

# Pitch and Amplitude Perturbation in 8-year old Children

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Voice production is a complex process involving precise control of a series of events in the peripheral phonatory organs by the central nervous system. Fluctuations have been observed in normal voice production which increase to a considerable extent in pathological voices. These fluctuations in voice are termed as pitch and amplitude perturbations or jitter and shimmer respectively which have attracted the attention of several researchers.

Pitch and amplitude perturbations can be measured using several parameters such as jitter ratio, jitter factor, relative average perturbations, directional perturbation factors, shimmer (dB) and so on.

Many researchers have studied pitch and amplitude perturbations in normals as well as in dysphonics. These measures have proved to have tremendous diagnostic and clinical significance. Most of the research in this area has been done on adults. Since, children's voice characteristics differ from adults due to possible physiological and anatomical variations, it seems rather unwise to extend our knowledge on the adult population to the children without looking into how these aspects differ in children. Bearing this purpose in mind, the present study was undertaken.

The main aims of this study were :

1. Obtaining norms for 6 pitch and amplitude perturbation measures in thirty 8-year old normal male children.
  - a. Jitter ratio (JR)
  - b. Directional perturbation factor for frequency (DPF)
  - c. Relative average perturbation (3 point)
  - d. Shimmer (dB)
  - e. Directional Perturbation Factor for amplitude (DPF)
  - f. Amplitude perturbation Quotient (APQ)
2. Comparing the data obtained for 8-year old children with that of adult normals.
3. Comparing the data obtained for 8-year olds with that of 7 year olds and 10-year olds.

Thirty normal school-going 8 year-old children who had normal E.N.T. findings, normal intelligence, normal audiological findings, with no known history of voice problems or other relevant history were selected for the present study. After a practice session of 5-7 minute, voice samples of phonations for /a/, /i/ and /u/ were recorded for 5 seconds and the most stable portion of phonation of one second was subjected to further analysis for the 6 parameters studied. This data was then subjected to appropriate statistical analysis including mean, standard deviation, analysis of variance and Duncan's Multiple Range Test and the following conclusions were drawn.

1. Since the pitch and amplitude perturbation measurements were obtained for thirty normal 8-year old male children, this data can be considered as normative for this particular age group.

2. The parameters which measure intensity variations were higher in case of low and open vowels /a/ whereas the parameters which measure frequency variations were higher in case of high and closed vowels /u/ and /i/.
3. Children had higher value for both pitch and amplitude perturbations when compared to adults. This result supports the view that separate norms for children is mandatory.
4. Relative average perturbations (3 point) across age groups (7, 8 and 10 years) was found to be almost similar. Thus a single normative value is sufficient to represent this population.
5. Across the three age groups, RAP (3 point) values for /V are highest followed by /u/ and then /a/.
6. Amplitude perturbation quotients across age groups (7, 8 and 10 years) were also found to be almost similar.
7. As far as the effect of vowels across the 3 age groups is concerned, values for /a/ was significantly higher than /V and /u/ for APQ values.