

Protecting the brain in sports

What do we really know?

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Guidelines for the diagnosis and treatment of concussion were last published 15 years ago.¹ Over the course of those years, much has changed, not only in our knowledge of this clinical syndrome, but also in the neurologist's role in the field of sports.

In 1997, it was rare to see a neurologist on the sidelines or at ringside. In fact, the American Academy of Neurology (AAN) supported a position statement calling for boxing to be banned.² That policy has been replaced by a call to arms for neurologists to become more involved in all sports as advocates for the safety of participants.³

Sports neurology is now on its way to becoming a recognized subspecialty of neurology. The Sports Neurology section of the AAN now has 465 members in addition to an active online community. The first Sports Neurology fellowship has been established at the University of Michigan.

The growth of sports neurology has also increased the visibility of neurologists who now serve in key positions on the health and safety committees of the National Football League Players Association (NFLPA), National Football League (NFL), National Hockey League, National Basketball Association, United States Tennis Association, and National Collegiate Athletic Association. Neurologists now even serve on multiple state boxing commissions.

The NFLPA has taken a central role in advocating for the health and safety of its players and accelerating the creation and adoption of guidelines for the care of NFL players with concussions. In October 2009, under the direction of the Executive Director, DeMaurice Smith, the Mackey-White Traumatic Brain Injury Committee of the NFLPA held its first meeting. Chaired by then-active player Sean Morey and the NFLPA Medical Director, Dr. Thom Mayer, this group comprised more than 25 eminent scientists with expertise in neurologic injuries, including neurologists, neurosurgeons, emergency physicians, and neuropathologists. Most importantly, it also included current and former players, representing, for the first time, the voice of the "player as person and patient." In November 2009, at the direction of Mr. Smith and following a rash of

concussions during that season, the NFLPA asked the NFL to develop immediately and then implement concussion guidelines to protect the players, which were in place within 30 days. Following the season, the Mackey-White Return to Play Subcommittee developed guidelines to ensure that NFL players sustaining concussions were evaluated and cleared by independent neurologic consultants prior to returning to play. While a detailed Sideline Concussion Evaluation was implemented by the NFL in 2011, its use was not mandated until 2012. The NFLPA supports the AAN guidelines published here and will continue to advocate in every possible way to ensure its players have the best clinical care provided by neurologic experts with appropriate credentials, including sideline concussion experts at each game.

In this issue of *Neurology*®,⁴ the guideline authors report on a literature review extending back to 1955. They approach the problem of concussion in sports by attempting to answer 4 broad questions:

1. For athletes, what factors increase or decrease concussion risk?
2. For athletes suspected of having a concussion, what diagnostic tools are useful in identifying those with concussion?
3. For athletes with a concussion, what clinical factors are useful in identifying those at increased risk for severe or prolonged early postconcussion impairments, neurologic catastrophe, recurrent concussions, or late neurobehavioral impairment?
4. For athletes with a concussion, what interventions enhance recovery, reduce the risk of recurrent concussion, or diminish late neurobehavioral impairment?

While attempting to answer these questions, the authors were able to provide crucial information regarding the most vulnerable sports and positions within those sports. They also answer many questions regarding protective equipment, sex differences, and medical factors that predispose to concussion.

The information in this guideline is the culmination of years of work, but instead of being the end of a long road, it is a foundation from which to build. As Churchill notably said, "This is not the end; it is not even the

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beginning of the end. But it may, perhaps, be the end of the beginning.⁵” Like any public health problem, the most important element in future endeavors regarding concussion in sports will be educating athletes. It is reassuring to know that neurologists will be an essential part of that effort.

AUTHOR CONTRIBUTIONS

A. Alessi: drafting/revising the manuscript, analysis or interpretation of data. T. Mayer: study concept or design, analysis or interpretation of data, contribution of vital reagents/tools/patients, statistical analysis, study supervision. D. Smith: analysis or interpretation of data, acquisition of data, statistical analysis.

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A. Alessi is a consultant to the National Football League Players Association and a member of the NFL/NFLPA Accountability and Care Committee.

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