Did you know…

- For more than 70 years, Nemours/Alfred I. duPont Hospital for Children has been providing high quality care for children and is ranked among the nation’s best pediatric hospitals.

- As a recipient of the Leapfrog Award, duPont Hospital for Children is 1 of 12 children’s hospitals in the country to be honored for outstanding quality and safety.

- The duPont Hospital for Children has also achieved Magnet status, the nation’s highest credential for nursing excellence.

- Our family-centered model of care ensures that caregivers and parents are part of the same team, working together, to develop a personalized plan that best meets the needs of the child.

Nemours/Alfred I. duPont Hospital for Children is ranked by U.S. News & World Report as one of the best children’s hospitals in the nation in cancer, cardiology & heart surgery, diabetes & endocrinology, gastroenterology, neurology & neurosurgery, nephrology, orthopedics and pulmonology.
Concussions and Kids

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Concussion is a brain injury caused by a blow to the head, neck or body that snaps the head forward, sideways and/or backwards, shaking the brain inside the skull. A youth doesn’t have to be knocked out to have suffered a concussion. Concussions may be related to sports or playground injuries, car accidents or other trauma. The injury may seem mild, but it can affect a young person’s health, thinking ability, behavior, school performance and social interactions. The primary treatment for a concussion is complete physical and mental rest.

Diagnosis

In a concussion, the brain is shaken or jostled, but there is no structural injury that can be seen on an X-ray, CT scan or MRI. Yet, after a concussion, the brain isn’t working the way it was prior to the injury. Concussion changes the way a person thinks, acts, sees and functions. The physician will ask questions that help evaluate the ability of the child/teen to remember and to learn. A physical examination will be performed to evaluate any changes in balance, coordination, reflexes and vision.

Signs and Symptoms

The signs and symptoms of a concussion may not be immediate. Symptoms usually appear within 24 to 72 hours after the injury and can range from mild to severe, lasting for hours, days, weeks or even months.

If the injured youth has one or more of the symptoms listed below, suspend all recreational and sports activity and seek medical attention for the youth from their pediatrician or local ER immediately.

<table>
<thead>
<tr>
<th>Signs observed by family</th>
<th>Symptoms experienced by the injured youth</th>
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<tr>
<td>Appears dazed or confused</td>
<td>Head pressure or headaches that won’t go away</td>
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<td>Can’t remember anything before or after the fall or injury</td>
<td>Sensitivity to light and/or sound</td>
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<td>May “black out” briefly</td>
<td>Nausea and vomiting</td>
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<td>Forgetfulness</td>
<td>Memory problems</td>
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<td>Changes in the way they play or act</td>
<td>Dizziness</td>
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<td>Cries easily or more than usual; more temper tantrums</td>
<td>Head and/or neck pain</td>
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<tr>
<td>Sluggish movements</td>
<td>Double or blurry vision</td>
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<tr>
<td>Slowed verbal responses</td>
<td>Short attention span; difficulty concentrating</td>
</tr>
<tr>
<td>Irritability, changes in mood</td>
<td>Feeling “down”</td>
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<tr>
<td>Sleeping patterns change</td>
<td>Excessively tired</td>
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If any of the above symptoms return or worsen, despite having seen a physician and receiving appropriate rest and treatment, the child/teen should seek additional medical attention immediately from their pediatrician or local ER.

Concussion changes the way a person thinks, acts, sees and functions.
The Concussion Program at Nemours/Alfred I. duPont Hospital for Children utilizes the expertise of specialists in sports medicine and in pediatric rehabilitation medicine along with specialists in neurology, neuropsychology, neurosurgery, ophthalmology and physical therapy to best manage concussions. The primary concussion specialist, usually a sports medicine physician or a pediatric rehabilitation physician, will direct the patient to other specialists as needed.

We evaluate and treat children of all ages, regardless of the source of trauma. Concussion treatment is initiated during the first contact with our nurse navigator. Our nurse navigator facilitates the scheduling of appointments and coordinates physician and therapy visits to minimize travel and wait times. She also assists families with information and other questions.

A comprehensive, coordinated care plan is developed for each concussion patient to best meet their individual needs.

