Head Injury

Schmitt-Thompson Clinical Content

DEFINITION

• Injuries to the head including scalp, skull and brain trauma

PAIN SEVERITY is defined as:

• **MILD (1-3):** doesn't interfere with normal activities
• **MODERATE (4-7):** interferes with some normal activities or awakens from sleep
• **SEVERE (8-10):** excruciating pain, can't do any normal activities with injured part
• **Assessment of Pain Severity:** Base it on the child's current behavior and function. 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". For teens, asking them to rate the pain from 1 to 10 may be a quick screening question.

INITIAL ASSESSMENT QUESTIONS

1. MECHANISM: "How did the injury happen?" For falls, ask: "What height did he fall from?" and "What surface did he 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 he is, who you are, and where he is? What is he 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

[1] Major bleeding (actively dripping or spurting) AND [2] can't be stopped

FIRST AID: apply direct pressure to the entire wound with a clean cloth

CA: 50, 10

[1] Large blood loss AND [2] fainted or too weak to stand

R/O: impending shock
FIRST AID: have child lie down with feet elevated

CA: 50, 10

[1] ACUTE NEURO SYMPTOM AND [2] symptom persists (DEFINITION: difficult to awaken or keep awake OR Altered Mental Status with confused thinking and talking OR slurred speech OR weakness of arms OR unsteady walking)

R/O: cerebral contusion, subdural or epidural hematoma

CA: 50, 10

Seizure (convulsion) for > 1 minute

CA: 50, 10

Knocked unconscious for > 1 minute

CA: 50, 10

[1] Dangerous mechanism of injury (e.g., MVA, diving, fall on trampoline, contact sports, fall > 10 feet, hanging) AND [2] NECK pain or stiffness present now AND [3] began < 1 hour after injury

FIRST AID: protect the neck from movement. Don't move until a neck brace is applied.

CA: 50, 11, 10

Penetrating head injury (eg arrow, dart, pencil)

FIRST AID: do not remove the object before being seen
Reason: could initiate severe bleeding

CA: 50, 10

Sounds like a life-threatening emergency to the triager

CA: 50, 10

See More Appropriate Guideline

[1] Neck injury AND [2] no injury to the head

Go to Guideline: Neck Injury (Pediatric)

[1] Recently examined and diagnosed with a concussion by a healthcare provider AND
[2] questions about concussion symptoms

Go To Guideline: Concussion Follow-up Call (Pediatric)

[1] Vomiting started > 24 hours after head injury AND [2] no other signs of serious head injury

Go to Guideline: Vomiting without Diarrhea (Pediatric)

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

Go to Guideline: Wound Infection Suspected (Pediatric)

Go to ED Now

[1] Neck pain (or shooting pains) OR neck stiffness (not moving neck normally) AND [2] follows any head injury

R/O: cervical spine injury, whiplash injury, muscle strain
FIRST AID: Discuss protecting the neck from movement before driving in

CA: 51, 12, 17, 13, 10

[1] Bleeding AND [2] won't stop after 10 minutes of direct pressure (using correct technique)

R/O: need for sutures

CA: 51, 14, 13, 10

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

R/O: need for sutures

CA: 51, 17, 15, 13, 10

Can't remember what happened (amnesia)

Reason: probably concussion, but needs neuro exam

CA: 51, 17, 13, 10

Altered mental status suspected in young child (awake but not alert, not focused, slow to respond)

R/O: concussion, intracranial bleed

CA: 51, 17, 13, 10

[1] Age 1- 2 years AND [2] swelling > 2 inches (5 cm) in size (Exception: forehead only location of hematoma, no need to see)

R/O: severe injury causing large scalp hematoma

CA: 51, 17, 13, 3, 10

[1] Age < 12 months AND [2] swelling > 1 inch (2.5 cm)

R/O: severe injury causing large scalp hematoma

CA: 51, 17, 13, 3, 10

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

R/O: depressed skull fracture

CA: 51, 17, 13, 10

Dangerous mechanism of injury caused by high speed (e.g., serious MVA), great height (e.g., over 10 feet) or severe blow from hard objects (e.g., golf club)

Reason: increased risk of injury warrants neuro exam

CA: 51, 17, 13, 10

[1] Concerning falls (under 2 y o: over 3 feet; over 2 y o : over 5 feet; OR falls down stairways) AND [2] not acting normal after injury (Exception: crying less than 20 minutes immediately after injury)

CA: 51, 17, 13, 10

Sounds like a serious injury to the triager

CA: 51, 17, 13, 10

Go to ED Now (or PCP triage)

