

Abnormal sense of limb position and movement in functional motor disorders

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Abstract

Background. Functional motor disorders (FMD) are characterized by motor symptoms (e.g., gait disturbance, tremor, dystonia) which resemble voluntary movements (e.g., tremor in one arm might decrease with distraction) but are perceived as involuntary by the patients. The mismatch between the voluntary nature of motor symptoms and the lack of perceived control reported by patients has been linked to abnormal sense of agency. Despite proprioception plays an important role in the sense of agency, impairment of the proprioceptive system in FMD has never been previously investigated.

Aim. The aim of this study was to explore the role of proprioception in the pathophysiology of the disease by specifically focusing on two main aspects: the sense of position and movement. **Method.** Twenty-three patients with FMD and 25 healthy controls (HC) were recruited for the study. All participants underwent a passive movement task and a tendon vibration task to assess the sense of position and the sense of movement, respectively. In the passive movement task, participants were blindfolded and required to match the felt position of a passively moved arm with their contralateral tracking arm. The final angle of the tracking arm was used as measure of sense of position. In the tendon vibration task, a mechanical vibration (92 Hz) was delivered for 45 s over the bicep brachii tendon of one arm and the participants were again asked to match the movement of the vibrated arm with their contralateral tracking arm. The final angle of the vibrated arm was used as measure of the tonic vibration reflex (TVR) and the final angle of the tracking arm was taken as measure of the sense of movement. **Results.** HC were precise in estimating arm position on both task. Conversely, patients were noted to: 1) overestimate the final position of the passively moved arm, indicating altered sense of position; 2) underestimate the final position of the vibrated arm, indicating altered sense of movement; 3) show a reduced TVR amplitude, indicating abnormal activation of proprioceptive fibers to vibratory stimulation. These results did not correlate with disease duration and were no different between the affected and the unaffected side. **Discussion.** This study demonstrated for the first time that the sense of limb position and movement are impaired in FMD patients. Such proprioceptive dysfunctions might undermine voluntary movement control and explain, at least in part, abnormal sense of agency in FMD.