

## **Ryan Kohler – concussion and soccer/football literature search.**

Please find the results of your requested literature search on concussion and soccer/football.

Some of the articles are available in full text. Where full text access is not available articles can be requested using the [NSIC Document Request Form](#)

Information from FIFA regarding concussion:

[Concussion in Sport](#)

[Player's Health : Head](#)

[FIFA Medical Network](#)

Canadian Academy of Sport Medicine Position Statement 2004: [Head injuries and concussion in soccer](#)

Journal articles:

[INJURY PREVENTION IN THE SOCCER ATHLETE.](#)

Silvers, Holly J., SportEX Medicine Jan2011, Issue 47, p14

Abstract: Football, or soccer, is the most widely played sport among both males and females, with approximately 265 million registered players around the world. This number is increasing, particularly among females, with a variety of positive effects on personal health. These obvious physical benefits have driven efforts to link the game with health education, to promote wellness and health, and so prevent ill-health and disease. However, there is a direct correlation between this growth in athletic exposure and injuries, and both the risks and epidemiology of football-related injury have been well documented. In the last decade, attempts have been made to gain a fuller understanding about these injuries and how to prevent them. This article describes recent developments in injury prevention programmes and sheds light on the ongoing international research to refine them and improve their effectiveness among the football community.

Database: SPORTDiscus with Full Text

[PDF Full Text](#) (1.3MB)

[Relationship of soccer heading to computerized neurocognitive performance and symptoms among female and male youth soccer players.](#)

By Kontos AP, Dolese A, Elbin RJ, Covassin T, Warren BL, Brain Injury: [BI] [Brain Inj], ISSN: 1362-301X, 2011; Vol. 25 (12), pp. 1234-41; PMID: 21902552; The purpose of this study was to investigate the relationship between soccer heading and computerized neurocognitive performance and symptoms in female and male youth soccer players.

Database: MEDLINE with Full Text

[Concussion occurrence and knowledge in Italian football \(soccer\).](#)

Broglio, Steven P.; Vagnozzi, Roberto; Sabin, Matthew; Signoretti, Stefano; Tavazzi, Barbara; Lazzarino,

Giuseppe, Journal of Sports Science & Medicine Sep2010, Vol. 9 Issue 3, p418

Abstract: The purpose of the study was to investigate concussion history, knowledge, injury identification, and management strategies among athletes, coaches, and medical staff in Italian club level football (soccer) clubs. Surveys (N=727) were distributed among Italian football clubs. Athletes' surveys were designed to evaluate athlete knowledge of concussive signs and symptoms and injury reporting. Coaches' surveys explored the understanding of concussive signs and symptoms and management practices. Medical staff surveys explored the standard of care regarding concussions. A total of 342 surveys were returned, for a 47% response rate. Descriptive analyses indicated 10% of athletes sustaining a concussion in the past year and 62% of these injuries were not reported, primarily due to the athletes not thinking the injury was serious enough. Coaches consistently identified non-concussion related symptoms (98.7%), but were unable to identify symptoms associated with concussion (38.9%). Most understood that loss of consciousness is not the sole indicator of injury (82.6%). Medical staff reported a heavy reliance on the clinical exam (92%) and athlete symptom reports (92%) to make the concussion diagnosis and return to play decision, with little use of neurocognitive (16.7%) or balance (0.0%) testing. Italian football athletes appear to report concussions at a rate similar to American football players, with a slightly higher rate of unreported injuries. Most of these athletes were aware they were concussed, but did not feel the injury was serious enough to report. Although coaches served as the primary person to whom concussions were reported, the majority of coaches were unable to accurately identify concussion related symptoms. With little use for neurocognitive and postural control assessments, the medical personnel may be missing injuries or returning athletes to play too soon. Collectively, these findings suggest that athletes, coaches, and medical personnel would benefit from concussion based educational materials on the signs, symptoms, and evaluative techniques of concussion.

