

**Submission ID:** 89961

**Title:** Headache Characterization and Phenotype in Pediatric and Adolescent Patients with Sports Related Concussion

**Category:** Post-traumatic Headache, TBI, and Concussion

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**Background:**

Headache is the most common reported symptom in pediatric and adolescent athletes following sports related concussion with a prevalence close to 90%. Despite its frequency, there is a dearth of research relating to headache phenotype and associated symptoms.

**Methods:**

A retrospective chart analysis was performed and 25 randomly selected sports related concussion patients ages 12 to 19 from a tertiary concussion clinic and headache center were selected for analysis. Time from the initial concussive event until clearance to return to play was documented. Headache intensity was measured using a 10 point visual analog scale. Associated signs and symptoms were analyzed, including the prevalence of: photophobia, phonophobia, nausea, vomiting, vestibular dysfunction, visual changes, neurocognitive symptoms, and worsening of headache with physical and cognitive activity. Headache phenotype was classified using the International Headache Society Classification (3rd Edition).

**Results:**

The mean age of the concussed athletes was 15.8 years. Concussions occurred while participating in football, soccer, basketball, hockey, softball, lacrosse, and gymnastics. 5% experienced loss of consciousness. 100% of the patients experienced headache at some point from the initial event to clearance to return to play and 80% noted that the headache often worsened throughout the day, particularly with physical and/or cognitive activity. The predominant headache phenotype was migraine or probable migraine with a mean visual analog pain score of 6.3 out of 10. Headache location varied among individuals with a majority of the patients having reported experiencing a throbbing or pounding type of pain. 28% had a past history of headache, 24% had a past history of concussion, and 12% had a history of attention deficit hyperactivity disorder. The concussed individuals reported the following associated signs and symptoms: photophobia (52%), phonophobia (40%), nausea (48%), vomiting (8%), allodynia (4%), disturbance in speech (8%) (i.e. word finding), visual changes (i.e. blurring, floaters, scintillating scotomas, etc.) (64%), and trouble initiating or maintaining sleep (12%). Vestibular symptoms were experienced by 72% of the athletes and numbness by 16%. 72% reported neurocognitive symptoms. Mean time until patients were cleared to begin return to play was 27.3 days.

**Conclusion:**

Sports related concussion is associated with a high prevalence of headache in pediatric and adolescent athletes. Contrary to other published reports by non-headache specialists, the predominant phenotype experienced by concussed athletes is migraine or probable migraine. Delayed initiation of the return to play protocol was observed in patients with a past history of headache, concussion, or attention deficit hyperactivity disorder.