

# VOCAL SELF-ASSESSMENT AND AUDITORY-PERCEPTUAL ASSESSMENT OF VOICE IN WOMEN WITH THYROID DISEASE

## *Autoavaliação vocal e avaliação perceptivo-auditiva da voz em mulheres com doença tireoidiana*

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### ABSTRACT

**Purpose:** to compare the vocal self-assessment and auditory-perceptual assessment of voice in women with thyroid disease. **Methods:** the study was performed in 40 female patients, mean age of  $49,50 \pm 10,40$  years, using a visual-analogue scale (EAV) to perform the vocal self-assessment of voice and auditory-perceptual analysis by speech and language pathologist. The patient considered the usual emission of voice in its self-assessment and for the vocal analysis by speech and language pathologist voice samples was recorded with the patient emission of 1 to 20 counting. Descriptive analysis considered mean, median and standard deviation. It was used the Wilcoxon and Mann-Whitney tests to compare means and the Spearman test to verify correlation between voice evaluations. The level of significance was 5%. **Results:** 19 (47.5%) patients reported complaints of dysphonia. Means and standard deviations of the VAS patient and the VAS speech therapist were  $32.58 \pm 27.99$  and  $37.23 \pm 15.92$ , respectively, with no statistically significant difference. Patients with vocal complaint had worse scores on self-assessment when compared with those who did not complain. There was no statistically significant difference between these groups in terms of perceptual assessment. There was no statistically significant correlation between the perception that the individual has over her voice and speech therapist assessment. **Conclusion:** there was no difference between means of vocal self-assessment and auditory-perceptual assessment by the speech and language pathologist; vocal self-assessment was worse in patients with vocal complaints; there was no correlation between evaluations.

**KEYWORDS:** Thyroid Gland; Voice; Voice Disorders; Self Assessment

### ■ INTRODUCTION

The thyroid pathologies are more frequent in women and they show a good prognosis when they are treated in an appropriate way<sup>1</sup>. The surgery to remove the gland partially or totally is suggested as an effective procedure to treat benign, malign thyroid diseases or the ones with potential malignity<sup>2</sup>, due

to rare permanent complications, reduced mortality rate and its safety, thus, avoiding reoperations and eventual or repeated occurrences<sup>1-3</sup>.

Voice changes caused by thyroidectomy may happen; however, even before any surgical procedure, patients with thyroid pathology may report symptoms of comprehensive origin and complaints about voice changes<sup>4</sup>. Researches<sup>5-7</sup> point out the presence of symptoms related to the voice in this population, with a frequency which varies from 9% to 38%. Among the symptoms reported, there are roughness, shortness of breath, effort to speak and uncertainty about how the voice will come out before the emission<sup>6</sup>.

Currently, there are several tools which can be used to describe the results of a vocal assessment. In order to establish data likely to be compared and

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correlated among them, two assessment tools may be taken into consideration: auditory-perceptual analysis and the self-perception of individuals<sup>8</sup>. In clinical evaluation, the auditory-perceptual analysis is a basic tool to characterize the voice of an individual<sup>9,10</sup> and it serves as a support element to therapeutic monitoring<sup>11</sup>. There is a high frequency of individuals with deviating voices identified from the auditory-perceptual assessment, which varies in terms of intensity since a slight dysphonia to severe cases<sup>12</sup>.

Besides the evaluation performed by the speech therapist, it is important to consider the patient's perception regarding their own voice. It is possible to observe that the data obtained through auditory-perceptual analysis does not always faithfully describe the patient's perception regarding the limitation in their activities of life, and it is necessary to obtain the knowledge on the self-assessment from the records of the individual himself<sup>13,14</sup>.

The aim of this research was to compare the vocal self-assessment and auditory-perceptual assessment of voice in women with thyroid disease.

## METHODS

This work has been submitted to Human Research Ethics Committee of the institution according to the Resolution CNS 196/96 and approved under the number 58983/2012.

This is an observational, exploratory, cross-sectional and descriptive study. Forty female patients were selected with average age of  $49.50 \pm 10.40$  years old; all these ones were taken care at Head and Neck Surgery Department with clinical diagnosis of thyroid disease, in a medical investigation to define the surgery indication. All the participants have signed an Informed Consent Form before they were submitted to research procedures.

