FEEMALES WITH POST-CONCUSSION SYNDROME HAVE DIFFERENCES IN CEREBELLUM VOLUME COMPARED TO HEALTHY CONTROLS
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Background: Females have greater reported rates of persistent symptoms and post-concussion syndrome (PCS), something reported to occur in 15% of concussed individuals. The etiology behind these prolonged symptoms is not well understood, however it has been suggested it may be due to changes in neural connectivity. While both concussion and post-concussion syndrome are considered a functional injury, alterations in neural connectivity may lead to structural changes. The cerebellum is essential for task performance through its involvement in sensorimotor integration, coordination, balance, and cognition. Yet, the effects of concussion on this structure are not well understood. Cerebellar atrophy has been found in moderate to severe brain injury, even when it is not the location of injury, and thought to be due to cortical-cerebellar diaschisis. Such atrophy has also been found in animal models after mild head trauma. Objective: To investigate structural differences within the cerebellum of females with post-concussion syndrome. Methods: To date, T1-weighted anatomical brain images (3T Siemens Tim Trio) have been acquired from 18 female participants; 9 with PCS for greater than 6 months and 9 aged-matched controls. The cerebellum and cerebellum lobules were segmented using SUIT within SPM12, and the percentage relative to the total intracranial volume was calculated. Results: Cerebellar volume was significantly lower in lobules VIIb (left p<.05, right p<.01), VIIIa (left p<.01, right p<0.001), and VIIIb (left p<.001, right p<.001) in those females with PCS compared to controls. These lobules serve cognitive and sensorimotor functions. Conclusions: These findings highlight a potential structural correlate for PCS.