

Sports related concussion and spinal injuries: the need for changing spearing rules at the National Capital Amateur Football Association (NCAFA).

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Introduction: Returning an athlete to play following a spinal or concussive injury remains a challenge for the health practitioner making the decision. Among the possible mechanisms responsible for such injuries in amateur football, the concept of “spearing” has attracted a great deal of attention in sport medicine.

Objective: The purpose of this paper is to present a review of the diagnosis and treatment of the potentially catastrophic neck and head injuries caused by spearing in Canadian amateur football and to suggest the role the chiropractic profession can have in their prevention. It proposes to follow the recommendations advocated by the National Capital Amateur Football Association (NCAFA) athletic trainers group, led by a chiropractor.

Methods: Information regarding the concepts and prevention of “spearing”, concussion and spinal injuries at the amateur football level in both the United States and Canada was obtained using the following computerized search methods: PubMed – MeSH (via the National Center for Biotechnology Information (NCBI); The Index to Chiropractic Literature (ICL); Google Scholar Beta. Recent (2005) information on sports related spinal injuries and concussion were obtained by attendance at the 2005 Sports Related Concussion and Spine Injury Conference. Foxborough, Massachusetts. From a total of 698 references, 63 were retained.

Conclusion: Literature search yields very little information regarding Canadian statistics for amateur football neck and head injuries. The author encourages such injury data collecting and proposes that original Canadian studies and statistical analyses be carried out, such as those from diverse sports groups in the United

Introduction : Autoriser le retour au jeu d'un athlète après un traumatisme ou une commotion médullaire demeure tout un défi pour le professionnel de la santé appelé à prendre cette décision. Entre autres mécanismes possibles responsables de ce type de blessures pour les joueurs de football amateur, la pratique du « dardage » soulève un grand intérêt dans la médecine sportive.

Objectif : L'objectif de cet article est de présenter un résumé des diagnostics et des traitements des blessures possiblement très graves au cou ou à la tête, provoquées par des « dardages » survenus lors de parties dans la Ligue canadienne de football et de suggérer le rôle que la chiropratique pourrait avoir dans la prévention de cette affection. L'étude propose de suivre les recommandations défendues par le groupe d'entraînement athlétique de la National Capital Amateur Football Association (NCAFA), dirigé par un chiropraticien.

Méthodes : L'information touchant les pratiques et la prévention du « dardage », les commotions et les traumatismes médullaires qui se présentent dans le football amateur, tant aux États-Unis qu'au Canada, a été obtenue en utilisant les méthodes suivantes de recherche par ordinateur : PubMed – MeSH (via le National Center for Biotechnology Information (NCBI); The Index to Chiropractic Literature (ICL); et Google Scholar Beta. De récentes informations (2005) sur les commotions et les traumatismes médullaires ont été obtenues au cours de la Conférence de 2005 portant sur les blessures reliées aux commotions et aux traumatismes médullaires dans le sport, qui s'est tenue à Foxborough, Massachusetts. Du total de 698 références, 63 ont été retenues.

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States and abroad.^{1, 2, 3} The NCAFA group of trainers recommends a changing of the rules for “spearing” within the league and advocates gathering of Canadian based sports injury statistics. It also recognizes the need for public presentations (of concussion/spinal injuries).⁵ This paper describes the different interpretations of spearing rules at American and Canadian football associations, both at the amateur and professional levels; it further shows that injury prevention in sports is an absolute necessity and that the chiropractic profession should play a role in its application. It is suggested that chiropractors, who often attend to athletes who sustained sport related neck and head injuries, ought to contribute in their prevention and treatment.
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Conclusion : La recherche documentaire n’a produit que peu de résultats sur la statistique canadienne touchant les blessures au coup et à la tête dans le football amateur. L’auteur du présent article encourage la collecte de ce type de données et propose que des études originales et des analyses statistiques soient effectuées au Canada, comme celles le sont par divers groupes sportifs aux États-Unis et à l’étranger. 1, 2, 3 Le groupe NCAFA d’entraîneurs recommande une modification des règlements pour le « dardage » pour la ligue et la compilation des statistiques sur les blessures sportives au Canada. Il convient également de la nécessité de la présentation des résultats au public (des commotions et de traumatismes médullaires). 5 Le présent article décrit les différentes interprétations données aux règlements sur le « dardage » aux associations canadiennes et américaines de football, tant au niveau amateur que professionnel; il démontre de plus que la prévention des blessures dans le sport constitue une nécessité absolue et que la profession des chiropraticiens devrait jouer un rôle dans son application. On propose que les chiropraticiens, qui souvent s’occupent des athlètes victimes de blessures au cou ou à la tête, devraient pouvoir contribuer à la prévention et au traitement.
(JACC 2006; 50(3):195–208)

KEY WORDS: chiropractic; spearing; cervical injuries; concussion; amateur football; Canada; statistics; prevention; NCAFA.

