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Voice Hygiene Evaluation at 7th and 8th Grade Secondary School Students at Voice Change Period via Vocal Health Test

Nilay Özaydın[1,*], Satı Doğanyiğit[2]

[1]Department of Music Education, Ahmet Kelesoglu Faculty of Education, Necmettin Erbakan University, Turkey
[2]Neset Ertas Fine Arts Faculty, Ahi Evran University, Turkey

Abstract Voice hygiene is an important part of voice training process, so voice hygiene should be taken care for a healthy voice. This study which is conducted to evaluate voice hygiene of secondary school students who are at voice change period at 7th and 8th grade is a scanning model. Study group consists of 297 students in total, 142 male and 155 female students at the age of 13-15 who are studying at 7th and 8th grade of randomly chosen public schools in Meram Region of Konya. An analysis of the differences between the Vocal Health Test points according to the age, gender and grade variables of the students participating in the study was made. The Turkish adaptation was made by experts in the field and linguists. While the test is being prepared, each question was examined by the experts in the field for the validity of the scope, and it was stated that the questions represent the measured characteristic, they are also clear and understandable. As a result of the study, significant differences in Vocal Health Test points according to gender was found ($P < 0.05$). The Vocal Health Test point of females is lower than that of males, and it can be said that females are more at risk of voice hygiene than males. There is a meaningful difference between vocal health test points in terms of age groups ($P<0.05$). The Vocal Health Test points of the students at the age of 14-15 are lower than the ones at the age of 13. It might be thought that voice change period is experienced more specifically at the age of 14-15, thus, if not paid attention, voice hygiene problem increases. When the grades are considered in terms of points, there is a significant difference between 7th grade and 8th grade students ($P<0.05$). It can be said that the 8th grade students are more inclined to have voice hygiene problems when compared to 7th grades. Analysis results between grade and age support each other.

Keywords Voice Hygiene, Voice Change Period (Mutation), Voice Training, Vocal Health Test

1. Introduction

The human voice is under a development and change since birth. Voice training plays an important role in undergoing a healthy process during these voice changes. Voice training in children in the age of voice change (mutation) is an extremely important and demanding issue for success in speech and singing in later ages. Children with conscious voice training during the period of voice change learn to preserve their voice health having knowledge of voice hygiene. Therefore, in the period of voice change, it is very important to use voice with a correct technique to prevent the problems related to voice health and to know the methods of voice protection.

Voice training is a child's knowledge how to use his voice as an instrument. Whether in solo voice training or collective voice training, the goal remains the same. The purpose of voice training is to provide training without disturbing child's voice, singing without shouting in a soft way, speaking without breaking up the sentences and utter them clearly, not disrupting the integrity using the breath correctly and sing like speaking [6, 9, 14, 17, 23, 26].

The fact that speaking and communication are important and the principles to use voice in a healthy and conscious way in human health should be instilled during childhood, and voice development should be assisted with training [12].

Voice training should be done very consciously and carefully so that the voice can pass to the adult voice in a healthy way. Along with this, voice hygiene should be cared for a healthy voice [22].

Voice hygiene is a collection of behaviors that should be personally followed like oral hygiene and should be observed during daily life. By doing certain things and not doing certain things, we can make our voice healthier and face less voice problems, and get rid of them as soon as they occur [10].

Voice hygiene focuses on completely removing or reducing the behavior that causes the voice problem to appear or continue, and it is thought that the voice features of the voice curves correct the vibrations. Vocal hygiene; includes diverse forms of vocal rest, anti-reflux proposals, and certain lifestyle changes such as not eating right before bedtime, not speaking at noisy places, occasional resting while speaking, talking at medium pitch and intensity level to avoid phonation related behavior, and increasing hydration [1].

The clue of good laryngeal hygiene is adequate fluid intake. If adequate fluid intake is not provided, vocal cord activity may be reduced.

Balanced nutrition, regular sleeping habits, rested body, good balance of humidity is important in terms of vocal health. Climate changes cause changes in the body together with changes in temperature. One should be careful during these periods; especially one should not stay outside during rainy, cold and dry weather. In cold weather, mouth breathing should not be done.

Smoking and exposure to cigarette smoke can also cause voice-related problems. Patients with problems in this regard should be informed about the risks of smoking and should be directed to smoking cessation programs if they want to quit.

Shouting and talking too much should be avoided, which can cause premature hyper function and cause nodules. Talking in noisy environments at the same time can cause the voice to be pushed and throttled, so be careful not to be present unless you are forced to do so. Talking in whispers also leads to wrong habits in the voices and may cause harm.