Database: SPORTDiscus with Full Text

[PDF Full Text](#) (272KB)

[The predicted risk of head injury from fall-related impacts on to third-generation artificial turf and grass soccer surfaces: A comparative biomechanical analysis.](#)

Theobald, Peter; Whitelegg, Liam; Nokes, Leonard D. M.; D. Jones, Michael, Sports Biomechanics Mar2010, Vol. 9 Issue 1, p29

Abstract: The risk of soccer players sustaining mild traumatic brain injury (MTBI) following head impact with a playing surface is unclear. This study investigates MTBI by performing headform impact tests from varying heights onto a range of third-generation artificial turf surfaces. Each turf was prepared as per manufacturers specifications within a laboratory, before being tested immediately following installation and then again after a bedding-in period. Each turf was tested dry and when wetted to saturation. Data from the laboratory tests were compared to an in situ third-generation surface and a professional grass surface. The surface performance threshold was set at a head impact criterion (HIC) = 400, which equates to a 10% risk of the head impact causing MTBI. All six third-generation surfaces had a >10% risk of MTBI from a fall >0.77 m; the inferior surfaces required a fall from just 0.46 m to have a 10% MTBI risk. Wetting the artificial turf did not produce a statistically significant improvement ( $P > 0.01$ ). The in situ third-generation playing surface produced HIC values within the range of bedded-in experimental values. However, the natural turf pitch was

the superior performer - necessitating fall heights exceeding those achievable during games to achieve HIC = 400.

Database: SPORTDiscus with Full Text

[PDF Full Text](#) (226KB)

Notes: National Sport Information Centre holds this title

#### [Soccer rules committee addresses concussion issue.](#)

Brown, Gary, NCAA News 2/19/2010, p1

Abstract: The article reports on the addition of signs of a concussion that warrant stoppage of football games by the National Collegiate Athletic Association (NCAA) Men's and Women's Soccer Rules Committee at its annual meeting held in February 2010. The move came after the NCAA Playing Rules Oversight Panel made recommendations on addressing concussions. Cliff McCrath of the committee said they prioritize the safety of players over the flow of the game. The committee also bars players with five restrictive cards in a season from a game.

Database: SPORTDiscus with Full Text

#### [Clinical Report — Injuries in Youth Soccer.](#)

Pediatrics, Feb2010, Vol. 125 Issue 2, p410-414, 5p

Abstract: Injury rates in youth soccer, known as football outside the United States, are higher than in many other contact/collision sports and have greater relative numbers in younger, preadolescent players. With regard to musculoskeletal injuries, young females tend to suffer more knee injuries, and young males suffer more ankle injuries. Concussions are fairly prevalent in soccer as a result of contact/collision rather than purposeful attempts at heading the ball. Appropriate rule enforcement and emphasis on safe play can reduce the risk of soccer-related injuries. This report serves as a basis for encouraging safe participation in soccer for children and adolescents.

Database: Psychology and Behavioral Sciences Collection

#### [The Role of Concussion History and Gender in Recovery From Soccer-Related Concussion.](#)

Colvin, Alexis Chiang; Mullen, Jimmy; Lovell, Mark R.; West, Robin Vereeke; Collins, Micky W.; Groh, Megan, American Journal of Sports Medicine Sep2009, Vol. 37 Issue 9, p1699

Abstract: Background: This study was designed to investigate differences in recovery in male and female soccer athletes. Hypotheses: Soccer players with a history of concussion will perform worse on neurocognitive testing than players without a history of concussion. Furthermore, female athletes will demonstrate poorer performance on neurocognitive testing than male athletes. Study Design: Cohort study (prognosis): Level of evidence, 2. Methods: Computer-based neuropsychological testing using reaction time, memory, and visual motor-speed composite scores of the ImpACT test battery was performed postconcussion in soccer players ranging in age from 8 to 24 years (N = 234; 141 females, 93 males). A multivariate analysis of variance was conducted to examine group differences in neurocognitive performance between male and female athletes with and without a history of concussion. Results: Soccer players with a history of at least 1 previous concussion performed significantly worse on ImpACT than those who had not sustained a prior concussion (F = 2.92, P = .03). In addition, female soccer players performed worse on neurocognitive testing (F = 2.72, P = .05) and also reported more symptoms (F = 20.1, P = .00001) than male soccer players. There was no significant difference in body mass index between male and female players (F

