

Traction

Contrast skeletal versus skin traction

- Skeletal traction: uses pins, wires, or screws to treat fractures of femur or when great force needs to be applied to the affected area
 - **SKELETAL = BEST FOR BONE ALIGNMENT**
 - Continuous traction
 - immobilize, position, and align a fractured femur, tibia or cervical spine
 - Greater wt (11 - 18kg)
 - Passes a metal pin or wire through the bone under local anesthesia, avoiding nerves, blood vessels, muscles, tendons, and joints
 - Applied using ropes and weights attached to the end of the pin
 - Surgeon applies traction using surgical asepsis
- Skin traction: uses tape or wraps; sometimes uses weights for resistance as prescribed
 - Short term
 - Stabilize fractured leg, control muscle spasms, immobilize area before surgery
 - Applied by weights attached to pt w/ Velcro, tape, straps, boots, or cuffs
 - Wt applied mustn't exceed tolerance of the skin
 - No more than 2 - 3.5 kg used on an extremity
 - Pelvic: 2.5 - 9kg

Buck's, chin halter strap (tx of chronic neck pain), and pelvic belt (treat lower back pain)

An order for traction should include: **type** of traction, **amount** of weight, **whether traction can be removed** for nursing care.

Skeletal traction

- Nursing interventions
 - Neuro assessments every hour first 24, then every 1-4 after that
 - Avoid lifting or removing weights
 - Ensure weight hang freely and not resting on floor
 - Ensure that pulley ropes are free of knots, fraying, loosening, and improper positioning at least every 8 to 12 hrs (Once per shift)

- Pin site care 1-2x day per protocol to monitor for infection signs
→ edema, erythema, drainage, odor
- Expected findings of patient
 - Reposition to maintain skin integrity
 - Prevent footdrop
- Expected findings of traction system
 - Hanging weights – NOT on the floor
 - Rope in wheel groove
 - Lengths of ropes are equal
- Ideal outcomes/goals
 - Prevent soft tissue injury
 - Realign of bone fragments
 - Decrease muscle spasms and pain
 - Correct or prevent further deformities

Neurovascular assessment

- Components of assessment
 - Pain
 - Sensation
 - Skin Temperature
 - Cap Refill
 - Pulses
 - Movement
 - Color- cyanotic, pale
- When to perform assessment
 - Every 1 hr for the 1st 24 hrs and every 1-4 hrs thereafter
- Normal versus abnormal findings
 - Normal: pink/ warm/ pulses present and equal bilaterally/ cap refill <3 seconds
 - Abnormal: cyanotic/ cold, cap refill >3 seconds, no or irregular pulses present

Compartment syndrome

- Risk factors
 - Pressure can result from external sources, such as a **tight cast or a constrictive bulky dressing** - **newly applied cast**
 - Internal sources, such as an **accumulation of blood or fluid** within the muscle compartment, can cause pressure as well
- Manifestations
 - Increased **pain unrelieved** with elevation or by pain medication; intense pain when passively moved
 - **Paresthesia** or numbness, burning, and tingling are early manifestations
 - **Paralysis**, motor weakness, or inability to move the extremity indicate major nerve damage and are late manifestations
 - Color of tissue is pale (**pallor**), and nails beds are cyanotic
 - **Pulselessness** is a late manifestations of compartment syndrome
 - Palpated muscles are hard and swollen from edema

Casts

- Neuro checks every hour for first 24 hours and assess pain
- Apply ice for first 24-48 hours
- Make sure area is clean and dry before applying cast
- Elevate cast above the heart during first 24-48 hours
- Regularly move joints about and below cast - prevent contractures
- Keep cast dry

Fat embolism

**** Common with hip and pelvis fractures = common causes; >70yo at risk; w/in 12-48hr after long bone fractures or w/ total joint arthroplasties**

