

Centre for Neuro Skills Presents an Abstract

The interplay between neuropathology and activity based rehabilitation after traumatic brain injury

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Exercise has been shown to facilitate the release of molecules that support neuroplasticity and to offer protection from brain damage. This article addresses the mechanisms behind exercise's beneficial effects within the context of traumatic brain injury (TBI). First, we describe how ongoing metabolic, neuroendocrine and inflammatory alterations after TBI interact with exercise. Given the dynamic nature of TBI-initiated pathophysiological processes, the timing, intensity and type of exercise need to be considered when implementing exercise. These factors have been shown to be important in determining whether exercise enhances or impedes neuroplasticity after TBI. In point of fact, intense exercise during the acute post-injury period has been associated with worsened cognitive performance. Similarly, exercise that is associated with a pronounced increase of stress hormones can inhibit the expression of brain derived neurotrophic factor that is usually increased with exercise. Second, we describe the clinical implications of these findings in returning to play following TBI. Finally, we address therapeutic exercise interventions in the context of rehabilitation following TBI. Exercise is likely to play an important role in improving cognitive and affective outcome during post-acute rehabilitation. It is important to take into account relevant patient, injury, and exercise variables when utilizing exercise as a therapeutic intervention to ensure that physical exercise programs promote adaptive neuroplasticity and hence recovery.

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