



## Concussion in the NFL

Sports-related concussion is a transient neurologic condition that occurs as a result of a traumatic blow to the head and neck region of the body. Symptoms that may result include disorientation, confusion, memory loss, nausea, dizziness, headache, visual problems and unsteady gait. These symptoms do not require a loss of consciousness to accompany the diagnosis of concussion. Studies have shown that concussion is usually unassociated with detectable changes on traditional neurodiagnostic testing including CT scans, MR imaging and EEG “brain wave” testing. Recent research has indicated that a comparison of computerized neurocognitive questioning and reaction time evaluation before the season (a “control or baseline study”) and 2 days after the concussive event appears to be superior to the classic standard of cursory on the field examination in terms of assessing the short and long- term consequences of trauma to the head. Total reliance on the athlete’s self- reporting of symptoms, during and after the game, is likely to be relatively inaccurate, since the athlete often tends to desire to return to the game and underestimate his problems. The newer objective testing tool is called IMPACT (immediate post-concussion assessment and cognitive testing).

The NFL commissioned a series of studies analyzing concussion in 1994. This took the form of a committee on Mild Traumatic Brain Injury. This committee is ably supported by the University of Pittsburgh Medical Center’s Sports Medicine Concussion Center. The league states that the concussion rates have stayed level in recent years at about 0.4 concussions per game or about 100 per year. However, some argue that the reporting of actual cases is not standardized nor well controlled. Nevertheless, the NFL has made game rule changes to protect against injury and encouraged changes in helmet design aimed at minimizing the occurrence of concussion. There is also some efforts to evaluate novel protective techniques like specially designed mouth pieces that might lessen concussive forces and reduce impact force. Clearly the tracking of post concussion syndrome has become a more important part of locker room follow-up.

The decision to return an individual player to the same game after a questionable concussive event remains a difficult judgment call that the team physicians must make in a cursory side-line assessment of the players responses and physical examination. However, most would agree that studies have suggested that the ill effects of concussion are cumulative. Thus, it appears that in players suffering from probable concussion, a return to playing football while recovering from symptoms increases the chances of having a more severe concussion, caused by less force than delivered initially. This is true during the early recovery period, but it appears that such vulnerability following one or two concussions may extend the susceptible period beyond the conventional recovery

period. These observations have generated a more cautious approach to concussion, making it harder to say “ You got a ding, get out there and play”.

More attention has also been given to the longer- term consequences of concussion. The University of North Carolina and the University of Pittsburgh have reported that younger high school or college football players need about a week after concussion symptoms fade to actually minimize their risk of suffering another concussion upon returning to play. In fact, they report that generally these younger players who have one concussion are three times more likely to get a second concussion in that same season. However, the NFL study group has found that NFL players recover more quickly than younger players. Possible explanations for this difference include the earlier neuro-development status in younger football players and the highly selected elite, conditioned status of NFL players.

A glance at retired NFL players has allowed the University of North Carolina group to perform a self-admitted survey of findings in over 2,488 former players. They found that 61% had admitted to suffering a concussion. In addition, 30 % had suffered more than three concussions in their average 6.7 year playing careers. This study group also found 11% of the players surveyed admitted to depression following their careers, but that stroke or Alzheimer’s disease (a chronic, debilitating loss of reasoning power) was not apparently increased in former players with a history of concussion. In perspective, those former players with three or four concussions had two times the risk of developing depression than players who never had a concussion and those with five or more concussions had three times the risk of depression than players unaffected by previous head trauma. However, another more recent survey study by the University of Michigan showed that the overall prevalence of depression in retired NFL players was similar to that seen in the general population matched for age.

In conclusion, much has improved in the diagnosis and management of concussion in NFL players, active and retired. The general awareness of the importance of concussion in contact sports has been heightened and medical follow-up more focused. As typical of initial evaluations in the health field, particular findings may vary. However, continued objective, scientific evaluations will help to clarify the ambiguities and eventually determine the actual health facts. This quest should contribute greatly to the decrease in morbidity related to any of the possible early and long- term consequences of concussion in the NFL.