

The neural structures involved in procedural memory

Results:

Six new and ecologically related laboratory-controlled perceptual-motor tasks were used to explore the capacity to learn and retain perceptual-motor skills in patients with focal brain damage. Five tasks were applied in the investigation of the putative involvement of the basal ganglia in skill learning, which was inferred from the performance of 16 patients with damage in the basal ganglia. The patients showed reduced skill learning. However, the impairment was not generalized to all tasks. The sixth task was used to examine the performance of patients with focal damage in the medial temporal area (N=5), the basal ganglia (N=7), the dorsolateral prefrontal cortex (N=5), and other brain areas (N=25). As expected patients with damage in the medial temporal area or other brain areas showed normal learning of the skill, whereas patients with dorsolateral prefrontal cortex damage showed impaired learning. The results from the basal ganglia subjects did not confirm the initial hypothesis of reduced learning of the skill. This task was also used to record the eye-movement behavior of 33 healthy subjects during the performance of the task. As expected the subjects' saccadic behavior changed during practice of the task and acquisition of the skill. The findings of these studies have important implications in the understanding of perceptual-motor skill learning as a multi-dimensional process and in the identification of the neuropsychological mechanisms underlying skill learning.

Published Work:

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