MOTS CLÉS : chiropratique; dardage; traumatismes modulaires; commotions; football amateur; Canada; statistiques; prévention; NCAFA.

Introduction

In the world of sports, the decision to return an athlete to play after an injury has caused much controversy in recent years.¹ The responsibility for such decisions remains with the health personnel involved, both at the sideline and off field. Of major concern are spinal and head injuries caused by “spearing”. Among all sports-related head injuries, once diagnosed, concussion remains one of the most contentious subjects where return to play decisions are required.

For the purpose of this article, football is used as one of North American sports most often represented with using the technique of “spearing”, or “head butting”. The

latter may have potentially catastrophic consequences on the head and cervical spine. The concept of spearing and the resulting “spear tackler’s spine” are defined and described, and concussion which is often seen happening in tandem with cervical spine injuries, is presented in conjunction with the newly adopted classification and grading system.

The main objective of this paper is to present a review of the diagnosis and management of concussion and cervical spine injuries as a direct consequence of dangerous tackling techniques in amateur American-rule football in Canada, such as spearing, and to suggest the role chiropractors can have in their prevention.

A review of the football rules and regulations regarding spearing, in Canada and the USA, both at the amateur and professional levels, as well as the preliminary steps for the development of a Canadian statistical injury database,^{2,3,4} are introduced. Preventive strategies are discussed.

Methods

Information regarding the concepts and prevention of “spearing”, concussion and spinal injuries at the amateur football level in both the United States and Canada was obtained using the following computerized search methods: PubMed – MeSH (via the National Center for Biotechnology Information (NCBI)), using the following search terms: sports AND chiropractic; chiropractic AND brain concussion; chiropractic AND cervical vertebrae; sports AND injuries AND statistics AND football. Results: 286. A second search using sports AND injury AND statistics AND football AND Canada returned 6 articles of which none were in the youth amateur category; one additional world wide search using limits for the 0 to 18 years of age group yielded 85 entries. The Index to Chiropractic Literature (ICL) was searched; the following terms for the databases were used: chiropractic AND concussion; chiropractic AND concussion AND cervical spine; chiropractic AND sports AND injuries; chiropractic AND football AND concussion; chiropractic AND football AND neck AND injury; spearing AND football AND cervical AND injuries AND concussion. Results: 196. Google Scholar Beta: Search using key words *chiropractic, sports injuries, football, concussion, and cervical spine*. Results: 124.

Recent (2005) information on sports related spinal injuries and concussion were obtained by attendance at the *2005 Sports Related Concussion and Spine Injury Conference*. Foxborough, Massachusetts.

From a total of 697 references, 63 were retained. Only one article partially pertained to Canadian amateur football injury statistics.⁴⁹

Background information

The commendable decision to make spearing illegal and its subsequent elimination across the USA in 2005, were the result of great efforts, spread over a 29 years period, by the National Athletic Trainers' Association (NATA), the National Collegiate Athletic Association (NCAA)

and the National Federation of State High Schools Associations (NFSHSA).

Spearing is defined as an intentional head-down contact with the top or crown of the helmet. It is a technique that results in axial loading on the cervical spine. Unintentional head-down contact is the inadvertent dropping of the head just before contact.⁵ In spite of some reduction in the incidence of catastrophic cervical spine injuries (CSI's) during the 1980's, head-down contact still occurred frequently. Furthermore, each time a player initiates contact head-down, the concussion risks are increased.⁵

Fortunately, there has been a steady influx of new research and recommendations with respect to diagnosis, grading of severity and management of injury to the head and neck based on new technology. There is now more refined neuropsychological testing and a consensus of opinion, such as grading concussion and determining a standardized return to play (RTP) protocol, arising from important international symposia and conferences.^{2,3} The purpose of these was to provide recommendations and improvements in the health and safety of athletes who suffered concussive injuries through participation in sport.

