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CASEREPORT

Chiropractic care of a professional ice hockey player suffering from multiple concussions: A case report

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Narrative: A professional ice hockey player suffering multiple concussions and having limited function in his ability to return to play his sport for nine months due to cognitive issues, headaches, and reduced pO2 values when physically stressed.

Chiropractic care with cranial interventions along with dental/chiropractic co-management of his TMJ dysfunction with a dental appliance appeared to create a significant change, and he returned to the ice within four weeks of care.

Indexing terms: Chiropractic; sacro-occipital technique; SOT; concussion.

Introduction

Awareness of sport-related concussion/post-concussion syndromes is beginning to influence the conversation about the health of professional athletes and their teams. '*Concussion has been defined as a pathophysiologic process affecting the brain and induced by traumatic forces*'. (1, 2, 3, 4)

> *... the patient's condition was complex due to the multiple concussions along with his post-concussion sequelae being relatively stable for nine months, well beyond the expected one-month duration...'*

Conservative and effective methods of care that help the athlete recover are important healthcare considerations. It has been estimated that 1.6 to 3.8 million sports- and recreation-related traumatic brain injuries occur in the United States each year. (5) Although most signs and symptoms resolve over time when concussive injuries are recognised and managed appropriately, concussions can be career-ending. (6, 7) Of the various professional sports, concussions are most commonly found in ice hockey players. (6, 8, 9, 10, 11, 12, 13) Benson et al noted '*post-concussion headache, low energy or fatigue, amnesia and abnormal neurologic examination were significant predictors of time loss among professional hockey player*'. (1)

The field of chiropractic is becoming more involved in the assessment and treatment of sports-related concussion. (14, 15) Studies have found that chiropractors and chiropractic interns in college have '*demonstrated the skills and knowledge to diagnose concussion*

and excel at identifying the definition and mechanism of concussion' yet still '*knowledge gaps regarding diagnosis and management of concussion were found*'. (16, 17) A survey noted that a high percentage of the sports-certified chiropractors that responded assess and manage sport concussion in their practice, and many of them endorse the use of the *Sideline Concussion Assessment Tool (*SCAT) as a sideline assessment tool. (18, 19) As the studies emerge, chiropractors involved in treating athletes for sport-related concussion are using the most recent SCAT assessment tools as they are being developed. (18, 19, 20)

This case report discusses a professional ice hockey player who presented for chiropractic and chiropractic cranial care at this clinic for unresolving symptoms secondary to multiple concussions.

Case Presentation

A 21-year-old male professional hockey player suffered a concussion on May 2017 when he was checked into the boards during a playoff hockey game. He was on the disabled list until early November 2017. Upon his return, he played five games before having another substantial head impact on November 22, 2017 resulting in an additional concussion.

At his initial presentation on January 18, 2018 he reported constant headaches, which were intermittent in intensity, ranging from increased head pressure to severe pain. His headache was localised to the frontal bone, bilateral sphenoid wings, and glabella. He also stated that he felt he was chronically clenching his jaw. After the initial head trauma, a SCAT concussion checklist suggested a significant brain injury associated with headache, photophobia, photophobia, impaired memory at the time of the head injury, intermittent brain fog, forgetfulness, fatigue, intermittent mood swings, and continuing for over nine months afterwards.

He was referred to this office by his team due to his multiple concussions and an inability to practice/play hockey due to suspected unresolving post-concussion syndrome.

Methods

The patient's pO2 values were 95% at rest and while on a stationary bicycle would decrease to the lower 90s. Sacro occipital technique (SOT) analysis and cranial assessment revealed multiple cranial, craniofacial, and temporomandibular joint (TMJ) related imbalances. Treatment consisted of balancing his left temporal extension distortion and included sphenoid maxillary craniopathy.

Cranial/dental co-treatment included lower occlusal splint therapy to control clenching and the translation of the force of his bite into his head. Dental treatment frequency was one visit per week for three weeks in a row immediately preceded by cranial treatment at this clinic. At each chiropractic office visit specific chiropractic adjustments were administered to his thoracic, lumbar spine, and cervical spine along with soft tissue therapy for his neck as indicated.

Results

The patient was treated for 10 visits over four weeks at which point he returned to regular play again. His oxygen saturation improved, registering with activity at 99%. His entire original presenting symptoms had resolved by the fourth week of care, and he scored a goal and had two assists in his first game back.

