SPARCC
Sports Medicine • Rehabilitation • Concussion Care

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Concussion Guide

What is a concussion?
A concussion is a mild injury to the brain that disrupts the function of the brain (how the brain normally works). Usually it is caused by a sudden blow or impact to the head. It is NOT necessary to be knocked out or have loss of consciousness to have a concussion. Another term for concussion is mild traumatic brain injury (mild TBI). Even though a concussion might be called a "mild" injury, it still must be taken seriously because it is an injury to the brain.

What should I do after a concussion?
A medical doctor should be involved in your care because, in rare cases, severe medical problems occur. Watch your symptoms carefully for the first one to two days after injury. Taking acetaminophen (Tylenol) for headaches is OK, but no other medications should be taken during this time without a doctor's approval. Seek IMMEDIATE medical help if you notice any of the following symptoms:

- A headache that is getting worse, lasts for a long time or is severe
- Persistent Confusion, extreme sleepiness or trouble waking up
- Recurrent Vomiting
- Weakness, numbness or trouble walking or talking
- A seizure or convulsion (arms or legs shake uncontrollably)
- Any other sudden change in thinking or behavior

What should you generally expect?
Most people recover completely from a simple concussion within one to two weeks. But, some people can take longer to recover. Common symptoms seen after a concussion are listed below. Talk with your doctor about any symptoms you notice after a concussion. As noted below there are many different symptoms that can be caused by a concussion and every concussion is different.

Physical
- Headaches
- Sick to stomach or vomiting
- Dizziness or balance problems
- Low energy or being run down
- Trouble with vision/seeing
- Bothered by light or noise

Cognitive (Thinking)
- Slowed thinking
- Trouble paying attention
- Difficulty remembering
- Acting like "in a fog"
- Easily confused
- Poorer school performance

Psychiatric (Behavioral or Emotional)
- Irritability or grouchiness
- Easily upset or frustrated
- Nervousness
- Sadness
- Acting without thinking
- Any personality change
- Sleep problems

Where do I follow up?
All concussions should have close follow up with a physician experienced in concussion care until resolution of symptoms and return to normal activity. In particular, return to work with accommodations and graded return to physical activity should be directed by medical personnel to ensure optimal care during critical healing window. All athletes should be medically cleared by physician prior to return to play.

Reasons to consider seeing medical or concussion specialists include:

- Any of the above problems last more than two weeks
- Any problem seems especially severe
- You have had more than one concussion
- You have a more severe injury to the brain (e.g., an injury with bleeding or bruising seen on a CT or MRI scan)

How can others help?
A concussion can be scary and stressful, but most problems will be short-lived. We recommend following these guidelines as you heal.

• Stay safe. It is important you do not hit your head again while healing. You will need to take a break from sports and other activities that might cause another head injury. (See "When should I play sports again?" for more information.)

• Rest. Doing too much too soon after a concussion may worsen problems. In the first days after injury, you will probably need more "down time" than usual to rest and relax.

• Make sure you get enough sleep and eat properly. Allow daytime naps and make sure you get plenty of sleep at night. Also, make sure you eat healthy foods and drink plenty of water.

• Allow extra time to finish things. You may notice you are a little slower in how you do things after a concussion. Allow more time than usual to finish tasks.

• Give more chances to learn. Remembering things might be harder for a while. When learning, first make sure you are paying attention. You might also need to hear or see information more times than usual.

• Allow more breaks. Paying attention during hard or boring tasks might be difficult. Take breaks when doing work and other similar tasks.

• Be patient. You might feel cranky, more easily upset, or more tired and forgetful. If the behavior continues, talk with a doctor.

References:
Children's Hospital Colorado Sports Medicine
American Academy of Pediatrics
American Medical Society of Sports Medicine

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Concussion Home Instructions

SYMPTOM PREVENTION AND TRIGGER AVOIDANCE

Use of sunglasses as needed for photophobia (light sensitivity)
Minimize all screen time to <1 hour and completely avoid all symptom exacerbating media such as I-phone/I-pad/video games/active technology media/loud music
Utilize school support plan to avoid any symptom exacerbation in school
Avoid dehydration or poor nutrition
Daily multivitamin and fish oil supplementation
Avoid all other known triggers of symptoms
Do daily gentle neck stretches and exercises
Utilize sleep hygiene instructions if having any difficulty with sleep

MEDICATIONS FOR HEADACHES

Prevention of headaches with trigger avoidance is best option
Tylenol only, unless otherwise specified by your doctor
Advil or Aleve can generally be utilized after first 5-7 days
AVOID: Narcotic pain medication

SLEEP HYGIENE

The most common cause of insomnia is a change in your daily routine. For example, traveling, change in work hours, disruption of other behaviors (eating, exercise, leisure, etc.), and relationship conflicts can all cause sleep problems. Paying attention to good sleep hygiene is the most important thing you can do to maintain good sleep.

