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Basilar Skull *Fracture*

A fracture at the base of the skull involving the temporal, occipital, sphenoid, or ethmoid bones — a high-risk traumatic head injury with classic clinical signs and critical "do-not" nursing actions.

NEUROLOGICAL

TRAUMA

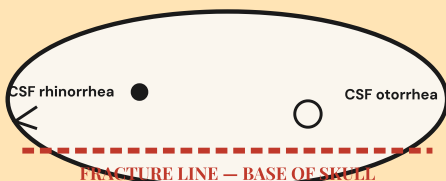
HIGH-ACUITY

ADULT HEALTH

1 Definition & Overview

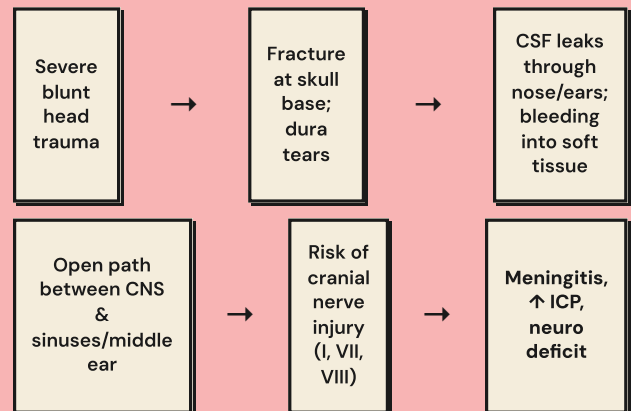
WHAT IT IS & WHY IT MATTERS

- ◆ A **linear fracture at the base (floor) of the cranial vault** — most often involving the temporal, occipital, sphenoid, or ethmoid bones.
- ◆ Results from **severe blunt-force trauma**: MVAs, falls from height, assault, sports injuries, blasts.
- ◆ Dangerous because of proximity to the **brainstem, cranial nerves, dural sinuses, and major vessels**; dura is often torn — creating a direct route from the outside world into the CNS.
- ◆ High mortality and risk of **meningitis, CSF leak, cranial nerve deficits, and intracranial hemorrhage**.



2 Pathophysiology

STEP-BY-STEP MECHANISM



WHY CSF LEAK MATTERS

A torn dura = bacteria from the nose, sinuses, and middle ear can travel directly to the brain. Meningitis can develop within hours to days.

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Signs & Symptoms

CLASSIC HALLMARK FINDINGS — KNOW THESE COLD

EARLY (MINUTES–HOURS)

- ◆ **CSF rhinorrhea** — clear fluid from the nose
- ◆ **CSF otorrhea** — clear fluid from the ear
- ◆ **Hemotympanum** — blood behind tympanic membrane
- ◆ Headache, nausea, vomiting
- ◆ Altered LOC; confusion; restlessness
- ◆ Possible cranial nerve deficits (loss of smell, facial weakness, hearing loss, vertigo)

LATE / DELAYED (HOURS–DAYS)

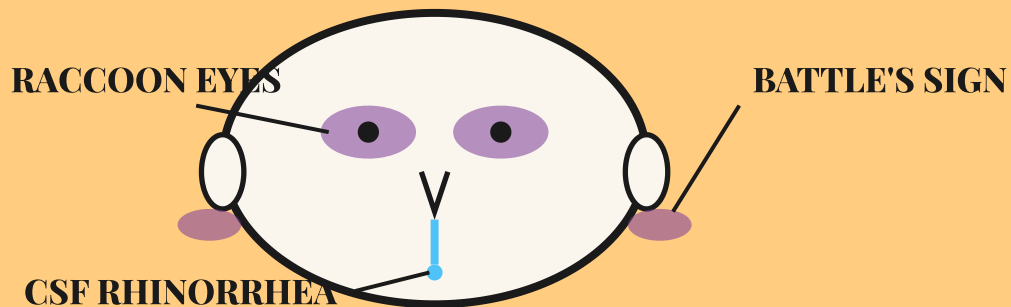
- ◆ **Battle's sign** — bruising over the mastoid process (behind the ear)
- ◆ **Raccoon eyes** — periorbital ecchymosis (both eyes)
- ◆ Worsening headache, vomiting
- ◆ Pupillary changes; Cushing's triad (↑ BP, ↓ HR, irregular respirations)
- ◆ Decorticate / decerebrate posturing
- ◆ Signs of meningitis (nuchal rigidity, fever, photophobia)

HALO / RING SIGN TEST

- ◆ Place suspicious drainage on a piece of **white gauze or filter paper**.
- ◆ If CSF is present, blood collects in the center and a **clear yellow halo** spreads outward.
- ◆ Confirm with **glucose test strip** — CSF is positive for glucose; mucus is not.

RED FLAG TRIAD

- ◆ **Raccoon eyes + Battle's sign + CSF leak** = classic basilar skull fracture.
- ◆ Battle's sign and raccoon eyes may take **several hours to appear** — absence early on does not rule out the fracture.
- ◆ Any clear nasal/ear drainage after head trauma is CSF until proven otherwise.



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Priority Nursing Interventions

ABCS + SAFETY + NCLEX PRIORITIZATION

A AIRWAY, BREATHING, CIRCULATION

- ◆ **Maintain patent airway** — manual jaw-thrust (not head-tilt) until C-spine cleared.
- ◆ Administer humidified oxygen; monitor SpO₂.
- ◆ Monitor for Cushing's triad (↑ BP, ↓ HR, irregular respirations).
- ◆ Establish IV access; monitor for shock.

NEURO & ICP MANAGEMENT

- ◆ **Assess GCS** and pupils every 1–2 hours.
- ◆ Elevate **HOB to 30°** (if C-spine cleared) to promote venous drainage.
- ◆ Keep head and neck **midline** — avoid hip flexion.
- ◆ Minimize stimulation; cluster nursing care.
- ◆ Seizure precautions (padded rails, suction at bedside).

THE CRITICAL "DO NOTS"

- ◆ **NEVER insert an NG tube** — risk of passing through fracture into the brain. Use **orogastric (OG)** instead.
- ◆ **NEVER suction through the nose** — use the mouth only.
- ◆ **Do NOT pack the ears or nose** — allows free CSF flow; packing traps bacteria.
- ◆ **Do NOT give the patient anything by mouth** until LOC and gag reflex are confirmed.
- ◆ Avoid Valsalva — no bearing down, coughing, sneezing with closed mouth.

CSF LEAK MANAGEMENT

- ◆ Place **loose sterile gauze/drip pad** under the nose or ear — change when saturated; document amount and character.
- ◆ **Test drainage** for the halo sign and glucose.
- ◆ Instruct: no nose blowing, sneeze with mouth open, no straining.
- ◆ Monitor for signs of **meningitis** daily (fever, nuchal rigidity, photophobia).
- ◆ Most CSF leaks resolve spontaneously within 7–10 days; surgical repair if persistent.

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Pharmacology

SUPPORTIVE MEDICATION MANAGEMENT

DRUG / CLASS	MECHANISM (SIMPLE)	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Phenytoin / Levetiracetam (<i>Anticonvulsants</i>)	Prevent post-traumatic seizures	Gingival hyperplasia (phenytoin), drowsiness, rash (Stevens-Johnson)	Monitor phenytoin levels (10–20 mcg/mL); never mix phenytoin with dextrose; check oral hygiene.
Mannitol (<i>Osmotic diuretic</i>)	Pulls fluid out of brain → ↓ ICP	Dehydration, electrolyte imbalance, rebound ICP	Use a filter needle (crystals form); monitor I&O, serum osmolality, BP.
Acetaminophen	Pain/fever control without bleeding risk	Hepatotoxicity at high doses	Preferred over NSAIDs/aspirin (bleeding risk); avoid masking neuro changes — use sparingly.
Stool softeners (<i>Docusate</i>)	Prevent straining/Valsalva → ↑ ICP	Mild GI cramping	Encourage fluids; assess bowel function daily.
Antiemetics (<i>Ondansetron</i>)	Prevent vomiting → ↑ ICP	Headache, QT prolongation	Monitor ECG with high-risk patients; avoid promethazine (sedation masks neuro signs).
Tetanus prophylaxis	Prevents tetanus when open fracture	Local reaction, low-grade fever	Confirm last booster; administer if open injury and > 5 years since last dose.



AVOID IN HEAD INJURY

Avoid

OPIOIDS

(mask LOC),

NSAIDS/ASPIRIN

(bleeding risk), and

SEDATING ANTIEMETICS

like promethazine.

PROPHYLACTIC ANTIBIOTICS ARE NOT ROUTINELY GIVEN

for CSF leak per current evidence — but treat infection aggressively if it develops.

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NCLEX Test Traps

COMMON WRONG-ANSWER PULLS

✗ WRONG

Insert an NG tube to decompress the stomach.

✓ RIGHT

Use an **orogastric (OG) tube**. NG tubes can pass through the fracture into the cranial vault.

✗ WRONG

Pack the ears or nose with sterile gauze to stop CSF drainage.

✓ RIGHT

Place a **loose drip pad** only — never pack. Packing increases ICP and traps bacteria.

✗ WRONG

Suction the nasopharynx if secretions accumulate.

✓ RIGHT

Suction the **mouth (orally) only**. Nasal suctioning risks brain injury and introduces infection.

✗ WRONG

Lay the patient flat to prevent shock.

✓ RIGHT

Elevate HOB to **30°** (after C-spine cleared) to reduce ICP. Treat shock with fluids/pressors as ordered.

✗ WRONG

Reassure the patient because Battle's sign is absent — they don't have a basilar fracture.

✓ RIGHT

Battle's sign and raccoon eyes **may take hours to develop**. Continue full neuro monitoring.

✗ WRONG

Administer aspirin for the patient's headache.

✓ RIGHT

Use **acetaminophen** only. NSAIDs and aspirin increase bleeding risk in head trauma.

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Patient & Family Education

DISCHARGE & HOME CARE

- ◆ **Do NOT blow your nose** for several weeks — pressure can force air or bacteria into the cranial vault.
- ◆ **Sneeze with your mouth open** and avoid bearing down or straining.
- ◆ Report immediately: **clear drainage from the nose or ear**, worsening headache, vision changes, neck stiffness, fever, confusion, or new weakness.
- ◆ Avoid contact sports, heavy lifting, and air travel until cleared by the provider.
- ◆ Use stool softeners to prevent straining; maintain hydration.
- ◆ Recognize signs of meningitis: **stiff neck, fever, photophobia** — seek emergency care.
- ◆ Avoid alcohol, aspirin, and NSAIDs as directed.
- ◆ Attend all follow-up imaging and neuro exams.

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Memory Boosters

MNEMONICS & QUICK ASSOCIATIONS

"BASE" — Basilar Skull Fracture Hallmarks

Battle's sign (mastoid bruising)

Avoid NG tubes — use OG

Suction the mouth, not the nose

Ecchymosis (Raccoon eyes)

"HALO" — Test the Drainage

Hold gauze under the drainage · **A** ring forms? · Look for clear/yellow rim around blood center · Obtain a glucose strip (CSF = + for glucose)

Quick Associations

- ◆ **Raccoon Eyes** = anterior fossa (cribriform plate of ethmoid bone)
- ◆ **Battle's Sign** = posterior fossa (temporal bone)
- ◆ **CSF Rhinorrhea** = anterior fracture (cribriform plate)
- ◆ **CSF Otorrhea** = middle / posterior fossa
- ◆ **Halo Sign** = CSF mixed with blood on gauze

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NCJMM Clinical Judgment Scenario

NEXT GENERATION CLINICAL JUDGMENT MEASUREMENT MODEL — FULL 6-STEP WALKTHROUGH

THE SCENARIO

A 28-year-old male is brought to the ED after being thrown from his motorcycle. He was not wearing a helmet. On arrival: GCS 13 (E3, V4, M6); HR 58; BP 158/72; RR 14, irregular. Clear fluid is draining from the right nare and right ear. Periorbital bruising is beginning to appear bilaterally. He complains of severe headache and nausea.

1 RECOGNIZE CUES

Clear nasal/ear drainage, bilateral periorbital ecchymosis, GCS 13, HR 58 with BP 158/72 (early Cushing's triad), irregular RR, severe headache, mechanism of injury (high-impact MVA, no helmet).

2 ANALYZE CUES

The clear drainage + raccoon eyes + mechanism strongly suggest **basilar skull fracture with CSF leak**. Bradycardia + widening pulse pressure + irregular RR = early **Cushing's triad** → **rising ICP**. GCS is declining.

3 PRIORITIZE HYPOTHESES

#1 Rising ICP (most life-threatening). **#2 CSF leak with meningitis risk.** **#3 Possible cervical-spine injury** (always assumed until cleared). Lower priority: pain, nausea.

4 GENERATE SOLUTIONS

Maintain spinal precautions, elevate HOB 30° once cleared, frequent neuro/GCS checks, place drip pads (no packing), prepare for CT head, anticipate mannitol/anticonvulsants, OG tube if decompression needed, monitor for meningitis daily.

5 TAKE ACTION

Apply O₂, ensure IV access, perform halo test on drainage, place loose sterile pads under nose/ear, hold all PO intake, notify provider STAT of declining GCS and Cushing's signs, prepare for emergent CT.

6 EVALUATE OUTCOMES

Effective: stable or rising GCS, normalizing vitals, controlled headache, no new neuro deficit, no meningitis signs. Ineffective: ↓ GCS, fixed pupils, posturing, fever — escalate immediately; prepare for ICU and possible surgical intervention.