Discussion

One theory of why the chiropractic cranial care may have assisted in patient recovery relates to the possibility that the low oxygen saturation may have been caused by injury to the medulla oblongata, a respiratory centre in the brain. Leddy et al found that '*exercise intolerance after concussion is believed to be the result of autonomic nervous system dysfunction*'. (21) Most commonly '*athletes with sports-related concussions will recover within 21-28 days. Symptoms*

demonstrated the greatest improvement in the first two weeks, although neurocognitive impairment lingered across various domains up to 28 days after a sport-related concussion'. (22)

The literature

There have not been any recent published studies of chiropractic care of a professional ice hockey player. Olson et al describe the successful management of a 14-year-old hockey player with post-concussion symptoms. (23) The student athlete was seen 13 days post-trauma, had '*failed to progress toward return to play, and his computerised neurocognitive testing scores had not improved*'. (23) Treatment included '*chiropractic manipulative therapy, myofascial release, instrument-assisted soft tissue technique, and therapeutic exercises … provided over five treatments spanning a 20-day period. The patient followed up each treatment with ImPACT testing. At the conclusion of the treatments, the patient's computerised neurocognitive testing scores had improved, and the patient was returned to play*'. (23)

Management

This case is different in that the chiropractic treatment included cranial and TMJ-related co-treatment. The type of cranial care was similar to osteopathic-type interventions, which have been found to be '*a safe adjunctive treatment option to improve concussion-related symptoms and recovery*'. (24) A case series by Wetzler et al utilised '*the effects of CranioSacral Therapy (CST), Visceral Manipulation (VM), and Neural Manipulation (NM) modalities for treating patients who have post-concussion syndrome*'. (25) They concluded that '*ten sessions of specific CST/VM/NM therapy resulted in statistically greater improvements in pain intensity, ROM, memory, cognition, and sleep in concussed patients*'. (25)

Also of note, the chiropractic/dental TMJ co-treatment involved the fabrication of a specific dental appliance or orthotic which helped with the patient's chronic bruxism. Recent studies are finding a relationship between orthotics and concussion prevention. (26)

For chiropractors treating sport-related concussion it is important to be familiar with the *Sport Concussion Assessment Tool* (SCAT), which is an assessment form that has various steps for the examining physician working with traumatised athletes. The SCAT has one section for on-the-field and the other during follow-up assessments. (20)

On the field assessment:

- Step one: Determine if there are any red flags
- Step two: View the athlete's position or behaviour on the field of play
- Step three: Perform a Memory Assessment *Maddocks Questions*
- Step four: Examination includes *Glasgow Coma Scale* and cervical spine assessments

Off field assessment

- Step one: Athlete's background
- Step two: Symptom evaluation
- Step three: Cognitive screening, which involves assessing their orientation, immediate memory, and concentration skills
- Step four: Neurological screening with balance examination
- Step five: Delayed recall assessment
- Step six: The physician's review of the assessments and decision or determination

Notes

As with any case study it is not possible to generalise the results to the population at large due to not being able to rule out confounding factors, such as the placebo or ideomotor effect, and

other related issues, such as possible regression to the mean.What is interesting in this case is that the patient's condition was complex due to the multiple concussions along with his post-concussion sequelae being relatively stable for nine months, well beyond the expected one-month duration. (22)

The temporal relationship between his stable condition for nine months and rapid improvement during the chiropractic cranial and TMJ treatment is suggestive that the intervention played a part in his recovered function and ability to return to the ice.

Conclusion

This case discusses the presentation of a professional ice hockey player suffering multiple concussions and having limited function in his ability to return to play his sport for nine months due to cognitive issues, headaches, and reduced pO2 values when physically stressed.

Chiropractic care with cranial interventions along with dental/chiropractic co-management of his TMJ dysfunction with a dental appliance appeared to create a significant change, and he returned to the ice within four weeks of care.

Based on the finding in this case report, further research into chiropractic cranial care to facilitate recovery from sports-related post-concussion syndromes might be warranted.

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About the practitioners

Thomas Bloink DC specialises in cranial-dental integration in Silicon Valley at the California Cranial Institute, which was founded in 1992.

Dr Bloink was on the board of advisors to help create SOTO-USA and is actively presenting at research conferences throughout the world, and developing novel treatment approaches for functional neurological conditions. He works closely with many different specialists including dentists, orthodontists, and oral-maxilla surgeons. ENT's and others to ensure the best possible outcome for his patients.

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