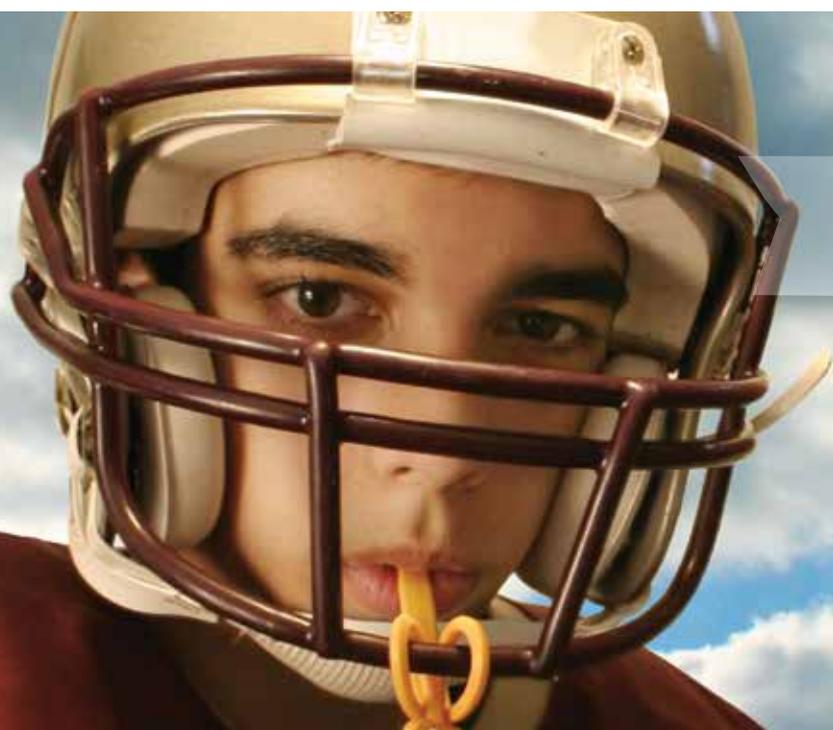




**CONCUSSION:**  
THE ROAD TO RECOVERY



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# road to recovery



## DRIVING ON THE SAME ROAD

More than 300,000 sports-related concussions are diagnosed each year in the United States. While no two injuries are alike, research indicates that most individuals show a full recovery within a few days to weeks, provided their injuries are proactively managed. In rare cases, symptoms can persist for months, and in even rarer circumstances, an unresolved or inadequately treated concussion can cause permanent damage.

Although rare, a phenomenon called “Second Impact Syndrome” can happen when a second blow to the head occurs before the first concussion totally heals. To minimize this, it’s critical for symptoms to be resolved before a student athlete is medically cleared to play sports again.

Clearly, sustaining a concussion is a serious matter that often needs more attention than a trip to the Emergency Department or a bag of ice. These injuries require a comprehensive approach that includes a combination

of rest, thoughtful symptom management and a carefully guided return to activities. This is even more important for children, as the brain of a child is continuing to develop and needs to be conservatively managed. Additionally, children typically have busy schedules and must be functioning at their best to stay on top of the demands of school, sports and their social lives.

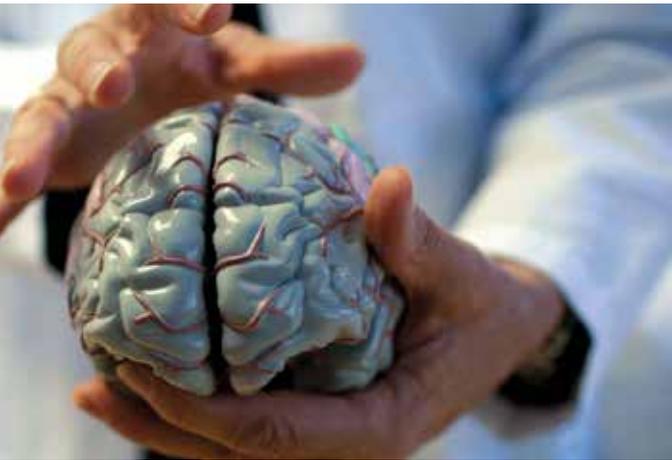
### Team-Centered Approach

At CHOC Children’s, a team-centered approach is used to develop and carry out an individually tailored plan to ensure a smooth recovery, so kids can get back on the road to being a kid.

In this booklet, CHOC Children’s provides an overview of our comprehensive concussion treatment and management, as we promote a more integrated approach to treating concussions in children and young athletes.