Tx-Maintain the client on bedrest, immobilize fractures, give O2

- Manifestations
 - Early manifestations:
 - Dyspnea, increased RR, decreased O2sat
 - HA
 - Decreased mental acuity r/t low arterial O2 level
 - Respiratory distress
 - Tachycardia
 - Confusion
 - Chest pain
 - Late manifestations:
 - **Cutaneous petechiae** (pinpoint-size subdermal hemorrhages that occur on neck, chest, upper arms, and abdomen from blockage of capillaries by fat globules)

Amputations

- Complications
 - Nursing interventions
 - Prevent post-complications (hypovolemia, pain, infection)
 - Assess surgical site for bleeding
 - Monitor tissue perfusion of end of residual limb
 - Monitor for manifestations of infection and non-healing of incision; infection can lead to osteomyelitis
 - **Phantom Limb Pain**
 - treat by administering calcitonin, beta-blockers, antiepileptics (gabapentin), antispasmodics (baclofen)
 - Teach client how to push the residual limb down toward the bed while supported on a soft pillow; this helps reduce phantom limb pain and prepare the limb for a prosthesis
- Preparing for prosthesis
 - Nursing interventions
 - Residual limb must be shaped and shrunk in preparation for prosthetic training
 - Shrinkage interventions:

- Wrap the stump, using elastic bandages (**figure-8 wrap**) to prevent restriction of blood flow and decrease edema
- Use a **stump shrinker sock** (easier for the client to apply)
- Use an air splint (plastic inflatable device) inflated to protect and shape the residual limb and for easy access to inspect the wound

Increased ICP

- Causes

AEIOU TIPS:

1. **A**lcohol or AAA
2. **E**pilepsy, hepatic **encephalopathy**
3. **I**nsulin (**hypoglycemia**)
4. **O**piates or overdose
5. **T**rauma, **temperature** (hypothermia, hyperthermia)
6. **I**nfections (**sepsis, meningitis****)
7. **P**sychogenic, PE, poisoning
8. **S**pace lesions, stroke, shock, seizure

I WATCH DEATH:

- 1) **I**nfection/ sepsis (elderly/ very young)
- 2) **W**ithdrawal from substance
- 3) **A**cute metabolic causes - hypoglycemia
- 4) **T**rauma/ temp
- 5) **C**NS causes - psychogenic
- 6) **H**ypoxia/ PE
- 7) **D**eficiencies (nutritional)/ electrolyte imbalance - Na**
- 8) **E**ndocrinopathies
- 9) **A**cute vascular causes, AAA, alcohol
- 10) **T**oxins or drugs (opioids/ OD)
- 11) **H**heavy metals

- Manifestations
 - Severe HA, deteriorating LOC, restlessness, irritability, dilated or pinpoint pupils, slowness to react, altered respirations (Cheyne-Stokes), deterioration in motor function, and abnormal posturing
 - Early: (**LOC, HA, eye, wX**) Change in LOC, Change in condition (restlessness, confusion, drowsiness, etc), Pupillary Changes, Weakness, HA
 - Late: (**CUSHINGS TRIAD- bradycardia, hypertension, bradypnea, emesis, LOC - coma/ stupor**) Respiratory and vasomotor changes,

Cushing's Triad, Projectile vomiting, stupor to coma, decorticate or decerebrate, Cheyne-Stokes, Loss of reflexes (gag, pupil, etc)

- Pharmacologic treatment
 - **Mannitol** – osmotic diuretic – decrease cerebral edema
 - i. Monitor urine output w/ foley
 - **IV fluids to maintain cerebral perfusion to decrease cerebral edema**
 - **Barbituates** (pentobarbital and thiopental)
 - ii. **Induce coma to decrease cellular demand until ICP can be decreased**

CPP = Cerebral Perfusion Pressure

- i. **CPP = MAP-ICP (mean arterial pressure of ICP)**
 - Normal- 70-100
 - Less than 50=permanent neurologic damage

Cushing's triad

- **Cushing's triad - Late s/s of increased ICP:**
 - **HTN, bradycardia, bradypnea (opposite of shock sx)**
 - **This is a LATE manifestation of increased ICP**

