

DEFINITION

- Injuries to the head
- An injury to the skin of the head area may be present, such as a bruise (contusion), cut (laceration), scrape (abrasion), or scratch.
- **Triager Tip:** This is an acute injury protocol. Old injuries with chronic, persistent symptoms are covered under the See in Office Within 2 Weeks disposition.

PAIN SEVERITY is defined as:

- **MILD:** doesn't interfere with normal activities
- **MODERATE:** interferes with normal activities or awakens from sleep
- **SEVERE:** excruciating pain, can't do any normal activities, severe crying
- Assessment of Pain Severity: Base it on the child's current behavior. Ask: "What does the pain keep your child from doing?" Do not ask: "Is the pain Mild, Moderate or Severe?" Reason: Many parents and teens will choose "Severe".

INITIAL ASSESSMENT QUESTIONS

1. **MECHANISM:** "How did the injury happen?" For falls, ask: "What height did your child fall from?" and "What surface did they fall against?" (Suspect child abuse if the history is inconsistent with the child's age or the type of injury.)
2. **WHEN:** "When did the injury happen?" (Minutes or hours ago)
3. **NEUROLOGICAL SYMPTOMS:** "Was there any loss of consciousness?" "Are there any other neurological symptoms?"
4. **MENTAL STATUS:** "Does your child know who they are, who you are, and where they are? What is your child doing right now?"
5. **LOCATION:** "What part of the head was hit?"
6. **SCALP APPEARANCE:** "What does the scalp look like? Are there any lumps?" If so, ask: "Where are they? Is there any bleeding now?" If so, ask: "Is it difficult to stop?"
7. **SIZE:** For any cuts, bruises, or lumps, ask: "How large is it?" (Inches or centimeters)
8. **PAIN:** "Is there any pain?" If so, ask: "How bad is it?"
9. **TETANUS:** For any breaks in the skin, ask: "When was the last tetanus booster?"

- Author's note: IAQ's are intended for training purposes and not meant to be required on every call.

TRIAGE ASSESSMENT QUESTIONS

Call EMS 911 Now

Acute Neuro Symptom and present now (Definition: difficult to awaken or keep awake OR confused thinking and talking OR slurred speech OR weakness of arms OR unsteady walking)

R/O: cerebral contusion, subdural or epidural hematoma

A seizure (convulsion) and still has altered mental status

Knocked unconscious and still has altered mental status

Not moving neck normally and began within 1 hour of injury (Exception: whiplash injury without any impact)

R/O: cervical spine injury. First Aid: Discuss protecting the neck from movement before transferring the call

Major bleeding that can't be stopped

Sounds like a life-threatening emergency to the triager

See More Appropriate Protocol

Concussion diagnosed by HCP

[Go to Protocol: Concussion Follow-up Call \(Pediatric\)](#)

Neck injury and no injury to the head

[Go to Protocol: Neck Injury \(Pediatric\)](#)

Wound infection suspected (cut or other wound now looks infected)

[Go to Protocol: Wound Infection Suspected \(Pediatric\)](#)

Go to ED Now

Altered mental status (awake but not alert, not focused, slow to respond)

[R/O: concussion, intracranial bleed](#)

Neck pain or stiffness

[R/O: cervical spine injury, whiplash injury, muscle strain](#)

Seizure and acts normal now

[R/O: post-traumatic seizure](#)

Blurred or double vision persists > 5 minutes

Go to ED/UCC Now (or to Office Now per Practice Policy)

Knocked unconscious and now fine

[R/O: concussion](#)

Bleeding that won't stop after 10 minutes of direct pressure

[R/O: laceration](#)

Skin is split open or gaping (if unsure, refer in if cut length > 1/2 inch or 12 mm on the skin, 1/4 inch or 6 mm on the face)

[R/O: need for sutures](#)

Large dent in skull (especially if hit the edge of something)

[R/O: depressed skull fracture](#)

Had Acute Neuro Symptom and no symptoms now

[R/O: concussion causing transient neuro symptom](#)