# team approach

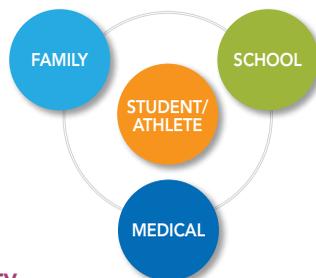


## CONCUSSION MANAGEMENT: A TEAM APPROACH

Our expert medical staff at CHOC Children's believes that a multi-disciplinary, team approach results in the best concussion management. Team members work together to care for the child during the entire recovery process. The potential for a good recovery is maximized when everyone is on the same road and aware of the same potential roadblocks. Good coordination and communication among the Teams improves the chances for a full recovery.

### The Teams:

- **The Family Team:** Made up of parents, grandparents, siblings and other relatives or primary caretakers.
- **The School Team:** The "academic team" (teachers, school nurses, school psychologist, counselor and principal) work with the "athletic team" (coaches, assistant coaches, athletic trainers, physical education teacher and teammates).
- **The Medical Team:** The student's primary physician, neurologist, neuropsychologist, neurosurgeon, orthopedist, nurses, physical therapist, speech therapists and anyone from the medical community involved with the patient's recovery.



### What Your Team Can Do Along the Road to Recovery

**The Family Team:** The student/athlete is at the center of his or her concussion management. Talk to your child to help

him/her understand that they must be an honest and willing partner in the recovery process! Don't let your child persuade you that he or she is fine simply because they are bored or eager to get back out. Success lies in the patient being engaged in the treatment plan and having open communication with all other team members. The first 24-72 hours should include cognitive and physical rest as well, limiting screen time and mentally challenging tasks. Look for the symptoms every day for the first week and then at least three times a week after that, and continue to monitor symptoms for signs of improvement.

**The School Team:** Have the school nurse, athletic trainer, counselor or someone at school be identified as the point person. The point person should solicit information about how the student is functioning and relay concerns to the other Teams. The point person should also help implement any suggested short-term adjustments to help the student on the road to recovery.

It's not "courageous" for an athlete to play injured. This is taking a huge risk. Discourage others from pressuring injured athletes to play and don't let your athlete convince you he or she is "just fine!"

**The Medical Team:** Assess and diagnose concussion. Educate the student and family about the need for rest and how to monitor recovery. Monitor symptoms closely for the first 72 hours, implementing physical and cognitive rest. Consult with the other Team members at school and home. A physician should be actively involved managing every concussion.



## WHAT IS A CONCUSSION?

A concussion is a mild traumatic brain injury (TBI) caused by a blow or direct or indirect force to the head or body. The spinal cord is also susceptible to concussions. Signs and symptoms of a concussion can range from mild to severe. The vast majority of concussion patients return to normal if they are treated early and aggressively. Here are some of the signs and symptoms a concussion patient may experience.



### PHYSICAL

- Headache
- Nausea
- Vomiting
- Balance Problems
- Dizziness
- Visual Problems
- Fatigue
- Sensitivity to Light
- Sensitivity to Noise
- Numbness/Tingling
- Dazed or Stunned

### COGNITIVE

- Feeling Mentally "Foggy"
- Feeling Slowed Down
- Difficulty Concentrating
- Difficulty Remembering
- Forgetful of Recent Information or Conversations
- Confused About Recent Events
- Answers Questions Slowly
- Repeats Questions

### EMOTIONAL

- Irritability
- Sadness
- More Emotional
- Nervousness

### SLEEP

- Drowsiness
- Sleeping Less than Usual
- Sleeping More than Usual
- Trouble Falling Asleep

*\*Having these symptoms does not necessarily indicate a concussion.*

### When to Seek Emergency Care

If the student athlete displays any of the following symptoms, seek immediate medical care at an emergency department near you:

- Changes in alertness and consciousness
- Convulsions or seizures
- Muscle weakness on one or both sides
- Persistent confusion
- Remaining unconsciousness
- Repeated vomiting
- Unequal pupils
- Unusual eye movements
- Walking problems



**DID YOU KNOW:** Each year, more than 200,000 Orange County children are expected to receive care at CHOC, ranked by *U.S. News & World Report* as among the nation's top pediatric hospitals. The Emergency Department in the Bill Holmes Tower opened in March 2013 as Orange County's first and only Emergency Department just for kids. It features 31 treatment rooms and three triage suites designed for rapid diagnosis and treatment.

