

Post concussion syndrome, temporomandibular joint disorders, and chiropractic dental co-treatment: A case report

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Abstract: The awareness of sports-related concussions with post-concussion syndromes is gaining exposure in the chiropractic profession. The following case describes a 21-year-old female patient who had a concussion with subsequent post-concussion syndrome symptoms that persisted for five months.

Methods/Intervention: Along with reduced TMJ functioning the patient presented with some altered cranial nerve findings related to photophobia, contrast sensitivity, and convergence insufficiency. Sacro occipital technique category one and two findings relating to pelvic torsion and sacroiliac joint hypo/hypermobility was found and treated along with cranial and TMJ adjusting. A dentist equilibrated the patient's mandibular occlusal splint over a 9 week period which was immediately preceded by chiropractic care.

Results: As of March 18, 2014 the patient was completely pain free with no symptoms of lightheadedness, brain fog, or nausea. She has been able to exercise, and has been lifting light weights. She was also able to run five miles. This is a significant improvement given that her symptoms and lack of function were consistent since her accident of September 2013.

Conclusion: Further research is needed to determine whether a subset of post-concussion or head trauma patients may have TMD, which is limiting their ability to fully recover function and return to their activities of daily living. Collaborative efforts between emergency room doctors, chiropractors and dentists (with TMD care training) with post concussion patients may help ultimately lead to improved patient outcomes.

Indexing Terms: Chiropractic, TMJ, dental, sacro-occipital technique.

Introduction

The awareness of sports-related concussions with post-concussion syndromes are gaining exposure in the chiropractic profession. (1) However, head trauma is common even when a subject is not participating in sports. For instance, in the United States, of 1.7 million people with traumatic brain injury (TBI), 52,000 die and 275,000 are hospitalized annually. (2) Still, sports-related concussion accounts for at least, and likely more than, 300,000 head injuries per year in the United States. (3)

At the 4th International Conference on Concussion in Sport held in Zurich in November 2012, a consensus statement was developed helping to create a definition of concussion:

'Concussion is a brain injury and is defined as a complex pathophysiological process

... Concussion has been advanced to the front burner in clinical care. This case describes an involvement of the TMJ. We recommend that all patients with concussion be assessed for TMJ dysfunction'



affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic and biomechanical injury constructs that may be utilised in defining the nature of a concussive head injury include:

'Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an "impulsive" force transmitted to the head.

'Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, symptoms and signs may evolve over a number of minutes to hours.

'Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.

'Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course. However, it is important to note that in some cases symptoms may be prolonged". (4)

The following case describes a patient who had a concussion with subsequent post-concussion syndrome symptoms that persisted for five months. Since treatment regimens for concussions and post-concussions are still being formulated, (5) low risk interventions such as chiropractic may offer a safe therapeutic approach to supplement care.

Case History

On September 13, 2013 the patient, a 21-year-old caucasian female, stood up abruptly, felt lightheaded, and fell down forward into a desk hitting her head on the desk and then on the floor. She was momentarily unconscious and awoke on the floor with significant head pain. Emergency services arrived, immobilized the patient, and transported her to the emergency room where she was examined and released. No CAT scan or MRI was performed.

Over the next few months she began to feel lightheaded and nauseous when exercising. These symptoms progressively worsened until she had to stop all exercise activities. Her symptoms progressed to include frontal and bilateral sphenoid headaches and were aggravated by all cognitive activities such as studying and using the phone, causing her to significantly reduce her physical and cognitive activities. After finishing school on December 12, 2013 she stayed in bed for much of the rest of the month. She noted some slight recovery following that time but had to significantly decrease all physical and mental activities now and felt profoundly constrained. For instance, driving caused her headaches, she routinely felt off balance when weight bearing, she was unable to attend school due to physical and cognitive limitations, and other related activities of daily living were also compromised.

