

Electroglottography in Dysphonics *

CHANDRASHEKAR, K. R.

As majority of phonatory dysfunctions are associated with abnormal vibrations of the vocal cords, analysis of the vibration of the vocal cords in terms of different parameters constitute an important aspect to be considered in the diagnosis and differential diagnosis of voice disorders.

Several direct and indirect methods have been developed with the object of studying the movements of the vocal cords. One of them is Electroglottograph (E.G.G.). E.G.G. has many advantages over the other techniques mainly because, it is a non-invasive technique and quantification of the vocal cord vibration is possible.

As there was very limited information available about E.G.G. in dysphonics and also no data of E.G.G. in dysphonics were available in Indian population, the present study was attempted.

In this study 34 dysphonic subjects (17 males and 17 females) in the age range of 15 to 50 years were studied using Electroglottograph (Kay Elemetrics Corporation), and High Resolution Signal Analyzer (B and K type 2033). The measurement for the following parameters were obtained for

three vowels [a], [i] and [u], phonated at comfortable pitch and loudness :

1. Open Quotient (OQ).
2. Speed Quotient (SQ).
3. Speed Index (SI).
4. ' S ' Ratio (SR).
5. Jitter (J).
6. Shimmer (S).

The data obtained were compared with normative data given by Sridhara (1986), on E.G.G. parameters using the same instruments and procedures.

The statistical analysis using Mann Whitney ' U ' test was carried out to find out the significance of difference between normals and dysphonics (as a group) and dysphonics (with particular kind of vocal cord pathology) in all the six E.G.G. parameters (Table I).

Conclusions

The following conclusions have been drawn from the results obtained :

(1) Male Dysphonics

- as a group showed significant difference from normals in terms of OQ, J and S values ;
- with vocal nodules showed significant difference from normals in terms of OQ and S values ;

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Table I. Comparison of different dysphonic groups with normal groups on different E.G.G. parameters

Parameters	OQ	SQ	SI	SR	J	S
Groups :						
Vocal nodules						
Male	+	—	—	—	—	+
Female	+	+	+	—	+	—
Vocal cord paralysis						
Male	+	—	—	—	+	+
Female	—	+	+	—		—
Glottal chink						
Male	+	—	—	+	—	+
Female	+	—	—	—	+	—
Functional high pitch voice						
Male	—	+	+	+	—	+
Functional hoarse voice						
Female	+	—	—	+	+	—
*Congestion of vocal folds						
Male	+	+	+	+	+	+
Female	+	+	+	+	+	+
*Spastic dy phonia						
Male	+	+	+	+	+	+
Female	+	+	+	+	+	+
*Chronic laryngitis						
Female	+	+	+	+	+	+
*Vocal polyp						
Male	+	+	+	+	+	
Dysphonics						
Male	+	—	—	—	+	+
Female	+	—	—	—	+	+

+ Presence of significant difference between means.

— Absence of significant difference between means.

* In these groups as the number of subjects were less, only comparison of mean values with normal mean values were done.

- with vocal cord paralysis showed significant difference from normals in terms of OQ, J and S values ;
- with glottal chink showed significant difference from normals in terms of OQ, SR and S values;
- with functional high pitched voice showed significant difference from normals in terms of SQ, SI, SR and S values.

This suggests that male dysphonic subjects (as a group) and also in different subgroups differed from normals on different parameters of E.G.G., thus permitting the differential diagnosis of different dysphonic conditions in males using E.G.G.

(2) Female dyphonics

- as a group showed significant difference from normals in terms of OQ, J and S values;
- with vocal nodules showed significant difference from normals in terms of OQ, SQ, SI and values;
- with vocal cord paralysis showed significant difference from normals in terms of SQ, SI and J values;
- with glottal chink showed significant difference from normals in terms of OQ and J values;
- with functional hoarse voice showed significant difference from normals in terms of OQ, SR and J values.

This suggests that the female dysphonic subjects as a group and also in different subgroups differed

from normals on different E.G.G. parameters, thus permitting the differential diagnosis of different dysphonic conditions in females using E.G.G.

- (3) Male and female dysphonics as a group showed significant difference from normals on OQ, J and S values. In subgroups (vocal nodules, vocal cord paralysis and glottal chink) the male and female dysphonics showed significant difference from normals on different E.G.G. parameters, *i.e.*, males showed significant difference on certain parameters, whereas, females showed significant difference on some other parameters. In other words, males and females with the same pathological condition did not show significant difference on the same parameters of E.G.G. For example, males with vocal cord paralysis showed significant difference from normals in terms of OQ, J and S values only. Whereas, females with vocal cord paralysis showed significant difference from normals in terms of SQ, SI and J values.

Factors contributing to this variation of E.G.G. results in male and female dysphonics were not known. Only further studies may answer this.

- (4) Dysphonic subjects with different pathological conditions of vocal cords, *viz.*, congestion of vocal folds, spastic dysphonia, chronic laryngitis and vocal polyp differed from normals on all the six parameters of E.G.G. As the number of subjects were less in these subgroups, further studies are suggested to verify the results obtained in the present study.