[1] Had ACUTE NEURO SYMPTOM AND [2] now fine (DEFINITION: difficult to awaken OR confused thinking and talking OR slurred speech OR weakness of arms OR unsteady walking)

R/O: concussion causing transient neuro symptom

CA: 52, 17, 13, 10

[1] Seizure for < 1 minute AND [2] now fine

R/O: post-traumatic seizure

CA: 52, 17, 13, 10

[1] Knocked unconscious < 1 minute AND [2] now fine

R/O: concussion

CA: 52, 17, 13, 10

[1] Black eye(s) AND [2] onset within 48 hours of head injury

R/O: basilar skull fracture, orbital fracture

CA: 52, 13, 10

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

Reason: difficult age to assess, consider non-accidental trauma

CA: 52, 17, 13, 10

[1] Age < 24 months AND [2] new onset of fussiness or pain lasts > 20 minutes AND [3] fussy now

Reason: neuro status difficult to assess by phone

CA: 52, 17, 13, 10

[1] SEVERE headache (e.g., crying with pain) AND [2] not improved after 20 minutes of cold pack

R/O: severe injury

CA: 52, 17, 13, 10

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

CA: 52, 17, 13, 10

[1] Vomited 2 or more times AND [2] within 24 hours of injury

CA: 52, 13, 17, 10

[1] Blurred vision by child's report AND [2] persists > 5 minutes

CA: 52, 17, 13, 10

Suspicious history for the injury (especially if not yet crawling)

R/O: child abuse

CA: 52, 17, 13, 10

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

CA: 52, 17, 13, 10

[1] Delayed onset of Neuro Symptom AND [2] begins within 3 days after head injury

CA: 52, 13, 10

Urgent Home Treatment with Follow-Up Call

[1] Concerning falls (under 2 y o: over 3 feet; over 2 y o: over 5 feet; OR falls down stairways) AND [2] acting completely normal now (Exception: if over 2 hours since injury, continue with triage)

CA: 74, 2, 3, 4, 5, 7, 28, 10

See PCP Within 24 Hours

[1] DIRTY minor wound AND [2] 2 or less tetanus shots (such as vaccine refusers)

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

CA: 54, 36, 1, 23, 3, 4, 5, 6, 7, 8, 9, 10

See PCP Within 3 Days

[1] Concussion suspected by triager AND [2] NO Acute Neuro Symptoms

CA: 55, 6, 3, 5, 4, 7, 30, 31, 10

[1] Headache is main symptom AND [2] present > 24 hours (Exception: Only the injured scalp area is tender to touch with no generalized headache)

R/O: possible concussion

CA: 55, 18, 30, 38, 10

[1] Injury happened > 24 hours ago AND [2] child had reason to be seen urgently on day of injury BUT [3] wasn't seen and currently is improved or has no symptoms

CA: 55, 6, 30, 19, 10

[1] Scalp area tenderness is main symptom AND [2] persists > 3 days

R/O: skull fracture

CA: 55, 18, 19, 10

[1] DIRTY cut or scrape AND [2] last tetanus shot > 5 years ago

CA: 55, 21, 1, 23, 3, 4, 5, 6, 7, 8, 9, 10

[1] CLEAN cut or scrape AND [2] last tetanus shot > 10 years ago

CA: 55, 24, 1, 23, 3, 4, 5, 6, 7, 8, 9, 10

Home Care

[1] Asleep at time of call AND [2] acting normal before falling asleep AND [3] minor head injury

CA: 58, 33, 34, 1, 3, 6, 5, 7, 8, 35, 10

Minor head injury (scalp swelling, bruise or tenderness)

CA: 58, 1, 3, 6, 5, 4, 7, 20, 8, 9, 10

ALSO, small cut or scrape present

CA: 58, 22, 23, 24, 37, 10

[1] Low-speed MVA AND [2] child restrained properly AND [3] no signs of injury or pain

CA: 58, 32, 5, 7, 28, 10

[1] Headache is main symptom AND [2] present < 24 hours

CA: 58, 29, 6, 3, 5, 4, 7, 31, 10

[1] Transient pain or crying AND [2] no visible injury

CA: 58, 16, 4, 5, 7, 20, 19, 10

External occipital protuberance, concerns about

CA: 58, 27, 4, 5, 7, 19, 10

[1] Black eye(s) (bruise around the eye) AND [2] onset > 48 hours following a large forehead bruise

CA: 58, 26, 19, 10

CARE ADVICE (CA) -

1. **Reassurance and Education:**
   - 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. **Bleeding - How to Stop**:
   - 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, Swelling or Bruising**:
   - For pain, swelling or bruising, 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, use as needed.
   - Reason: Helps with the pain and helps stop any bleeding. Also, will help prevent big lumps ("goose eggs").
   - 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. Mild headache, mild dizziness and nausea are common.
   - Allow your child to sleep if he wants to, but keep him nearby.
   - After 2 hours, awaken your child. Check that he is alert and knows who you are. Also, check that he can talk and walk normally.

