Acoustical Analysis Of Voice In Geriatric Populations

Suresh. T

Student, A.I.I.S.H, Mysore.

The past two decades have been witness to an increasing application in acoustic analysis to the study of speech development in children. "Sometimes the acoustic analysis is appropriate to test certain hypothesis about developmental changes in anatomy, motor control and physiological function" (Kent, 1976).

Objectives of study of variations in acoustic parameters with age are to establish norms across all age groups; to relate to the development of motor control of laryngeal phonatory mechanism; to help in differentiation of normal from dyshponics; to know normal pattern of age changes and to differentiate from disorders in old age.

Acoustic analysis is found useful in identifying various types of dysarthias, in adults and old age. Many of the parameters given by Michel and Wendahl (1971), Kim (1982), Yoon (1984), were found useful in identification of voice disorders. Some of these parameters are also studied in children and in adults.

Hence these parameters listed below were selected in order to study changes in voice as a function of age in the age range of 35 to 85 years in both males and females.

These parameters were studied in a sample of 96 adults both males and females, 10 males and 10 females were selected in each decade. Last age group 75-85 years consisted of 7 males and 7 females.

1) Maximum phonation duration.
2) Fundamental frequency in phonation.
3) Fundamental frequency in speech.
4) Frequency range in phonation.
5) Frequency range in speech.
6) Intensity range in phonation.
7) Intensity range in speech.
8) Extent of fluctuation in frequency.
9) Speed of fluctuation in frequency.
10) Extent of fluctuation in intensity.
11) Speed of fluctuation in Intensity.
12) Rise time of phonation.
13) Fall time of phonation.

Test material included maximum phonation sample of 3 vowels /a/, /i/ and /u/ and repetition of 3 Kannada sentences "idu pa:pu", "idu ko:ti" and "idu kempu banna".

Maximum phonation duration was measured using a stop watch. Fo and related measures in phonation were analyzed by digitizing through ADC with sampling for 8000Hz and analyse using a computer.

To measure SFF, SFR, SIR the 3 Kannada sentences were fed into pitch analyzer (PM-100).

The data thus obtained was subjected to statistical analysis, in order to determine the mean, S.D. and significance of difference between sex and different age groups.

Following conclusions were drawn after statistical analysis:

1) In males and females the maximum phonation duration decreased with age.
2) Variability measure in MPD shows increase with age.
3) Males and females do not show any significant differences in MPD, throughout the age group studied.
4) In males, Fo in phonation increases with age and
5) In females, Fo in phonation shows progressive decrease with age.
6) Variability measure in Fo in phonation shows increase with age in both males and females.
7) Males and females show significant difference in fundamental frequency in majority of age groups studied in all three vowels.
8) In males, fundamental frequency in speech increases with age as in fundamental frequency in phonation.
9) In females, fundamental frequency in speech shows increasing trend upto 55 years after which little changes are seen.
10) In males, frequency range in phonation shows an increasing trend with age.
11) In females, such trend was not seen.
12) Significant difference between males and females in freqeuncy range in phonation are seen only in the age ranges 35 to 55 years.
13) In males intensity range in phonation shows lower values in age groups 55-65 and 65-75 years compared to other age groups.
14) In females, no such changes are seen.
15) Generally, no significant differences are found between males and females in terms of intensity range in phonation in all the vowels.
16) In males higher extent of fluctuation in frequency in phonation is seen in the age group 75-85 years in all the three vowels.
17) In females the extent of fluctuation in frequency in phonation is higher in the age groups 55-65 years and 75-85 years.
18) Significant difference between males and females in the extent of fluctuation in frequency in phonation is seen in the age groups 35-45 years, 45-55 years and 55-65 years.
19) In males age groups 65-75 years and above shows higher value than other age groups with respect to speed of fluctuation in frequency in phonation.
20) Females generally show a lower speed of fluctuation in frequency in phonation in the age groups 35-45 years and 45-55 years.
21) Significant difference between males and females are present in the majority of age groups studied.
22) In males, older age groups 65-75 years and 75-85 years show higher values in extent of fluctuation in intensity of phonation than the rest.
23) Females also show such a trend.
24) Generally significant difference between males and females in extent of fluctuation in intensity in phonation are not found in majority of age groups studied.
25) In males speed of fluctuation in intensity in phonation do not vary systematically with age.
26) Also, lowest values are seen in the age groups of 55-65 years in males.
27) In females increasing mean values with age are present.
28) All age groups show higher variability in both males and females.
29) Both males and females show an increasing trend in rise time in phonation with age.
30) Significant differences are not found between males and females in all age groups, for all the three vowels.
31) In both males and females the older age groups show significant differences when compared with younger ages groups.
32) Again as in rise time in phonation values, significant differences are not found between males and females in all age groups.
33) In males gradual increase in frequency range in speech with age is seen whereas females do not show much changes in freqeuncy range in speech with age.
34) Significant difference between males and females in frequency range in speech is present in lower age groups.
35) In general females do not show any change with age in intensity range in speech whereas males do show significant change with age.
36) Significant difference between males and females in intensity range in speech are not found in majority of groups.