### DID YOU KNOW: Concussion Statistics

- More than 300,000 sports-related concussions are diagnosed each year in the United States (U.S. Centers for Disease Control and Prevention, 2011). The actual number is thought to be much higher, however, due to those that are not reported and/or diagnosed.
- A 2010 study by the CDC found that U.S. emergency rooms annually treat 173,285 concussions related to sports or recreation among people age 19 years of age and under.
- During the last decade, emergency room visits for sports and recreation-related concussions among children and adolescents increased by 60 percent (CDC).
- Overall, the activities associated with the greatest number of traumatic brain injury-related emergency room visits included football, bicycling, playground activities, basketball and soccer (CDC). Numbers and rates were the highest in football (55,007) and girls soccer (29,167).



# return to learn

## RETURN TO LEARN

Returning a student to school after a concussion while the student is still experiencing symptoms can result in learning problems and poor academic performance. Too much cognitive exertion can lead to headaches, problems concentrating, fatigue and trouble with emotional control. The student may feel overwhelmed or irritated. So, when is the right time for a student who had a concussion to return to school?

A healthcare professional can help offer guidance following an evaluation. The school must be notified that the student with a concussion is returning, so the student can be observed and monitored. The point person can also serve as the primary person to interact with other Teams.

Schools may need to make some short-term adjustments for a returning student, as he or she recovers, so the brain is not over-taxed. Schools may need to limit or adjust regular educational activities like computer use, studying, test-taking and reading.

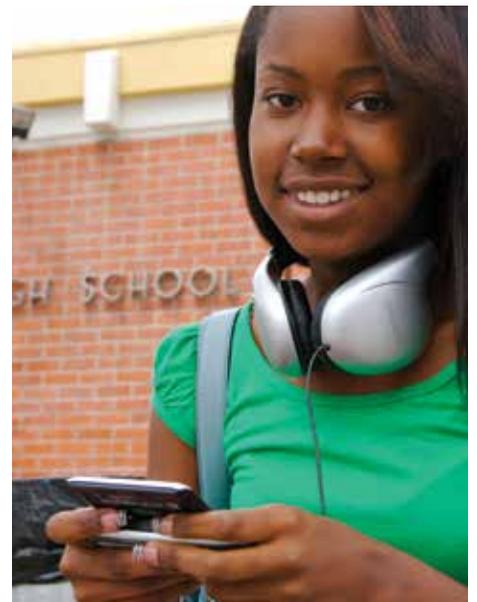
It's normal for the student to feel frustrated, embarrassed, isolated or sad, particularly as there are often no outward signs of injury, so have the school psychologist or counselor talk to the student if necessary to offer support and encouragement as needed.

In addressing a student's abilities when returning, school officials should consider:

- Do some classes or tasks at school, such as looking up or down to take notes, cause the student greater difficulty than others?
- For each class, is there a specific time frame after which the student appears fatigued?
- Does the student have a harder time concentrating after a certain amount of time or as the day progresses?
- Do specific things at the school or in the classroom distract the student?
- Are any behavioral problems linked to a specific event or setting, such as loud noises in the hallway or bright lights in the cafeteria?

### DID YOU KNOW: "Delayed Concussion"

A child may not show or develop symptoms right after being injured. Symptoms can appear hours or days later. All Team members must remember to look for delayed symptoms and pay attention to activities that can worsen them.





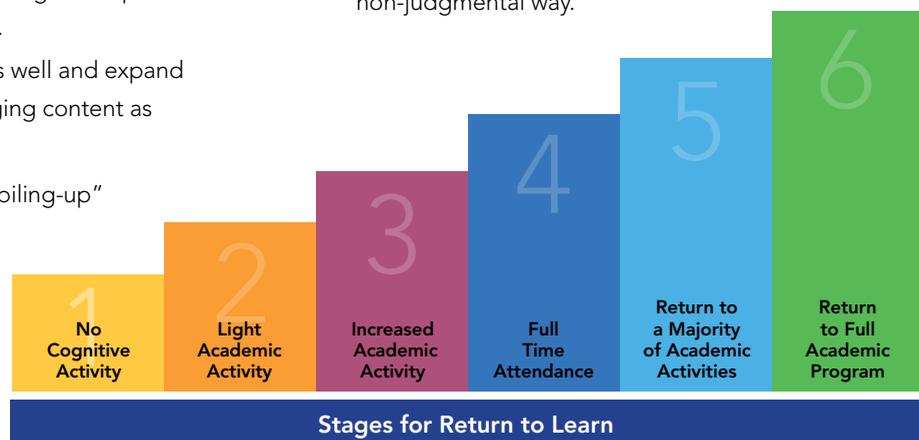
### Some Strategies for Addressing Concussion Symptoms at School