Dangerous mechanism of injury caused by high speed (such as MVA > 25 mph, pedestrian/bicyclist struck by car), great height (under 2 years: over 3 feet; over 2 years: over 5 feet) or hard object (such as golf club, baseball bat, etc)

[Reason: increased risk of injury warrants neuro exam](#)

Vomited 2 or more times within 24 hours of injury

Black eye(s) onset over 24 hours after head injury

SEVERE headache now (such as constant crying with pain)

R/O: severe injury

Suspicious story for injury (especially if not yet crawling or walking)

R/O: child abuse

High-risk child (e.g., bleeding disorder, blood thinners, V-P shunt, brain tumor, brain surgery)

Age < 6 months (Exception: cried briefly, baby now acting normal, no physical findings and minor type of injury with reasonable explanation)

Reason: difficult to assess; consider NAT

Age < 24 months with fussiness or crying now

Reason: neuro status difficult to assess by phone

Watery or blood-tinged fluid dripping from the NOSE or EARS now (Exception: tears from crying or nosebleed from nose injury)

R/O: CSF leak from basilar skull fracture

Age under 2 years with large swelling over 2 inches or 5 cm (for age under 12 months: size over 1 inch)

R/O: severe injury causing large scalp hematoma

Can't remember what happened (amnesia) or inability to store new memories

Reason: probably concussion

Sounds like a serious injury to the triager

Go to Office Now

Mild concussion suspected by triager

See in Office Today

Headache persists > 24 hours

R/O: skull fracture, post-concussion syndrome

Discuss With PCP and Callback by Nurse Today

Dirty minor wound and 2 or less tetanus shots (such as vaccine refusers)

Reason: needs tetanus shot and may need Tetanus Immune Globulin (TIG)

See in Office Within 3 Days

Scalp area tenderness from acute injury persists > 3 days

R/O: skull fracture

For DIRTY cut or scrape, last tetanus shot > 5 years ago

For CLEAN cut or scrape, last tetanus shot > 10 years ago

Triager thinks child needs to be seen for non-urgent problem

Caller wants child seen for non-urgent problem

See in Office Within 2 Weeks

Old injury (happened > 4 weeks ago) with persistent pain or other symptoms

Home Care

Minor head injury (small scalp swelling, bruise, or mild tenderness)

Home Care Advice for Minor Scalp Injuries

1. **Reassurance and Education - Minor Scalp Injuries:**
 - It sounds like a scalp injury rather than a brain injury or concussion.
 - Swelling of the scalp does not mean there is any swelling of the brain. The scalp and brain are not connected. They are separated by the skull bone.
 - Big lumps or bruising can occur with minor scalp injuries. This is normal. Reason: The scalp has a large blood supply.
 - Treatment at home should be safe.
2. **Wound Care:**
 - If there is a scrape or cut, wash it off with soap and water.
 - Then apply pressure with a sterile gauze for 10 minutes to stop any bleeding.
3. **Cold Pack for Pain or Swelling:**
 - For pain or swelling, use a cold pack. You can also use ice wrapped in a wet cloth. Put it on the area for 20 minutes.
 - Repeat in 1 hour, then as needed.
 - Reason: Prevent big lumps ("goose eggs"). Also, reduces pain and helps stop any bleeding.
 - Caution: Avoid frostbite.
4. **Watch Your Child Closely for 2 Hours:**
 - Observe your child closely during the first 2 hours following the injury.
 - Encourage your child to lie down and rest until all symptoms have cleared. (Note: mild headache, mild dizziness and nausea are common)
 - Allow your child to sleep if they want to, but keep them nearby.
 - After 2 hours awaken your child.
 - Check that they are alert and know who you are. Also check that they can talk and walk normally.
5. **Diet - Start with Clear Fluids:**
 - Offer only clear fluids to drink, in case they vomit.
 - Return to regular diet after 2 hours.
 - Exception: Babies can continue breast feeding or formula.
6. **Pain Medicine:**
 - For pain relief, give acetaminophen every 4 hours OR ibuprofen every 6 hours as needed (See Dosage Table)
 - Caution: Never give aspirin to children and teens (Reason: always increases risk of bleeding).
 - Exception: Avoid until 2 hours have passed from injury without any vomiting.
 - Also, don't continue pain medicine more than 3 days without seeing your child's PCP.
7. **Special Precautions for 1 Night:**
 - Mainly, sleep in same room as your child for the first night.
 - Reason: If a complication occurs, you will recognize it because your child will first develop a severe headache, vomiting, confusion or other change in their behavior.
 - Optional: If you are worried, awaken your child once during the night. Check the ability to walk

