

Differential involvement of the cerebellum in biological and coherent motion perception.

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Perception of biological motion (BM) is a fundamental property of the human visual system. It is as yet unclear which role the cerebellum plays with respect to the perceptual analysis of BM represented as point-light displays. Imaging studies investigating BM perception revealed inconsistent results concerning cerebellar contribution. The present study aimed to explore the role of the cerebellum in the perception of BM by testing the performance of BM perception in patients suffering from circumscribed cerebellar lesions and comparing their performance with an age-matched control group. Perceptual performance was investigated in an experimental task testing the threshold to detect BM masked by scrambled motion and a control task testing the detection of motion direction of coherent motion masked by random noise. Results show clear evidence for a differential contribution of the cerebellum to the perceptual analysis of coherent motion compared with BM. Whereas the ability to detect BM masked by scrambled motion was unaffected in the patient group, their ability to discriminate the direction of coherent motion in random noise was substantially affected. We conclude that intact cerebellar function is not a prerequisite for a preserved ability to detect BM. Because the dorsal motion pathway as well as the ventral form pathway contribute to the visual perception of BM, the question of whether cerebellar dysfunction affecting the dorsal pathway is compensated for by the unaffected ventral pathway or whether perceptual analysis of BM is performed completely without cerebellar contribution remains to be determined.