

The Neurosurgeons Sports Medicine Laboratory

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Joseph Maroon, MD, FAANS(L) | Features
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General Douglas MacArthur had his own words inscribed over the entrance of the gymnasium at West Point:

“On the fields of friendly strife are sown the seeds that, upon other fields, on other days, will bear the fruits of victory.”

These words are truly inspirational, yet even the strife on those friendly athletic fields can lead to injury.⁴

Turning Fields of Strife to Science

I played contact sports from grade school through college and learned first hand about concussions and spinal injuries. Then beginning in 1977, I used the “fields of friendly strife” as a laboratory to make observations regarding neurotraumatic injuries and this work has carried through my entire career. It was in that first year that I published my first significant observations, after treating two high school athletes with cervical fracture dislocations who presented only with severe burning paresthesias in their hands. Because they did not

complain of cervical discomfort or radicular pain, we came to recognize burning hands syndrome as a manifestation of possible catastrophic spinal cord injury in athletes.⁵

A few years later, we had evidence that showed the higher incidence of spinal cord injuries and quadriplegia in western Pennsylvania football players, nearly 10 times higher compared to the rest of the country.⁶ This prompted the initiation of educational sports medicine seminars as a means of prevention for coaches, trainers, parents and the athletes themselves – unique in western Pennsylvania at that time.

Birth of ThinkFirst

In 1986, neurosurgeon Dr. Fletcher Eyster, MD, FAANS(L), initiated a program in Florida called “Feet First, First Time” after observing the high incidence of quadriplegia for those people (mostly young men) diving into pools, streams and the ocean. When he and colleague Clark Watts, MD, JD, brought this preventive medicine concept to Bob Ojeman, MD, and me, we launched the ThinkFirst Program, a major joint preventive activity for both the AANS and CNS.²

Concussion Assessment

In 1990, after working with the Pittsburgh Steelers for over a decade, I was challenged by four-time Superbowl-winning coach Chuck Noll about why I would not allow his star quarterback with a concussion to play the following week. I referenced long-held protocol, but Coach Noll demanded objective data about concussions, rather than guidelines that had been determined by a committee and were not evidence-based. This led to collaboration with neuropsychologist Mark Lovell, PhD, to create Immediate Post-concussion Assessment and Cognitive Testing (ImPACT), which has become the only FDA-approved program for athletic cognitive testing in the country.¹ Thanks to Coach Noll’s prompting, 23 million youth have since been baseline tested with this preventive measure.

Concussion and Return to Play

More recently, my colleagues and I have co-published on the criteria for return to play after an anterior cervical discectomy in one of the largest series of professional athletes.⁷ In addition, I have been involved in discussions about the possibility of return to play for those with post traumatic hyperintense lesions in the spinal cord who are completely normal neurologically.⁹

In 2011, we postulated immunoexcitotoxicity as an underlying mechanism for the pathophysiology of chronic traumatic encephalopathy and further described the neuro-inflammatory, neuro-immunomodulating and metabolic factors most likely operant in this condition.³

Finally, I recently presented the Inaugural Chuck Noll Lectureship at the AANS/CNS Section on Trauma meeting, titled *Chronic Traumatic (CTE): Past, Present and Future*. In that presentation, I called for a balance of more science and less sensationalism and click-bait in CTE publications. This was with the support of Dr. William Stewart and 60 other neuroscientists who recently published their thoughtful paper in *The Lancet*, calling for the same balance in science and reporting relative to CTE.⁸

Many in neurosurgery pioneered work in the arena of sports-related injury including: Richard Schneider, MD; Ayub Ommaya, MD, DSc; Tom Gennarelli, MD, FAANS(L); Julian Bailes, MD, FAANS; Art Day, MD, FAANS; Robert Cantu, MD, FAANS(L); Henry Feuer, MD, FAANS(L); and Allen Sills, MD, FAANS. I have tried to carry on their noble traditions and have used the fields of friendly strife as my own neurosurgical laboratory to support the health and wellness of athletes.

References

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Joseph Maroon, MD, FAANS(L), is vice chairman and Heindl Scholar in neuroscience in the department of neurosurgery at the University of Pittsburgh Medical Center. He is also team neurosurgeon to the Pittsburgh Steelers and medical director for World Wrestling Entertainment (WWE). He has authored or co-authored 280 papers and published six books. He has also completed eight Iron Man distance triathlons.

Calendar/Courses
