

## CHILDREN'S PHYSICIAN ACCESS

### 24/7 assistance

- referrals
- consultations
- admissions

612-343-2121  
866-755-2121

**Children's**  
MINNESOTA

childrensMN.org

### THREE LOCATIONS

**Children's St. Paul**  
345 North Smith Avenue, Suite 302  
St. Paul, MN 55102

**Children's Minneapolis**  
2530 Chicago Avenue South, Suite 70  
Minneapolis, MN 55404

**Children's Maple Grove**  
7767 Elm Creek Boulevard, Suite 301  
Maple Grove, MN 55369

### MEET THE TEAM



Joseph Petronio, MD  
Medical Director,  
Neurosurgeon



Robert Doss,  
PsyD, ABPP-CN  
Co-director



Meysam  
Kebriaei, MD,  
Neurosurgeon



Douglas  
Hyder, MD  
Neurologist



Richard  
Patterson, MD  
Neuroradiologist



Maurice Sholas,  
MD, PhD,  
Physiatrist



Kevin  
Coleman, PsyD  
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Heather Lorier,  
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Emily Nicol,  
APRN, CNP



Jennifer  
Frost, PA

### CHILDREN'S CONCUSSION CLINIC

The Children's Concussion Clinic provides comprehensive medical evaluation and treatment for children and young adults with concussions caused by sports, accidents or falls. Our pediatric experts are here to help you help your patients—so they can get back to being kids as quickly as possible. Call us if you have questions—we're happy to help with a consult or referral.

**COLLABORATIVE:** Our multidisciplinary teams are subspecialty experts in the state's only kid-focused healthcare system

**INTEGRATED:** Pediatric program support through our network of emergency departments, primary care, subspecialty and rehabilitation clinics

**CONNECTED:** The Concussion Clinic is part of Children's neuroscience program that includes specialists in neurosurgery, neurology, neuropsychology, pediatric psychology, physical rehabilitation and more

**PROVEN:** Children's offers documented quality care measures as well as concussion-specific research studies that focus on continuous improvement

### WHEN TO REFER TO THE CHILDREN'S CONCUSSION CLINIC

Referral to a specialist such as the Children's Concussion Clinic is appropriate if one or more of the following criteria are met following an injury:

- History of multiple previous concussions
- Unusually long or protracted recovery
- Unusual neurological symptom complaints or history, including vestibular or balance symptoms, migraine headaches and/or visual disturbances
- Complicated co-morbid history including major psychiatric illness, learning disabilities and/or attention deficit hyperactivity disorder (ADHD)
- The patient or family is requesting rapid return-to-play clearance

### CHILDREN'S EDUCATION BRIEF

# CONCUSSIONS

How to diagnose and treat pediatric head trauma



Traumatic brain injuries (TBIs) like concussions can have a prolonged impact on a child's memory, communication, mood, expression and understanding. As the incidence of sports-related head injuries continues to be better recognized, timely diagnosis and treatment is critical to help ensure your patients recover fully and completely.

#### TAKE A LOOK — THE BRIEF:

- Reviews common concussion signs and symptoms
- Shares key evaluation and examination criteria
- Recommends treatment and management tips
- Provides new concussion research by experts at Children's
- Identifies when to refer to the Children's Concussion Clinic

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## COMMON CONCUSSION SIGNS AND SYMPTOMS

Concussions are diagnosed based on clinical symptoms that present right after the injury, or in some cases, recognized hours or days later.

Here are some symptoms that may appear initially and over the next several hours or days following the injury:

- Headache or pressure in the head
- Nausea or vomiting
- Balance problems or dizziness
- Confusion or amnesia
- Slurred speech
- Fatigue or feeling tired
- Visual changes like dark or bright spots
- Blurred or double vision
- Sensitivity to light and/or sound
- Unusual or inappropriate emotions
- Seizures or loss of consciousness

**Tip:** Use a tool like the Sports Concussion Assessment Tool (SCAT3) to quantitatively evaluate and score patient symptoms.