A “Position Statement” to that effect was published by the NATA in *The Journal of Athletic Training* in 2004.⁵ A subsequent article, as a further position statement, published in the same journal, included the management of concussive injuries.⁸ The NCCA meeting, in August 2005, was also trying to modify or remove the word “punish”. This had not been achieved as of July 2005. The purpose of both of these position statements was to determine if there should be changes to the rules governing spearing and helmet contact, to discuss how to encourage officials to enforce spearing rules and to better educate officials, coaches and athletes regarding spearing and its consequences.

As a result, several recommendations were proposed. In brief, it was suggested that health professionals concerned with sport injuries work together as a team, document all pertinent information surrounding spinal and concussive injuries, make use of uniform and objective assessment tools such as the SCAT (Sport Concussion Assessment Tool)^{3,8} and BESS (Balance Error Scoring System)⁹ for postural stability testing following head injury. In the end, RTP (Return to Play) guidelines should

be adhered to uniformly across all levels of play.^{6,8,10}

A survey was conducted^{8,9} because it was realized that the penalties were not being called by the officials. Statistics showed that one out of six “holding” infractions was called but only one of eight hundred and thirty three “spearing” penalties was.^{8,9} Officials were reluctant to make the call because they could not determine “intent”. A 32-member *task force* sponsored by the NATA and the

American Football Coaches Association (AFCA) was created in January 2005.¹⁰ and consisted of a group of physicians, athletic trainers, researchers, coaches, football officials and administrators from the NATA, NCAA and other governing bodies. The outcome of the task force was a recommendation for a rule change regarding spearing and the creation of a rules committee on safeguards and medical aspects of sport. On February 24th

Table 1 Sport organizations and timeline for the elimination of “spearing” in amateur football in the USA and recommendations for safety practices relating to neck and had (concussion) injuries.

<i>Organization</i>	<i>Course of action and outcome</i>	<i>Time period</i>
National Athletic Trainers’ Association (NATA) National Collegiate Athletic Association (NCAA) National Federation of State High Schools Associations (NFSHSA)	Broaden the concept of “spearing” to include “deliberate use” of the helmet as the initial contact. Groups wanted to decrease the incidence of CSI’s in amateur football across the country. Incidence of CSI’s reduced by 53% in 1977; 87% in 1984. ⁵	1976–1984
NFSHSA and NATA ongoing study of “head down” contact	Statistical data collection High Schools Enforcement of rules and regulations for spearing and “head butting” ⁵	1990 – 2001–2002
International Ice Hockey Federation (IIHF) International Olympic Committee (IOC) Federation Internationale de Football (FIFA): The Concussion in Sport Group.	1 st International Symposium on Concussion in Sport. To expose the dangers and incidence of concussion in sports. Recommendations for safety. Draft of a position statement. ²	Vienna 2001
The Concussion in Sport Group	2 nd International Symposium on Concussion in Sport. Protocols for return to play and develop conceptual understanding of concussion. Recommendations for standardized management and prevention. ³	Prague 2004
The 2005 Sports Related Concussion and Spine Injury Conference.	Follow up to the 1 st and 2 nd International Symposia and addition of CSI’s data and management issues on cervical and lumbar spine injuries. ⁶ Updates on injury prevention and management in contact sports. ⁷	Foxborough, Massachusetts May 2005
The 1 st World Congress of Sports Injury Prevention.	Spearing is abolished in amateur football in the USA ^{10, 11, 12, 13}	Oslo July 2005
NATA – NCAA News Release	Preliminary injury data collection – Canadian content. Adoption of the proposed recommendations for “on the sidelines” management of concussion and spinal injuries from NATA and the Concussion in Sport Group. ^{2, 3, 4, 5, 6, 21}	Dallas, USA August 2005
National Capital Amateur Football Association (NCAFA): The Trainers Group.		Ottawa, Canada August 2005

2005, the Playing Rules Oversight Panel approved the committee's proposals for rule changes for the 2005 season at the amateur level.¹⁰ This became reality during August 2005. Table 1 shows the organizations responsible for the change of rules leading to the elimination of spearing at the amateur football level in the United States.

