Establishing and Validating Isochronal Tone Stimulation Technique*

SHANTHA, Y. S.

The common factor in a majority of these voice therapies is that they aim at changing the pitch and focus their attention on achieving an optimum pitch.

A review of the literature on the methods of locating optimum pitch, which is an important step in most of the voice therapies, shows that a majority of these are subjective. The methods of eliciting optimum pitch are also subjective and have their limitations.

Out of the limitations of the present voice improving techniques and the belief that a majority of the voice disorders can be treated by changing the pitch thereby providing optimum frequency and a felt need for a technique which provided a better model than mere auditory or visual, arouse this technique of isochronal tone stimulation. The present study evolved techniques of voice therapy by isochronal stimulation and tested its usefulness in 35 cases with a variety of voice problems.

It was hypothesized that it would be possible to correct all voice disorders by changing the pitch and that this change could be brought about by the isochronal tone stimulation technique.

As a part of the study it was also necessary to arrive at a relationship between the fundamental frequency of the vocal cords and the natural frequency of the vocal tract in good voices in the age range of 20 to 25 years. A definite and consistent relationship of 5 : 1 was found between the natural frequency of the vocal tract in the [a] position and the fundamental frequency (in the [a] position) of the good voices. This relationship was used to establish optimum frequencies of the cases under study on the assumption that the good voices had a fundamental frequency which was optimum. 35 cases with different voice problems were selected for therapy. Habitual frequency and optimum frequency was recorded for each case before therapy started. Out of 35, 20 were puberphonics—14 males and 6 females—4 with hoarse voice—all males, 3 with nasality—2 females and one male, 1 female case of breathiness, 1 male spastic dyphonic, 2 hysterial aphonics—both females—1 male with aphosia and aphonia, and 3 cases of hearing loss with high pitched voices—two of whom were females.

Instruments for the isochronal tone stimulation technique were a B.F.O. and the vibrator of an artificial larynx, connected to the B.F.O. The vibrator was kept at the neck region tuned to the case's habitual frequency first. Cases were instructed to match their voice to the frequency of the vibrator. Next the vibrator frequency was

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changed toward optimum frequency step by step following the progressive approximation technique. During this matching procedure cases were guided by the appearance and disappearance of beats.

All the cases achieved optimum frequency. In cases of nasality and hoarseness there was a change in quality at optimum frequency. One case who was diagnosed as having breathiness did achieve optimum frequency but did not achieve a good voice. Cases were discharged with good voices.

This method was validated by re-testing some of the discharged cases for their optimum frequency usage. This and fellow-up indicated that the improvement had been maintained.

Conclusions

(1) Isochronal tone stimulation technique was found to be useful in a majority of voice disorders.

(2) By changing pitch and by providing optimum frequency voice problems such as puberphonia, nasality, hoarseness, spastic dysphonia can be treated.

(3) This is a good technique for treating hysterical aphonics.

(4) Nasality may be either a phonatory or a resonatory problem. It may also be a combination of the two.

Recommendations for Further Research

(1) The relationship between the natural frequency and the fundamental frequency in all age groups needs to be established. This may facilitate providing correct optimum frequency for all cases.

(2) A comparative study of this technique with other techniques of voice therapy and with other types of feedback needs to be undertaken.

(3) Studying the distance between habitual frequency and the optimum frequency in voices which are subjectively judged as abnormal may help in correlating objective measures and subjective judgment.

(4) Replication of the study in all voice disorders and on larger groups will help making more confident generalisations.

Limitations

(1) It is felt that the optimum frequency established for all the cases may not be in fact optimum frequency although when the cases achieved the frequency given the voices were judged as good. This was because the relationship now available is for the age group 20–25 in both males and females. Relationship for other groups is not available and it is possible that it may be different.

(2) It is possible that there might have been some amount of auditory information available to the cases. This may not be a serious limitation because of the presence of beats and apparent discomfort felt with the beats. This gives sufficient evidence that in fact isochronal matching takes place.