

Andrew M Tucker, MD
Medical Director, Sports Medicine, Union Memorial Hospital, Baltimore, MD
Member, NFL Committee on Mild Traumatic Brain Injury
Head Team Physician, Baltimore Ravens

Hearing: Legal Issues Relating to Football Head Injuries
October 28, 2009

(2)

I have been a team physician in the NFL since 1991 and a member of the NFL Committee on Mild Traumatic Brain Injury since its inception in 1994. From both perspectives, I have seen positive changes, both in the science and in the culture, related to the injury of concussion in the NFL and would like to summarize these observations over the next few minutes.

I. The perspective of MTBI Committee member.

In 1994, Commissioner Paul Tagliabue requested that a committee be formed to determine what was known about concussions in sports, and study every facet of the injury as it related to the game of football. The first request revealed a stark reality—we did not have much scientific data on sports related concussions. Evaluation and treatment guidelines were well intentioned but not based on solid science. Major helmet manufacturers informed us their products had not changed substantially in many years. Their products were adequately protecting players from catastrophic brain injuries, but there was no stimulus for innovation to decrease the risk of concussion.

The first several years of Committee activity concentrated on understanding the very basic epidemiology (the who, what, why, where, when of the injury) as seen in professional football. Beginning in 1996, team medical staffs documented every diagnosed injury by completing initial and follow up forms. The record keeping continues today on all 32 teams.

In parallel work, the Committee enlisted the help of highly respected biomechanical experts from the academic communities in the US and Canada to ambitiously study concussions in professional football in new and creative ways. Game videotape of actual concussive injury on the field of play was studied and analyzed. Over time, the researchers were able to create laboratory reconstructions of collisions of helmeted test dummies that accurately represented what was happening to players on the field of play. This had never been accomplished before with sports concussions and the research breakthroughs resulted in tangible benefits:

- **Helmet design-** The video analysis of dozens of collisions resulting in concussion allowed us to understand concussion in new ways. The location of impact in the concussed player was found to be often on the side of the helmet, or the facemask. This information shared with the helmet manufacturers was a critical stimulus to the first substantive change in helmet design in many years, and provides us some optimism that risk of concussion for players at all levels may be decreased with these improved designs
- **Helmet testing-** as the biomechanical experts have developed a valid laboratory protocol for recreating the conditions that result in concussion on the field, this

(3)

same laboratory set up can be used to evaluate the possible effectiveness of new helmets in decreasing concussion risk.

- **Helmet testing part II-the interaction with NOCSAE** (the committee that establishes safety standards for sports equipment, including helmets) - The biomechanical research allowed us to understand the speeds and forces involved with injury. We learned that the speed of colliding players resulting in concussion was often far greater than the speed used to test helmets by the safety committee charged with evaluating helmets. Open dialogue with NOCSAE is resulting in modifications in how helmets are tested for efficacy
- **Rules changes-** greater understanding of how concussions occur on the field was shared with the NFL and provides the Competition Committee with objective information on which to make rules changes to protect players and make the game safer

Neuropsychological testing, the study of retired players, and ongoing education.

Neuropsychological testing has been utilized in the study of stroke patients, dementia, and severely brain injured patients for over 50 years. Our colleagues in Pittsburgh, and in other academic centers, were leaders in developing neuropsychological testing for the evaluation of mild brain injury in athletes since the early 1990's. The test has evolved as a valid and reliable evaluation and management tool for sports related concussion for professional, collegiate, high school, and recreational athletes. Our Committee was instrumental in supporting the use of this technology across all NFL teams in the mid to late 1990's. Today, its use is mandated for all NFL clubs. The Committee's support of this tool was instrumental in promoting its use in the evaluation and treatment of athletes in all levels of competition.

The study of retired NFL players remains the most concentrated focus of our Committee. Other researchers have published findings from survey and questionnaire data that suggest that recurrent concussions may increase the risk for chronic changes in brain function in retired players. The Committee regards these data as valuable, concerning, and yet not definitive, due to the limitations of these research methods. The Committee is supervising a study of retired players that involves comprehensive neurological testing and imaging with a control group of men who played college football (but not professional football) in order to more definitely ascertain whether playing professional football is associated with increased risk of brain dysfunction in the retired athlete.

The issue of a chronic traumatic encephalopathy in former football players has been, and will be, a most vigorously examined, debated and scrutinized topic among experts inside and outside our Committee. Some experts believe the autopsy findings of former football players are due solely to the effects of trauma. Other experts feel repetitive head trauma, or repeated concussions, is only a part of the puzzle of this complex issue. The Committee has hosted scientific exchanges on this topic as recently as May of 2009, and will have another meeting next month.

(4)

Education of our own medical staffs, players, coaches, and team administrators has been a priority of the Committee since its inception. The first concussion educational symposium for NFL team medical staffs was held in New York and Phoenix in 1995. The most recent took place in Chicago in 2007, and another is being planned for 2010. Ongoing concussion education has occurred regularly at our NFL Team Physician Scientific Symposiums at the annual Scouting and Testing Combine in Indianapolis. Sharing our knowledge and experiences with concussion has been point of emphasis at our biannual NFL Team Physician Meetings, an educational course for sports medicine providers conducted with the American Orthopedic Society for Sports Medicine.

Clearly, the last 15 years has been a time for important advances in concussion research and clinical care. While our committee has published 17 articles from our research, we admit we do not have all the answers. Our charge remains overseeing quality research for the benefit of our active and retired players, and to advance the science of sports related concussion. We are actively engaged with other researchers and sports medicine providers in other sports, and other countries, sharing what we have learned and willing to learn from others.

II. The Team Physician Perspective

There are many challenges to evaluating and treating concussions in athletes of all ages. While the injury is easy to diagnose in some circumstances, often times it is not clear an athlete has sustained a concussion. With concussion, as in any other medical issue, the medical staff is dependent on the athlete giving us accurate information to help us make a diagnosis and properly care for their injury, including determining a safe return to play.

Team physicians and athletic trainers have long observed two primary barriers to this important exchange. First, the athlete for too long has thought that being “dinged” is part of the game, and not important to discuss with their medical staff. Secondly, athletes want to compete, and tend not to want to divulge information that might result in restriction to play. I feel strongly that, in NFL players as well as my high school and collegiate athletes, these barriers of lack of patient education and a conscious reluctance to share information, are much less imposing now than they were 10 or 15 years ago. In addition, education programs targeted at our players’ families as well as our coaches has resulted in valuable exchanges of information that improves the quality of care for our players.

Finally, as a team physician at all levels of competition, I evaluate and manage concussions differently today than I did 15 years ago. While we try to understand the potential effects of head injury on our current retired players, it would be unwise to indict the care being provided today’s players based on reports on players treated a generation or more ago. I am optimistic that care being rendered to today’s athletes will prove beneficial to the retired players of tomorrow.