#### Cognitive

- Adjust the student's schedule as needed to avoid fatigue, such as a shorter school day, reduced course load or holding the most challenging classes earlier in the day.
- Adjust the environment to reduce distractions or protect the student from irritations like bright lights, talkative peers and loud places. Move the student closer to the teacher.
- Give the student extra time to finish classwork and take tests.
- Help the student create a to-do list or get organized.
- Give the student assistance: assign a peer to take notes for the student and/or allow the student to record classes.
- Break down assignments into smaller chunks and offer recognition cues.
- Provide alternate methods for a student to show mastery of a subject, such as allowing a multiple-choice or verbal test vs. an essay exam.
- Focus on what the student does well and expand the curriculum to more challenging content as symptoms subside.
- Adjust school load to prevent "piling-up" of assignments.

#### Behavior/Social/Emotional

- If the student is frustrated with failure in one area, redirect him or her to other curriculum areas where he or she can succeed.
- Reinforce positive behavior and academic success.
- Set reasonable expectations.
- Provide structure and consistency; make sure all teachers use the same strategies.
- Remove a student from a problem situation, but don't characterize it as a punishment.
- Involve the family in any behavior management plan.
- Acknowledge that the student may be having a hard time. Be empathetic, encouraging and patient.
- Have the student work with you to make decisions about schedule changes or prioritizing tasks.
- Irritability, low frustration tolerance or "short fuse" are common. Approach student in a non-judgmental way.



# return to activity



## CHOC CHILDREN'S GRADUATED RETURN TO ACTIVITY

Before engaging in a graduated return to activity, the student should have returned to a majority of academic activities. The cornerstone of good concussion management is physical and cognitive rest early and then a graded program of exertion in mental, then physical activity. The student may have to miss some classes. It is common for athletes to miss both practices and games.

Recovery time can't be measured in days and doctors can't completely predict how long it will take to recover because each patient is different and each concussion is different. Collaboration and communication among all

Team members will help determine how a child or young athlete is progressing and when full activities at school and in sports can be safely resumed.

The rate of progression and final clearance is determined by the Medical Team and will be based on test results, evaluation findings and the student athlete's ability to tolerate the return to activity. Each concussion is treated individually and progression is dependent on symptom presentation, neurocognitive testing and/or evaluation findings from physical, occupational or speech therapists.

Return to Sports/Physical Activity			
Stage	Physical Activity Level	Exercise	Next Step
1	No physical activity.	No exercise! Complete physical rest and quiet time with maximum rest.	Typically, a patient can move to Stage 2 when symptom-free for a minimum of 24 hours (may be longer for younger athletes).
2	Light aerobic activity.	10-15 minutes of light exercise with no resistance. Examples are walking, stationary cycling or swimming. Quiet play time alone or with a parent.	If symptoms re-emerge with this level of exertion, return to previous stage. If symptom-free for a minimum of 24 hours, go to the next stage.
3	Sport-specific exercise.	Add movement such as running drills for up to 30 minutes but no contact. Play must be supervised and activities low-risk.	If symptoms re-emerge with this level of exertion, return to previous stage. If symptom-free for a minimum of 24 hours, go to the next stage.
4	Non-contact training drills.	Progress to more complex training drills and progressive resistance training. May run and jump as tolerated.	If symptoms re-emerge, return to previous stage. If symptom-free for a minimum of 24 hours, go to the next stage.
5	Full-contact practice.	With medical clearance, participate in normal training activities with full exertion. Have parent or adult supervision.	If symptoms re-emerge, return to previous stage. If symptom-free, go to the next stage.
6	Return to activity.	Normal game play.	No restrictions.



The student will be monitored for recurrence of symptoms during each step along the road. Post-concussive symptoms vary greatly from person to person. Therefore, all factors surrounding the student-athlete are carefully considered when determining progression.

Retirement from contact sports should be considered for any athlete who has sustained multiple concussions or who has suffered from prolonged post-concussion symptoms. Even in patients having suffered a single concussion, it is important for the athlete and the family to understand the risks of participating in contact sports and activities.



### **DID YOU KNOW: Concussions and California Law**

Assembly Bill 25, signed by the Governor in 2011, requires California school districts to immediately remove an athlete from a school-sponsored athletic activity if the student is suspected of sustaining a concussion or head injury. Students are prohibited from returning to activity until they are evaluated by, and receive written clearance from, a licensed healthcare provider.