Components of the care plan may include:
- medical care from diagnosis to recovery
- headache management
- post-injury neuropsychological screening
- vestibular assessment
- vision assessment
- cognitive remediation/therapies
- physical therapy
- return-to-play guidance/management
- in-hospital school program to ease the transition back to school

Baseline Testing

Baseline testing is available at the following locations:
- Nemours/Alfred I. duPont Hospital for Children, Wilmington, DE
  Call (302) 651-5600
- Nemours duPont Pediatrics, Egg Harbor Township, NJ
  Call (609) 641-3700
- Nemours duPont Pediatrics, Voorhees, NJ
  Call (856) 309-8508
- Nemours duPont Pediatrics, Bryn Mawr, PA
  Call (610) 557-4800
- Nemours duPont Pediatrics, Lancaster, PA
  Call (717) 481-8771
- Nemours duPont Pediatrics, Newtown Square, PA
  Call (610) 557-4800
- Nemours duPont Pediatrics, Philadelphia, PA
  Call (215) 861-8800

Baseline testing for groups or teams is available on Saturdays at duPont Hospital for Children, in Wilmington, DE.
Call (302) 651-5600 to schedule testing.

Baseline Testing

ImPACT® (Immediate Post-Concussion Assessment and Cognitive Testing) is a computerized, neuropsychological test used to assess certain aspects of thinking known to be disrupted during a concussion. Pre-concussion results are then used as a benchmark for comparison with post-concussion ImPACT® scores. These test results provide specific and individualized information for assessment, treatment and return to play.

Who should receive baseline testing and what is involved?
Any active youth 10 years of age or older
- The test is a 30-minute computerized assessment.
- The cost of baseline testing is $12. It is not covered by insurance and payment is due at the time of testing. This cost may be covered by a Health Savings Account.

Athletes and Recreational Activities
We recommend all young people who participate in sports or recreational activities like biking, skateboarding and/or contact and collision sports undergo baseline screening to establish pre-injury brain functioning prior to the sports season.
If a Concussion is Suspected

- Remove the child/teen from all exercise and activity.
- Seek medical attention immediately.
- Communicate with the child/teen’s daycare providers, coaches, trainers, physical education instructors and school nurses to ensure compliance with the prescribed plan for recovery.

Returning to Activities and Sports

Most young people will recover completely within 2-4 weeks. A concussion patient may seem to be fully recovered, but symptoms can reappear a few days later or worsen with mental activity (school, computer games, etc.) or physical activity (gym, bike riding, etc.). Symptom monitoring coupled with balance and cognitive testing are helpful in determining readiness to return to school, sports and everyday activities.

Return to all activities is a gradual process. Readiness for return to school, sports and everyday activities should be determined by a health care provider trained in concussion management.

Minimizing Future Concussions

The brain needs time to heal. Being physically or mentally active too soon after a concussion increases the risk of developing a more serious injury. A young person who sustains a second concussion BEFORE the brain has fully healed may recover more slowly and could develop long-term problems.

Ensure your concussion patient:

- gets the rest they need during the recovery process.
- follows the return to activity plan avoiding physical or mental activities such as school work, TV, video games, computer, gym, and exercise for the specified time period.
- reports new or worsening symptoms if they occur during recovery or post-recovery.
- understands that it is not smart to “tough it out” and play with a concussion.
- follows playground safety.
- wears a seat belt or is placed in a booster seat correctly.
- wears a helmet and properly fitting safety gear for their activity.
- follows bicycle safety.
Frequently Asked Questions About Concussion

**QUESTION:** What is a concussion?

**ANSWER:** A concussion is a brain injury caused by a blow to the head or neck during a fall or collision that shakes the brain inside the skull. Someone doesn’t have to be knocked out to have suffered a concussion. Concussions may be related to sports or playground injuries, car accidents or other trauma. The injury may seem mild, but it can affect a young person’s health, thinking ability, behavior, school performance and social interactions.

**QUESTION:** What are the signs and symptoms of a concussion?

**ANSWER:** The signs and symptoms may not be immediate. Symptoms usually appear within 24 to 72 hours after the injury and can range from mild to severe, lasting for hours, days, weeks and even months.

Symptoms may include:

*Physical:*
- headaches that don’t go away
- nausea and/or vomiting
- tired all the time
- appears dazed
- changes in sleep patterns
- balance difficulties
- sensitivity to light and/or noise

*Thinking:*
- difficulty remembering
- shortened attention span
- slowed response
- difficulty concentrating

*Behavior/Personality:*
- irritability
- changes in the way they play or act
- more temper tantrums
- cries easily

**QUESTION:** What should you do if you suspect that a someone has a concussion?

**ANSWER:**
- Remove them from all exercise and activity.
- Seek medical attention immediately from their pediatrician or from the ER.
- Communicate with their day care providers, coaches, trainers, physical education instructors and school nurses to ensure compliance with the prescribed plan for recovery.