The criteria on the inclusion were: patients aged 21 or over, female sex with clinical diagnosis of thyroid disease, under a medical investigation to define the surgery indication. The criteria on the exclusion were: active disease which could not allow the assessment; craniofacial anomalies or syndromes, difficulty in understanding simple commands or neurological, neuromuscular and neurodegenerative changes; patients with temporomandibular joint disorders; patients who suffered traumatic injuries or previously submitted to any surgery in the head and neck.

The collection stages are described below.

1) The patients were informed about the objectives and procedures of this study from the Informed Consent Form (TCLE);

2) A standardized collection form by the authors was used in interview format to collect personal and clinical data. In addition, the records were consulted when it was necessary;

3) In order to record the voice self-assessment, the visual analogic scale (EAV) was carried out. The scale is composed by a line of 100 mm in which the patient was oriented to mark the point that represents the perception she had about her own usual voice. The patient was informed to take as reference the scale edges, with left (represented by 0) as the minimal vocal change and right (represented by 100) as the maximum vocal change.

4) The voice recording was done in an environment with controlled noise below 50dB, by using a notebook HP® Compaq model 6535b, a separate external microphone Clone® Model 11070 and software PRAAT®(available on <http://www.praat.org>). At recording time, the patient was comfortably sat with microphone at a distance of 10 cm from the mouth. The numerical count from 1 to 20 in usual frequency and intensity was requested to the patient. The voices were recorded with input frequency of 44.100 Hz, mono, they were saved in wave format (.WAV) and analyzed by a speech therapist who are a voice specialist, with more than five years of experience with auditory-perceptual assessment and more than one year of experience with EAV. The reliability of this analysis was assessed through Wilcoxon's test ( $p=0,091$ ), by taking into account the significance level of 5%, according to a prior study<sup>8</sup>. The speech therapist did not have contact with the patients; each sample was presented three times to the specialist in a quiet room, by using a Logitech® headset, model H10; the therapist considered the general voice level (the global impression which the voice transmit when it is listened) and he recorded his assessment in EAV, following the same parameters previously described to mark the line of 100mm.

For the purposes of analyzing EAV result, the records of voice self-perception and the assessment of the specialist were classified according to the cut-off points defined by the numerical scale proposed in the study of Yamasaki et al. (2008)<sup>15</sup>, who defined the levels of voice deviation in the following ranges: normal variability of vocal quality (0 to 35.5mm), slight to moderate (35.6 to 50.5 mm), moderate to intense (50.6 mm to 90.5mm) and intense (90.6 mm to 100mm). In addition, the age was categorized by the median, so two age groups were created: one was composed by individuals aged up to 48 years old and the second group composed by individuals aged above 48 years old.

The statistical analysis of data was carried out software PSPP version 0.7.9. for the descriptive

analysis of variables, average and median were taken into account (measures of central tendency), as well as the standard deviation (measures of variability). The difference of averages between the voice assessments was calculated through nonparametric Wilcoxon test, when the whole sample was considered. When the patients were divided regarding their voice complaint and age range, the difference of averages was obtained from nonparametric Mann-Whitney test. In order to analyze correlation between the self-assessment and auditory-perceptual scales, the correlation test of Spearman was applied. The significance level used was equivalent to 5%.

■ **RESULTS**

Nineteen (47.5%) patients mentioned voice complaint, which is equivalent to almost half of the sample of this study.

In Table 1, the results show that the EAV averages of self-assessment and auditory-perceptual were above 30, and this last one had a discreetly higher

values, however, without a statistically significant difference. When the values found were analyzed according to the cut-off point defined by numerical scale<sup>15</sup>, it was noted that the EAV average of self-assessment was classified within the variability range of vocal quality. On the other hand, the EAV average of speech therapist classified the voices within the range of slight to moderate change. When the standard deviation was considered in both variables, the values oscillated between normal variability of vocal quality and moderate to intense voice changes.

It can be observed in table 2 that, in this sample, the age range did not influence either of both assessments and no statistically significant difference was found. On the other hand, the average value of vocal self-assessment was significantly higher in individuals who mentioned complaint regarding voice change when they were compared to the ones who did not report voice complaint. In the auditory-perceptual assessment carried out by the speech therapist, there was no statistically significant difference regarding the presence or absence of vocal complaint of the volunteers.