For voice health, one should do voice exercises before singing and avoid singing nonstop for a long time (more than 2 hours). A good night's sleep is also important for vocal health. In order to have a healthy voice, it is necessary to have a healthy body and mental health.

1.1. Mutation Period

Beginning from birth, people go through a number of stages of growth and development. The first of these stages is the first years after birth, and the second is the mutation (puberty), the most serious and surprising phase of human life [20].

Puberty which is also called "adolescence" is another period of transition from childhood to adulthood, during which adolescence has a biological, psychological, mental and social development and maturation [24].

In addition to the changes and developments in body physiology during the mutation period, the voice, which is the second determinant of gender characters, also undergoes a changeover and a new "adult male" and "adult female" identity is developed. This process, up to having a healthy voice, causes a casual change that is often unpredictable, "especially in the voices of males" [18]. The reason for this is that there are many changes and developments in the structure of the larynx, which is the vocal producing organ in this period, when all the organs of the body are affected in the same way. Depending on the descent of the larynx, the vocal tract grows to about 4-8 mm in length, and the vocal becomes pale as a result of dilation and deepening of the tube of the throat [5, 15]. This affects male voice production. The change of voice is manifested by symptoms such as aphonia, hoarseness, loss of clarity and roughening, and the voice becomes unstable showing double register. The vocal is low, uncovered, colorless and unstable [7]. Easily noticeable vocal field changes occur. It also draws attention to the broken vocal of the voice. The first sign to change the voice in men is the voice breaking. A detailed research on the male voice revealed that the voice maturate starts at the age of 13 and ends at around 13 months, the peak of change is reached at the age of 14 and its intensity declines at around at the age of 15 [4]. It is determined that the voice change and maturation process takes about 1.5 years. Within the mentioned period, the change in male voice ends in a short time (generally 3-6 months), but the change in voice at singing takes a longer time [13].

The period of mutation consists of three phases; premutation (pre-adolescence: involving the developmental process between the ages of 9 and 12), mutation (puberty: stage involving the developmental process between ages 12-15) and post mutation (post-adolescence) [15].

During mutation, larynx cartilage grows and thyroid cartilage changes shape. It loses its rounded appearance and forms a protrusion forward.

The vocal cords grow longer about 1 cm and for females, and they extend and enlarge 3-4 mm. In males, the ratio of muscle fibers to connective tissues is higher. The opposite is true for females [2].

When the individual differences and other factors are considered, the mutation period starts on average from 9-15 years old in the females and ends at 12-16.5 years, and in males it starts from 9.5-14 years old and ends in the age of 13.5-18 years. Especially in the voices of males, at any time during this period (about 13-15), there is a substantial change that is unidentified and unpredictable. Laryngeal muscle coordination cannot be achieved during this change and development, which leads to the falsetto, fracture, hoarseness and rustling of the vocal production between the unstable, chest and head voice [12].

Clinical findings of mutation period; hypertrophy in vocal cords, glottis gap known as mutation triplet during phonation, mutation acoustic sign between voice and chest registers, breaking, toning difficulty, excessive air loss, tremolo, etc. [2].

Voice begins to gain a new character in this period. Knowing the characteristics of the period, showing correct approaches will contribute to the development of the voice as well as to protect the vocal health.

Recognizing the importance of protecting the voice health during the voice change period, determining the

useful and harmful habits that are important for voice protection, avoiding behaviors that will disturb the voice health when using voice, and acquiring voice health and protection knowledge are needed in order to identify the voice health status of 7th and 8th grade students of secondary school.

Subjective methods are also used to determine voice problems as well as objective voice analysis. Expression of the voice problems by the individual is a reliable information which is perceived as subjective.

The "Vocal Health Test" used for this purpose was developed by Rianne Marcum Gebhardt [8] to apply to individuals at the time of voice change (mutation). This test is designed to get information about vocal health and to raise awareness for that age group.

1.2. Purpose of the Research

It is aimed to determine the voice hygiene of the 7th and 8th grade students at secondary school who are at voice change period by Vocal Health Test. The sub-problems of the research for this purpose are as follows.

1. Are there any differences in the vocal health test points of the 7th and 8th grade students at secondary school who are at voice change period in terms of gender?
2. Are there any differences in the vocal health test points of the 7th and 8th grade students at secondary school who are at voice change period in terms of age?
3. Are there any differences in the vocal health test points of the 7th and 8th grade students at secondary school who are at voice change period in terms of grade?