5. **Diet - Start with Clear Fluids:**
   - Offer only clear fluids to drink, in case he vomits.
   - 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.)
   - **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.
   - Caution: Never give aspirin to children and teens. (Reason: always increases risk

7. **Special Precautions For 1 Night:**
   - Mainly, sleep in same room as your child 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. (For infants, check the ability to become fully alert and move both arms and legs normally.)
   - After 24 hours, return to a normal routine.

8. **Expected Course**:
   - Most head trauma 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. **Call Back If**
   - Severe headache or crying persists after 20 minutes of ice pack
   - 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

10. **Care Advice** per Head Injury (Pediatric) guideline.

11. **Protect the Neck:**
   - Protect the neck from any turning or bending.
   - Do not move your child until a neck brace or spine board has been applied.

12. **Try Not to Move Neck**:
   - Encourage your child not to move the neck until seen.

13. **Don't Give Anything By Mouth:**
    - Do not allow any eating or drinking.
    - Also avoid pain medicines until seen. (Reason: condition may need surgery and general anesthesia.)

14. **Bleeding - How to Stop**:
    - Continue direct pressure with a sterile gauze or clean cloth until seen.

15. **Cover the Wound:**
    - Cover with a sterile gauze or cloth until seen.

16. **Reassurance and Education**:
    - If your child is now acting normal and there is no swelling or bruise, the injury sounds like a minor one.
    - Your child should do fine.

17. **Bleeding - How to Stop**:
    - Apply gentle pressure to stop any bleeding.
    - Don't wash this wound before coming in. (Reason: could be an open fracture.)

18. **Pain Medicine**:
    - For pain relief, give acetaminophen every 4 hours **Or** ibuprofen every 6 hours as needed. (See Dosage table.)

19. **Call Back If**
    - Your child becomes worse.

20. **Soft Spot - Concerns About:**
    - The soft spot (fontanel) is present from birth until 12 to 18 months of age.
    - It's covered and protected by a thick layer of fibrous tissue.
    - Injuries near the soft spot do not cause any additional complications.

21. **Tetanus for Dirty Wounds:**
    - A tetanus shot (booster) may be needed for dirty cuts, skin infections or other open wounds.
    - Check your vaccine records to see when your child got the last one. Call your PCP during regular office hours (within 3 days) if unsure.
    - If last tetanus shot was given over 5 years ago, your child needs a booster.
    - See your child's doctor for a booster during regular office hours. It's safe to give it within 3 days or less.

22. **Reassurance and Education**:
    - It sounds like a small cut or scrape that you can treat at home.

23. **Cut or Scrape Treatment:**
    - Wash the wound with soap and water for 5 minutes.
    - For any dirt, wash gently with a wash cloth.
    - For any bleeding, apply direct pressure with a sterile gauze for 10 minutes.
    - Apply an antibiotic ointment (OTC) 3 times per day.
    - For large scrapes or cuts, cover with a Band-Aid. Change daily or if gets wet.

24. **Tetanus for Clean Cuts and 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. Call your PCP during regular office hours (within 3 days) if unsure.
    - If last tetanus shot was given over 10 years ago, your child needs a booster.
    - See your child's doctor for a booster during regular office hours. It's safe to give it within 3 days or less.

25. **Call Back If**
    - Dirt in the wound persists after washing
    - Looks infected (pus, redness)
    - Doesn't heal within 10 days

26. **Reassurance and Education - Black Eyes**:
    - Many bruises occur on the forehead.
    - The blood in these bruises can spread downward with gravity and cause black eyes on 1 or both sides.
    - The black eyes begin about 3 days after the forehead bruise and can last 2 weeks.

27. **Reassurance and Education:**
    - The lump you feel at the base of the skull is a normal bony prominence.
    - If you feel carefully, you will find one on yourself or other children.
    - This is not caused by your child's injury.

28. **Call Back If:**
    - Vomiting occurs
    - Your child develops any symptom
    - Your child starts to act abnormal

29. **Reassurance and Education:**
    - Headache is your child's main symptom.
    - That's common after a bump on the head.
    - If the headache doesn't get worse, your child should do fine.
    - If it lasts more than 24 hours, make an appointment with your child's doctor.
    - In the meantime, avoid any sports or vigorous activities until the headache is gone.
    - Here is some care advice that should help.

