

## PEDIATRIC BRAIN AND SPINAL CORD INJURY



Brain and spinal cord injuries in children are unfortunately very common. **We have the only LEVEL 1 Trauma Center in Central Florida**, and perform this unique service to the community with pride.

### **What is a brain or spinal cord injury? How are children different from adults?**

Head injuries account for 75% of all pediatric admissions for trauma. This adds up to 29,000 hospitalizations, and almost 500,000 emergency department visits. The most common mechanisms for injury in children include falls, motor vehicle crashes or pedestrians hit by cars, and inflicted injuries. Children are particularly vulnerable due to the disproportionate size of the head to the body. Immediate post-traumatic seizures occur more commonly in children than adults. Child abuse remains a significant cause of morbidity in infants and toddlers. **Adults have different mechanisms responsible for trauma and different physiologic responses to brain injury. We treat children at APH with age-specific management strategies, not a “one size fits all” approach.**

### **What work-up will be done to evaluate the child with head injury?**

An emergency response trauma team will evaluate every child upon arrival. Assessment begins with a thorough neurological examination. Airway, breathing, and circulation will be assessed immediately and problems addressed. The mechanism, neurologic status, medical history, and other injuries will be recorded. A CT scan of the brain and cervical spine is performed to look for fracture or hemorrhage. An MRI scan may be ordered to look in a more detailed way for brain injury.

Some children without loss of consciousness or neurological deficits can be observed in the emergency department without CT imaging. Neither are cervical spine scans needed in an older child without pain or tenderness and a normal neurological exam.

### **What types of injury can occur?**

Skull fractures can occur at any age and are very common. They can indicate an underlying brain injury and need to be evaluated by a neurosurgical specialist. Only very depressed fractures or fractures with tears in the covering of the brain (the dura mater) require surgery. Some fractures grow over time and widen instead of healing. These may need surgical repair as well. Spinal fluid can leak from the nose or ears from fractures of the base of the skull.

The brain can be injured from the forces imparted during blunt trauma to the head. Contusions or bleeding in the brain can alter brain functioning. Large collections of blood called hematomas will likely need to be removed, and brain swelling minimized. These include epidural (outside the brain covering) and subdural hematomas (under the brain covering). Seizures can develop from this irritation of the brain. A diffuse brain injury can occur as well with shearing of the connections between brain cells. These injuries often require the care of our Intensive Care specialists and neurosurgery team.

### **What treatments are available?**

Severe brain injury is an emergency and brain swelling can be reduced through a number of interventions. Children are often sedated and intubated. A cervical collar is placed on the neck to protect the spine from further injury, until physicians feel its safe to remove. Blood pressure, oxygenation and ventilation, and temperature are all monitored precisely to minimize further brain injury. Medications are given to reduce brain swelling and work by drawing water out of brain tissue, and a drain may be placed to remove spinal fluid. Other options are available to reduce brain swelling and include lowering body temperature, sedating medicines called barbiturates, and removal of the skull (craniectomy). Interventions are tailored to each child depending on type of injury, response to treatment, other injuries and the child's overall medical condition.

## CONCUSSION CLINIC and SPORTS CONCUSSION PROGRAM

What are the signs and symptoms of concussion?

Physical	Mental/Cognitive	Emotional	Sleep
Headache • Nausea • Vomiting • Balance problems • Dizziness • Visual problems • Fatigue • Sensitivity to light • Sensitivity to noise • Numbness/ Tingling • Dazed or stunned • Repeats questions	• Feeling mentally “foggy” • Feeling slowed down • Difficulty concentrating • Difficulty remembering • Forgetful of recent information or conversations • Confused about recent events • Answers questions slowly	• Irritability • Sadness • More emotional than usual • Nervousness • Trouble falling asleep	• Drowsiness • Sleeping less than usual • Sleeping more

Concussions are extremely common and often go unreported. Approximately 1.6 to 3.8 million sports or recreation-related traumatic brain injuries occur in the U.S. each year. Any of the above symptoms can occur and these symptoms can last days, weeks or even months. Children take longer to recover than adults. Any blow to the head or body can cause a concussion, and loss of consciousness is **not** essential for a diagnosis of concussion. A child with a concussion is at increased risk of another concussion, and returning a child to play too soon after a blow to the head can lead to severe and permanent brain damage. Return to play should be gradual, moving from light aerobic exercise to more rigorous (contact) activities over time.

### KEY POINTS:

- **A concussion is a brain injury**
- **A concussion can occur in any activity or sport**
- **You do not have to lose consciousness to have a concussion**
- **DO NOT return to the game if you suffer a concussion**
- **Seek medical attention if your child has a concussion**
- **Get plenty of rest before returning to play**
- **Return to play in a step-wise fashion**

The Neurosurgery team at Arnold Palmer Hospital works closely with the pediatricians in the community to educate and advise treating physicians in managing head injury. We have the latest tools at our disposal (such as IMPACT testing) to evaluate your child. Referrals to Neuropsychology and Neurology to manage learning difficulties and headache symptoms after head injury are readily available. A pediatric rehabilitation unit is in development to help children with severe brain injury reach optimal functional recovery.

**Call our Neurosurgery team to schedule an appointment if your child has a concussion and you are concerned: (321) 841 3050.**