and talk.

- After 24 hours, return to a normal routine.

8. **Expected Course:**

- Most head impact only causes a scalp injury.
- The swelling may take a week to resolve.
- The scalp tenderness at the site of impact usually clears in 3 days.

9. **Tetanus Shot for Cuts or Scrapes:**

- A tetanus shot (booster) may be needed for cuts and other open wounds.
- Check your vaccine records to see when your child got the last one.
- **For Dirty Cuts:** If last tetanus shot was given over 5 years ago, your child needs a booster within 3 days.
- **For Clean Cuts and Scrapes:** If last tetanus shot was given over 10 years ago, your child needs a booster within 3 days.
- See your child's doctor for a booster during regular office hours. It's safe to give it within 3 days or less.

10. **Call Back If:**

- Pain or crying becomes severe
- Vomiting occurs 2 or more times
- Your child becomes difficult to awaken or confused
- Walking or talking becomes difficult
- Headache lasts more than 24 hours
- Scalp tenderness lasts more than 3 days
- Your child becomes worse

FIRST AID

First Aid Advice for Spinal Cord Injury: Do not move child until EMS has arrived and assessed the child.

First Aid Advice for Bleeding: Apply direct pressure to the entire wound with a clean cloth.

First Aid Advice for Shock: Lie down with the feet elevated.

First Aid Advice for Penetrating Object: If penetrating object still in place, don't remove it (Reason: removal could increase internal bleeding).

BACKGROUND INFORMATION

Matching Pediatric Handouts for Callers

Printed home care advice instructions for patients have been written for this guideline. If your software contains them, they can be sent to the caller at the end of your call. Here are the names of the pediatric handouts that relate to this topic:

- Head Injury
- Acetaminophen (Tylenol) Dosage Table - Children
- Ibuprofen (Advil, Motrin) Dosage Table - Children

Types of Head Injuries

- **Scalp Injury:** Most head injuries only damage the scalp (a cut, scrape, bruise or swelling). It is common for children to fall and hit their head at some point while growing up. This is especially common when a child is learning to walk. Big lumps (bruises) can occur with minor injuries because there is a large blood supply to the scalp. For the same reason small cuts on the head may bleed a lot. Bruises on the forehead sometimes cause black eyes 1 to 3 days later because the blood spreads downward by gravity.
- **Skull Fracture:** Only 1% to 2% of children with head injuries will get a skull fracture. Usually there are no other symptoms except for a headache at the site where the head was hit. Most skull fractures occur without any injury to the brain and they heal easily. (Exception: skull fractures in children younger than 12 months have a higher risk of intracranial injury).
- **Concussion:** A concussion is an injury to the brain that changes how the brain normally works. It is usually caused by a sudden blow or jolt to the head that causes it to shake. Many children bump or hit their heads without causing a concussion. Obvious signs of a concussion are a brief period of confusion or memory loss following the injury. Other signs of a concussion can include a headache, vomiting, dizziness, acting dazed, or being knocked out. A person does NOT need to be knocked out (lose consciousness) to have had a concussion. Following a concussion, some children have ongoing symptoms such as headaches, dizziness, thinking difficulties, school problems or emotional changes for several days to weeks.
- **Brain Trauma:** Defined here as potential structural damage to the brain. Recognized by the presence of the following Acute Neurological Symptoms: (1) Difficult to awaken or keep awake, OR (2) confused thinking and talking, OR (3) slurred speech, OR (4) weakness of arms or legs, OR (5) unsteady walking. These Acute Neurologic Symptoms require an EMS (911) disposition. EXCEPTION: The following acute symptoms do not require an EMS (911) response: Headache, dizziness, vomiting or blurred vision as an isolated symptom.