**Table 1 – Difference between the averages of vocal self-assessment and voice assessment by speech therapist in patients with thyroid disease**

	<b>Average</b>	<b>dp</b>	<b>p</b>
EAV self-assessment	32.58	27.99	0.194
EAV speech therapist	37.23	15.92	

EAV: visual analogic scale; dp: standard deviation. p<0.05. Wilcoxon nonparametric test.

**Table 2 – Average comparison of variables which are dependent on vocal self-assessment and voice assessment by speech therapist regarding the independent variables, age group and presence of voice complaint**

	n(%)	<b>EAV self-assessment</b>		<b>EAV speech therapist</b>	
		<b>Average±dp</b>	<b>p</b>	<b>Average±dp</b>	<b>p</b>
<b>Age group</b>					
Up to 48 years old	20(50)	25.95±19.54	0.260	36.00±12.50	0.840
Above 48 years old	20(50)	9.20±33.67		38.45±18.99	
<b>Voice complaint</b>					
Yes	19(47.5)	48.32±28.62	<b>0.001</b>	40.53±18.58	0.378
No	21(52.5)	18.33±18.49		34.24±12.79	

EAV: visual analogic scale; dp: standard deviation; p<0.05. Mann-Whitney nonparametric test.

Table 3 shows the result of correlation analysis between vocal and auditory-perceptual assessment. It can be observed that there was no correlation

between the perception which the patient had regarding her voice and the assessment by the speech therapist.

**Table 3 – Correlation between the variables which are dependent on vocal self-assessment and auditory perceptual assessment**

	EAVspeech therapist	
	rho	p
EAV self-assessment	0.1	0.53

EAV: visual analogic scale; rho: Spearman's linear correlation coefficient;  $p < 0.05$ . Spearman's correlation test.

## ■ DISCUSSION

In this study, there was a high frequency of negative self-assessment of the voice in women with thyroid disease in medical research to define surgical indications. This result points to the fact that the voice is an element to be valued in the clinical evaluation of this population even before any invasive procedure such as thyroidectomy. Other authors<sup>3,7</sup> also found patients with thyroid disease who mentioned voice complaints before the surgical procedure, which confirms the need for assessment and intervention in preoperative period.

With regard to the intensity of vocal deviation, Arakawa-Sugueno<sup>16</sup> verified predominance from discreet to moderate change in relation to the general dysphonia level by using GRBASI scale during preoperative period of thyroidectomy. In the present study, by using EAV, a similar profile has been found, with very close averages, independently of who has assessed the voice, if it was the individual himself or the speech therapist. The location of thyroid gland in the region of neck and its straight communication with larynx may justify the presence of voice changes in this population. It is worth pointing out that changes in laryngeal mobility in patients with thyroid diseases may or may not be associated to nerve injury<sup>17</sup>. Such fact alerts to the need for a vocal assessment before the patients are submitted to a surgical procedure. It is underlined that laryngological examination is also pointed as a complementary assessment tool in preoperative<sup>17,18</sup>. The examination was not considered in this study due to logistical difficulties which would prevent the access of all the female patients to the procedure. In addition, as the aim of this study has only covered perceptual aspects, it was possible to dismiss this dimension of the assessment. About this, it is worth to emphasize that not all the symptoms reported by the patients are directly related to laryngeal examination<sup>10</sup>.

In this study, no correlation between voice self-assessment and voice assessment by speech therapist was found, when EAV was used. No other studies, which used EAV in both assessments, were found. The authors of this study suggested the use of the same quantitative instrument in both cases, because they have considered it applicable and pertinent in terms of comparison and reliability.

Ugulino, Oliveira and Behlau<sup>8</sup> carried out a study with 96 individuals with and without voice complaints, independently of the otorhinolaryngological diagnosis. The authors have also not found correlation between these two dimensions of voice assessment when they considered the count of 1 to 20 in the analysis of speech therapist and a scale of 5 points in the voice self-assessment. The absence of correlation between the voice self-assessment and the assessment by speech therapist was also found in other studies<sup>13,19,20</sup>.

In this way, it is possible to observe that the image of dysphonic individuals on the impact of dysphonia in their quality of life does not satisfy, many times, the analysis of the professional<sup>13</sup>. Spina<sup>19</sup> discusses this fact and she points out that such difference is probably associated to proprioceptive issues of the patient which the speech therapist cannot measure. The author states that patient's judgment does not only take into account which he listens to, but also which he feels; so, his report is not only relied in the vocal quality, but also in physical sensations such as fatigue, tension or discomfort during the vocal emission. The influence of his experience to listen frequently to different voice types and the fact of his assessment is carried out under different environmental conditions than usual situations to the patient is attributed to the analysis of speech therapist.

