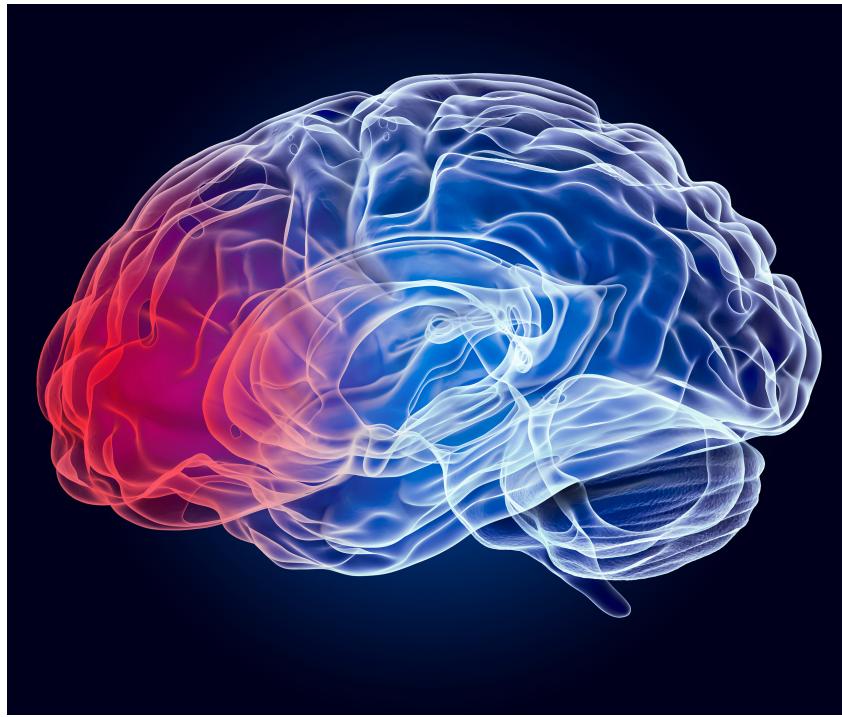




NAVIGATING POST CONCUSSION SYNDROME IN ADOLESCENTS

Dr. Jordan Adams, DC, MS

UNDERSTANDING CONCUSSION



A concussion is a type of mild traumatic brain injury caused by a bump or blow to the head resulting in some level of disruption of brain function. Adolescents are particularly susceptible due to their involvement in contact sports and physical activities, and rates of adolescent concussions have doubled between 2007 and 2014. Concussions in adolescents are a significant health concern and have a potential for long-term effects on the developing brain. It's crucial to recognize the symptoms of a concussion, which may include headaches, confusion, fatigue, dizziness, mood changes, and more. While symptoms often appear within the first few hours, these may take several days to appear. It's important for caregivers and healthcare professionals to monitor symptoms closely, as they can vary in intensity and duration. Early diagnosis and treatment are essential for a full recovery.

POST CONCUSSION SYMPTOMS

These symptoms appear within the first few hours to few days after the injury, and not all may present. If symptoms persist beyond 12 weeks, this is called post-concussion syndrome.

PHYSICAL

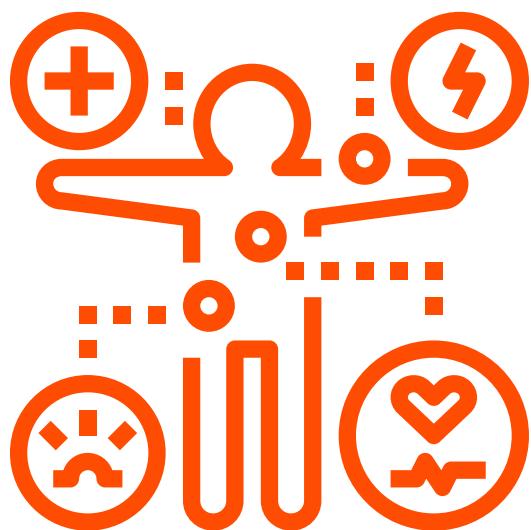
- Headache
- Nausea
- Dizziness
- Fatigue
- Balance loss
- Vision changes
- Sensitivity to light
- Sensitivity to noise
- Sleep disturbances

COGNITIVE

- Loss of concentration
- Memory problems
- Slower thinking
- Confusion
- Problems with decision-making or judgment

BEHAVIORAL

- Irritability
- Feeling down
- Anxious
- Personality shifts
- Withdrawal from usual interests
- Insomnia
- Restlessness
- Loss of appetite





CONCUSSION RECOVERY

Many children and teens may experience improvement within the first month or two after an injury, but recovery in this age group can differ significantly from adults. Adolescent brains are still developing, making them more susceptible to long term impacts of traumatic brain injuries like concussions. The damages to the developing brain and subsequent inflammation may lead to longer recovery times and an increased sensitivity to symptoms. Additionally, adolescents may experience more pronounced cognitive symptoms, such as greater difficulties with memory, concentration, and processing speed, which can affect their academic performance and social interactions.

