Concussion – Mild Traumatic Brain Injury

A concussion is any injury to the brain that disrupts normal brain function. Concussions are typically caused by a direct or indirect blow or jolt to the head.

*All concussions are serious, and all athletes with suspected concussions **should not return** to play until they see a doctor.*

When do concussions occur?

Concussions can happen in any sport but more often occur in **collision sports**, such as football, rugby, lacrosse or ice hockey.

They also are common in contact sports that don't require helmets, such as soccer, basketball, and wrestling. Concussions can also occur from a collision with the ground, a wall, or post (cheerleading, tumbling, gymnastics, or horseback riding); or a ball that has been thrown, hit, or kicked.

Many pediatric concussions also occur outside organized sports. For example, a child **riding a bike** or skateboard can fall down and bump his head on the street or an obstacle.

Symptoms

The hallmark symptoms of concussion are confusion and memory loss (in particular amnesia of the event or play that caused the injury). The symptoms of a concussion range from subtle to obvious and usually happen right after the injury but may take hours to days to show up. Athletes who have had concussions may report "feeling normal" before their brain has fully recovered. With most concussions, patients are not knocked out or unconscious, but loss of consciousness can occur in up to 10% of concussions.

Symptoms of a concussion include the following:

- Headache*
- Nausea or vomiting*
- Dizziness or balance problems*
- Lack of awareness of surroundings*
- Trouble remembering
- Confused or forgetful about recent events
- Loss of consciousness (<10%)
- Double or blurry vision
- Sensitivity to light
- Sensitivity to noise
- Feeling dazed or stunned
- Feeling mentally "foggy"
- Trouble concentrating
- Slow to answer questions
- Changes in mood—irritable, sad, emotional, nervous
- Drowsiness
- Sleeping more or less than usual
- Trouble falling asleep

**Early concussion symptoms usually apparent within minutes to hours.*

PAY SPECIAL ATTENTION TO THESE SYMPTOMS:

In the first 24-48 hours, all patients with concussions should be observed carefully for sudden onset of any "red flag" symptoms. Any positive report requires urgent emergency medical evaluation since these symptoms may represent deteriorating neurological function:

-Headaches that worsen
-Looks very drowsy/cannot be awakened
-Slurred speech
-Weakness/numbness in arms/legs
-Neck pain
-Can't recognize people or places
-Repeated vomiting (2 or more)
-Increased confusion or irritability
-Unusual behavior changes
-Any other focal neurological signs

Diagnosis

Prematurely returning to play after a concussion can lead to another concussion or even death. Therefore, the quality of the sideline symptom assessment is crucial in order to prevent a catastrophic event. The Standardized Assessment of Concussion (SAC) was developed as a tool for the sideline evaluation of athletes with a suspected concussion. The SAC should not be used to determine readiness for return to play (RTP) and is probably most useful in the acute injury setting when a baseline measure has already been done.

A doctor can confirm the diagnosis of concussion; determine the need for any specialized tests, such as CT scan, MRI, or neuropsychological tests; and decide if and when it is OK for the athlete to return to play.

An athlete with a history of concussion may be more susceptible to another injury than an athlete with no history of concussion.

No one knows how many concussions are too many before permanent damage occurs. Repeated concussions are particularly worrisome, especially if each one takes longer to resolve or if a repeat concussion occurs from a light blow. Notify your doctor of any prior concussions.

Treatment

Recovery time from concussion is variable based on the individual, the severity of the concussion, and the history of prior concussions.

Pediatric and adolescent athletes should never be returned to play the same day of injury.

Do not rush through the return protocols.

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RETURNING TO LEARN

Patient Instructions

Plan: Please read ALL these instructions.