30. **Avoid Sports and Strenuous Activities:**
    - Until evaluated, your child should avoid all strenuous activity or sports.
    - Your child should not return to play until the headache and other symptoms are completely gone. The headache must be gone both at rest and during exercise.
    - Until evaluated, your child should avoid any mental or physical activity that makes the symptoms worse.
    - Extra sleep is also helpful.
    - Your doctor will talk to you further about when your child can safely return to these activities.

31. **Call Back If:**
    - Headache 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
    - Your child becomes worse

32. **Reassurance and Education**:
    - It sounds like your child wasn't injured.
    - It's great that you were using a car safety seat.
    - Watching him at home should be safe.

33. **Reassurance About Sleeping:**
    - Many children want to sleep after a bump on the head.
    - This is more common for young children who still take naps.
    - You have told me that your child was acting normal before he/she fell asleep.
    - Have your child sleep where you can watch him.
    - After 2 hours, awaken your child.
    - Check that he is alert and knows who you are. Also, check that he can talk and walk normally.

34. **Triager Option: Nurse Callback**
    - Note to triager: if you are more concerned, tell the parent that you will call them in about 2 hours.
    - Tell the parent to call sooner than that if anything changes.
    - If you are worried, you can also have them wake the child at the time of the call.

35. **Call Back After You Awaken Your Child if:**
    - Acts confused
    - Can't walk or talk normally
    - Does not act normal in other ways
    - You want your child examined

36. **Tetanus For Dirty Cuts in Underimmunized Children:**
    - Your child hasn't received enough DTaP vaccines to be fully protected from tetanus.
    - In addition to a tetanus vaccine, your child may need another shot of a medicine called Tetanus Immune Globulin or TIG.
    - You may need to go to an ED or UCC versus a regular office to get TIG. Call ahead to find out if TIG is available. If the office will be open tomorrow, call your doctor during morning office hours about the appropriate treatment and site.

37. **Call Back If**:
    - Looks infected (pus, redness)
    - Doesn't heal within 10 days
    - Your child becomes worse

38. **Call Back If:**
    - Headache becomes severe
    - Your child becomes difficult to awaken or confused
    - Walking or talking becomes difficult
    - Your child becomes worse

50. **Call EMS 911 Now**:
    - Your child needs immediate medical attention. You need to hang up and call 911 (or an ambulance).
    - Triager Discretion: I'll call you back in a few minutes to be sure you were able to reach them.

51. **Go To ED Now**:
    - Your child needs to be seen in the Emergency Department immediately.
    - Go to the ED at _____ Hospital.
    - Leave now. Drive carefully.

52. **Go To ED/UCC Now (or PCP Triage):**
    - **If No PCP (Primary Care Provider) Second-Level Triage**: Your child needs to be seen within the next hour. Go to the ED/UCC at _____ Hospital. Leave as soon as you can.
    - **If PCP Second-Level Triage Required**: Your child may need to be seen. Your doctor (or NP/PA) will want to talk with you to decide what's best. I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, go directly to the ED/UCC at _____ Hospital.

    Sources of Care:
    - **Triager Caution**: In selecting the most appropriate care site, you must consider both the severity of the patient's symptoms AND what resources are available at that care site.
    - **ED:** Patients who may need surgery, need hospitalization, sound seriously ill or may be unstable need to be sent to an ED. Likewise, so do most patients with complex medical problems and serious symptoms.
    - **UCC is Open:** Some Urgent Care Centers (UCCs) can manage patients who are stable and have less serious symptoms (e.g., minor illnesses and injuries). The triager must know the UCC capabilities before sending a patient there. If unsure, call ahead.
    - **Office is Open**: If patient sounds stable and not seriously ill, consult PCP (or follow your office policy) to see if patient can be seen NOW in office.

53. **See HCP (or PCP Triage) Within 4 Hours**:

• **If Office Will Be Open:** Your child needs to be seen within the next 3 or 4 hours. Call your doctor's (or NP/PA) office as soon as it opens.

• **If Office Will Be Closed and No PCP (Primary Care Provider) Second-Level Triage:** Your child needs to be seen within the next 3 or 4 hours. A nearby Urgent Care Center (UCC) is often a good source of care. Another choice is to go to the ED. Go sooner if your child becomes worse.

• **If Office Will Be Closed and PCP Second-Level Triage Required:** Your child may need to be seen. Your doctor (or NP/PA) will want to talk with you to decide what's best. I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, call again. **Note:** If on-call provider can't be reached, send to UCC or ED.

Note to Triager:

• Use nurse judgment to select the most appropriate source of care.