= .04, P = .85). Conclusion: A history of concussion and gender may account for significant differences in postconcussive neurocognitive test scores in soccer players and may play a role in determining recovery. These differences do not appear to reflect differences in mass between genders and may be related to other gender-specific factors that deserve further study.

Database: SPORTDiscus with Full Text

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Notes: National Sport Information Centre holds this title

[Do UK university football club players suffer neuropsychological impairment as a consequence of their football \(soccer\) play?](#)

By: Rutherford, Andrew; Stephens, Richard; Fernie, Gordon; Potter, Douglas. *Journal of Clinical & Experimental Neuropsychology*, Aug2009, Vol. 31 Issue 6, p664-681, 18p, 5 Charts, 1 Graph

Abstract: Male players from football and rugby clubs and sportsmen from a variety of noncontact sports clubs at a UK university were compared on biographical and neuropsychological test measures. A data analysis paradigm was developed and employed to control the inflation of Type 1 error rate due to multiple hypotheses testing. Rugby players sustained most head injuries in their chosen sport, but neuropsychological tests of attention, memory, and executive function provided no evidence of performance impairment attributable to the number of head injuries sustained or the football, rugby, or noncontact sport groups. Footballers' heading frequency was related to the number of football head injuries sustained, but no relationship was detected between footballers' heading frequency and their neuropsychological test performance. Following discussion of pertinent methodological limitations it is concluded that there was no evidence in this dataset of neuropsychological impairment consistent with either mild head injury incidence or football heading frequency. However, a need for further research examining the long-term neuropsychological consequences of such head injuries was identified.

Database: Psychology and Behavioral Sciences Collection

[PDF Full Text](#) (207KB)

[The role of concussion history and gender in recovery from soccer-related concussion.](#)

By Colvin AC, Mullen J, Lovell MR, West RV, Collins MW, Groh M, *The American Journal Of Sports Medicine* [Am J Sports Med], ISSN: 1552-3365, 2009 Sep; Vol. 37 (9), pp. 1699-704; PMID: 19460813;

This study was designed to investigate differences in recovery in male and female soccer athletes.

Database: MEDLINE with Full Text

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Notes: National Sport Information Centre holds this title

[HEADS UP! A Soccer Coach's Guide to Concussion.](#)

Elbin, Robert J.; Kontos, Anthony P.; Couassin, Tracey, *Soccer Journal* Mar/Apr2009, Vol. 54 Issue 2, p38

Abstract: The article offers information on concussions. It occurs when the head of an athlete directly contacts an opponent, ball, goal post, or ground, as well as during an abrupt halt of the head. The signs, symptoms, and cognitive impairments of concussion include headaches, visual problems,

and slow reaction time. Information on the studies concerning the effectiveness of protective headgear for soccer is also discussed.

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[PDF Full Text](#) (66KB)

Notes: National Sport Information Centre holds this title

[Examining the Relationship Between Purposeful Heading in Soccer and Computerized Neuropsychological Test Performance.](#)

Kaminski, Thomas W.; Cousino, Eric S.; Glutting, Joseph J., Research Quarterly for Exercise & Sport Jun2008, Vol. 79 Issue 2, p235

Abstract: The purpose of this study was to determine if a relationship exists between purposeful heading in soccer and neuropsychological test performance. Automated Neuropsychological Assessment Metrics throughput scores were derived on seven subset variables that measure a variety of neurocognitive abilities. Simple Spearman's rank correlations were calculated between headers per game (HPG) and the criterion variables. Interestingly, math processing speed (Spearman's rho = .160) and continuous performance test #2 (rho = .124) had small but significant correlations; both showed improvement in performance pre- to post season. There were no significant correlations between HPG and the other five variables. This study found no detrimental relationship between the number of purposeful headers and the neurocognitive measures in this population.