**43%**  
of concussions treated in Minnesota hospitals are caused by participation in sports and recreational activities<sup>1</sup>



## EVALUATION AND EXAMINATION CRITERIA

When examining a patient in a primary care setting, here are some key assessments you'll want to conduct:

- 1. Comprehensive health history**  
Document things such as medical history, medications, neurological and developmental history, and grades, school and sports performance.
- 2. Physical examination**  
Look for bleeding or bruising in or near ears, palpable head bumps or lumps, midline point tenderness in the neck or limitations to head or neck movement.
- 3. Neurological examination**  
Assess visual acuity and motor skills using cover/uncover and finger/nose tests, and evaluate things such as muscle strength, balance and coordination, and reflexes.
- 4. Cognitive function assessment**  
Use a tool such as ImPACT™ or Headminder to measure baseline and post-injury neurocognitive function. Keep in mind that these tests do not predict recovery or serve as return-to-play justification.
- 5. Mental health assessment**  
Explore things such as incidence of past or current anxiety or depression, difficulties adjusting socially or in school, and sleep disturbances.
- 6. Additional evaluations**  
For patients over the age of two, consider a CT scan if there are severe headaches, a history of vomiting or loss of consciousness, or a severe mechanism of injury (includes falls >5 feet). Do a CT scan in cases of altered mental status or signs of basilar skull fracture.

## TREATMENT AND MANAGEMENT TIPS

Give patients and their families home care instructions that include physical and cognitive restrictions, and remind them that it's important to monitor the concussion over the next several days and weeks as symptoms may resolve, worsen, or ebb and flow based on a variety of factors.

### Physical restrictions and recommendations

- Patients should rest for 1-2 days after the injury, then on days 2-3, a gradual resumption of normal activity provided there is no increased risk of trauma to the head
- Increase water intake by 50-100 oz. daily
- Use NSAIDs or acetaminophen to help manage headaches
- Use an antiemetic such as ondansetron to help manage nausea or dizziness

### Cognitive restrictions and recommendations

- If headaches or visual disturbances are present, patients should avoid electronics, reading and homework for 1-2 days
- If symptoms start to subside, slowly add cognitive activities back in starting with reading followed by electronics
- If sensitive to light, wear a hat with a brim or sunglasses

## RETURN-TO-PLAY PROTOCOL

Once free of all signs and symptoms of concussion, a stepwise process is required before a child can return to play or competition. Each step requires a minimum of 24 hours, and the child can only proceed to the next level if he or she continues to be free of any signs or symptoms at the current level. If any signs or symptoms recur, the child should drop back to the previous level.

**STEP 1:** No sport activity; rest until all symptoms have resolved

**STEP 2:** Light aerobic activity such as walking or stationary cycling; no resistance training

**STEP 3:** Sport-specific exercise such as skating in hockey or running in soccer

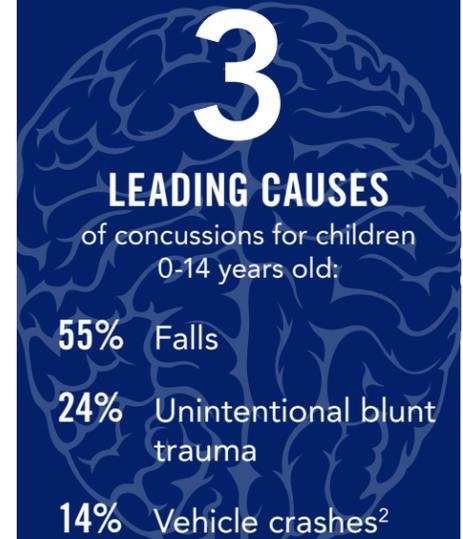
**STEP 4:** Non-contact training drills

**STEP 5:** Full contact training after medical clearance

**STEP 6:** Game play or activity participation

### Sources:

1. Centers for Disease Control and Prevention. Nonfatal Traumatic Brain Injuries Related to Sports and Recreation Activities Among Persons Aged ≤19 Years — United States, 2001–2009. MMWR 2011; 60(39):1337–1342.
2. Centers for Disease Control and Prevention, Traumatic Brain Injury stats



## CHILDREN'S RESEARCH STUDIES UNDERWAY

The Pediatric Concussion Program at Children's is actively involved in a variety of research projects including studies investigating high-field neuroimaging of concussion in collaboration with the University of Minnesota's Center for Magnetic Resonance Research, balance assessment in our emergency departments, recovery time differences in children injured during the school year vs. summer months, and the extent/nature of visual deficits associated with concussion.