• Consider both the urgency of the patient's symptoms AND what resources may be needed to evaluate and manage the patient.

Sources of Care:

• **ED:** Patients who may need surgery or hospital admission need to be sent to an ED. So do most patients with serious symptoms or complex medical problems.

• **UCC:** Some UCCs can manage patients who are stable and have less serious symptoms (e.g., minor illnesses and injuries). The triager must know the UCC capabilities before sending a patient there. If unsure, call ahead.

• **OFFICE:** If patient sounds stable and not seriously ill, consult PCP (or follow your office policy) to see if patient can be seen NOW in office.

54. **See PCP Within 24 Hours:**

• **If Office Will Be Open:** Your child needs to be examined within the next 24 hours. Call your child's doctor (or NP/PA) when the office opens and make an appointment.

• **If Office Will Be Closed:** Your child needs to be examined within the next 24 hours. A clinic or an urgent care center is often a good source of care if your doctor's office is closed or you can't get an appointment.

• **If Patient Has No PCP:** Refer patient to a clinic or urgent care center. Also try to help caller find a PCP (medical home) for future care.

Note to Triager:

• Use nurse judgment to select the most appropriate source of care.

• Consider both the urgency of the patient's symptoms AND what resources may be needed to evaluate and manage the patient.

55. **See PCP Within 3 Days**:

• Your child needs to be examined within 2 or 3 days.

• **PCP Visit:** Call your doctor (or NP/PA) during regular office hours and make an appointment. A clinic or urgent care center are good places to go for care if your doctor's office is closed or you can't get an appointment. **Note:** If office will be open tomorrow, tell caller to call then, not in 3 days.

• **If Patient Has No PCP (Primary Care Provider):** Try to help caller find a PCP for future care (e.g., use a physician referral line). Having a PCP or "medical home" means better long-term care.

56. **See PCP Within 2 Weeks**:
    - Your child needs an evaluation for this ongoing problem within the next 2 weeks.
    - **PCP Visit:** Call your child's doctor (or NP/PA) during regular office hours and make an appointment.
    - **If Patient Has No PCP (Primary Care Provider):** A primary care clinic is where you need to be seen for chronic health problems. **Note:** Try to help caller find a PCP (e.g., use a physician referral line). Having a PCP or 'medical home' means better long-term care.

58. **Home Care**:
    - You should be able to treat this at home.

59. **Call PCP Now**:
    - You need to discuss this with your child's doctor (or NP/PA).
    - I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, call again.

60. **Call PCP Within 24 Hours:**
    - You need to discuss this with your child's doctor (or NP/PA) within the next 24 hours.
    - **If Office Will Be Open**: Call the office when it opens tomorrow morning.
    - **If Office Will Be Closed**: I'll page the on-call provider now. Exception: From 9 pm to 9 am. Since this isn't urgent, we'll hold the page until morning.

61. **Call PCP When Office Is Open**:
    - You need to discuss this with your child's doctor (or NP/PA) within the next few days.
    - Call the office when it is open.

74. **Urgent Home Treatment With Follow-Up Call:**
    - Call-back instructions.

    Call Center Provides RN Call-Backs:
    - Your child will usually improve with the home treatment advice I give you.
    - I'll call you back in 1-2 hours to see how your child is doing.
    - *Call me back immediately if:* Your child becomes worse before my follow-up call.

    Call Center Does Not Provide RN Call-Backs:
    - I'll explain how to treat your child's symptom.
    - After finishing the home treatment, call me back (in 1-2 hours) and tell me how your child is doing.
    - *Go to the ED immediately without calling back if:* Your child **becomes worse or doesn't improve** with treatment.

    RN Response to Follow-Up Call:
    - Evaluate child's response to home treatment.
    - If unchanged or worse, refer to ED Now.
    - If improved or resolved, review remaining triage questions and give care advice.

FIRST AID

First Aid Advice for Spinal Cord Injury: Do not move child until a cervical collar and spine board are applied.

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

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 the brain 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 Acute Neurologic Symptoms: (1) Difficult to awaken OR (2) confused or slow 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.

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

Lacerations: Indications for Suturing

• Any cut that is split open or gaping probably needs sutures.
• Cuts longer than 1/2 inch (12 mm) usually need sutures.
• On the face, cuts longer than 1/4 inch (6 mm) need sutures.
• Any open wound that may need sutures should be evaluated by a physician and closed as soon as possible to get the best results.
• All open wounds, regardless of the time that has passed since the initial injury, need to be treated to prevent wound infection.

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 guideline.