## FAQs

### **Q: How can concussions be prevented or avoided in young people and athletes?**

**A:** You should always wear a helmet while riding a horse, motorbike, bicycle, skateboard or snowboard, or while playing contact sports like football, hockey and lacrosse. Although helmets cannot prevent a concussion, they do protect from more severe traumatic brain injury and skull fractures. Helmets should fit appropriately and be in good condition. In sports, student athletes should be taught safe playing techniques, equipment maintenance, and to follow the rules of the game.

Also, every athlete should know it's critical for them to tell their coach, athletic trainer or parent if they have hit their head or are experiencing symptoms of a head injury, even if it means stopping play. Young athletes and children should NEVER ignore a head injury or impact to the head.

### **Q: How can I help my child achieve a complete recovery?**

**A:** Over 90 percent of concussions heal fine if managed well in the first few weeks following the injury. This is why it's so important for coaches, parents and others to recognize the symptoms and act quickly to briefly and temporarily remove the child from activity. This is sometimes referred to as, "cocoon therapy."

Parents often face challenges keeping active kids quiet and resting but this is very important. Insist that your child get plenty of sleep, quiet time and rest, immediately after a concussion. Limit mental and academic stimuli as well as physical activity. This includes limiting everything from television and texting to reading and doing homework. Your child should avoid loud events like sports games, practices or parties. Help your child to decrease stressors because concussions tend to magnify pre-existing conditions, especially the stress that student athletes are under to perform in the classroom and on the field. Also, don't let your teen drive until a physician says it's ok because a concussion usually slows reaction time.

### **Q: Can a concussion lead to a more serious medical complication?**

**A:** Yes. The most significant complications associated with a concussion are brain swelling and increased intracranial pressure. If left untreated, this pressure can cause brain damage by preventing blood and oxygen circulation throughout the brain. Furthermore, a student who suffers a second impact or consecutive concussions without a full recovery in between each concussion is at risk for more serious or long-term complications.



# comprehensive



## CHOC'S COMPREHENSIVE APPROACH TO SPORTS-RELATED CONCUSSION

CHOC Children's Concussion Program takes an individualized and evidence-based approach when evaluating sports-related concussions. Our team is comprised of the following specialists:

**Pediatric Neurologist:** Board certified by the American Board of Psychiatry and Neurology in neurology, with special qualification in child neurology, our pediatric neurologists diagnosis and treat neurologic disorders of the neonatal period, infancy, early childhood and adolescence.

**Sports Medicine Specialists:** Our specialists have a special interest in sports medicine, which focuses on promoting lifelong fitness and wellness and encourages prevention of illness and injury.

**Neurosurgeon:** Neurosurgeons are surgical specialists that deal with the nervous system, including the brain and spinal cord. Our surgeons are available to manage more serious traumatic brain injuries.

**Pediatrician and Primary Care Physician:** These physicians provide continuous medical care and are trained to treat a wide variety of health-related problems. They can refer patients to specialists as needed.

**Neuropsychologist:** Clinical neuropsychologists have specialized knowledge and training in the applied science of brain-behavior relationships. They use this knowledge in the assessment, diagnosis, treatment and rehabilitation of patients of all ages who have neurological, medical, developmental or psychiatric conditions. Our specialists can use a computer-based tool to evaluate cognitive function and then monitor the patient's cognitive recovery, including measuring attention span, memory, processing speed and reaction time.

**Physical Therapist:** Physical therapists treat physical dysfunction or injury with therapeutic exercise and the application of modalities intended to restore or facilitate normal function or development. Our therapists guide the graduated return to play, perform vestibular rehabilitation and work on sport-specific strategies to limit future injuries.

**Speech Therapist:** Speech therapists treat speech defects and disorders, especially through the use of exercises and audio-visual aids that help patients develop new speech habits. Our speech therapists also provide evaluation and treatment of cognitive function including attention, memory and executive functioning.

**Athletic Trainer:** They are often the first responders to an injured athlete immediately following a concussion. Athletic trainers assist in directing athletes with concussions to the appropriate medical care, ensuring the safety of the players and helping guide them in the graduated return to play. The athletic trainer often serves as the point person between the school and the medical team.



**CONCUSSION HOTLINE:** The CHOC Children's Concussion Program offers pediatric concussion experts who provide an immediate response. For concussion consultations, including on nights and weekends, call (714) 509-4054.





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