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Notes: National Sport Information Centre holds this title

[Head injuries in the female football player: incidence, mechanisms, risk factors and management.](#)

Dvorak, Jiri; McCrory, Paul; Kirkendall, Donald T., British Journal of Sports Medicine Aug 2007: Vol. 41 Issue 1 Suppl. p. i44-i46

Abstract: Although all injuries in sports are a concern for participants, head injuries are particularly troublesome because of the potential for long-term cognitive deficits. To prevent any specific injury, it is important to understand the basic frequency and incidence of injury and then the mechanism of injury. Once these are established, prevention programmes can be tested to see if the rate of injury changes. A primary problem with head injuries is recognizing that the injury has occurred. Many athletes are not aware of the seriousness of concussive injury, thus this type of injury is probably under-reported. Once the diagnosis of a concussion is made, the next difficult decision is when to return a player to the game. These two management issues dominate the continuing development of understanding of concussive head injury. This paper explores the known gender differences between head injuries and highlights the areas that need to be considered in future research.

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Notes: National Sport Information Centre holds this title

[Descriptive Epidemiology of Collegiate Men's Soccer Injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 Through 2002-2003.](#)

Agel, Julie; Evans, Todd A.; Dick, Randall; Putukian, Margot; Marshall, Stephen W., Journal of Athletic Training Apr-Jun2007, Vol. 42 Issue 2, p270

**Abstract:** Objective: To review 15 years of National Collegiate Athletic Association (NCAA) injury surveillance data for men's soccer and to identify potential areas for injury prevention initiatives. Background: The NCAA sanctioned its first men's soccer championship in 1959. Since then, the sport has grown to include more than 18 000 annual participants across 3 NCAA divisions. During the 15 years from 1988-1989 to 2002-2003, the NCAA Injury Surveillance System accumulated game and practice injury data for men's soccer across all 3 NCAA divisions. Main Results: The injury rate was 4 times higher in games compared with practices (18.75 versus 4.34 injuries per 1000 athlete-exposures, rate ratio = 4.3, 95% confidence interval = 4.2, 4.5), and preseason practices had a higher injury rate than in-season practices (7.98 versus 2.43 injuries per 1000 athlete-exposures, rate ratio = 3.3, 95% confidence interval = 3.1, 3.5). In both games and practices, more than two thirds of men's soccer injuries occurred to the lower extremities, followed by the head and neck in games and the trunk and back in practices. Although player-to-player contact was the primary cause of injury during games, most practice injuries occurred without direct contact to the injured body part. Ankle ligament sprains represented the most common injury during practices and games, whereas knee internal derangements were the most common type of severe injury (defined as 10+ days of time loss). Recommendations: Sprains, contusions, and strains of the lower extremities were the most common injuries in men's collegiate soccer, with player-to-player contact the primary injury mechanism during games. Preventive efforts should focus on the player-to-player contact that often leads to these injuries and greater enforcement of the rules that are in place to limit their frequency and severity. Emphasis also should be placed on addressing the high rate of first-time and recurrent ankle ligament sprains.

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Notes: National Sport Information Centre holds this title.