**QUESTION:** What is the treatment for a concussion?

**ANSWER:** The brain needs time to heal so the primary treatment for concussion is complete physical and mental rest.

**QUESTION:** Why would someone, who has suffered a concussion and is resting, fail to improve?

**ANSWER:** Delays in recovery can be due to a number of factors. First, a concussion patient may be resting, but not achieving a complete state of rest. The patient may be watching TV, text-messaging or reading, using the computer and/or playing video games. The recovering student may not be receiving accommodations at school and is still trying to complete too much school work. A concussion patient’s past medical history may also be a factor in a slowed recovery process. Children with a history of previous concussion, ADHD or learning disabilities, mood disorders, sleep disorders or speech difficulties typically take longer to recover than children without these diagnoses.
**QUESTION:** How long will the headaches last?

**ANSWER:** This varies from patient to patient. The more a patient rests, the quicker the headaches will go away. Headaches tend to last longer in children who have a history of headaches prior to their concussion or whose family history includes migraine headaches.

**QUESTION:** Should my young athlete have a CT scan or other imaging tests?

**ANSWER:** CT scans are not recommended following a concussion unless the patient's neurologic examination is abnormal or if there is concerning history. Concussions do not show up on CT scans since they are functional injuries rather than structural injuries of the brain. If the concussion patient does not follow the typical pattern of recovery or has persistent headaches four weeks after the start of treatment, an MRI may be ordered.

**QUESTION:** On average, how long will it take for a young person to recover from a concussion?

**ANSWER:** Approximately 90 percent of children will recover within four to six weeks after a concussion and an additional five percent will recover by three months. One to two percent of all patients with concussions can take one year or longer to fully recover.

**QUESTION:** When can a concussion patient return to school?

**ANSWER:** Most children should be kept home from school for a complete mental rest following their injury, especially if they are still having significant symptoms. Typically, children will remain out of school for one to two weeks and then return, gradually, beginning with half-days. They should continue half-days until they are able to tolerate full days.

**QUESTION:** When can a young athlete return to sports?

**ANSWER:** Once a young athlete no longer has symptoms, has normal mood and balance and demonstrates complete mental (thinking and processing of information) recovery, they will be able to gradually return to sports activities. A complete recovery includes return to his or her regular school day with a full workload. Since all patients recover at different rates, the timing of returning to sports also varies.

**QUESTION:** If a young athlete is feeling fine, why can’t they return to full sports participation?

**ANSWER:** The concussion patient may be feeling fine, but their balance may still be abnormal or they may not have regained complete cognitive functioning. In order to return to sports and activities safely, he or she must be fully recovered. Full recovery includes no physical symptoms and no mood, thinking and balance disturbances, at rest or upon exertion.

**QUESTION:** After the concussion patient is cleared by a physician, is there any benefit to waiting longer before returning to sports?

**ANSWER:** We ensure that your child is fully recovered from his or her injury before clearing them to safely return to sports. There is no evidence to suggest that waiting longer beyond this point will be advantageous or will decrease the risk of another injury.
**QUESTION:** If a young person’s balance has always been “off,” why can’t he or she return to sports?

**ANSWER:** If a child is an athlete, they should have good balance to reduce the risk of further injury. The in-office assessment we perform is a screening evaluation of balance. If there is concern regarding the child’s balancing abilities, more in-depth evaluation by a physical therapist or physician is needed. A balance evaluation will determine if the concussion patient is still experiencing impaired balance post-concussion or if there are other concerns that may be affecting it. If balance is determined to be a weakness, therapy to improve balance skills will be recommended and is available.

**QUESTION:** Why does a concussion patient need a Return to Play (RTP) evaluation?

**ANSWER:** For individuals who have experienced a more severe or complicated concussion, a RTP evaluation will help determine their readiness for full return to play. If symptoms return during aerobic activities, the patient is not yet fully recovered.

**QUESTION:** Why do young concussion patients have to go through a five-step RTP program before they can get back to full activities?

**ANSWER:** Sometimes increasing heart rate and head movement can precipitate physical symptoms associated with concussion. This tells us that the patient has not completely recovered from their concussion and needs additional treatment.

**QUESTION:** Will my child have any lasting effects from this concussion?

**ANSWER:** Typically, most children completely recover from their concussion. However, the more concussions a person has, the more likely they are to have long-term or lasting effects.