ABSTRACT

Objective: Each year there are an estimated 1.6-3.8 million sports-related brain injuries; 136,000 of which occur in young athletes in the course of high school sports. The purpose of this article is to discuss the management and outcome of a post-concussive headache and neck pain in a young athlete and implications for return to play.

Clinical Features: A 16-year-old male athlete presented to a chiropractic clinic complaining of neck pain and daily headaches from a concussion while playing football 5 weeks previously.

Intervention and Outcome: A short course of diversified-type cervical and thoracic manipulation was applied with significant relief after the second treatment and resolution of symptoms after 5 visits performed over 2 weeks. The athlete was able to participate in a graduated return to play. Three months post-SRC the athlete was able to return to full game play symptom free.

Conclusion: Chiropractors who see athletes in their practices should be aware of SRC and return to play guidelines.
Introduction

Recently attention has been focused on sports-related concussions (SRC), in part due to the untimely concussion-related deaths of high school athletes, cognitive problems in professional football players, and head injuries sidelining professional hockey players for extended periods of time. Understanding the signs and symptoms of SRC and appropriate return-to-play recommendations is imperative to the safety of all athletes and young athletes in particular.

Each year in the United States, there are an estimated 1.6 to 3.8 million sports-related brain injuries;\(^1\) 136,000 of which occur in young athletes in the course of high school sports.\(^2\) However, these statistics may be grossly underestimated. McCrea and colleagues\(^3\) found over half of a sample of high school football players did not report a head injury, even though it had occurred. One of the reasons for this is a failure of athletes to recognize their injury as significant. Delany and coworkers\(^4,5\) found that only 18.8% to 23.4% of concussed players in the Canadian Football League, and Canadian university football and soccer players realized they had sustained a concussion. Another factor in the underestimation of SRCs is the reporting of head injuries to untrained personnel, such as coaches or parents, who in turn may fail to recognize a concussion.\(^3,6,7\)

Concussion has been defined as “a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces” and may or may not involve loss of consciousness (LOC).\(^8-10\) Another definition that may be more clinically useful is, “a trauma-induced alteration in mental status.”\(^11\) Several common features of SRC include: \(^8-10\)

- May be caused by an impulsive force that is transmitted to the head either direction or indirectly.
- Rapid onset and spontaneous resolution of transient neurological impairment.
- Acute symptoms are that of a functional disturbance rather than a structural injury.
- Involve a graded set of clinical syndromes that may or may not involve LOC. These syndromes typically resolve sequentially.

Although a dramatic LOC is easily detected, most concussions do not involve such obvious clinical signs.\(^4,6,12,13\) The most commonly reported symptoms of SRC are headache and dizziness,\(^6,14,15\) both of which athletes may often ignore on the field of play.

Because signs and symptoms of SRC may be ignored by players or missed by non-trained individuals, it is imperative that on- or off-field clinicians involved in the treatment of athletes be well versed in the sign and symptoms of SRC.

**Signs** of concussion include: LOC, seizures, amnesia (retrograde or anterograde), disorientation, confusion, forgetfulness (game rules, score, opponent, etc.), inappropriate emotionality, slow verbal responses, behavioral and personality changes, poor coordination, and imbalance.
Symptoms include: headache, dizziness, nausea or vomiting, poor balance, vision changes, photophobia, phonophobia, feeling “off” or “out of it”, fogginess, difficulty concentrating, tinnitus, drowsiness/fatigue, sadness/depression, and hallucinations.\textsuperscript{16,17}

If a SRC is suspected, return-to-play should follow a stepwise progression where symptoms are absent prior to progressing to the next stage.\textsuperscript{8-10} Initially, the athlete should have complete physical and cognitive rest to allow for a period of recovery, followed by light aerobic exercise (no resistance training) to increase the athlete’s heart rate. The next phase is sport specific exercise that may include light training drills; however, no contact is permitted at this time. From here the athlete will progress to more complex training drills and resistance training. If the athlete is able to perform at this intensity with no symptoms and is cleared by trained personnel, they can begin participating in full-contact practice sessions. The last phase is a full return-to-play with normal levels of competition and game play. If at any stage the athlete experiences symptoms they are to move back to the previous stage for a period of time before attempting to progress further.

Athletes do not progress through these return-to-play stages in a consistent or predictable manner. As such, care should be given to assessing each phase with each athlete. Typically, a simple concussion will resolve within 7 to 10 days. However, in complex concussions (multiple concussions, convulsions, LOC >1minute, prolonged cognitive impairment) the recovery time may be much longer.\textsuperscript{9} Various methods of assessing cerebral function have shown impairment well beyond the 7 to 10 day mark.\textsuperscript{18-23} For example, in a group of 38 concussed athletes, Slobounov’s group\textsuperscript{23} found that all athletes were asymptomatic after 10 days. However there were visual-kinetic integration problems at two weeks for singly concussed athletes and at 30 days for multiply concussed athletes. With this in mind, much care should be given to considering the return-to-play of an athlete suspected of having a SRC.

This paper documents the treatment and return to play of a young athlete that sustained a SRC and presented to a chiropractic clinic with a post-concussion headache and neck pain.

Clinical Features

A 16-year-old male athlete presented to a chiropractic clinic complaining of neck pain and daily headaches the nature of which was a constant ache with occasional throbbing in the fronto-temporal region of the head. He reported that while playing football 5 weeks prior he suffering a head injury followed immediately by the current headache as well as a sense of “fogginess.” The young athlete and his parents were unsure if he had lost consciousness; however he did report feeling dazed after the impact. He was removed from play at once, with a suspected SRC. The young athlete had expected to return to play in 1 to 2 weeks, but as the headache and neck pain had not subsided he was still unable to do so, which caused him considerable frustration. He also reported impaired sleep leading to fatigue and difficulty concentrating on cognitively intense tasks such as homework. He described his pain as disabling. On a 0 to 10
visual analog scale, he rated his headache as 5/10 on average and ranged between 8/10 at its worst and 4/10 at best. Neck pain he rated as 3/10 on average and when the pain was at its worst it was reported to be 5/10 and at its best 2/10. He had been prescribed NSAIDs and vicodin, which he took daily, for pain control.

The patient denied any previous history of headaches prior to the head injury he had sustained while playing football. There was no contributory previous medical history such as prior significant illness or surgeries. Four weeks after the concussion an MRI was performed the results of which were unremarkable and showed no gross structural abnormalities.

Examination revealed no focal neurological deficits. Deep tendon reflexes were brisk and equal bilaterally. Babinski’s reflex was unremarkable and cranial nerves II-XII were grossly intact. Cervical range of motion testing reproduced neck pain with active extension.

**Intervention and Outcome**

A short course of diversified-type cervical manipulation (i.e. supine lateral cervical break) and upper thoracic manipulation was suggested and applied. The patient noted significant symptomatic relief after the second treatment and virtually complete resolution of symptoms after 5 visits performed over 2 weeks.

Two months post-SRC, the athlete was able to begin the process of returning to play starting with light aerobic exercise and progressing to game play. During his return to activity the athlete twice complained of mild neck pain and mild headache, which precipitated two follow-up visits to the chiropractor and a modest delay in his returning to full activity. Three months post-SRC the athlete was able to return to full game play symptom free.

**Conclusion**

Chiropractors who see athletes in their practices should be aware of SRC and return to play guidelines. They must also recognize that each athlete will progress at a different rate. However, in some circumstances therapies offered by chiropractors may be of benefit to athletes that have sustained sports-related concussions, and further research should be conducted in this area.

**References**