[Resistance Training and Head-Neck Segment Dynamic Stabilization in Male and Female Collegiate Soccer Players.](#)

Mansell, Jamie; Tierney, Ryan T.; Sitler, Michael R.; Swanik, Kathleen A.; Stearne, David, Journal of Athletic Training Oct-Dec2005, Vol. 40 Issue 4, p310

**Abstract:** Context: Cervical resistance training has been purported to aid in reducing the severity of brain injuries in athletes. Objective: To determine the effect of an 8-week resistance-training program on head-neck segment dynamic stabilization in male and female collegiate soccer players. Design: Pretest and posttest control group design. Setting: University research laboratory and fitness center. Patients or Other Participants: Thirty-six National Collegiate Athletic Association Division I collegiate soccer players (17 men, 19 women). Intervention(s): The resistance training group underwent an 8-week cervical resistance training program that consisted of 3 sets of 10 repetitions of neck flexion and extension at 55% to 70% of their 10-repetition maximum 2 times a week. Participants in the control group performed no cervical resistance exercises. Main Outcome Measure(s): Head-neck segment kinematics and stiffness, electromyographic activity of the upper trapezius and sternocleidomastoid muscles during force application to the head, and neck flexor and extensor isometric strength. Results: No kinematic, electromyographic, or stiffness training effects were seen. The posttest resistance training group isometric neck flexor strength was 15% greater than the pretest measurement. Isometric neck extensor strength in the female resistance training group was 22.5% greater at the posttest than at the pretest. Women's neck girth increased 3.4%

over time regardless of training group level. Women exhibited 7% less head-neck segment length and 26% less head-neck segment mass than men. Conclusions: Despite increases in isometric strength and girth, the 8-week isotonic cervical resistance training did not enhance head-neck segment dynamic stabilization during force application in collegiate soccer players. Future researchers should examine the effect of head-neck segment training protocols that include traditional and neuromuscular activities (eg, plyometrics) with the focus of reducing head acceleration on force application.

Database: SPORTDiscus with Full Text

[PDF Full Text](#) (124KB)

Notes: National Sport Information Centre holds this title.

### [Biomechanical investigation of head impacts in football.](#)

Withnall, C.; Shewchenko, N.; Gittens, R.; Dvorak, J., British Journal of Sports Medicine Aug 2005: Vol. 39 Issue Suppl 1. p. i49-i57

Abstract: Objectives: This study sought to measure the head accelerations induced from upper extremity to head and head to head impact during the game of football and relate this to the risk of mild traumatic brain injury using the Head Impact Power (HIP) index. Furthermore, measurement of upper neck forces and torques will indicate the potential for serious neck injury. More stringent rules or punitive sanctions may be warranted for intentional impact by the upper extremity or head during game play. Methods: Game video of 62 cases of head impact (38 % caused by the upper extremity and 30 % by the head of the opposing player) was provided by F-MARC. Video analysis revealed the typical impact configurations and representative impact speeds. Upper extremity impacts of elbow strike and lateral hand strike were re-enacted in the laboratory by five volunteer football players striking an instrumented Hybrid III pedestrian model crash test manikin. Head to head impacts were re-enacted using two instrumented test manikins. Results: Elbow to head impacts (1.7-4.6 m/s) and lateral hand strikes (5.2-9.3 m/s) resulted in low risk of concussion (< 5 %) and severe neck injury (< 5 %). Head to head impacts (1.5-3.0 m/s) resulted in high concussion risk (up to 67 %) but low risk of severe neck injury (< 5 %). Conclusion: The laboratory simulations suggest little risk of concussion based on head accelerations and maximum HIP. There is no biomechanical justification for harsher penalties in this regard. However, deliberate use of the head to impact another player's head poses a high risk of concussion, and justifies a harsher position by regulatory bodies. In either case the risk of serious neck injury is very low. [ABSTRACT FROM AUTHOR]

Database: SPORTDiscus with Full Text

[Linked Full Text](#)

Notes: National Sport Information Centre holds this title

### [Reproducibility of computer based neuropsychological testing among Norwegian elite football players.](#)

Straume-Naesheim, T. M.; Andersen, T. E.; Bahr, R., British Journal of Sports Medicine Aug2005 Supplement, Vol. 39, pi64