Pain Severity Scale

- **Mild:** doesn't interfere with normal activities
- **Moderate:** interferes with normal activities or awakens from sleep
- **Severe:** excruciating pain, unable to do any normal activities, incapacitated by pain
- **Assessment of Pain Severity:** Base it on the child's current behavior. Ask: "What does the pain keep your child from doing?" Do not ask: "Is the pain Mild, Moderate or Severe?" Reason: Many parents and teens will choose "Severe".

U.S. Rule for Predicting Serious Head Injuries (Kuppermann 2009)

This study analyzed 42,412 patients younger than 18 years presenting to the emergency department within 24 hours of head injury. Data was obtained across 22 hospitals within the Pediatric Emergency Care Applied Research Network in the U.S. All of the identified risk factors are included in the Head Trauma protocol. Results: The study identified the following risk factors for intracranial complications. If all of the risk factors are absent, the negative predictive value is 100% for clinically-important traumatic brain injury (ciTBI). Approximately 4% of children with altered mental status or evidence of skull fracture will have ciTBI.

History

- Presence of altered mental status (e.g., agitation, sleepiness, slow responsiveness, repetitive questioning)
- Loss of consciousness over 5 seconds
- Severe headache
- Any vomiting
- Parental report of abnormal behavior

Examination

- Scalp hematoma other than frontal (for children under 2 years)
- Signs of basilar skull fracture

Mechanism (Severe injury mechanism)

- MVC with ejection from motor vehicle, death of other passenger, rollover
- Pedestrian or unhelmeted bicyclist struck by motor vehicle
- Fall over 5 feet if 2 years or older
- Fall over 3 feet if under 2 years
- Struck by high-impact object (e.g., golf club or baseball bat)

Falls and Dangerous Heights

- Premise: The greater the height of the fall, the more severe the potential injury. Most injuries are seen with falls from heights greater than 5 feet. Mortality rates increase with falls from heights greater than 15 feet (Judy, Pediatrics in Review 2011).
- Children younger than 3 years of age are less likely to have serious injuries from falls. Reasons: lower weight (body mass) and more fat and cartilage to dissipate energy. (Judy 2011).
- Falls: Ground-level falls or running into a stationary object are not considered to be high risk.
- Free-falls from a great height are considered high risk. A US study (Kuppermann 2009) defined these heights as over 3 feet for age under 2 years, and over 5 feet for age over 2 years. The UK study defined the height as twice the child's height or over 10 feet for school-age children.
- This guideline uses the more conservative cutoffs (3 and 5 feet).
- Practical implication: Countertops are usually 3 feet. Washers and dryers, shopping carts and from parent's arms are usually over 3 feet. Tables and desks are usually 2 ½ feet. Highchair seats are usually 2 feet.
- Falls down stairways: Since most children roll down the stairs, these accidents are not equivalent to free falls. Nurse judgment is required in these cases. We are most concerned about pre-verbal children younger than 2 years. A parent carrying an infant down the stairs who either drops the child or falls on the child are also high-risk and should be sent in. If a child is in a walker at the time, the risk for a serious injury is greatly increased. Children over age 2 can usually be triaged on the basis of symptoms. A steep concrete stairway is dangerous at any age. So is a free fall that doesn't include rolling or tumbling.
- Sports that involve height: Dangerous sports for severe neck injuries include trampolines, cheerleading stunts and diving.