Ugulino, Oliveira and Behlau<sup>8</sup> mention that when the individual assess his own voice, he also considers eventual physical, social and professional restrictions, not only the sound emitted. On the other hand, the focus of the auditory-perceptual judgment

by speech therapist is vocal quality. This is clarified when, in the present research, the patients with complaints self-assessed their voices negatively when they are compared to patients without complaints. The auditory-perceptual did not capture this difference, probably due to the fact of specialist analysis is only focused on noise emission in this moment; for this reason, it does not allow achieving other dimensions which only the patient assessed can access. It is worth to mention that patients with thyroid diseases frequently show compressive complaints in cervical region<sup>4</sup>, and these symptoms associated to the disease may influence the worsening of the voice self-assessment. In addition, in a prior research<sup>20</sup> with a similar population, it was found that the worsening of vocal self-assessment is correlated to the increase of voice negative impact in the quality of life, which stresses the fact of other factors besides the vocal signal deviated contribute to the perception that the individual has about his own voice.

The results of this research shows that the clinical assessment should be complemented by other instruments which can access aspects that only the individual assessed can note. In this sense, the valuation of self-assessment as an allied of the data collected in clinical assessment is necessary, allowing comparisons between these two

perspectives by using reliable resources, in order to assure an early diagnosis, the knowledge on the impact of the problem and the support to direct the therapeutic design and intervention<sup>8</sup>.

As it can be observed in the results of this work, the self-assessment has constituted a different dimension of a specialist perception, which induces to understand it as an essential tool to help professionals having a more appropriate and precise behavior.

## CONCLUSION

In the samples of women who suffer from thyroid disturb, the averages of vocal self-assessment and auditory perceptual assessment by speech therapist have not shown a statistically significant difference, however, the clinical perceptual assessment has recorded discreetly worse values than the ones of vocal self-assessment. Volunteers with voice complaint self-assessed their voices in a more negative way than the ones who did not mention complaint, however, this difference was not found in the auditory-perceptual assessment of the speech therapist. There was no correlation between the vocal self-assessment and the auditory-perceptual of voice carried out by speech therapist.

## RESUMO

**Objetivo:** comparar a autoavaliação vocal e a avaliação perceptivo-auditiva da voz em mulheres com doença tireoidiana. **Métodos:** o estudo foi realizado com 40 pacientes do sexo feminino, idade média de  $49,50 \pm 10,40$  anos, utilizando a escala analógica-visual (EAV) para realizar a autoavaliação vocal e a análise perceptivo-auditiva pelo fonoaudiólogo. A paciente considerou a emissão habitual do dia a dia na sua autoavaliação e para a análise fonoaudiológica da voz foram gravadas amostras da contagem de 1 a 20. A análise considerou o tamanho total da amostra e também sua categorização grupos de acordo com a presença ou não de queixa e por faixa etária.

A análise descritiva das variáveis considerou média, mediana e desvio-padrão. Foram aplicados os testes de Wilcoxon e Mann-Whitney para comparação de médias e o teste de Spearman para testar correlação entre as duas avaliações. O nível de significância foi de 5%. **Resultados:** 19 (47,5%) pacientes relataram queixa de disfonia. A média e desvio-padrão da EAV das pacientes e da EAV do fonoaudiólogo foram  $32,58 \pm 27,99$  e  $37,23 \pm 15,92$ , respectivamente, sem diferença estatisticamente significativa. Pacientes com queixa vocal apresentaram pior média na autoavaliação quando comparadas às que não tiveram queixa. Não houve diferença estatisticamente significativa entre esses grupos em relação à avaliação perceptivo-auditiva. Não foi encontrada correlação estatisticamente significativa entre a percepção que a paciente tem sobre sua voz e a avaliação do fonoaudiólogo.

**Conclusão:** não houve diferença entre as médias da autoavaliação vocal e da avaliação perceptivo-auditiva; a autoavaliação da voz foi pior em pacientes com queixa vocal; não houve correlação entre as duas avaliações estudadas.

**DESCRITORES:** Glândula Tireoide; Voz; Distúrbios da Voz; Auto-Avaliação

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