Abstract: Background: Head injuries account for 4-22% of all football injuries. The rate of brain injuries is difficult to assess, due to the problem of defining and grading concussion. Thus computerised testing programs for cognitive function have been developed. Objective: To assess the reliability of a computerised neuropsychological test battery (CogSport) among Norwegian

professional football players. Methods: Norwegian professional football league players (90.3% participation) performed two consecutive baseline CogSport tests before the 2004 season. CogSport consists of seven different subtasks: simple reaction time (SRT), choice reaction time (ChRT), congruent reaction time (CgRT), monitoring (MON), one-back (OBK), matching (Match) and learning (Learn). Results: There was a small but significant improvement from repeated testing for the reaction time measurements of all seven subtasks (SRT: 0.7%, ChRT: 0.4%, CgRT: 1.2%, MON: 1.3%, OBK: 2.7%, Match: 2.0%, Learn: 1.1 %). The coefficient of variation (CV) ranged from 1.0% to 2.7%; corresponding intraclass correlation coefficients ranged from 0.45 (0.34 to 0.55) to 0.79 (0.74 to 0.84). The standard deviation data showed higher CVs, ranging from 3.7% (Learn) to 14.2% (SRT). Thus, the variance decreased with increasing complexity of the task. The accuracy data displayed uniformly high CV (10.4-12.2) and corresponding low intraclass correlation coefficient (0.14 (0.01 to 0.26) to 0.31 (0.19 to 0.42)). Conclusion: The reproducibility for the mean reaction time measures was excellent, but less good for measures of accuracy and consistency. Consecutive testing revealed a slight learning effect from test 1 to test 2, and double baseline testing is recommended to minimise this effect.

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Notes: National Sport Information Centre holds this title

#### [Head Injuries and Concussions in Soccer.](#)

Delaney, J. Scott; Frankovich, Renata, Clinical Journal of Sport Medicine July 2005: Vol. 15 Issue 4. p. 214-217

Abstract: A list of recommendations is provided by the Canadian Academy of Sport Medicine (CASM) to decrease the risk of head injuries and concussions in soccer. Information on ball size and protective equipment is included.

Subjects: SPORTS medicine; SOCCER; BRAIN -- Concussion; HEAD; WOUNDS & injuries; PREVENTION; EQUIPMENT & supplies; FEDERATIONS

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Notes: National Sport Information Centre holds this title

#### [The neuropsychology of heading and head trauma in Association Football \(soccer\): a review.](#)

By Rutherford A, Stephens R, Potter D, Neuropsychology Review [Neuropsychol Rev], ISSN: 1040-7308, 2003 Sep; Vol. 13 (3), pp. 153-79; PMID: 14584910;

Association Football (soccer) is the most popular and widespread sport in the world. A significant proportion of the injuries suffered in football are head injuries involving trauma to the brain. In normal play, head trauma frequently arises from collisions, but some researchers have claimed that it also may arise as a consequence of heading the ball. Although assessments based on biomechanical analyses are equivocal on the potential for brain injury due to football heading, a growing literature seems to support the claim that neuropsychological impairment results from general football play and football heading in particular. However, this review suggests a distinction is required between the neuropsychological effects of concussive and subconcussive head trauma and that all of the neuropsychological studies conducted so far suffer from methodological problems. At best, a few of these studies may be regarded as exploratory. The review concludes that presently, although there is exploratory evidence of subclinical neuropsychological impairment as a

consequence of football-related concussions, there is no reliable and certainly no definitive evidence that such impairment occurs as a result of general football play or normal football heading. The neuropsychological consequences of football-related subconcussive effects await confirmatory investigation.