Unlike adults, who often have more control over their recovery environment, adolescents must navigate the demands of school and social activities, which can complicate their recovery process. Furthermore, hormonal changes and psychosocial factors unique to adolescence can amplify emotional and behavioral symptoms following a concussion. Therefore, it's crucial to adopt a more cautious approach to concussion management in adolescents, often involving extended rest periods and a more gradual return to academic and physical activities. Understanding these differences is key to providing age-appropriate care and support to help young individuals fully recover from concussions.



STANDARD CARE PROTOCOL

Immediate rest - academic and physical rest

Gradual return to activities

Avoid anything that exacerbates symptoms

Seek physical, vestibular or cognitive therapy if symptoms
continue

THE ROLE OF DIET

Diet is often overlooked, but what you eat can significantly impact the healing process following a concussion. The typical **Western Diet** (what most Americans eat every day) is high in processed foods, refined sugars, and unhealthy fats, and it lacks essential nutrients needed for brain repair. A Western Diet may delay recovery, add to the inflammation cascade, and increase oxidative stress. These exacerbated insults to the brain may make neuron damage worse.

OMEGA 3 FATTY ACIDS

Omega-3 fatty acids, particularly EPA and DHA found in fish oil, have been shown to aid in brain healing. They help reduce inflammation and support the repair of cell membranes. Daily intake should be 250 mg/day - 500 mg/day, but most people only get 90-120 mg/day. Including omega-rich foods like fish, walnuts, and flaxseeds in the diet can be beneficial during the recovery process. You can also take daily supplementation.

MEDITERRANEAN DIET

The Mediterranean diet is rich in fruits, vegetables, whole grains, lean proteins, healthy fats, and antioxidants. The nutrient density of this diet may greatly help adolescents recovering from a concussion. This diet is known for its neuroprotective properties, which can aid in reducing the symptoms and duration of concussion recovery.



IMPLEMENTING THE MEDITERRANEAN DIET

Increase fruit and vegetable intake

Choose a variety of colors and types

Aim for 5 servings a day

Choose whole grains

Brown rice, barley, oats, whole wheat, and quinoa

Cook with healthy fats

Olive oil, avocado oil

Snack on nuts and seeds

Aim for 1-2 servings a day

~ 15 almonds

~ 8 walnuts

Eat fish/shellfish 2-3 times per week

Tuna, salmon, sardines, cod, halibut, oysters, shrimp

Consume lean protein

Such as poultry or legumes

Limit meat portion sizes to 3-4 oz.

Use red meat sparingly

Limit processed foods and sugar

Drink plenty of water

SAMPLE MENU

BREAKFAST

1 c. Greek yogurt (whole milk) + 1 c. mixed berries + 8 walnuts
2 Whole grain toast + 1 egg

SNACK

Fresh fruit (1 apple or 1 pear) + 15 almonds

LUNCH

4 oz Grilled salmon + 1 c. mixed greens + diced tomatoes
10 olives
1 Tbsp Olive oil + lemon juice dressing
1 Pita (whole wheat)

SNACK

3 Tbsp Hummus + 1 cup carrots

DINNER

5 oz. Chicken breast
1 cup bell peppers sautéed in olive oil and fresh herbs
1 cup Brown rice
1 cup Side salad + 1 Tbsp olive oil and lemon juice dressing

SNACK

1 oz. Dark chocolate + 1 cup grapes

HYDRATION

Drink water throughout the day

ADDITIONAL RECOVERY TIPS



Keep a symptom diary

Keeping track of symptoms can give you a deeper understanding of your individual triggers and recovery needs.



Slowly and gradually reintroduce activity

Begin with light, low impact activity like walking or swimming and increase intensity and duration in small increments.



Prioritize sleep

Sleep is when the body does the most amount of healing and recovery. Aim for at least 8 hours a night, but you may need up to 10 while you recover.



Listen to your body

Tune in to your body's cues and follow them. If something doesn't feel right or exacerbates symptoms, stop.

RESOURCES

QUESTIONS TO ASK

- What is your name?
- What day / time is it?
- Where are you?
- Do you feel dizzy? Off balance?
- Does your head hurt?
- Can you follow my finger (move your finger around in front of their face and watch their eyes for synchronized eye movement)

Your child may get injured at home or somewhere where you may need to quickly assess their status. These questions are a great starting point, but you still need to seek medical care for proper diagnosis.

