



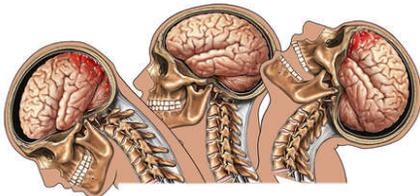
## Pathophysiology

The Concussion in Sport Group (CISG) on sport-related concussion (SRC):

- “SRC 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.”
- “SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.”
- “SRC may result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.”
- “SRC results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.”

## Screening and Diagnosis

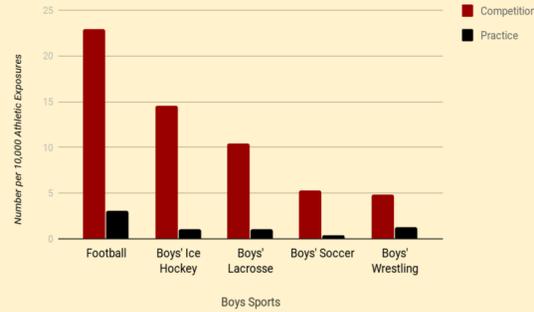
- Sport Concussion Assessment Tool (SCAT-5)
- On field evaluation
- Imaging to rule out other possible injuries
- Diagnosed and treated by practitioner



## Epidemiology

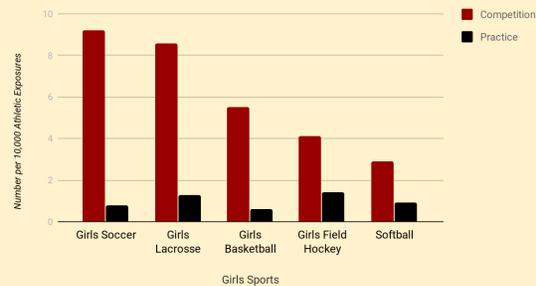
### Top 5 Boys' Sports (2008-2010)

Concussions per 10,000 Athletic Exposures



### Top 5 Girls' Sports (2008-2010)

Concussion per 10,000 Athletic Exposures



### Overall Concussion Trend

Percentage of Concussions in High School Sports Injuries (2005-2017)



## Prevention

- Require all athletes to wear all fully functional protective equipment
- Emphasis on proper form and safety techniques
- Limiting the frequency of full contact practices
- Training officials to recognize the signs and symptoms

## Treatment

- Rest is mainstay of treatment
- 5-Step Return to Play Progression
  - 1) Light aerobic activity
  - 2) Moderate activity
  - 3) Heavy, non-contact activity
  - 4) Practice & full contact
  - 5) Competition
- Must return to school and be cleared by PCP before return to play

## Recommendations

- Proper form and technique
- Properly fitting helmet: well maintained, age appropriate, and certified for use
- Protective equipment should be worn consistently in practice and competition
- Officials and coaches should receive proper training on recognition and appropriate response to concussions

## References

- Centers for Disease Control and Prevention. (2017). *Brain Injury Safety Tips and Prevention*. Retrieved from [https://www.cdc.gov/headsup/basics/concussion\\_prevention.html](https://www.cdc.gov/headsup/basics/concussion_prevention.html)
- Centers for Disease Control and Prevention. (2015). *Concussion signs and symptoms*. Retrieved from [https://www.cdc.gov/headsup/basics/concussion\\_symptoms.html](https://www.cdc.gov/headsup/basics/concussion_symptoms.html)
- Centers for Disease Control and Prevention. (2015). *Returning to sports and activities*. Retrieved from [https://www.cdc.gov/headsup/basics/return\\_to\\_sports.html](https://www.cdc.gov/headsup/basics/return_to_sports.html)
- Comstock, R.D., Pierpoint, L.A., Erkenbeck, A.N., Bihl, J.B. (2017). *National High School Sports-Related Injury Surveillance Study (2016-2017 School year)*. Retrieved from <http://www.ucdenver.edu/academics/colleges/PublicHealth/research/ResearchProjects/piper/projects/RIO/Pages/default.asp>
- Eschmiedia, R.J., Meeuwisse, W., McCrory, P., Davis, G.A., Putukian, M., Leddy, J., . . . Makkissi, M. (2017). The sport concussion assessment tool 5th edition (SCAT-5): background and rationale. *Br J Sports Med* 2017, 51:851-858. doi:10.1136/bjsports-2017-097506SCAT5
- Marmor, M., Mellvain, N., Fields, S. K., & Comstock, R. D. (2012). Epidemiology of Concussions Among United States High School Athletes in 20 Sports. *The American Journal of Sports Medicine*, 40(4), 747-755. doi:10.1177/0363546511435626
- McCrory, P., Meeuwisse, W., Dvorak, J., Aubry, M., Bailes, J., Broglio, S., . . . Vos, P.E. (2017). Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016. *Br J Sports Med* 2017, 51:838-847. doi:10.1136/bjsports-2017-097699

## Common signs of concussion:



Dizziness



Nausea



Headaches



Light Sensitivity



Confusion

## Other Signs and Symptoms

- Memory loss
- Clumsy movement
- Mood/behavioral changes
- Loss of Consciousness

## Complications

- Post-Concussive Syndrome
- Post-Traumatic seizures
- Chronic Traumatic Encephalopathy (CTE)
- Decreased Neurocognitive Function