

Draft Preview of Abstract #551132

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Abstract Number: 551132

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Keyword 1: Dysarthria

Keyword 2: Voice tremor

Title: Parkinson's disease dysphonia: results from 273 patients of the Aix-en-Provence Parkinsonian speech database

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Objective: To describe and characterize Parkinsonian dysphonia using a large-scale corpus.

Background: Describing voice changes in Parkinson's disease (PD) still remains a matter of debate. The reasons involve both methodological issues, dependent on the reliability of the device used, and pathophysiological considerations. On this latter point, the availability of small number of patients represents the major limitation of such investigation. Speech of PD patients and age-matched controls has been recorded prospectively in our Neurology Outpatient Department, from January 2001 to March 2010.

Methods: All patients were followed up by the same clinician, who conducted all the clinical evaluations. Before the patients were recorded, their global motor disability was assessed using the UPDRS. First, the patients were instructed to pronounce the sustained vowel /a/ for a few seconds. Second, the Maximum Phonation Time (MPT) was recorded in a separate file, while the instruction given to the patients was to take a deep breath and sustain the vowel for as long and as steadily as they could. Files were selected according to the fact that patient treatment state at the time of the recording was withdrawn at least 12 hours before. Neither records of patients benefiting from deep brain stimulation nor lesional neurosurgery have been considered. ANOVA comparisons ($p < 0.05$) were carried out between controls and patients for all speech variables studied.

Results: The table summarises the main data obtained for both PD patients and controls, specifying gender subgroups, for all speech parameters analysed.

Variables	Male controls	Male PD patients	Female controls	Female PD patients
N =	64	182	81	91
Age at record (years)	64.18	67.15	61.30	66.20
Age PD start (years)	-	58.62	-	58.60

F0 (Hz)	121.8 (\pm 1.8)	132.23 (\pm 3.0)	179.00 (\pm 1.8)	184.10 (\pm 5.3)
F0 CV	1.5	2.2	1.5	3.0
Jitter	0.49	0.90	1.19	1.93
Shimmer	0.40	0.52	0.32	0.51
Airflow (dm ³)	0.20 (\pm 0.02)	0.19 (\pm 0.02)	0.14 (\pm 0.01)	0.13 (\pm 0.01)
Airflow CV	11.6	12.5	14.6	14.5
MPT (s)	19.27	15.30	14.58	13.86
mean F0 MPT	124.3	134.6	191.7	189.3
mean exhaled air volume MPT	3.18	2.39	1.88	1.67
UPDRS (total)	-	30.4	-	26.0
UPDRS (speech)	-	1.45	-	0.97

F0: fundamental frequency; CV: coefficient of variation

These data showed the following main significant differences: 1/ an increase in mean pitch (F0) in male patients; 2/ a decrease in voice stability (F0 CV, jitter, shimmer) in all patients; 3/ a decrease in MPT and exhaled air volume in male patients.

Conclusions: The present large sample of PD patients' speech recordings represent an unique possibility of describing and characterizing Parkinsonian dysphonia. Because of the phenotypic variability in laryngeal anatomophysiology and in Parkinsonian symptomatology, instrumental analysis requires large-scale samples, like for perceptual investigations, in order to discriminate the specific impairment due to PD.