Voice Timing in Two Parkinson's Disease Patients following Subthalamic Nucleus Deep Brain Stimulation

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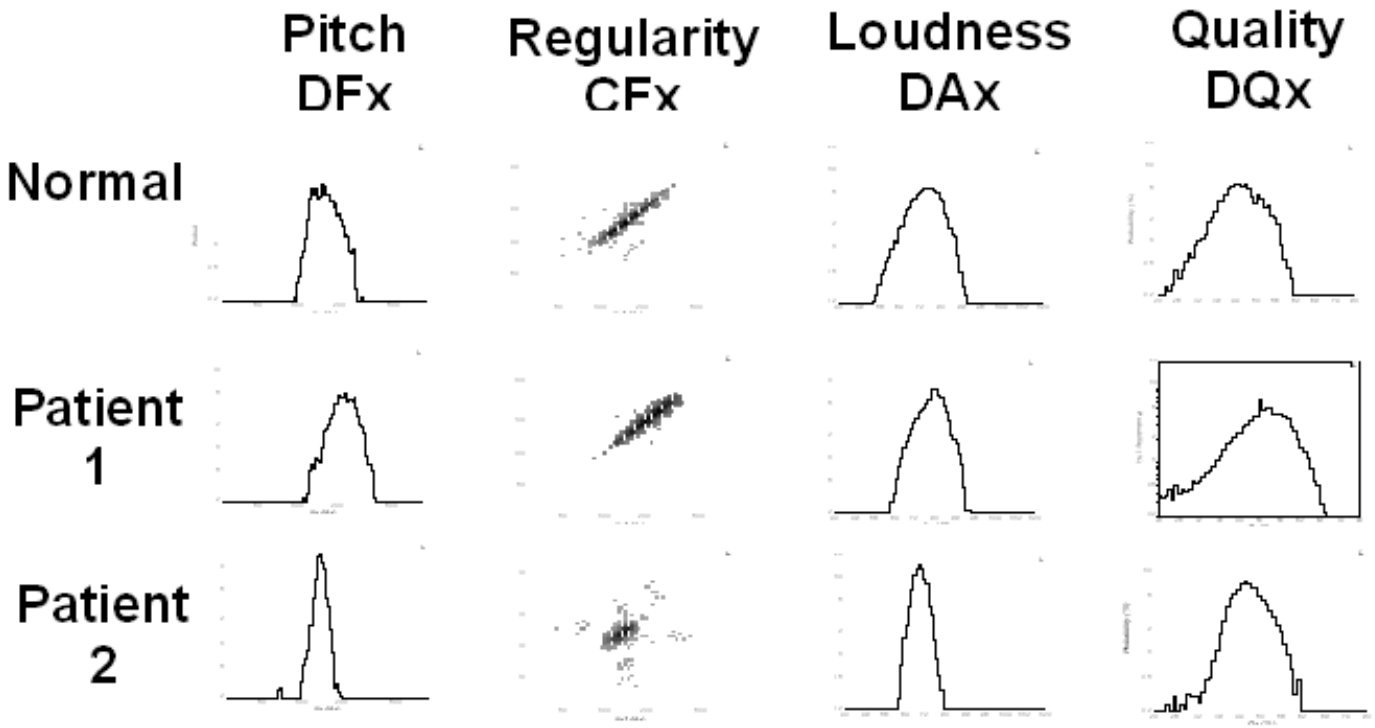
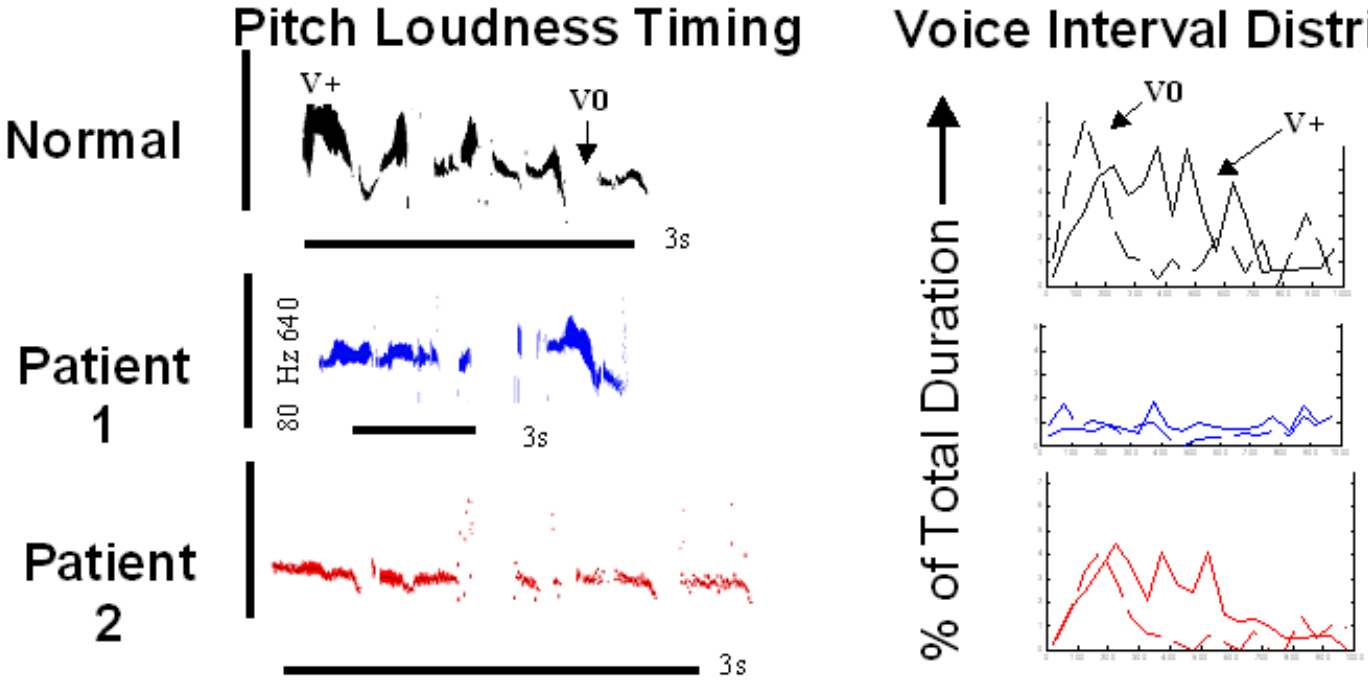


