QUALITY JUDGEMENTS OF HEARING AIDS USING SPECTROGRAPHIC ANALYSIS

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INTRODUCTION

The evaluation of hearing aid performance is not an end in itself, but an integral part of the total rehabilitation of the hearing impaired. A hearing aid should be able to produce an optimal signal to the ear. The purpose of the quality judgement of the hearing aids is to provide "best suitable" hearing aid to a client.

Need for the Study

Hearing aid evaluation is judgement as to the merits of a hearing aid and is better determined by means of electroacoustic instrumentation. Quality judgements by the individuals are questionable at least because they are so easily influenced by suggestions or variables outside the testing conditions. Sound spectrograph is an instrument that helps in examining the frequency, intensity and time characteristics of particular phonemes or words (Koenig et al. 1946, Potter et al 1947). Therefore it was proposed to judge the quality of hearing aids with the help of a spectrograph.

Purpose of the Study

This study was planned to judge the quality of few selected hearing aids using sentences as hearing aid processed stimuli.

METHODOLOGY

Seven hearing aids were selected at random for the study. The following sentences were used as stimuli.

1. We were away a year ago.
2. May we all learn a yellow lion roar.
3. Did you thank him ?

Two young adult speakers, one male and one female were selected for recording of the sentences. The speakers were advised about the nature of the

experiment. Sentences spoken alternatively by male and female speakers were recorded on high quality professional tape recorder.

For the experimental recording, the hearing aids were set at half average gain setting, the receiver of various hearing aids were connected to a condenser microphone using 2cc coupler. All the three sentences were transduced through all the seven hearing aids in a random order, while speakers speaking the sentences in the same manner as in the control recordings- The output from the hearing aid was recorded.

The recorded tape containing control and experimental recordings was played on the spool tape recorder. The output from the tape recorder was fed to sound spectrograph. In this way spectrograms were taken for control and experimental recordings.

In the second part *of* the study, eight judges were selected for perceptual analysis. The judges were allowed to listen to six control recordings, in order to familiarize with control recordings. They were asked to rate each bearing aid, for frequency, gain and distortion based on 5 point scale.

DISCUSSION AND RESULTS

The spectrograms obtained from male and female speakers were compared and analyzed. Hearing aids were ranked based on the analysis of three sentences both for male and temale speaker. There was reliable agreement in the rankings of the hearing aids provided by different sentences 1, 2 and 3 for male and female speaker and judgements of hearing aids ranking did not differ significantly based on male and female voices.

In part-11 of the study rating provided by 4 male and 4 female judges were compared. Male judges showed high degree of correlation in their rankings which was aiso true for female judges. It was further noted that there is no reliable difference in ratings of the male and female judges.

Further combined rankings of male and female speakers for spectrographic and perceptual judgements were compared. Significant difference in ratings provided by spectrographic and perceptual analysis was observed.

It was possible to judge "best" and "worst" hearing aid through, spectrographic and perceptual analysis and they obtained the some ranking. It was noted that quality of the hearing aids differed depending upon their physical characteristics.

The results of the study showed that the performance of the hearing aids can be evaluated using spectrographic and perceptual analysis and they can be ranked in terms of proficiency.

CONCLUSION

1. There was reliable agreement in the ranking of the each hearing aid provided by different sentences 1,2 and 3 for male as well as female speaker.

2. The data provided reliable evidence of consistent differences among hearing aids for male as well a female speakers.

3. Judgements of hearing aids did not differ significantly based on combined estimates provided by three sentences for male and female speakers.

4 There is reliable over all agreement among judges for the rankings based on perceptual analysis for different hearing aids.

5. Rankings for various hearing aids for combined male and female voices did not differ significantly.

6. Combined rankings based on spectrographic analysis and perceptual analysis differed significantly.

RECOMMENDATION

1. More data should be collected to demonstrate the superiority or reliability of one method over other.

2. Judges should be asked to rate hearing aids based on paired judgements in case of perceptual judgements.

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