Cervical and head injuries in amateur football

Cervical spine injuries

The most common cervical injuries in football players are the commonly called "stingers" or "burners" (brachial plexus injury);^{19,63} acute cervical sprains and strains are close second; intervertebral disc injuries (herniations being a rare occurrence) follow; and cervical spine fractures and dislocations which are included in the "catastrophic" injuries.¹⁴

According to the National Center for Catastrophic Sports Injury Research (NCCSI), 7 players suffered permanent paralysis due to C-spine injuries sustained while playing football in 1995. More recent data show that there has been an unfortunate increase in the number of severe (catastrophic) spinal injuries between 1994 and 2004. For instance, there were 12 reported cord injuries with incomplete neurological recovery during the 2004 High School and collegiate football season across the United States. Neurological catastrophic events include quadriplegia and quadriparesis; fatal injuries number 4 in both of 2003 and 2004.¹⁵

Past statistics showed that 32% of US college football recruits sustained moderate cervical injuries in High Schools.^{16,17} Some were reported as "catastrophic", i.e.: life-changing or fatal, at a rate of 2.5 per 100,000 "reported" in 1976 but down to 0.5 per 100,000 in 1991^{17,15,16,17} as a result of the National Collegiate Athletic Association (NATA) research and position statement.⁸ However, the NATA Injury Surveillance System (ISS) reported an increase in concussion injury between 1995 and 1999.^{4,8} This is rather surprising, considering the previous decrease of such injuries following the "change of rules" regarding spearing.^{5,16,17}

The Elimination of Spearing:

the first objective of the NCAFA Trainers Group

Spearing must be eliminated from the game because of

its potential catastrophic consequences to both the "spearer" and the player being speared.^{18,19} The NCAFA Trainers Group has made the elimination of spearing a priority.^{20,21} No matter how it is defined, besides being one leading cause of concussion, it often results in ill effects on the "performer". Torg defines the spear tackler's spine as "a condition that occurs in football players who habitually use the head as the initial point of contact."¹⁸ Axial loading usually involves secondary forces of hyperflexion, hyperextension and rotation thus adding to the injury complex.²² The illustration below (Figure 1) shows such effects of forces on an alordotic cervical spine.

Figure used with permission: Joseph S. Torg¹⁸

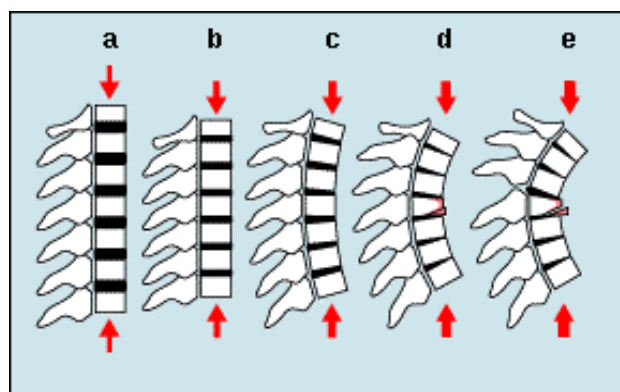


Figure 1 "Spear tackler's spine" showing the loss of cervical lordosis and the axial load on a now-segmented column and the compression on the intervertebral discs (a and b). Maximum compression occurs and the spine buckles (c), resulting in possible fracture, dislocation or subluxation (d and e).

Because of its potential catastrophic neurological consequences, such as permanent neurological deficits of quadriplegia, incomplete hemiplegia, or residual long track signs, spear tackler's spine is an absolute contraindication to further participation in contact sports.^{18,19} For the purpose of this line diagram, "subluxation" is defined as a dislocation without fracture which results from disruption of the posterior soft tissue supporting elements. Angulation and anterior translation of the superior vertebrae occurs. No associated fractures exist, and associated neurological injuries may or may not exist.²³

This differs from the definition of subluxation used in

The following photographs of plain lateral radiographs of the cervical spine show the relationship between a “normal lordotic curve and the effects of axial loading forces during “spearing” may have on the alordotic spine.”



Figure 2 A normal cervical lordosis where loading forces are distributed evenly at each intervertebral disc.



Figure 3 Axial loads on a “segmented” alordotic spine will bear on a smaller area, causing discal compression to one single level.



Figure 4 Normal cervical flexion view.



