DO MINOR HEAD TRAUMAS IN FOOTBALL CAUSE CONCUSSIVE INJURY? – A PROSPECTIVE CASE CONTROL STUDY

Straume-Næsheim Truls[1]*, Andersen Thor Einar*[1]*, Holme Ingar*[1]*, McIntosh Andrew*[2]*, Dvorak Jiri*[3]*, Bahr Roald*[1]
(Oslo Sports Trauma Research Center[1], Norway, University of New South Wales[2], Australia, FIFA Medical Assessment and Research Center[3], Switzerland)

Background: Cross-section studies have indicated declined brain function among footballers. Heading of the ball was earlier suggested as the cause, but recent investigations advocate head traumas as a more likely aetiology.
Main objective: To determine whether minor head traumas in an elite football match causes measurable brain function impairments.
Method: Professional football players in the Norwegian elite league, Tippeligaen conducted prior to the 2004 or 2005 seasons a neuropsychological test (CogSport) (N=548 where 144 conducted the test both years). A player who experienced a head impact during a league match conducted a Cogsport follow-up test the following day (Head Impact Group). Video tapes of the incidents were collected from the Norwegian Broadcasting Corporation (NRK) and reviewed. A group of players without head impact also conducted a CogSport follow-up test after a league match to serve as controls (Match Control Group, N=47).
Results: A total of 228 incidents were identified in the video review during the two seasons and 45 (19.7%) of these were followed up with a CogSport test. Analyses of the incidents on video verified that the followed up incidents were representative with respect to the potential severity of the trauma. The Head Impact Group had a greater change in reaction time from baseline to follow up compared to the Match Control Group with regard to the three simplest tasks. However, there was no difference for the higher cognitive domains. On individual basis 7 (15%) controls versus 15 (34%) in the Head Impact Group had declined performance on two or more tests (967;2 = 4.57, p = 0.033). Ten (66.6%) of these 15 reported symptoms either acute or at the time of the testing. For the players who participated both in the 2004 and 2005 seasons, the testing prior to the 2005 season revealed a decline in the neuropsychological performance for the group who had experienced one or more head impacts during the 2004 season, whereas their non-injured colleagues showed no change or a slight improvement. However none of these footballers were impaired when compared to normative control data.
Conclusion: Sub-concussive head traumas in football caused deteriorations in neuropsychological performance that differed significantly from the effect of playing an elite football match for 90 minutes. However, the deficits were limited to the simpler tasks and most prominent among the symptomatic players.
Keywords: Football, Neurophysiology, Cognition