Database: MEDLINE with Full Text

[PDF Full Text](#)

[Linear and angular head accelerations during heading of a soccer ball.](#)

Naunheim, R.S.; Bayly, P.V.; Standeven, J.; Neubauer, J.S.; Lewis, L.M.; Genin, G.M., *Medicine & Science in Sports & Exercise* Aug 2003: Vol. 35 Issue 8. p. 1406-1412

Abstract: Purpose: Cognitive deficits observed in professional soccer players may be related to heading of a soccer ball. To assess the severity of a single instance of heading a soccer ball, this study experimentally and theoretically evaluated the linear and angular accelerations experienced by the human head during a frontal heading maneuver. Methods: Accelerations were measured using a set of three triaxial accelerometers mounted to the head of each of four adult male subjects. These measurements (nine signals) were used to estimate the linear acceleration of the mass center and the angular acceleration of the head. Results were obtained for ball speeds of 9 and 12 mDTs-1 (approximately 20 and 26 mph). A simple mathematical model was derived for comparison. Results: At 9 m.s-1, peak linear acceleration of the head was 158 +/- 19 m.s-2 (mean +/- standard deviation) and peak angular acceleration was 1302 +/- 324 rad.s-2; at 12 m.s-1, the values were 199 +/- 27 mDTs-2 and 1457 +/- 297 rad.s-2, respectively. The initial acceleration pulses lasted approximately 25 ms. Measured head accelerations confirmed laboratory head form measurements reported in the literature and fell within the ranges predicted by the theoretical model. Conclusions: Linear and angular acceleration levels for a single heading maneuver were well below those thought to be associated with traumatic brain injury, as were computed values of the Gadd Severity Index and the Head Injury Criterion. However, the effect of repeated acceleration at this relatively low level is unknown.

Database: SPORTDiscus with Full Text

[Linked Full Text](#)

Notes: National Sport Information Centre holds this title

[Concussions among university football and soccer players.](#)

Delaney, J.S.; Lacroix, V.J.; Leclerc, S.; Johnston, K.M., *Clinical Journal of Sport Medicine* Nov 2002: Vol. 12 Issue 6. p. 331-338

Abstract: The aim of this study is to determine the incidence, duration of symptoms, time lapse before return to play, and risk factors of concussions among 529 Canadian university athletes during a full year of football or soccer participation. Data was collected from completed self-reporting questionnaires. Results indicated that these athletes experience a significant amount of concussions while participating in their respective sports; however, symptoms of concussion may not be recognized by many players.

Database: SPORTDiscus with Full Text

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Notes: National Sport Information Centre holds this title

[Heading and head injuries in soccer.](#) / Jeu de tete et traumatismes de la tete au football.

Kirkendall, D.T.; Jordan, S.E.; Garrett, W.E., Sports Medicine 2001: Vol. 31 Issue 5. p. 369-386

Abstract: In the world of sports, soccer is unique because of the purposeful use of the unprotected head for controlling and advancing the ball. This skill obviously places the player at risk of head injury and the game does carry some risk. Head injury can be a result of contact of the head with another head (or other body parts), ground, goal post, other unknown objects or even the ball. Such impacts can lead to contusions, fractures, eye injuries, concussions or even, in rare cases, death. Coaches, players, parents and physicians are rightly concerned about the risk of head injury in soccer. Current research shows that selected soccer players have some degree of cognitive dysfunction. It is important to determine the reasons behind such deficits. Purposeful heading has been blamed, but a closer look at the studies that focus on heading has revealed methodological concerns that question the validity of blaming purposeful heading of the ball. The player's history and age (did they play when the ball was leather and could absorb significant amounts of water), alcohol intake, drug intake, learning disabilities, concussion definition and control group use/composition are all factors that cloud the ability to blame purposeful heading. What does seem clear is that a player's history of concussive episodes is a more likely explanation for cognitive deficits. While it is likely that the subconcussive impact of purposeful heading is a doubtful factor in the noted deficits, it is unknown whether multiple subconcussive impacts might have some lingering effects. In addition, it is unknown whether the noted deficits have any affect on daily life. Proper instruction in the technique is critical because if the ball contacts an unprepared head (as in accidental headball contacts), the potential for serious injury is possible. To further our understanding of the relationship of heading, head injury and cognitive deficits, we need to: learn more about the actual impact of a ball on the head, verify the exposure to heading at all ages and competitive levels, determine stable estimates of concussive injury rates across the soccer spectrum, conduct prospective longitudinal studies on soccer players focusing on exposure, injury and cognition, and determine the minimum safe age to begin instruction on the skill of heading. Only then will we be able to speak with some authority on the issue of heading and head injuries in soccer.