Figure 5 Buckling at C4-C5 takes place in this flexion view. Fracture, dislocation or subluxation may result.

chiropractic that is defined as a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health.^{24,25}

Associated cervical trauma with concussion may include one or several of neck pain, reduced cervical range of movement, cervicogenic headache, cervicogenic vertigo and occipital neuralgia.²⁶ Cervical injuries, more often than not, occur in tandem with a concussion. If the athlete is unconscious, assume a spinal injury has occurred until proven otherwise and if the athlete reports any symptoms, it should be assumed they have been concussed until proven otherwise.²⁷

Concussion

Concussion is defined as a complex neuropathophysiological process affecting the brain, induced by traumatic biomechanical forces which induce a traumatic alteration in brain function that is manifested by an alteration in awareness of consciousness”^{2,3,6}

It can be caused by a direct hit to the head, face, neck or elsewhere on the body while a sudden and impulsive force is transmitted to the head. This typically results in

the rapid onset of a short lived neurological impairment which usually resolves spontaneously. Although it may set off neuropathological changes, the resulting acute symptoms are typically functional rather than structural. Contrarily to popular belief, loss of consciousness (LOC) does NOT have to be present and it is expected that the resolution of the clinical and cognitive symptoms will follow a chronological course. The most common signs, as often seen in football, are cognitive in nature and may include a period of confusion and retrograde amnesia. Symptoms most often consist of headaches, balance problems, nausea, visual impairment such as “seeing stars” and “flashing lights”, ringing in the ears, irritability and mood changes. Common physical signs may also include coordination and gait difficulties, seizure, poor concentration, inappropriate emotions (laughing or crying), slurred speech, vacant stare and glassy eyes, personality changes and inappropriate behavior (going in the wrong direction for instance).^{1,2,3,6,8,9} However, a concussion is characteristically associated with gross normal imaging studies.^{2,3,6}

Second Impact Syndrome

Second-impact syndrome (SIS) refers to the catastrophic events which may occur when a second concussion occurs while the athlete is still symptomatic and healing from a previous concussion. The second injury may occur from days to weeks following the first. Loss of consciousness is not required. The second impact is more likely to cause brain swelling and other widespread damage, and can be fatal. This is a rare occurrence, nevertheless needing serious consideration. However, the true incidence and impact of SIS remains a thorny issue. A total of 17 cases have been reported in the literature, and only five cases had confirmed diagnoses of SIS. Thus, the claim that SIS is a risk factor for diffuse cerebral swelling has not been supported in the literature.^{3,6,33}

Grading concussion

Concussion grading systems are all anecdotal, with no hard scientific evidence.²⁸ Return-to-play times accompanying these guidelines are usually personal estimates^{28,29} nevertheless there has to be some agreement on what is the safest manner to return an athlete to play after concussion. The trend in adopting the new guide-

lines seems to be ever growing, particularly in collision and contact sports^{2,3,6,8,30} including football, hockey, lacrosse, soccer, wrestling and diving³¹; and rugby and boxing.³² Table 2 compares the “new” guidelines for grading concussion with the “old” system. Following the Vienna and Prague Concussion conferences,^{2,3} the consensus has been that the athlete having suffered a concussion should be removed from play and not returned to play during the ongoing game. Medical and neuropsychological evaluations should ensue, followed with the step wise process described.^{2,3,34}

In Canada, we find a combination of both the old and new systems however, the tendency leans toward the adoption of the new grading by several groups such as the Ontario Brain Injury Association (OBIA)⁴⁰, Judo Canada,³⁰ NCAFA,²⁰ ThinkFirst Canada,²⁹ and Canadian Family Physician (CFP).²⁸

Treatment of concussion

Because of its approach to health, chiropractic is well suited to address the physical disorders induced by body contacts and positioning in most sports.⁴¹ Chiropractors

Table 2 A comparison of the “old” vs. the “new” concussion grading guidelines. The new guidelines were proposed following the 2nd International Conference on Concussion and Sport, Prague, 2004.³ A world wide consensus in adopting the new guidelines has not yet been achieved.

<i>The “Old” Grading System</i>	<i>The “New” Grading System</i>
Mild (Grade 1) concussion is variously defined as no loss of consciousness, or concussion symptoms or mental status abnormalities on examination that resolve in less than 15 minutes.	A simple (first degree) concussion is defined as an altered state of consciousness (without a loss of consciousness), resulting from a blow to the head or whiplash, with symptoms lasting no more than fifteen minutes. This corresponds to a Grade One concussion using the American Academy of Neurology guidelines.
Moderate (Grade 2) concussion is variously defined as loss of consciousness less than 5 minutes or post traumatic amnesia longer than 30 minutes, confusion with amnesia, or concussion symptoms or mental status abnormalities on examination that last more than 15 minutes.	Any cognitive deficits that arise from a simple concussion will disappear within 24 hours.
Severe or Grade 3 concussion is variously defined as loss of consciousness longer than 5 minutes or post traumatic amnesia longer than 24 hours, or any loss of consciousness, either brief (seconds) or prolonged (minutes). ^{35,36,37,38,39}	A complex (second degree) concussion is defined as an altered state of consciousness resulting from a blow or whiplash where there is brief loss of consciousness or symptoms lasting longer than fifteen minutes. This corresponds to a Grade Two or Grade Three concussion using the American Academy of Neurology Guidelines. ^{2,3,6}