- **REST** – NO athletic or play activity, NO exercise, for now. Only essential walking
- **SCHOOL ATTENDANCE** – we strongly encourage you to attend school every day. Most students are able to go to school all or part of the day while they are recovering from their concussion. We recommend the following modifications to your school day:
    - Please allow the student to take breaks during tests
    - Athlete should NOT be required to attend team functions (practice, meetings should be optional)
    - We can request other school modifications as needed
- **COGNITIVE REST** ("brain rest")
    - Only essential texting and phone calls (e.g. "come pick me up at school")
    - Minimal TV watching (2 hrs/day)
    - May use computer for homework
    - Limit use of social media to 15 minutes per day
    - No gaming or web surfing
    - No loud music
- **SLEEP** – minimum 8 hours per night, bedtime no later than 10 pm
    - Stick to a regular bedtime schedule, even on weekends
    - No caffeine (sodas, coffee, tea, energy drinks, chocolate)
    - Stop using your cell phone, computer, tablet or TV 30 minutes before bedtime
    - If you must nap during the day, keep the naps < 30 minutes
- **MEDICINE** – Use ibuprofen for headache pain; take every 8 hours, for pain > 4/10
- **NUTRITION** – Do not skip meals and drink plenty of fluids
- Call our office if you have ANY questions or concerns

RETURNING TO PLAY

When returning athletes to play, they should follow a stepwise symptom-limited program, with stages of progression. For example:

1. Rest until asymptomatic (physical and mental rest)
2. Light aerobic exercise (e.g. stationary cycle)
3. Sport-specific exercise
4. Non-contact training drills (start light resistance training)
5. Full contact training after medical clearance
6. Return to competition (game play)

There should be approximately 24 hours (or longer) for each stage and the athlete should return to stage 1 if symptoms recur. Patients who follow an appropriately-paced RTP are usually symptom-free within 7 to 10 days.

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Disclaimer: These guidelines are to help the caretaker with treatment at home. However, if you are ever concerned about your child's health, you should see a physician in person.

Prevention

Not all concussions can be prevented, but some may be avoided. Helmets should be worn for any riding activities (like horseback, all-terrain vehicle (ATV), motorbike, bike, skateboard, or

snowboard) or contact sports (like football, hockey, or lacrosse). Helmets should fit appropriately and be in good condition. Athletes should be taught safe playing techniques and to follow the rules of the game.

****Most importantly, every athlete needs to know how crucial it is to let their coach, athletic trainer, or parent know if they have hit their head or have symptoms of a head injury—even if it means stopping play. Never ignore a head injury, no matter how minor.**

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Acute Concussion Evaluation (ACE)

Care Plan

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Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____
Date of Injury:_____

You have been diagnosed with a concussion (also known as a mild traumatic brain injury). This personal plan is based on your symptoms and is designed to help speed your recovery. Your careful attention to it can also prevent further injury.

You should not participate in any high risk activities (e.g., sports, physical education (PE), riding a bike, etc.) if you still have any of the symptoms below. It is important to limit activities that require a lot of thinking or concentration (homework, job-related activities), as this can also make your symptoms worse. If you no longer have any symptoms and believe that your concentration and thinking are back to normal, you can slowly and carefully return to your daily activities. Children and teenagers will need help from their parents, teachers, coaches, or athletic trainers to help monitor their recovery and return to activities.

Today the following symptoms are present (circle or check). ____**No reported symptoms**

Physical		Thinking	Emotional	Sleep
Headaches	Sensitivity to light	Feeling mentally foggy	Irritability	Drowsiness
Nausea	Sensitivity to noise	Problems concentrating	Sadness	Sleeping more than usual
Fatigue	Numbness/Tingling	Problems remembering	Feeling more emotional	Sleeping less than usual
Visual problems	Vomiting	Feeling more slowed down	Nervousness	Trouble falling asleep
Balance Problems	Dizziness			

RED FLAGS: Call your doctor or go to your emergency department if you suddenly experience any of the following			
Headaches that worsen	Look very drowsy, can't be awakened	Can't recognize people or places	Unusual behavior change
Seizures	Repeated vomiting	Increasing confusion	Increasing irritability
Neck pain	Slurred speech	Weakness or numbness in arms or legs	Loss of consciousness