Database: SPORTDiscus with Full Text

[PDF Full Text](#) (323796)

Notes: National Sport Information Centre holds this title

[Heading in soccer: integral skill or grounds for cognitive dysfunction?](#)

Kirkendall, D.T.; Garrett Jr., W.E., Journal of Athletic Training July/Sept 2001: Vol. 36 Issue 3. p. 328-333

Abstract: To critically review the literature concerning the effect of purposeful heading of a soccer ball and head injuries on reported cognitive dysfunction in soccer players. We searched MEDLINE (1965 - 2001) and SPORTDiscus (1975 - 2001) for refereed articles in English combining key words for soccer (eg, soccer, football, association football) with key words for head injuries (eg, concussion, head injury). In addition, literature on cognition and head injuries was obtained. We reviewed reference lists of current literature for pertinent citations that might not have been found in the search procedures. The fact that soccer players (and other athletes) have selected cognitive deficits is not questioned, and the popular press is quick to publicize results of questionable validity. The reasons for such deficits are many. Much of the early data implied that heading was the culprit; however, subsequent research has suggested that other interpretations and factors may be potential explanations for these deficits. The current focus is on concussions, a known factor in cognitive dysfunction and a common head injury in soccer. It is difficult to blame purposeful heading for the reported cognitive deficits when actual heading exposure and details of the nature of head-

ball impact are unknown. Concussions are a common head injury in soccer (mostly from head-head or head-ground impact) and a factor in cognitive deficits and are probably the mechanism of the reported dysfunction.

Database: SPORTDiscus with Full Text

Notes: National Sport Information Centre holds this title.

[Concussion incidence in elite college soccer players.](#) / Incidences d'un coup de tete de l'elite (niveau lycee) chez les joueurs de football.

Boden, B.P.; Kirkendall, D.T.; Garrett, W.E., American Journal of Sports Medicine Mar/Apr 1998: Vol. 26 Issue 2. p. 238-241

Abstract: A unique aspect of soccer is the use of the head for directing the ball. The potential for resultant head injuries has been the focus of discussions worldwide. Prior work has attributed neuropsychologic deficits to the cumulative effects of heading, without evaluating concussion rates in soccer players. We prospectively studied the seven men's and eight women's varsity soccer teams in the Atlantic Coast Conference during two seasons to document concussion incidence. The 29 concussions diagnosed over the 2 years in 26 athletes, 17 (59 percent) concussions in men and 12 (41 percent) in women, resulted from contact with an opponent's head (8, 28 percent), elbow (4, 14 percent), knee (1, 3 percent), or foot (1, 3 percent); the ball (7, 24 percent); the ground (3, 10 percent); concrete sidelines (1, 3 percent); goalpost (1, 3 percent); or a combination of objects (3, 10 percent). Twenty concussions (69 percent) occurred in games; none resulted from intentional heading of the ball. The basic incidence was 0.96 concussions per team per season. The overall incidence was 0.6 per 1000 athlete-exposures for men, and 0.4 per 1000 athlete-exposures for women. By concussion grade, there were 21 (72 percent) grade 1, 8 (28 percent) grade 2, and no grade 3 concussions. These findings suggest that concussions are more common in soccer than anticipated and that acute head injuries may have potential for long-term neuropsychologic changes.

Database: SPORTDiscus with Full Text

Notes: National Sport Information Centre holds this title