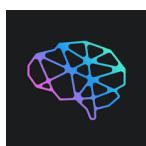
ASSESSMENTS

- Pupil Size
- SCAT 5
- Balance Error Scoring
- ImPACT Test

MULTIDISCIPLINARY TEAM

- Physician
- Functional Neurology
- Dietician
- Physical Therapist
- Vestibular Therapy
- Coach / Trainer
- Chiropractor
- Neuro-optometrist
- Psychologist

DOWNLOADABLE RESOURCES



The Concussion Tracker App

Take baseline tests, perform immediate sideline assessments, track symptoms, enhance communication between coaches / parents / doctors



Focus Builder by NeurdSolutions

Therapeutic eye movement rehabilitation to target brain recovery in specific regions.



My Mediterranean Diet Tracker App

Track diet adherence, get access to 1000s of recipes, keep track of macros

* Requires a clinician to set up programming

REFERENCES

Barrett, E. C., McBurney, M. I., & Ciappio, E. D. (2014). ω -3 fatty acid supplementation as a potential therapeutic aid for the recovery from mild traumatic brain injury/concussion. *Advances in nutrition* (Bethesda, Md.), 5(3), 268–277. <https://doi.org/10.3945/an.113.005280>

Casazza, K., & Swanson, E. (2017). Nutrition as medicine to improve outcomes in adolescents sustaining a sports-related concussion. *Exploratory Research and Hypothesis in Medicine*, 2(4), 122–130. <https://doi.org/10.14218/erhm.2017.00029>

Desai, A., Chen, H., Kevala, K., & Kim, H. Y. (2021). Higher n-3 Polyunsaturated Fatty Acid Diet Improves Long-Term Neuropathological and Functional Outcome after Repeated Mild Traumatic Brain Injury. *Journal of neurotrauma*, 38(18), 2622–2632. <https://doi.org/10.1089/neu.2021.0096>

Fotuhi, M., Khorrami, N. D., & Raji, C. A. (2023). Benefits of a 12-week non-drug “Brain Fitness Program” for patients with attention-deficit/hyperactive disorder, post-concussion syndrome, or memory loss. *Journal of Alzheimer's disease reports*, 7(1), 675–697. <https://doi.org/10.3233/ADR-220091>

Kara, S., Crosswell, H., Forch, K., Cavadino, A., McGeown, J., & Fulcher, M. (2020). Less Than Half of Patients Recover Within 2 Weeks of Injury After a Sports-Related Mild Traumatic Brain Injury: A 2-Year Prospective Study. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*, 30(2), 96–101. <https://doi.org/10.1097/JSM.0000000000000811>

Katherine D. McManus, MS. “A Practical Guide to the Mediterranean Diet.” Harvard Health, 22 Mar. 2023, www.health.harvard.edu/blog/a-practical-guide-to-the-mediterranean-diet-2019032116194.

Miller, S., Dimeff, R., Zynda, A. J., Sabatino, M., & Ellis, H. B. (2019). Docosahexaenoic acid (DHA) for the treatment of pediatric sport-related concussion: Results of a feasibility trial. *Pediatrics*, 7. <https://doi.org/10.1542/peds.144.2ma2.181>

Patch, C. S., Hill-Yardin, E. L., Lewis, M., Ryan, L., Daly, E., & Pearce, A. J. (2021). The More, the Better: High-Dose Omega-3 Fatty Acids Improve Behavioural and Molecular Outcomes in Preclinical Models in Mild Brain Injury. *Current neurology and neuroscience reports*, 21(9), 45. <https://doi.org/10.1007/s11910-021-01132-z>

Shaito, A., Hasan, H., Habashy, K. J., Fakih, W., Abdelhady, S., Ahmad, F., Zibara, K., Eid, A. H., El-Yazbi, A. F., & Kobeissy, F. H. (2020). Western diet aggravates neuronal insult in post-traumatic brain injury: Proposed pathways for interplay. *EBioMedicine*, 57, 102829. <https://doi.org/10.1016/j.ebiom.2020.102829>

Walton, S. R., Kerr, Z. Y., Brett, B. L., Chandran, A., DeFreese, J. D., Smith-Ryan, A., Guskiewicz, K. M. (2021). Health-promoting behaviours and concussion history are associated with cognitive function, mood-related symptoms and emotional-behavioural dyscontrol in former NFL players: An NFL-LONG study. *British Journal of Sports Medicine*, 55(12), 683–690. doi:<https://doi.org/10.1136/bjsports-2020-103400>

Zhang, A. L., Sing, D. C., Rugg, C. M., Feeley, B. T., & Senter, C. (2016). The rise of concussions in the adolescent population. *Orthopaedic Journal of Sports Medicine*, 4(8). <https://doi.org/10.1177/2325967116662458>



CALIBRATION
CHIROPRACTIC + FUNCTIONAL HEALTH



calibrationmansfield.com



817.779.3435



info@calibrationchiropractic.com



408B S. Main St.
Mansfield, TX 76063