— SCHOOL VERSION —

Returning to Daily Activities

1. Get lots of rest. Be sure to get enough sleep at night- no late nights. Keep the same bedtime weekdays and weekends.
2. Take daytime naps or rest breaks when you feel tired or fatigued.
3. **Limit physical activity as well as activities that require a lot of thinking or concentration. These activities can make symptoms worse.**
   - Physical activity includes PE, sports practices, weight-training, running, exercising, heavy lifting, etc.
   - Thinking and concentration activities (e.g., homework, classwork load, job-related activity).
4. Drink lots of fluids and eat carbohydrates or protein to main appropriate blood sugar levels.
5. **As symptoms decrease, you may begin to gradually return to your daily activities. If symptoms worsen or return, lessen your activities, then try again to increase your activities gradually.**
6. During recovery, it is normal to feel frustrated and sad when you do not feel right and you can't be as active as usual.
7. Repeated evaluation of your symptoms is recommended to help guide recovery.

Returning to School

1. If you (or your child) are still having symptoms of concussion you may need extra help to perform school-related activities. As your (or your child's) symptoms decrease during recovery, the extra help or supports can be removed gradually.
2. Inform the teacher(s), school nurse, school psychologist or counselor, and administrator(s) about your (or your child's) injury and symptoms. School personnel should be instructed to watch for:
   - Increased problems paying attention or concentrating
   - Increased problems remembering or learning new information
   - Longer time needed to complete tasks or assignments
   - Greater irritability, less able to cope with stress
   - Symptoms worsen (e.g., headache, tiredness) when doing schoolwork

~Continued on back page~

Returning to School (Continued)

Until you (or your child) have fully recovered, the following supports are recommended: *(check all that apply)*

__No return to school. Return on (date)_____

__Return to school with following supports. Review on (date)_____

__Shortened day. Recommend ___ hours per day until (date)_____

__Shortened classes (i.e., rest breaks during classes). Maximum class length: _____ minutes.

__Allow extra time to complete coursework/assignments and tests.

__Lessen homework load by _____%. Maximum length of nightly homework: _____ minutes.

__No significant classroom or standardized testing at this time.

__Check for the return of symptoms (use symptom table on front page of this form) when doing activities that require a lot of attention or concentration.

__Take rest breaks during the day as needed.

__Request meeting of 504 or School Management Team to discuss this plan and needed supports.

Returning to Sports

1. **You should NEVER return to play if you still have ANY symptoms** – (Be sure that you do not have any symptoms at rest and while doing any physical activity and/or activities that require a lot of thinking or concentration.)
2. Be sure that the PE teacher, coach, and/or athletic trainer are aware of your injury and symptoms.
3. It is normal to feel frustrated, sad and even angry because you cannot return to sports right away. With any injury, a full recovery will reduce the chances of getting hurt again. It is better to miss one or two games than the whole season.

The following are recommended at the present time:

___ Do not return to PE class at this time

___ Return to PE class

___ Do not return to sports practices/games at this time

___ **Gradual** return to sports practices under the supervision of an appropriate health care provider.

- Return to play should occur in gradual steps beginning with aerobic exercise only to increase your heart rate (e.g., stationary cycle); moving to increasing your heart rate with movement (e.g., running); then adding controlled contact if appropriate; and finally return to sports competition.
- Pay careful attention to your symptoms and your thinking and concentration skills at each stage of activity. Move to the next level of activity only if you do not experience any symptoms at the each level. If your symptoms return, stop these activities and let your health care professional know. Once you have not experienced symptoms for a minimum of 24 hours and you receive permission from your health care professional, you should start again at the previous step of the return to play plan.

Gradual Return to Play Plan

1. No physical activity
2. Low levels of physical activity (i.e.,). This includes walking, light jogging, light stationary biking, light weightlifting (lower weight, higher reps, no bench, no squat).
3. Moderate levels of physical activity with body/head movement. This includes moderate jogging, brief running, moderate-intensity stationary biking, moderate-intensity weightlifting (reduced time and/or reduced weight from your typical routine).
4. Heavy non-contact physical activity. This includes sprinting/running, high-intensity stationary biking, regular weightlifting routine, non-contact sport-specific drills (in 3 planes of movement).
5. Full contact in controlled practice.
6. Full contact in game play.