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)

UK Rule for Predicting Serious Head Injuries (Dunning 2006)

A prospective study on 22,772 children with head injuries led to the development of a decision rule to identify children at high risk of intracranial complications. The rule has a sensitivity of 98% and specificity of 87%. The data comes from children seen at 10 hospital emergency departments in England. The following is the study's list of high risk factors. All of them were already included in the Head Trauma guideline as indicators to be seen.

History

- Witnessed loss of consciousness of over 5 seconds duration
- History of amnesia of over 5 minutes duration
- Abnormal drowsiness
- 3 or more vomits after head injury (a vomit is defined as a single discrete episode of vomiting)
- Suspicion of non-accidental injury
- Seizure after head injury in a patient who has no history of epilepsy

Examination

- Glasgow Coma Score (GCS) under 14, or GCS under 15 if under 1 year old
- Suspicion of penetrating or depressed skull injury or tense fontanelle
- Signs of a basilar skull fracture (defined as evidence of blood or cerebrospinal fluid from ear or nose,

panda eyes, Battles sign, hemotympanum, facial crepitus or serious facial injury)
• Positive focal neurology (defined as any focal neurology, including motor, sensory, coordination or reflex abnormality)
• Presence of bruise, swelling or laceration over 5 cm (2 inches) if under 1 year old

Mechanism

• High-speed road traffic accident either as pedestrian, cyclist or occupant (defined as accident with speed over 40 miles per hour)
• Fall of over 3 meters (10 feet) in height
• High-speed injury from a projectile or an object

Falls and Heights: 2010 changes

• 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. Kuppermann's study (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 injuries for severe neck injuries include trampolines, cheerleading stunts and diving.

Falls and Dangerous Heights: 2012 changes

• A 2011 outcome study (Children's Hospital Colorado) found that seeing asymptomatic children who fell over 3 feet (under age 2) and or over 5 feet (over age 2) led to over-referral to the ED.
• After consultation with our ED head trauma expert (Dr. Joe Grubenhoff), the "fall distance" triage question was split into 2 questions. If the child fell from a "dangerous height" and had **any** symptoms, they are referred in now. If the child was asymptomatic at the time of the first call, they are observed at home with a nurse-initiated call-back in 1 hour to recheck the child's status.
• Reason: 42 asymptomatic patients sent in because of a positive response to "dangerous mechanism of injury"; the majority of calls met the cutoff for "dangerous fall height". The most common falls were down stairs or from a highchair.
• Results: 11 (26%) didn't go in to the recommended site (presumed parental non-compliance based on review of EMR), 18 (43%) had normal neurological exam and were discharged, 12 (28%) were observed for 1-5 hours, and 1 (2%) who had a dresser and TV fall on the child needed an imaging study.

Preverbal Child: How to Determine Location of Injury

• This question comes up with falls or other un-witnessed injuries. It also comes up after MVAs where

the young child has no signs of injury and is not crying or acting like he has any pain.
• Young children cannot tell us where they hurt. We are dependent on the person who is with the child to tell us what they think "hurts".
• The triage nurse mainly needs to focus on behavior and motor function. Most sites of injury can be suspected if the child can't move his arm, leg or neck normally. Good questions ask about walking, crawling, reaching for objects, etc. ("Can he move his arms and legs normally?") Also, the nurse needs to be concerned if the child is acting different than normal. Ask, "In what way is your child acting differently?"
• If there is no apparent site of injury, the child may not have sustained any injury. Usually with these cases, the nurse should use the Head Injury guideline. Reason: The head is the heaviest part of a young baby or toddler.
• If the child is too irritable or fussy for the caller to test movement or tell what hurts, the child usually needs to be referred in on the basis of prolonged crying. It's usually from severe pain.

Sleep after a Minor Head Injury

• Many children want to sleep after a bump on the head.
• This is more common for young children who still take naps, but can occur at any age.
• If the child passes triage and was acting normal before he/she fell asleep, sleeping can be considered normal.
• If the parent tries to awaken the child during normal deep sleep (the first 60 minutes or so), it may be difficult. The child may act confused for 5 minutes until they are fully awake.
• Therefore, if they are sleeping quietly, let them sleep for a complete sleep cycle: 90-120 minutes.
• Then, awaken them and check them for alertness and motor function.

Vomiting as Marker For Intracranial Injury

Delayed vomiting beginning more than an hour after the head injury always needs to be evaluated. Vomiting once or twice within minutes of the injury is much more common and usually not medically important. Vomiting occurs in 14 to 19% of children sent to an ED for evaluation of head trauma. Two recent studies looked at the predictive value of vomiting for intracranial injury (ICI) documented by CT scan. Palchak (2003) found an 11.4% incidence of ICI and a 2.3 relative risk with vomiting. Haydel (2003) found a 2.46 relative risk. Based on these 2 studies, in 2004 this triage guideline now refers in any child who has vomiting 2 or more times following a head injury. (Note: neither pediatric study addressed how many times the child had vomited. Author's observation: Vomiting once is often associated with the initial hard crying and pain). An excellent editorial by Greenes (2003) raises questions about the specificity and cost-effectiveness of some soft indications for CT. However, having these patients evaluated neurologically is a safe step.

Fluid Drainage From Nose: Rarely CSF

• Spinal fluid leakage from the nose or ear may be seen with basilar skull fractures. Basilar skull fractures are a rare type of head injury in children.
• Symptom: Watery or blood-tinged fluid dripping from nose or ear can be a symptom, but not the only symptom.
• Confirmation: must be present when child is not crying. Almost always, clear nasal drainage is from tears (or a recent viral URI). Clear ear canal drainage is also usually tears that have collected there while the child was lying down.
• Even if the drainage is CSF, it’s not an emergency, so consider calling the parent back in 30 minutes for an update.
• Basilar skull fracture: fracture of the base of the skull. Usually only follows major head trauma. Acute neurological findings (e.g., altered mental status) are usually present. Diagnosis of basilar skull fracture: Mainly a clinical diagnosis. Usually not seen on skull films, but detected on helical CTs.
• Risk: If basilar skull fracture connects to nose or sinus, very small risk of meningitis until tear in dura membrane heals.
• Treatment: Close follow-up. Prophylactic antibiotics are not helpful.

Black Eye(s) 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 can often 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 2 to 3 days after the initial minor forehead 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 within 6 to 12 hours of the initial injury, but can occur later. Often, there is no associated forehead bruise.
- Basilar skull fractures usually only follow major head trauma. Acute neurological findings (e.g., altered mental status) are usually present.

Acute Concussion - Symptoms (adapted from McCrory 2013 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

- Definition: The rapid onset of a temporary impairment in neurological function following head trauma.
- Mechanism: The acute concussion symptoms largely reflect a functional disturbance in brain activity rather than structural injury to the brain.
- Symptoms: Headache, nausea, and feeling irritable and sleepy are common, especially during the first couple days after a concussion. Other symptoms of a concussion include amnesia (can't remember what happened), dizziness, difficulty concentrating or "foggy" feeling, poor memory, feeling dazed, and decreased coordination.
- Diagnosis: The diagnosis is made by a doctor based upon the clinical examination of the injured person. The CT scan of a patient with a concussion (without any other brain injuries) is normal and the study is usually not needed.
- Caution: All children with a concussion need a neurological exam.
- Prognosis: In most children (80 to 90%), concussion symptoms resolve in 2-4 weeks. The recovery time frame may be longer in younger children. Some children may experience prolonged symptoms, usually less than 10%. These symptoms include poor school performance, difficulty concentrating, and personality changes. If symptoms last longer than 4 weeks, it is recommended to see your primary care provider for further recommendations.
- "Second impact injury": A rare complication where a second head injury occurs while the first is still recovering. This can lead to a significantly more severe brain injury, including death.
- Return to Sports: No child athlete who sustains a concussion should be returned to play on that

same day.

External Occipital Protuberance (EOP): Confusion with Hematomas

The EOP is a normal bony prominence found at the base of the skull (located at the lower midline of the occipital bone.) It is bony and feels like a hard knot. Its size can vary greatly. Following a fall or other head trauma, some callers (who have never felt it before) attribute it to the fall. The triager's job is to avoid calling any lump at this site a hematoma. Usually additional questioning will pinpoint the classic site, that it feels like bone and that's it's non-tender. Many callers are reassured by being told how to feel their own EOP.

Pupil Size and Head Injuries: Telephone Assessment Not Warranted

- Pupil size assessment was purposely excluded from this guideline for the following reasons:
- Normal variant: Unequal pupils are a normal finding in 10% of the population. (physiologic anisocoria). The difference can be so slight (usually 1 mm), that many parents don't notice it until they are asked to compare pupils following a head injury. Looking at a previous photo often confirms this diagnosis.
- Pupil size is difficult and time-consuming for most parents to assess, especially in young children or ones who are crying.
- Brain stem herniation: Although a unilateral dilated pupil can be a sign of an intracranial hematoma and impending brain stem herniation, it is always a late sign and it's never the only sign. (Altered mental status and severe headache are also present)
- Local eye trauma: Blunt trauma to one eye can cause a unilateral dilated pupil (traumatic mydriasis). Associated symptoms are eye redness and pain.
- Equal large pupils are common following any injury, because crying and pain release epinephrine which in turns dilates the pupils.

