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VOLUNTARY, SPONTANEOUS, AND REFLEX BLINKING IN PARKINSON'S DISEASE: THE EFFECTS OF MEDICATION AND SUBTHALAMIC NUCLEUS STIMULATION.

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Objective: To evaluate the effects of subthalamic nucleus stimulation (STN-DBS) and L-dopa on the kinematics of voluntary, spontaneous and reflex blinking in patients with Parkinson's disease (PD).
Background: STN-DBS have proved to be an effective therapy in PD patients. However, it is unknown whether STN-DBS alone, or in combination with L-dopa, modify voluntary spontaneous and reflex blinking in PD patients.
Methods: 10 PD patients were studied in four experimental conditions: OFF treatment, STN-DBS ON, STN-DBS plus L-dopa and L-dopa alone. Patients were asked to blink voluntarily as fast as possible; spontaneous blinking was recorded during two 60s rest periods; reflex blinking was evoked by electrical stimulation of the supraorbital nerve. Eyelid movements were recorded with the SMART analyzer motion system.
Results: STN-DBS ON increased the peak velocities and amplitudes, for both the closing and opening voluntary blink phases and prolonged the duration of the pause, the neurophysiological marker of switching processes between the closing and opening blink phases. L-dopa had no effects on the kinematics of voluntary blinking and reverted the changes induced by STN-DBS when the two therapies were combined. No significant differences were observed in the four experimental conditions on the kinematics of spontaneous and reflex blinking.
Conclusions: The STN-DBS in PD patients modifies the kinematics of the closing and opening voluntary blink phases and impairs the switching between them. These findings are in line with emerging evidence suggesting a variety of favourable and detrimental effects induced by STN DBS.

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TWO-MINUTE VOCAL TEST AND ACOUSTIC ANALYSIS REVEAL VOICE AND SPEECH DISORDERS IN EARLY UNTREATED PARKINSON'S DISEASE

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Background: The disorders of voice and speech in Parkinson's disease (PD) result from the involvement of several subsystems including respiration, phonation, articulation, and prosody. We have designed a quick vocal test consisting of sustained phonation, diadochokinetic task, and running speech, and assessed its performance in separating PD patients from healthy controls (HC).
Methods: 24 untreated patients with recently diagnosed PD and 22 age-matched HC were tested. In total, 116 vocal recordings were collected and the voice parameters were obtained using 11 measurements designed with the possibility of automatic extraction in a common acoustic environment. Subsequently, a predictive model was built using kernel support vector machine to find the best combination of measurement to differentiate PD from HC subjects.
Results: Significant differences between both groups were found in 10 out of 11 measurements. The best classification performance of 85.02% was reached in a combination of four measures that represent all PD-related speech subsystems, including the ability to maintain sound pressure level, noise-to-harmonics ratio, accuracy of articulation, and melody variations. Reduced melody in running speech appeared essential in characterizing the vocal impairment in PD. In addition, correlations were found between the measures of articulation and phonation, and subscores of bradykinesia and rigidity.
Conclusions: Our designed configuration of acoustic vocal tests can detect abnormalities of speech since the early untreated stages of PD. Thus, these tests can ease the clinical assessment of voice and speech disorders, and serve as measures of clinical progression as well as in the monitoring of treatment effects.