Methods/Intervention

Physical exam findings on February 12, 2014 noted the following:

The patient had a close-locked TMJ, with no translation of right temporomandibular joint, along with decreased translation of left temporomandibular joint. Exquisite sensitivity was noted upon palpation at the right zygomatic maxillary joint, right zygomatic temporal joint, right upper medial orbit, right sphenoid wing, right temporomandibular joint, right squamosal and coronal sutures. There was evidence of clenching, significant maxillary buccal exostosis, which could have been secondary to clenching or dental parafunction and consistent with her malocclusion and bilateral working interference 6-8. Evaluation noted photophobia and contrast sensitivity. She had convergence insufficiency with the left eye deviating laterally. Tuning fork bone conduction on right mastoid caused local irritation. She had a noted right occiput in a cranial extension position. The right occiput position led

to compensatory hypertonicity and palpatory pain at the right gluteal muscles due to their attempt to maintain descending visual and vestibular postural righting 9. Pelvic torsion with reduced sacral nutation (sacro occipital technique's category one) 10 was particularly noted at the upper left side of the joint while related sacroiliac joint right sided hypermobility (sacro occipital technique's category two) was stabilized .

Treatment consisted category one prone block placement with a physiological right short leg to reduce pelvic torsion and improve sacral nutation along with category two supine block placement to reduce sacroiliac joint right sided hypermobility. (10) Spheno-maxillary cranial adjusting (11) was performed based upon the patient's right inferior maxilla. Sacro occipital technique intraoral cranial adjusting treated her right occiput, which was in extension. (12) Due to her dental and TMJ-related presentations a referral was made to a dentist that specializes in temporomandibular joint disorders (TMD). The dentist performed an evaluation and delivered and equilibrated a mandibular occlusal splint on February 27, 2014, which was followed up on March 6, 2014 for one more equilibration. She was seen for a total of nine treatments at this clinic. Each dental equilibration at her dentist's office was preceded by sacro occipital technique category one and cranial treatments the same day.

Results

As of March 18, 2014 the patient was completely pain free with no symptoms of lightheadedness, brain fog, or nausea. She has been able to exercise, and has been lifting light weights. She was also able to run five miles. This is a significant improvement given that her symptoms and lack of function were consistent since her accident of September 2013.

Discussion

Physical exam revealed excessive clenching with malocclusion which was hypothesized to be triggering a head pain – TMJ parafunction – leading to increased head pain. Ultimately this cycle inhibited her ability to recover from her post concussion syndrome. Although not every post concussion syndrome may benefit from this therapy, it is possible that this particular subset with malocclusion and clenching secondary or related to head trauma or concussion may need to be evaluated in a new light.

Head trauma and TMD has some basis in the literature. (13, 14) Yustin and Neff describe in a study of a *'56-year-old female suffering from TMD caused by trauma to her temporal head area. The management consisted of occlusal devices until her condition stabilized followed by prosthodontic rehabilitation to obtain and maintain a physiologic maximum intercuspation.'* (15)

A relationship between dental occlusion and the use of TMJ splints, orthotics, or appliances to prevent secondary effects of head trauma or concussion has also been discussed in the literature. For instance Takeda et al reported that *'Mouth guards can reduce distortion to the mandibular and the acceleration of the head from the same blow. So mouth guards might have the possibility to prevent mandibular bone fractures and concussions.'* (16) In a similar vein Singh et al studied concussion/head trauma prevention in high-school football athlete investigating the use of dental orthotics. They found that *'preliminary results of this study suggest that a customized mandibular orthotic may decrease the incidence of concussion/mild traumatic brain injuries in high-school football athletes ...'* . (17)

Conclusion

With any case report the findings are limited due to the lack of control, possible regression to the mean, and any possible placebo/ideomotor effect. However, the temporal nature of the patient's response to care, the lack of response to prior therapies, and the length of her symptoms prior to care suggests that the care rendered played an important part of her recovery. Further

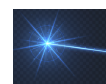
research is needed to determine whether a subset of post-concussion or head trauma patients may have TMD which is limiting their ability to fully recover function and return to their activities of daily living.

Collaborative efforts between emergency room doctors, chiropractors and dentists (with TMD care training) with post concussion patients may help ultimately lead to improved patient outcomes.

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