1.3. The Importance of Research

This study is important in terms of 7th and 8th grade students at secondary school who are at voice change period being able to see the voice hygiene through Vocal Health Test, the effect of voice health on voice training during voice change period, and to create awareness of voice health for the students at voice change period and their evaluating their own voice health on their own.

2. Materials and Methods

2.1. Model of Research

This study has been prepared in a screening model for the case detection, and the literature has been searched for the theoretical framework.

The research is in the general screening model. General screening models are screening arrangements made on the universe or a group taken from it, an example or sample in order to come through a general judgment about the universe in a phase consisting of a large number of elements [11].

2.2. Study Group

The study group consists of 297 students from 7th and 8th grade of public secondary school located in Meram Region of Konya chosen randomly in the spring term of 2016-2017 Academic Year. The distribution of students are as 142 Male and 155 female; 105 of them are 13 years old, 162 of them are 14 years old, 30 of them are 15 years old; 119 of them at 7th grade, 178 of them 8th grade and given in Table 1. Sampling group was selected considering the age of voice change onset (mutation).

Table 1. Distribution of Study Group by Gender, Age and Grade

Grade	Gender	Age			Total
		13	14	15	
7	Female	47	11	0	58
	Male	52	9	0	61
8	Female	6	76	15	97
	Male	0	66	15	81
Total		105	162	30	297

2.3. Data Acquirement and Analysis

In the study, Vocal Health Quiz, a version adapted to Turkish as Vocal Health Test, that will ensure the individual evaluate his own vocal hygiene has been used, and the differences between the vocal health values of the participating students have been analyzed according to gender, age and grade variables. Scale has been made using face-to-face interview method. For each question, the parts that they do not have conceptual knowledge or could not understand have been completed and getting the answers apprehensibly is ensured. Thus, "missing value" is not observed in scale forms. The data have been analyzed in this way. In the study, it is seen that the data in selection of appropriate statistical test do not provide normal distribution and also the homogeneity of the variances; therefore, non-parametric Mann-Whitney U and Kruskall Wallis tests were performed. Descriptive statistics are also given. The front section of the Vocal Health Test includes questions about demographic information like gender, age, and classroom. It is a test consisting of 15 items, each of which has 3 items as a, b, c, and the scoring is different in each item. The total score is 45 points and the lower the score; the more likely it is to have problems with voice hygiene. Translation for Turkish adaptation has been done by field experts and linguists. When preparing the scale, each question has been examined by the experts for content validity. It is stated that the questions are clear, understandable and represent the measured characteristic.

Content validity is to measure the whole and each item in the scale to see to what extent they serve to purpose [21].

3. Findings

3.1. The Findings of Vocal Health Test of the 7th and 8th Grade Students at Secondary School Who Are at Voice Change Period in Terms of Gender, Age and Grade

Under this title, the obtained data has been examined within the scope of the determined variables.

Table 2. Mann-Whitney U Test Results of Vocal Health Test Points According to Gender

Variable		Average	Std Error	Std Deviation	Test Statistic	P
Gender	Male	30.01	0.30	3.602	8250.5	**0.000**
	Female	28.46	0.24	3.003		

When the groups have been compared in terms of the Vocal Health Test points according to age group, the averages have been found as 30.13 for male, and 28.46 for female in Table 2. The result of Mann-Whitney U test which was conducted to determine if the difference between the averages is found in favour of male ($p < 0.05$). According to this, females' voice health problem is more than males.

Table 3. Kruskal Wallis Test Results of Vocal Health Test Scores According to Age

Variable		Average	Std Error	Std Deviation	Test Statistic	P
Age	13	30.13	0.34	3.511	16.803	**0.000**
	14	28.86	0.26	3.288		
	15	27.73	0.48	2.612		

When the groups have been compared in terms of the Vocal Health Test points according to age group, the averages has been found as 30.13 for 13 years, 28.86 for 14 years and 27.73 for 15 years. The Kruskall Wallis test to determine whether the differences between these averages are meaningful revealed that the differences between age groups are significant ($P < 0.05$). According to this, the average is different for at least one age group.

Table 4. Pairwise Comparisons Of Ages

Age Group	Test Statistic	Std Error	P
15-14	31.854	16.976	0.182
15-13	64.657	17.681	**0.001**
14-13	32.803	10.701	**0.007**

Multiple comparison tests were conducted to determine which age group was different. According to Table 4, there is no difference between the age groups of 14-15, and it is seen that the age group of 13 is different than the age groups of 14 and 15 years old. According to this, the group with the highest voice health problem is group of 15 years old and then group of 14 years old. The age group with the lowest voice health problem is 13 years old.