Acute Concussion - Symptoms (adapted from McCrory 2009 and Gedeit 2001)

- Loss of consciousness (LOC): only 10% of concussions have LOC. LOC prolonged over 1 minute suggests a more serious injury.
- Amnesia for the event, retrograde amnesia or memory deficit. With a concussion, it's more common to temporarily lose post-traumatic (anterograde memory) than pre-traumatic memory (retrograde memory). This means the inability to store new information and create new memories. It's manifested by repeatedly asking the same question and then forgetting what they were told. This can last minutes to hours. It's often the hallmark of a concussion. Longer duration of amnesia is more serious.
- Vacant stare, blank look or visual abnormalities
- Altered mental status (e.g., confusion or feeling like "in a fog")
- Slurred speech
- Inappropriate or exaggerated emotions (emotional lability)
- Dizziness or incoordination
- Headache
- Nausea or vomiting
- Cognitive impairment (e.g., slow reaction times)
- Drowsiness or other sleep disturbances

Concussion Treatment

- Treating a concussion requires both Physical Rest and Brain Rest. If symptoms occur (such as headache), the child needs to do less. In 24 hours, they can try again to do the next level.

- Brain rest means a gradual return to full studying and school attendance.
- Physical rest means a gradual return to normal activity, work and gym class.
- Athletes involved in sports need to have a stepwise plan for "return to play". Progressing through stages should be supervised by a doctor or athletic trainer.

Pain Medicine and Head Injuries

- Post-traumatic headache and scalp pain is a symptom following many head injuries.
- This protocol recommends treating it with acetaminophen or ibuprofen.
- While ibuprofen produces some platelet dysfunction and a small increased risk of bleeding that lasts up to 6 hours, no one in the ED at our Children's Hospital restricts the use of ibuprofen for minor head injury. (Exception: high risk patient with major head injury or underlying bleeding disorder who are referred in).
- Aspirin is never recommended following head trauma. Aspirin produces platelet dysfunction and increased risk of bleeding that lasts for several days. (Note: also not recommended in children and teens because of increased risk of Reye syndrome)
- Vomiting: Since vomiting after a head injury is a possible marker for intracranial injury, all medicines are avoided during the first 2 hours post-injury.
- There is no medication that makes a concussion get better faster.
- Pain medication may be taken for any headache for the first few days following the concussion, but may be limited in its efficacy. Use of pain medications for headaches beyond 72 hours should be under the direction of the primary care physician after a follow up evaluation is performed. Medication overuse headaches can be caused by taking pain medicine more than 3 days per week. (Walter, 2016; Halstead, 2010)

Black Eye(s), (Raccoon Eyes) Following Head Trauma

- Black eye(s) after a head injury can be a clue to a basilar skull fracture or orbital fracture.
- The cause of bilateral black eyes often can be determined by the timing of their onset.
- Bilateral black eyes are sometimes called raccoon eyes.
- **Forehead hematomas** cause most of them. Minor falls in young children can cause large forehead bruises. The black eye(s) appear within a day or so after the initial minor injury. Mechanism is the seepage of blood downward through the tissue planes with the help of gravity.
- **Basilar skull fracture** is occasionally the cause. A fracture of the frontal part of the base of skull can cause blood to seep anteriorly into the orbits. The black eye(s) usually appear 1-3 days after the initial major injury.
- Basilar skull fractures usually only follow major head trauma (multilevel fall, unhelmeted crash, etc). Acute neurological findings (e.g., altered mental status) are usually present.

Second Impact Syndrome (SIS)

- Definition: An athlete who is recovering from a concussion, returns to play before they are fully healed and then goes on to sustain a second head injury.
- Diffuse cerebral swelling can occur, causing brain herniation and sometimes death.
- While there is argument over incidence of SIS, authors agree that the syndrome is rare.
- The best way to prevent SIS is to prevent repeat head trauma while the brain is not fully recovered.

Expert Reviewers

- Children's Hospital of Philadelphia (CHOP) Concussion Management committee. See *Pediatr Emerg Care* 2016;32: 149-153 for details of their study.
- Joseph A Grubenhoff MD, Pediatric Emergency Medicine, Medical Director, Diagnostic Safety Program, Children's Hospital Colorado, Aurora, Colorado.
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