Do:

1. Go to bed at the same time each day.
2. Get up from bed at the same time each day.
3. When cleared by your doctor for activity: Get regular exercise each day, preferably in the morning. There is good evidence that regular exercise improves restful sleep. This includes stretching and aerobic exercise.
4. Get regular exposure to outdoor or bright lights, especially in the late afternoon.
5. Keep the temperature in your bedroom comfortable.
6. Keep the bedroom quiet when sleeping.
7. Keep the bedroom dark enough to facilitate sleep.
8. Use your bed only for sleep.
9. Take medications as directed. It is helpful to take prescribed sleeping pills 1 hour before bedtime, so they are causing drowsiness when you lie down, or 10 hours before getting up, to avoid daytime drowsiness.
10. Use a relaxation exercise just before going to sleep.
    - Muscle relaxation, imagery, massage, warm bath, etc.
11. Keep your feet and hands warm. Wear warm socks and/or mittens or gloves to bed.

Don't:

1. Exercise just before going to bed.
2. Engage in stimulating activity just before bed, such as playing a competitive game, watching an exciting program on television or movie, or having an important discussion with a loved one.
3. Have caffeine in the evening (coffee, many teas, chocolate, sodas, etc.).
4. Read or watch television in bed.
5. Use alcohol to help you sleep.
6. Go to bed too hungry or too full.
7. Take another person's sleeping pills.
8. Take over-the-counter sleeping pills, without your doctor's knowledge. Tolerance can develop rapidly with these medications. Diphenhydramine (an ingredient commonly found in over-the-counter sleep meds) can have serious side effects for elderly patients.
9. Take daytime naps.
10. Command yourself to go to sleep. This only makes your mind and body more alert. If you lie in bed awake for more than 20-30 minutes, get up, go to a different room (or different part of the bedroom), participate in a quiet activity (e.g. non-excitable reading or television), and then return to bed when you feel sleepy. Do this as many times during the night as needed

Tryptophan Rich Foods Aid in Sleep

Poultry: Turkey may well be the most well known dietary source of L-tryptophan, but all animal proteins contain some of the amino acid.

Seafood: Fish, such as tuna, halibut, salmon, sardines and cod, and scallops also contain between 250 and 400 mg of L-tryptophan per serving.

Dairy Products: Cheese, milk, and yogurt still provide you with a full essential amino acid set along with bone healthy calcium. A 1-cup serving of reduced fat cow's milk provides 100 mg of the amino acid, while 1 cup of low-fat yogurt gives you 60 mg.

Nuts and Seeds: Nuts and seeds are a convenient way to supplement your L-tryptophan intake when you're short on time. With the highest dose of the amino acid per serving, pumpkin seeds provide 110 mg per 1/4 cup. Sunflower seeds, cashews, almonds and walnuts all contain over 50 mg of L-tryptophan per 1/4 cup.

Legumes: Legumes, such as beans, split peas, peanuts and lentils, offer a fiber- and protein-rich source of L-tryptophan. Kidney beans, black beans and split peas each contain 180 mg per cup, while 1/4 cup of peanuts contains 90 mg.

Medications

Melatonin is a naturally produced substance in the brain that can help with sleep if above measures not working:

Melatonin 3-6 mg before going to bed as needed for sleep induction

Consult with your doctor prior to using other sleep aids

References:

CDC Heads Up Concussion
University of Maryland Medical Center: Tryptophan
Familymedicine.tufts.edu

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Diet and Nutritional Supplements for Concussions

It is highly recommended that fresh vegetables, fruits, fish, meats and grains are superior to processed foods and build the immune system. Most commonly utilized nutritional supplements are:

Fish oil (DHA/EPA): 1000 mg twice daily Under 7: 500 mg twice daily
Magnesium: 200mg once daily Under 7: 100mg once daily
Vitamin D: 2000IU once daily Under 7: 1000IU once daily

Multivitamins can supply the basic vitamins and supplements that your diet may be lacking. Omega-3 fatty acids (fish oil) counteract free radicals that cause oxidative damage to brain cells and may help improve nerve signal transmission at synapses.
In addition, antioxidants which include vitamins C, E, and beta carotene counteract oxidative damage caused by certain foods, and the stress caused by brain injury. B vitamins boost metabolism and effect brain and nervous system functioning.

