عنوان مقاله:

Investigation of MRI Brain Changes in Developmental Coordination Disorder and Friedreich's Ataxia

محل انتشار:

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خلاصه مقاله:

To move things is all mankind can do. ... whether whispering a syllable or felling a forest.' - Charles SherringtonThe human motor system is one of the most complicated systems in the human body. This complex system of interactions and collaborations between different regions of the human nervous system enables humans to interact with their external environment. Several parts of the human central nervous system are required to communicate effectively to send signals to the target muscles to carry out the final voluntary or involuntary movements. At the level of the central nervous system (CNS), motor planning and control form the essential element of any voluntary movements and several models have been suggested to describe these processes. Internal models, and specifically the 'forward model' is one of the most recognised theories of human motor control function. In this thesis, I have investigated two different movement disorders in which motor dysfunction is suggested to be involved in motor planning level in one disorder and motor execution in the other. I used several novel MRI methods to elucidate the neuro-mechanisms and brain regions likely to be involved in motor impairment in these two disorders, developmental coordination disorder (DCD) and (Freidreich's ataxia) FRDA. Integral to this process was an endeavor to investigate human motor control theory and examine its pathological aspects through the window of neuroimaging.Recent advances in neuroimaging technologies, and particularly MRI methods, have provided researchers with invaluable insights into the structure of the human brain compared with those obtained by conventional T1 and T2 MRI imaging methods. I have used novel structural MRI technologies in this research project, including diffusion tensor imaging (DTI) and magnetisation transfer imaging (MTI). I have also harnessed the power of functional magnetic resonance imaging (fMRI), a method of mapping brain activity based on measuring the hemodynamic response related to neural activity. This method has received considerable attention in neuroscience studies because of its non-invasive nature and it offers the potential to map brain activities in considerably higher spatial resolution compared to older methods such as EEG. I have used these new functional and structural MRI imaging techniques to investigate the dysfunction in human motor execution and planning circuits in DCD and FRDA.Developmental Coordination Disorder (DCD) is a movement disorder with an ... unknown aetiology and a prevalence of 5-10% in children. Individuals with DCD show

کلمات کلیدی:

Central nervous system, Developmental coordination disorder, Friedreich's ataxia

لینک ثابت مقاله در پایگاه سیویلیکا: