact of stress on their functioning. The findings showed that stress significantly correlated with difficulty in mouth opening ($p = 0.001$, $\chi^2 = 10.6$). Notably, short-term symptoms of stage fright are similar to the symptoms of stress [2].

In humans, the thoracoabdominal breathing pattern is most efficient and thus desirable. In this study, we showed that indicators of proper breathing patterns were significantly more pronounced during neutral conversations than under stressful conditions. There is little doubt that stage fright promotes unfavorable breathing patterns in susceptible individuals.

Voice apparatus dysfunction has a direct effect on experiencing negative symptoms such as burning, tension, dryness, pain, itching, feeling a “lump in the throat”, nuchal rigidity, jaw clenching, throat tightness, grunting, and shallow breathing. The study showed statistically significant differences between the condition of stage fright and the neutral condition with regard to the following symptoms: burning, tension, dryness, jaw clenching, throat tightness, grunting, and shallow breathing.

We used the VTD questionnaire published by L. Mathieson et al. to develop our own tool for assessing vocal tract discomfort. [4]. The VTD scale has been extensively used in previous research but for other purposes than in our study [4, 5, 14, 15, 16]. The tool is mainly used to evaluate the effects of therapy. Our findings show that some parts of the VTD questionnaire

can be successfully used for measuring short-term symptoms, such as symptoms of stage fright.

As regards voice quality, voice tremor was one of the most common symptoms experienced by our participants. We showed that 70.4% of them reported voice tremor when experiencing stage fright; typically, the tremor was mild to moderate. Also, against the background of other symptoms, tremor was severe.

In conclusion, the impact of stage fright on the function of the voice apparatus and reported symptoms has not been investigated satisfactorily to date. Our findings demonstrate that stage fright impairs vocal tract function and influences the sensations within it. Undoubtedly, people who use their voices professionally and are susceptible to stage fright should be under constant care of a speech therapist.

CONCLUSIONS

Stage fright significantly influences the activities and sensations within the vocal tract, i.e., the submandibular space, lateral pharyngeal walls, sternocleidomastoid muscles, thyrohyoid and cricothyroid spaces, jaw mobility, and breathing pattern.

In addition, stage fright increases the negative sensations within the vocal tract such as burning, tension, dryness, jaw and throat tightness, grunting, shallow breathing, voice tremor, hoarseness, and faltering voice.

The feeling of discomfort during situations that elicit stage fright correlates with self-assessed voice quality.

References

1. Chodkiewicz J., Miniszewska J.: Polska adaptacja Kwestionariusza Lęku przed Wystąpieniami Publicznymi. *Psychiatr. Pol.* 2015; 49 (1): 95–105.
2. Kanehira H., Agariguchi A., Kato H., Yoshimine S., Inoue H.: Association between Stress and Temporomandibular Disorder. *The Journal of the Japan Prosthodontic Society.* 2008; 52: 375–380.
3. Kopaliński W.: *Słownik wyrazów obcych i zwrotów obcojęzycznych.* Wiedza Powszechna; Warszawa 1990, 522.
4. Mathieson L., Hirani S.P., Epstein R., Baken R.J., Wood G., Rubin J.S.: Laryngeal Manual Therapy: A Preliminary Study to Examine its Treatment Effects in the Management of Muscle Tension Dysphonia. *J. Voice.* 2009; 23 (3): 353–366.
5. Rodrigues G., Zambon F., Mathieson L., Behlau M.: Vocal Tract Discomfort in Teachers: Its Relationship to Self-Reported Voice Disorders. *J. Voice.* 2013; 27 (4): 473–480.
6. Roy N., Ferguson N.: Formant frequency changes following manual circumlaryngeal therapy for functional dysphonia: evidence of laryngeal lowering? *J. Med. Speech. Lang. Pathol.* 2001; 9: 169–175.
7. Schlenker B.R., Leary M.R.: Social Anxiety and Self-presentation: A Conceptualization and Model. *Psychol. Bull.* 1982; 92: 641–669.
8. Sillamy N.: *Słownik psychologii.* Książnica, Warszawa 1989, 306.
9. Spahn C., Echternach M., Zander M.F., Voltmier E., Richter B.: Music performance anxiety in opera singers. *Logop. Phoniater. Voco.* 2010; 35: 175–182.
10. Spahn C.: *Music Performance Anxiety. A Review of the Literature.* Praca dyplomowa. Freiburg 2009.
11. Spahn C.: Treatment and prevention of music performance anxiety. *Prog. Brain. Res.* 2015; 217: 129–140.

12. Szulc M., Olszak A.: Wybrane psychologiczne wyznaczniki tremy koncertujących muzyków profesjonalistów i amatorów. *Estetyka i Krytyka*. 2012; 25 (2): 201–230.
13. Śliwińska-Kowalska M., Niebudek-Bogusz E.: Przyczyny problemów z głosem nauczycieli. Rehabilitacja zawodowych zaburzeń głosu. *Poradnik dla nauczycieli*. Instytut Medycyny Pracy im. prof. J. Nofera, Łódź 2009, 17–34.
14. Woźnicka E., Niebudek-Bogusz E., Kwiecień J., Wiktorowicz J., Śliwińska-Kowalska M.: Applicability of the vocal tract discomfort (VTD) scale in evaluating the effects of voice therapy of occupational voice disorders. *Med. Pr.* 2012; 63 (2): 141–152.
15. Woźnicka E., Niebudek-Bogusz E., Śliwińska-Kowalska M.: Ocena efektów terapii głosu w dysfonii porażennej – studium przypadku. *Otorinolaryngologia*. 2011; 10 (3): 138–145.
16. Woźnicka E., Niebudek-Bogusz E., Wiktorowicz J., Śliwińska-Kowalska M.: Porównanie wyników skali dyskomfortu traktu głosowego z obiektywnymi i instrumentalnymi parametrami badania foniatrycznego u nauczycieli rehabilitowanych z powodu zaburzeń głosu. *Med. Pr.* 2013; 64 (2): 199–206.

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