Other Nutritional Tips for Head Injuries
Eat small meals every three to four hours. Keep small baggies of healthy snacks with you during the day to boost your energy, such as nuts, trail mix, apples, cheese, hard-boiled eggs, and energy bars. Ask a member of your family or support group to make these for you and put them in a small cooler to take with you when away from home.

Balance small meals with a combination of protein, healthy fats and oils, and carbohydrates. Proteins include fish, lean meats, nuts, and eggs. Healthy fats and oils can be found in avocados, seeds, and nuts. Carbohydrates are found in vegetables, fresh fruits, and grains. Many individuals report that sugar and chocolate increase headaches, so eat sweets sparingly.

Eat by the clock. If your brain/body signals are not working well, set a timer, watch alarm or a mobile phone to alert you that it's time to eat. Since weight gain is common following brain injury, this is another reason to stick to a healthy diet. Try to eat around the same time every day. The body does best when it is on a routine schedule. It is very important to eat healthy foods to help the brain function efficiently. Feed your brain with protein snacks throughout the day.

Foods to Avoid
Alcohol
Caffeine
Salty foods
Sugary beverages, sweets, high fructose corn syrup
Migraine type headaches can also be triggered by certain foods. Common known food triggers for migraines include: Chocolate Tyramine/Tannins (Wine/beer, aged cheese, avocados, bananas, pork, processed meats, coffee/tea, nuts, apple juice)
Food additives and artificial sweeteners (aspartamate, nitrates, MSG)

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Return to Play Protocol for Concussion

A concussion is a type of mild brain injury. Every concussion should be taken seriously and be followed by a health care provider who has expertise in brain injury. In the initial period of recovery following a concussion, athletes should generally "take it easy" to allow the brain time to rest and heal. Athletes should be free of all concussion-related symptoms (e.g. headache) before starting the return to play protocol. An easy walk around the neighborhood is okay while still symptomatic, but should not count as step 1. Once the athlete is entirely free of symptoms and a health care provider says it is medically safe, returning to play should occur in a gradual, step-wise fashion, as follows:

1. Light aerobic exercise such as brisk walking or stationary cycling for 15-20 minutes.

2. Sport specific exercise such as skating in hockey or dribbling in soccer with minimal resistance from other players for 30-45 minutes.

3. Non-contact practice with the addition of resistance such as blocking pads in football for 1-2 hours.

MEDICAL CLEARANCE NEEDED BY A HEALTH CARE PROVIDER

4. Full contact practice. An example would be full pads and contact in hockey or football practice.

5. Competitive game play including tournaments.

With this stepwise progression, the athlete should continue to proceed to the next step if free of symptoms at the current step. There should be a 24 hour period between each step. If any symptoms reoccur, the athlete should drop back to the previous step and try to progress again after 24 hours of rest. Remember, medical clearance by your health care provider is required before returning to play in any sport.

_____ _____

Health Care Provider's Signature Date

*If your school or coaches have any questions or concerns, we are available over phone at (520) 222-8076 or visit our website at **sparcctucson.com** for our contact information and handouts.*

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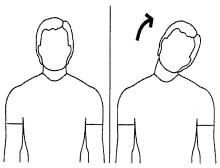
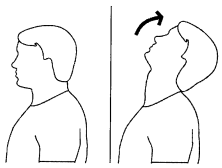
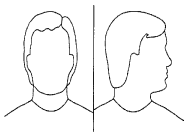
Cervical Rehabilitation Program



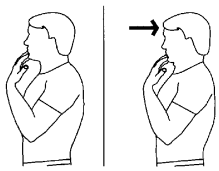
* Stand with good posture.
*Looking straight ahead, bend neck sideways, moving ear toward shoulder.



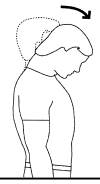
* Stand with good posture.
* Move chin up looking toward ceiling, without bending trunk.



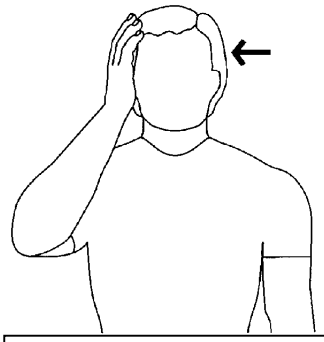
* Sit or stand, looking forward, with good posture.
*Turn head right, then left.