are often the first practitioners who will attend to a patient who has suffered a sports injury and athletes frequently seek their help for treatment of chronic post traumatic concussion syndrome.⁴² Several manual techniques for the treatment of post traumatic concussion syndrome have been described as either “direct” or “indirect”.⁴³ Examples of direct techniques include spinal adjustments, or high-velocity thrusts, myofascial release, ART®,⁴⁴ Graston Technique®,⁴⁵ or muscle energy techniques which aim to directly release restricted joints or soft tissue barriers. Indirect methods are those not directly applying forces to release restrictions, or “barriers”. Strain-counterstrain and positional release therapy are considered indirect techniques.⁴³

Medically, the treatment of concussion is passive, depending mostly on allowing the brain to heal itself with rest, avoidance of re-injury activities, follow the return to play protocols and observation.⁴⁶ Supportive care using non narcotic analgesics and antiemetics may be provided for moderate to severe cases.³²

Return to play after concussion: protocol

It is absolutely unsafe to return to play while symptomatic in any way following a concussion.^{2,3,6,20,21,42} Return to play should follow a stepwise progression. This progression will vary depending on the duration of postconcussion symptoms and the type of sport.^{2,3,6,29} Table 3 below illustrates the protocol which has been proposed at NCAFA, according to the Prague symposium 2004 and the Boston Conference 2005.^{3,6,20,21,29} Players are also provided with a list of concussion “symptoms”, Table 4.

The protocol is now widely accepted however some feel that it is perhaps exaggerated while trying to apply it to professional sports. It is said that “the ludicrous international recommendation that players should sit out for 3 weeks following a concussion means that players are conditioned to hide any concussive symptoms from their doctors for fear of being stood down.”⁴⁷

Outcome of the preliminary NCAFA Trainers Group meeting

Following the August 2005 NCAFA presentation²¹ to the Group of Trainers, an agreement was reached for a standard by which statistical information would be introduced. It was further agreed to adopt a system to gauge Return to

Play after concussion and spinal injuries; the group arrived at a consensus to implement pre-season neuropsychological assessments for concussions including previous history and baseline measurements; the Sport Concussion Assessment Tool (SCAT card) was accepted as a valuable instrument, available for download from several websites⁴⁸ and received support from the trainers from all clubs. The information was conveyed to and well received by the league authorities.

The group recognized that, apart from one Canadian study in sports related injuries in children in which football was only part of the total number of sports mentioned,⁴⁹ there are no injury statistics available at the “lower” levels of football in Canada. A review of the available information at Football Canada⁵⁰ (amateur level) falls short of any mention of such data. Further inquiry at the CIS (Canadian Interuniversity Sport) indicated that no such records or statistics were kept for “lower leagues” football players. (Personal communication, September 8, 2005). Attempted communications with the Canadian Athletic Therapists Association (CATA) proved fruitless in attempting to access information and statistics. The most important review of sport-related injuries from a Canadian source ought to be the Sports and Recreation Injury Prevention Strategies carried out in 2001,⁵¹ however its actual statistical content proves to be mostly non-Canadian.

Consequently, a statistical injury database is presently being created by the trainers of the NCAFA, a first step in gathering such information at the amateur level in Canada. The data will be compiled and analyzed during the existing 2005 season. A statistical research paper will be drafted and presented to the officials of NCAFA. Potentially, this could become the foundation on which to build a national database from which further research could be conducted. As a result, it was approved that the agenda for the next meeting will include a formal presentation for a change of rules on spearing, with supporting evidence from statistics, and a request for agreement in developing a uniform system for RTP which, it is hoped, will be supported by the association. It is finally the intention of the group to propose to make the injury statistics collection compulsory for the 2006 season and to convey the message to parents, to the coaching staff and to the public both directly and through the media to ensure awareness of the steps it has taken in order for this

Table 3 NCAFA adoption of the return to play guidelines after concussion.

