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Sports-related concussion: ongoing debate.

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Authors
Slobounov, Semyon
Bazarian, Jeff
Bigler, Erin
et al.

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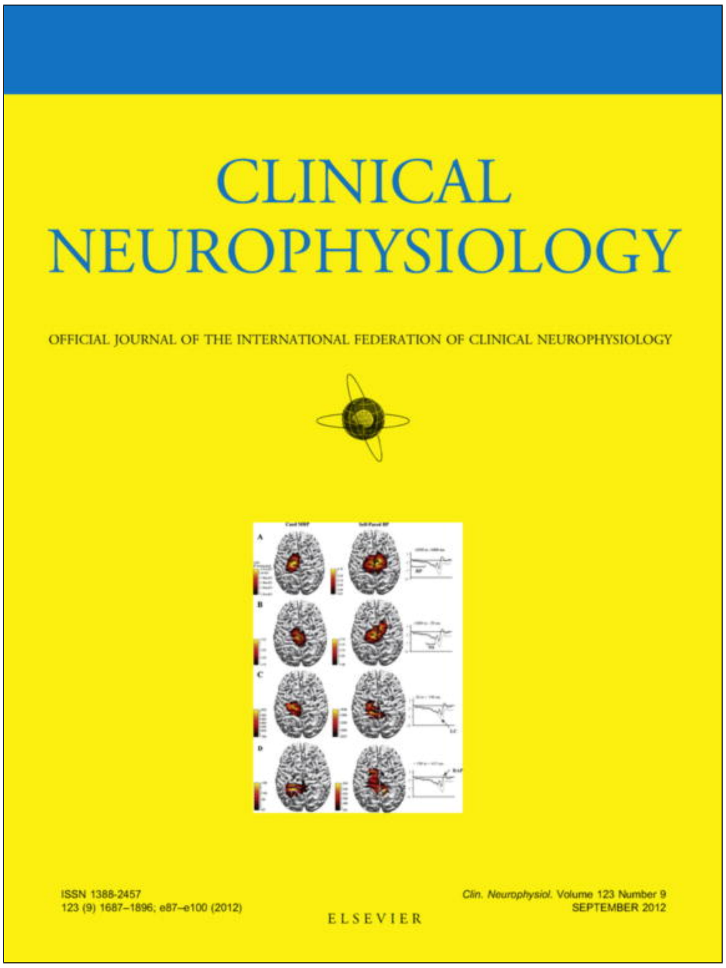
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Editorial

Postural alpha suppression after sports head injury

See Article, pages 1755–1761

In this issue, Slobounov and colleagues (2012) describe postural alpha EEG suppression after mild traumatic brain injury, i.e. concussion. Because these head injuries were suffered in a competitive college sports program, the authors were able to record from subjects prior to their injury. They followed the athletes for a year after the injury, and showed how EEG changes and postural instability gradually diminished over time. This is an excellent example of how such a high-risk group can be used to study the significant public health problem of concussion-related cerebral dysfunction. This complements studies in other research arenas that also show the impairments from sports injuries (Slobounov et al., 2010). A growing body of literature suggests that measurable increased cortical activity is required to accomplish ordinary tasks after concussion, and this manifests as increased BOLD signal in functional MRI (Pardini et al., 2010), increase instability in coordination with EEG suppression with postural challenge (Slobounov et al., 2012), and in other measurements.

This Slobounov et al. study has an important lesson. The public and their representatives in public health, schools, and athletic professions need to reconsider sports rules that involve repeated head injuries over the extended duration of school and professional athletes' sports participation (Sedney et al., 2011). The long-term adverse medical consequences of sports injuries are significant enough to warrant rules changes.

A methodologic advantage of this EEG study is that it concentrated on just five EEG variables. Some other previous quantitative EEG studies have used hundreds or thousands of EEG variables, which effectively eliminates conventional statistics from reliably identifying the differences between groups. This has been a problem especially with some prior literature in the mild head injury field, as reviewed elsewhere (Nuwer et al., 2005).

This study describes the pathophysiology of head injury and the time course of improvement. It is not a clinical study of the use for diagnosis of individual patients. The study did not demonstrate how to use this test clinically to determine which person has suffered from a concussion at some point in the past. That was not the design of this study. The statistical results presented here were group differences. Some prior mild head injury studies with quantitative EEG have misinterpreted data to claim clinical usefulness. For clinical diagnostic studies, additional studies must be conducted beyond presenting basic data and statistics on a topic. Those data and the study design must be relevant to the clinical questions, and that often is not present in initial general scientific reports. Important points for demonstrating clinical usefulness of quantitative EEG studies (Nuwer, 1992) include controlled outcome studies designed to show whether the proposed technique can answer the clinical questions at hand. Slobounov and colleagues stayed clear of such problematic conclusions in the present study. I encourage others not to over interpret their results as if it were a clinical outcome study.

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Marc R. Nuwer

Department of Clinical Neurophysiology,
Ronald Reagan UCLA Medical Center,
Department of Neurology,
David Geffen School of Medicine at UCLA,
Reed Neurological Research Center,
710 Westwood Plaza
Los Angeles, CA 90095, USA.
Tel.: +1 310 206 3093; fax: +1 310 267 1157.
E-mail address: MRN@UCLA.edu

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