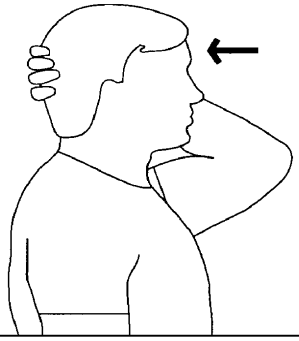
* Sit or stand, looking forward, with good posture.
* Tuck chin in, then return to start position



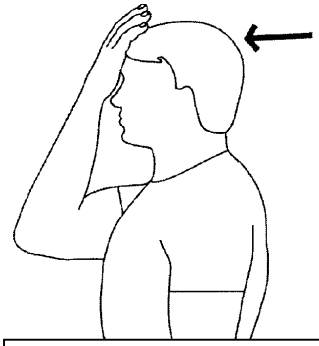
* Stand with good posture.
* Move chin down toward chest.



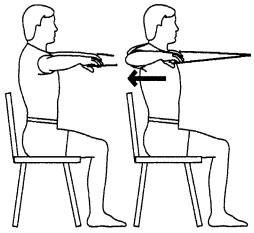
* Place palm against side of head
* Push head into palm, not allowing neck to bend.



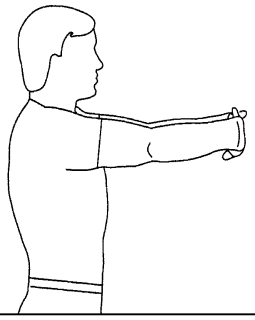
* Place palm against back of head.
* Push back of head into palm, not allowing neck to bend.



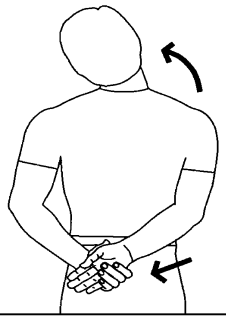
* Place palm against forehead.
* Push forehead into palm, not allowing neck to bend.



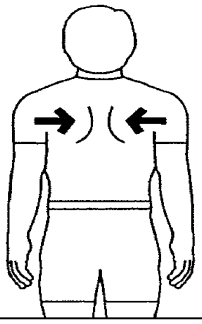
*Attach elastic to secure object.
* With elastic in hands, sit in chair with proper posture.
* Squeeze shoulder blades together as shown.



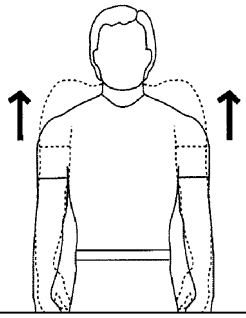
* Interlock fingers of both hands.
* Straighten arms in front, palms facing outward.
* Rounding back and separating shoulder blades.



* Place involved arm behind back, grasping with uninvolved arm.
* Bend neck sideways, as you pull involved arm to the same side.



* Stand with arms at sides.
* Squeeze both shoulder blades together.
* Relax and repeat



* Stand or sit, raise shoulders upward towards ears.
* Return to start position

References:
Children's Hospital Colorado Sports Medicine Program for young athletes
American Academy of Pediatrics
American Medical Society of Sports Medicine

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Vestibulo-Ocular Exercises

BALANCE EXERCISES

Start with 3 sets of 15-30 sec daily, and gradually increase duration. *All exercises should be performed within symptom tolerance.*

1. **Stance:** Balancing on 2-1 foot, firm to soft surface, level ground to incline or uneven.

2. **Core stability exercises:** Plank, side plank, wall sit, lunges, quad rocks with rotation and airplanes

3. **Gait exercises:** Tandem walk, toe and heel walk, walk with finger to nose.

VISUAL EXERCISES

Start with 3 sets of 15 reps of each exercise daily, and gradually increase duration, number of repetitions.

1. **Side to side (Saccades):** Eyes will jump back and forth between two targets (choose small targets like a cup) without moving the head. Gradually progress speed or location of targets.

2. **Near/Far (Accommodation):** Hold onto a paper with a photo/word and have a second page on a wall in the distance. Using only their eyes, patient will look down at the image until it is in focus, then look up until image on wall is in focus.

3. **Pencil Push-ups (NPC):** Patient holds pencil in front of their nose at a distance where they see only a single pencil. Patient slowly brings the pencil closer to their nose until the pencil appears double. Hold for a few seconds and slowly move away from their nose.

4. **Dolls eye (hVOR):** With eyes fixed on a pencil rotate head as close to 90 degrees as possible while maintaining focus on the fixed pencil.

Visual/Vestibular Integration

Combine visual exercises with balance exercises above (ie; Near/Far exercise with one foot stance, or pencil push ups during lunges)

References:

Fowler Kennedy-stay active rehab

St Joseph Health Care Rehab

McCrory P, Meeuwisse W, Johnston K, Dvorak J, Aubry M, Molloy M, Cantu R. Consensus Statement on Concussion in Sport: The 3rd International Conference on Concussion in Sport Held in Zurich, November 2008. Journal of Athletic Training. 2009; 44(4): 434-448