<ul style="list-style-type: none"> • <i>Step One:</i> REST. No school or work for the first 24 hours. This may require remaining seated or bed rest if symptoms are severe. If less severe, light activities such as walking around the house are fine. You have to be <u>at least 24 hours</u> symptom free before proceeding to the next step. • <i>Step Two:</i> LIGHT AEROBIC EXERCISE. Such as walking or stationary biking. Do this for only ten minutes at a time and keeping the intensity very low. Return to school or work if it does not require demanding physical activities beyond the walking level. No weight/resistance training allowed. No activity requiring rapid head position change. Again, you must be symptom free for at least 24 hours before going to the next step. • <i>Step Three:</i> INCREASE LEVEL OF AEROBIC ACTIVITY. Walk or cycle as much as comfortable. NO resistance activities, weights, or sudden changes in body position. 24 hours minimum symptom free before next step. • <i>Step Four:</i> SPORTS SPECIFIC ACTIVITIES/TRAINING. For example, in football, this would involve resuming light running and simple drills such as throwing/catching the ball, position plays, etc. WITH NO CONTACT. 24 hours symptom free is required again before going to Step Five. • <i>Step Five:</i> SPORTS SPECIFIC ACTIVITIES/NO BODY CONTACT. At this point, you can increase the level of aerobic activity, progressive weight training and field practice drills. You may NOT dress in your football gear yet as you may easily become a “target”. The other players will not readily notice that you are/were an injured player. The 24 hours “symptom free” period still applies before going to Step Six. At this point, you are fully active without body contact. The next step requires body contact and you should PROCEED ONLY WITH MEDICAL CLEARANCE. • <i>Step Six:</i> SPORTS SPECIFIC DRILLS, training with full body contact practice. Note that you might not yet be ready for game play! Any symptom at this point again means that you are going back one step! • <i>Step Seven:</i> RETURN TO GAME PLAY. <p><i>NOTE:</i> At ANY level above: you must go back to the previous step should you experience ANY symptoms and again wait at <u>least 24 hours</u> before proceeding to the next level.</p> <ul style="list-style-type: none"> • <i>Should you experience another concussion or symptoms of a “flare up”, you must return to the initial step (Step 1). You will be asked for medical clearance before resuming football activities and the Step Program will start again.</i>
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Table 4 Signs and symptoms of acute concussion. Handout accompanying the RTP protocol.

<p>Typical symptoms of concussion. Other symptoms such as a feeling of slowness and fatigue after an impact may indicate that a concussion has occurred or has not fully resolved.</p> <ul style="list-style-type: none"> ○ Headache or pressure in the head ○ Balance problems or dizziness ○ Nausea ○ Feeling "dinged", "foggy", stunned, or "dazed" ○ Visual problems – for example, seeing stars or flashing lights, double vision ○ Hearing problems – for example, ringing in the ears ○ Irritability or emotional changes <p>Physical signs:</p> <ul style="list-style-type: none"> ○ Loss of consciousness/impaired conscious state ○ Poor coordination or balance ○ Concussive convulsion/impact seizure ○ Gait unsteadiness/loss of balance ○ Slow to answer questions or follow directions ○ Easily distracted, poor concentration ○ Displaying inappropriate emotions – for example, laughing, crying ○ Vomiting ○ Vacant stare/glassy eyed ○ Slurred speech ○ Personality changes ○ Inappropriate playing behavior—for example, running in the wrong direction ○ Significantly decreased playing ability^{3,6}

Table 5 Comparison of the football definitions, rules and regulations concerning “spearing” in Canada and the United States at the amateur and professional levels. Note the most important change which took place at the NCAA where spearing has been eliminated during late August 200