Air Bag Deployment

- Air bags inflate within 50 milliseconds of impact and at a speed of 100 miles per hour.
- The gas produced to inflate the airbag is completely harmless.
- It's mainly nitrogen.
- The chemical (sodium azide) that's used to produce the gas is poisonous; however, there's none of it in the gas.
- CDC reports no poisoning from airbag deployment. (2009)
- Front seating is not recommended until 13 years of age or older.
- Airbag injuries are mainly minor abrasions or burns. (**Exception:** in younger children who are inappropriately placed in front seat)

Pain Medicine and Head Injuries

- Post-traumatic headache and scalp pain is a symptom following many head injuries.
- This guideline 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)

Neurogenic Fevers

- Definition: fever caused by damage to temperature-regulating center in the brain
- Frequency: very rare
- Cause: severe brain damage
- Lesson: fevers that occur soon after a minor to moderate head injury are not due to the injury. They tell us the child is coming down with a new infection, such as a URI.

Caution: Associated Neck Trauma

- Neck trauma should also be considered in all patients with a head injury. Concerning findings include: numbness, weakness, and neck pain.
- After using the Head Injury guideline, if the triager or caller has remaining concerns about neck trauma, then the patient also should be triaged using the Neck Injury guideline.

Tetanus Booster - Clean versus Dirty Wounds

- **Clean Cuts and Scrapes - Tetanus Booster Needed Every 10 Years:** Patients with clean minor wounds AND who have previously had 3 or more tetanus shots (full series) need a booster every 10 years. Examples of minor wounds include a superficial knee abrasion, a small cut from a clean knife blade, or a glass cut sustained while washing dishes. All wounds need wound care and cleaning right away. If more than 10 years since last tetanus shot, a tetanus booster (Td or Tdap) should be given within 72 hours.
- **Dirty Minor Wounds - Tetanus Booster Needed Every 5 Years:** Patients with dirty wounds need a booster every 5 years. Examples of dirty wounds include any cut contaminated with soil, feces, saliva and more serious wounds from deep punctures, crushing, and 2nd or 3rd degree burns or frostbite. All wounds need to be cleaned right away. Some dirty wounds need immediate care in a doctor's office, urgent care, or emergency department. Many can be cared for at home. A tetanus booster (Td or Tdap) should be given at the time of wound care, and definitely within 72 hours. Exception: Because of the higher risk of tetanus with puncture wounds, animal bites and wound infections, they will continue to be referred for tetanus shots within 24 hours.
- **Contaminated Major Wounds** (e.g., crush injuries, amputations, avulsions, gaping cuts, large burns, or any other wound that needs debridement or irrigation) are all referred in immediately for wound care. For these patients, if a tetanus booster is required, it will be given on the day of the injury. Persons with major or dirty wounds who have not received a full tetanus vaccination series (3 doses) also may need tetanus immune globulin (TIG) when they get the tetanus booster (Td or Tdap).
- **Timeline for Tetanus Booster:** The AAP Red Book supports the 5 year dirty wound and 10 year clean wound indicators for a tetanus booster. However, the AAP or CDC do not provide a timeline for how soon these need to be given following the injury that causes the wound. Therefore, to prevent unnecessary ED visits, callers are instructed to schedule tetanus boosters as soon as the PCP office is open (with 3 days as an outer limit) for minor cuts and scrapes. The safety of this timeline is supported by the fact that serious injuries are referred to the ED immediately. Also the average incubation period for tetanus is 8 days. While tetanus is common in undeveloped countries, it is a rare disease in the US with less than 40 cases per year, mainly in the elderly or the unvaccinated.

Expert Reviewers

- Children's Hospital of Philadelphia (CHOP) Concussion Management committee. See Pediatr Emer 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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SEARCH WORDS

AMNESIA
AUTO ACCIDENT
BLACK EYES
BRAIN
BRAIN TRAUMA
BRIEF LOSS OF CONSCIOUSNESS
CAR ACCIDENT
CNS
CONCUSSION
DIFFICULT TO AWAKEN
DING
EPIDURAL HEMATOMA
FALLS
GOOSE EGG
GRAZE
HEAD
HEAD INJURIES
HEAD INJURY
HEAD PAIN
HEAD TRAUMA
HEADACHE
INJURIES
INJURY
KNOT
LOC
LOSS OF CONSCIOUSNESS
MOTOR VEHICLE ACCIDENT
MVA
NECK PAIN
NEURO
RACCOON EYES
SCALP
SCALP BLEEDING
SCALP HEMATOMA

SCALP INJURY
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