*Neuropsychological testing can provide valuable information to assist physicians with treatment planning, such as return to play decisions.

This referral plan is based on today's evaluation:

___ Return to this office. Date/Time_____

___ Refer to: Neurosurgery____ Neurology____ Sports Medicine____ Physiatrist____ Psychiatrist____ Other____

___ Refer for neuropsychological testing

___ Other_____

ACE Care Plan Completed by:_____ **MD RN NP PhD ATC**

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Concussion Questionnaire (Ages 5-12 years)

Patient Name: _____ DOB: _____ Date: _____

Both parent and child must fill this form out

Child Report	Not at all/ Never	A little/ Rarely	Somewhat/ Sometimes	A lot/ Often
I have headaches	0	1	2	3
I feel dizzy	0	1	2	3
I feel like the room is spinning	0	1	2	3
I feel like I'm going to faint	0	1	2	3
Things are blurry when I look at them	0	1	2	3
I see double	0	1	2	3
I feel sick to my stomach	0	1	2	3
My neck hurts	0	1	2	3
I get tired a lot	0	1	2	3
I get tired easily	0	1	2	3
I have trouble paying attention	0	1	2	3
I get distracted easily	0	1	2	3
I have a hard time concentrating	0	1	2	3
I have problems remembering what people tell me	0	1	2	3
I have problems following directions	0	1	2	3
I daydream too much	0	1	2	3
I get confused	0	1	2	3
I forget things	0	1	2	3
I have problems finishing things	0	1	2	3
I have trouble figuring things out	0	1	2	3
It's hard for me to learn new things	0	1	2	3
Total number of symptoms:				of 21
Symptom severity score:				of 63
Do the symptoms gets worse with physical activity?			Y	N
Do the symptoms get worse with trying to think?			Y	N

Overall rating for child to answer:	Very bad										Very Good
On a scale of 0 to 10 (where 10 is normal), how do you feel now?	0	1	2	3	4	5	6	7	8	9	10

If not 10, in what way do you feel different?:

Parent Report **The child:**	Not at all/ Never	A little/ Rarely	Somewhat/ Sometimes	A lot/ Often
Has headaches	0	1	2	3
Feels dizzy	0	1	2	3
Has a feeling that the room is spinning	0	1	2	3
Feels faint	0	1	2	3
Has blurred vision	0	1	2	3
Has double vision	0	1	2	3
Experiences nausea	0	1	2	3
Has a sore neck	0	1	2	3
Gets tired a lot	0	1	2	3
Gets tired easily	0	1	2	3
Has trouble sustaining attention	0	1	2	3
Is easily distracted	0	1	2	3
Has difficulty concentrating	0	1	2	3
Has problems remembering what they are told	0	1	2	3
Has difficulty following directions	0	1	2	3
Tends to daydream	0	1	2	3
Gets confused	0	1	2	3
Is forgetful	0	1	2	3
Has difficulty completing tasks	0	1	2	3
Has poor problem solving skills	0	1	2	3
Has problems learning	0	1	2	3
Total number of symptoms:				of 21
Symptom severity score:				of 63
Do the symptoms get worse with physical activity?			Y	N
Do the symptoms get worse with mental activity?			Y	N

Overall rating for parent/teacher/coach/carer to answer

On a scale of 0 to 100% (where 100% is normal), how would you rate the child now?

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Concussion Questionnaire (Ages 13 years and older)

Patient Name: _____ DOB: _____ Date: _____

	None	Mild		Moderate		Severe	
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or anxious	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Total number of symptoms:							of 22
Symptoms severity score:							of 132
Do your symptoms get worse with physical activity?					Y		N
Do your symptoms get worse with mental activity?					Y		N
If 100% is feeling perfectly normal, what percent of normal do you feel?							
If not 100%, why?							

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