Canada	United States
<p><u>Canadian Football League (CFL) Professional Fouls and Penalties; Section 2: Major Fouls; Article 3: Unnecessary Roughness.</u> A player shall be penalized for any of unnecessary roughness against an opponent including, but not limited to: f. Using the helmet to butt, ram or spear an opponent, including but not limited to, a passer, a receiver in the act of catching a pass, a ball carrier in the grasp of another tackler, or a ball carrier on the playing surface not attempting to advance. Penalty: L15 yards. http://www.cfl.ca/index.php?module=ContentExpress&func=display&ceid=13</p>	<p><u>National Football League (NFL) Professional NFL Rules and Policies: Article 8: Impermissible use of the helmet and facemask. Using any part of a player’s helmet (including the top/crown and forehead/”hairline” parts) or facemask to butt, ram an opponent violently or unnecessarily;</u> Defenseless postures: - player in the act of or just after throwing a pass - receiver catching or attempting to catch a pass - runner already in the grasp of a tackler - Kickoff or punt returner attempting to field a kick in the air - player on the ground at the end of the play <i>Article 11: Hits to the passer’s head and use of helmet and facemask.</i> http://www.nfl.com/fans/rules</p>
<p><u>Football Canada (Amateur)</u> <i>Section 2. Rough Play</i> <i>Article 3 – Butt Blocking, Butt Tackling or Spearing.</i> Butt blocking, butt tackling or spearing, if done deliberately in such a way as to cause calculated injury may be penalized under this section. <i>Section 3. Unnecessary Roughness</i> <i>Article 7 – Spearing</i> “... a deliberate and malicious driving of the helmet into a player A player shall be called for Spearing even if he commits himself before the ball is dead, if he uses the head and helmet as the primary or main point of force.” Penalty for Unnecessary Roughness: 15 yards! http://www.footballcanada.com/english/programs.html#tackleofficiating</p>	<p><u>National Collegiate Athletic Association (NCAA) (Amateur)</u> <i>Rule 2-24-1</i> Spearing. Delete “intentional” from this rule. (Also, see change to Rule 9-1-2-1 and n.) Rationale: After reviewing survey data from the AFCA and officiating organizations, it appears officials are hesitant to call this foul in some cases because intent is difficult to determine. The Committee on Competitive Safeguards and Medical Aspects of Sport also recommended this alteration. <i>2005 NCAA football rules changes</i> <i>On February 24, the NCAA Playing Rules Oversight Panel approved the Football Rules Committee’s proposals for the 2005 season.</i> <i>Spearing is eliminated as of August 2005.</i> http://www.chathamjournal.com/weekly/sports/football/ncaa-football-rules-changes-50727.shtml http://www.popwarner.com/articles/nata_spearing.asp?lable=news</p>

essential undertaking to be completed.

Prevention – An overview

*There will always be another game, but you only have one brain. When in doubt, stay out*⁵⁴

The chiropractic profession is a strong advocate of prevention whether it be relating to spinal degenerative conditions or sport related injuries. In the United States,^{55,56,57,58} Canada,⁵⁹ the United Kingdom⁶⁰ and Australia^{61,62} there is a growing interest in specialty sports chiropractic advocating prevention as its mainstay. Far from having to be restricted to clinical settings, however, the skills of chiropractors ought to be taken to the sidelines. Among preventative measures involving sport injuries, the task of showing proper contact techniques in diverse contact sports should not be left entirely to the coaches. Chiropractors can advise players, in lay terms, to practice the best techniques in order to reduce risks of serious injury,³² including that their teachings must spread beyond the obvious injuries that are spinal and concussive in nature. Officials ought to be encouraged to enforce the rules and regulations which relate to the subject of spearing. The summary of the rules and regulations on spearing now in effect in both the USA and Canada, at both the professional and amateur levels, is shown in Table 5. American rulings differ from their Canadian counterparts on several points, especially relating to the definition of spearing and its interpretation as to whether there is malicious “intent”.

Conclusion

Sports medicine professionals ought to respond and participate, recognize the need for educating sport practitioners such as athletic trainers and others who work at the sidelines, and speak at coaching and information clinics about the importance of eliminating dangerous playing tactics such as spearing, thus demonstrating that it is everyone’s mission to make sports safer for our youth.^{10,51,52,53} It is their duty to show that concussion and spinal injuries are not just unfortunate accidents and that these injuries can be prevented.

In the end, the responsibility for ensuring the safety of the young athletes falls on all those involved with contact sports, including parents and the players themselves, as well as coaches, trainers, health professionals, officials and the administrative staff. In order for them to become competently involved, they need to be informed of the

most recent happenings and developments, as well as decisions, deriving from research.

Sports injuries such as cerebral concussion and spinal trauma can be catastrophic, and preventing them becomes one of the most important tasks confronting the sports health professional. Health professionals with interests in sports, including chiropractors, become the gateway for the dissemination of such new information and must attend and participate in national and international events relating to new trends in sports injury management and prevention. This starts at the lower levels of sports and, rather than just standing by on the “sidelines”, the chiropractic profession ought to become directly engaged in all aspects of sports injuries and actively help developing systems by which it can be recognized as a core participant within the sports medicine world.

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