Standard measurements of the ranges of pitch, vocal fold contact regularity, loudness and quality show that the patients are not substantially deviant in these respects



Pitch Loudness Timing patient contours are abnormal VID analyses indicate the nature of the abnormalities and provide bases for their measurement, therapy and management

Voice Timing in Two Parkinson's Disease (PD) Patients following Subthalamic Nucleus Deep Brain Stimulation (STN-DBS)

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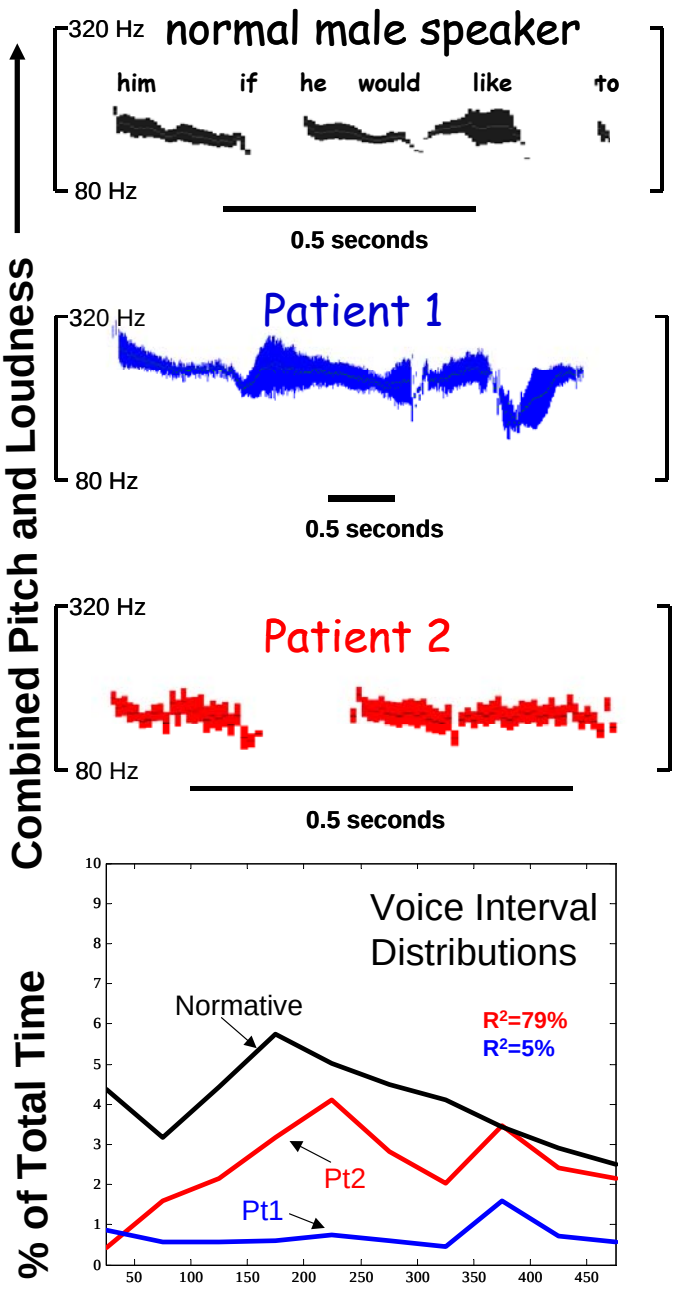
Aim: STN-DBS is an established treatment for the primary symptoms of PD (Limousin *et al*, 1995). Speech and voice can have a variable response (Tripoliti *et al,* 2014). Subtypes of presentation have been proposed (Tsuboi *et al*, 2014). This study sought to examine the effects of STN-DBS on the temporal prosodic structure of voicing in the connected speech of two STN-DBS patients with contrasting presentations. Laryngograph® data (Lx) provided the basis for the exact temporal definition of sequences of voiced intervals in each sample.

Methods: A standardised reading passage, speech intelligibility test (SIT) and minute monologue were recorded using the Computerised Speech Lab (CSL) and Lx. Prosodic structural analysis of the Lx data was performed (Fourcin, 2010). The new **Voiced Interval Distribution (VID)** was the primary outcome measure. Pitch range, regularity, vocal fold (VF) contact and loudness were also examined. Perceptual measures included the SIT score (%) and a perceptual Score (DAB, Plowman-Prine, 2009)

Results: Pitch and VF contact were near normal for PT 1&2. Temporal prosodic control characteristics were abnormal. PT1 had a flat VID range without the normal central probability peak at 100 – 200ms. SIT =57% & DAB =16/42. Speech was strained with "squeezed" phonation, distorted intonation contours, imprecise articulation and, overall, dystonic in nature. PT 2 approached normality with a central VID probability peak but a less organised voice interval range. SIT =100% & DAB =38/42. Speech was breathy, monopitch with reduced vocal loudness and, overall, bradykinetic in nature.



Conclusion: The use of VID analysis to examine the temporal prosodic structure of voicing in the connected speech of STN-DBS patients provides an objective measure reflecting perceptual features known to occur, and may assist management and prosodic therapy.

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