Table 5. Mann- Whitney U Test Results of Vocal Health Test Points According to Grade

Variable		Average	Std Error	Std Deviation	Test Statistic	P
Sınıf	7	30.20	0.30	3.305	7521	**0.000**
	8	28.53	0.25	3.282		

When the groups have been compared according to grade variable in terms of Vocal Health Test points in Table 5, the averages have been found as 30.20 for 7th grade, and 28.53 for 8th grade respectively. The Mann-Whitney U test conducted to determine whether the difference between these averages was significant ($P < 0.05$), the result found in favor of 7th grade. According to this, the voice health problem of the 8th grade is higher than the 7th grade.

4. Result, Discussion and Suggestions

4.1. Result and Discussion

When the groups have been compared according to gender variable in terms of Vocal Health Test points, females' point was lower than males. It is thought that females are not conscious of this period and are unaware of the voice change, have no knowledge of voice use and voice hygiene, and they force their voices in daily life.

In his study, "Investigation of the Effects of Physiological Change and Development (Mutation) on Human Voice", Metin [17] states that the close average between the groups in terms of gender might be due to the positive attitudes of the families which suggests that the mutation period leads to a problem-free transition. According to gender (female/male) and school (primary/secondary) variables; male students in elementary schools and high schools like to sing less than female students that is more likely to be explained by the tendency not to use their voices during adolescence, also, the adolescences who are not accustomed to their new voice abstain from breaking off their relation with the environment and avoid from singing in order not to feel degraded

When the groups are compared according to age variable in terms of Vocal Health Test results, group with the lowest point is the group at the age of 15, then the group at the age of 14. When it is thought that at the age of 14 and 15 when the effects of voice change period are most obvious, if the voice hygiene is not protected it might be dangerous and difficulties might be faced in respect of voice protection. In the age group of 13 years, which is considered as the age of onset of voice change period, voice control is still being provided for high vocal health test point and therefore voice hygiene is less risky.

According to Enc, according to a survey conducted with 2000 children in Ankara schools, mutation is seen at females at the age of 13 and at males at the age of 14 in an amount of 98%. [25].

In his study," The Voice Problems of Students at Mutation Period in Music Lessons at Secondary School Institutions", Yuce [26] states that the majority of teachers, who got voice training, meet these children at the age of 12-15, at 8th grade of secondary school, and they meet them partly at 6-7th grade of secondary school and 1st grade of high school.

When the groups are compared according to Vocal Health Test results, according to the class variable, according to this, the vocal health test point of the 8th grade is lower than the 7th grade. It is thought that this result has a parallelism with the result that the age group with the highest voice hygiene problem is 15 years old group. By looking at the information that voice change is seen in the end of 7th grade and in the beginning of 8th grade, it is thought that there is inattention to voice hygiene as the voice hygiene problem is high at 8th grade when the voice change is apparent.

According to Cooksey, when the singing voice of 8th grade male students is evaluated, it is noticed that the control of the voice has begun to be difficult as well as the loss of the voice agility (fluency, quickness). The width and pitch of the voice is limited. This is a very important period to be careful in voice training. There are coordination problems with voice control; especially if the voice pitch is forced out of its range. This time period is a period in which most voice problems and serious hoarseness (dysphonia) arise [3]

In his study, "The Effect of Voice Training on the Voice Functions in Adolescence", Malkoc [16] asked to music teacher candidates about their ideas and suggestions related to voice change period. Music teacher candidates emphasized that students should be informed about the factors that will adversely affect the voice health in secondary education.

In his study, "The Voice Change and Training in Voice of Adolescents", Otacioglu [19] states that the basic trainings such as voice hygiene and physiology, yawning, breathing, phonation, posture, resonance, articulation, etc. should be practised carefully without tiring the voice, choosing the appropriate repertoire considering voice boundary and classification, and long and compulsory trainings should be avoided.

4.2. Suggestions

The period of mutation, in which the most dramatic effects of voice change are seen, is a matter that needs to be meticulously addressed. It should be emphasized that students should be informed about the period of mutation in the learning teaching process, how this change starts in males and females and how it affects the voice and what precautions should be taken to protect the voice health should be expressed to students. The habits that should be gained for voice hygiene should be emphasized, the wrong habits should be changes, the period should be observed and if necessary, the families should be contacted in this regard.

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