Methods for keeping ICP within normal limits

- Nursing interventions
 - **Elevate HOB at *least 30 degrees*** (promote venous drainage)
 - Avoid extreme **flexion, extension, or rotation of head**
 - maintain the body in a midline neutral position
 - Maintain patent airway
 - Administer O2 to keep **PaO2 >60**
 - Consider **hyperventilation to decrease ICP**
 - Maintain c-spine stabilization
 - Maintain safety and seizure precautions
 - *Must know normal ICP*
 - **10 -15 mmHG**

ABC prioritization

Altered LOC

- Diagnostic tests
- Glasgow Coma Scale
 - Best possible score = 15
 - Score **<8** associated w/ **severe** head injury and coma
 - Score **9-12** indicates **moderate** head injury
 - Score **>13** associated with **minor** head trauma

- Labs
 - Based upon underlying cause
 - CMP for electrolytes
- Diagnostic tests
 - Based upon underlying cause
- Management:
 - ABCs
 - Consider intubation
 - Treat underlying cause
- Manifestations
 - Is not oriented
 - Does not follow commands
 - Needs persistent stimuli to achieve a state of alertness
 - Painful stimuli – sternal rub
 - Verbal – pt opens eyes to voice

GCS

- Scoring
 - Best possible score = 15
 - Score <8 associated w/ severe head injury and coma
 - Score 9-12 indicates moderate head injury
 - Score >13 associated with minor head trauma
 - ***Intubation limits ability to use GCS summed scores***
 - If intubation is present, GCS may be reported as 2 scores, with modification noted
 - Generally reported as “GCS 5t” t represents intubation tube

Scoring: EVM

- **Eye opening (E):** best eye response
 - 4= eye opening occurs spontaneously
 - 3= eye opening occurs to sound
 - 2= eye opening occurs secondary to pain
 - 1= eye opening does not occur
- **Verbal (V):** best verbal response
 - 5= conversation is coherent and oriented
 - 4= conversation is incoherent and oriented
 - 3= words are spoken but inappropriately
 - 2= Sounds are made, but no words
 - 1= vocalization does not occur
- **Motor (M):** best motor response
 - 6= commands are followed
 - 5= local reaction to pain occurs
 - 4= general withdrawal to pain
 - 3= decorticate posture (flexion of elbows & wrists)

- 2= decerebrate posture (extension of elbows & wrists)
- 1= motor response does not occur

Stroke

- Hemorrhagic
 - Manifestations, signs/symptoms
- Occurs **secondary d/t ruptured artery/aneurysm.**
- Prognosis = poor d/t amount of ischemia and increased ICP caused by expanding collection of blood. If caught early and evacuation of clot can be done w/ stopping of active bleed, prognosis improves significantly

Manifestations of hemorrhagic stroke:

- HA and nuchal rigidity (stiff neck) - increased ICP
- Vomiting - increased ICP
- **Change in LOC**
- Sluggish pupil rxn - increased ICP
- Speech difficulty and visual disturbances - LOC
- **Facial drooping**

Right versus left hemisphere - Manifestations of each

RIGHT: visual/ spatial awareness/ proprioception's affected

- altered perception of deficits (doesn't understand gravity of deficits), **unilateral neglect** (of L side - may occur in both L/R stroke but most common in R sided stroke), **loss of depth perception**, poor impulse control, visual changes (hemianopia)

Left: language, math, analytics affected

- **expressive and receptive aphasia**, **agnosia** (can't ID sensory inputs; light, sound, **touch** [cotton ball touching skin]/ cant recognize familiar objects), **alexia** (can't read or understand written words), **agraphia** (can't write), right extremity hemiplegia/hemiparesis, slow cautious behavior, depression, anger, visual changes (hemianopia)

Thrombolytic therapy- Indications and contraindications

used in the instance of a **ischemic stroke** (embolic or thrombotic)
 given w/in **3 - 4.5 hrs of onset of s/s (if unknown - the last time pt presented "normal")

- a. no tPA = if pt is on anticoagulant (ie: heparin, warfarin), head trauma w/in last few months, recent spinal surgery/cranial surgery in PSHx

TPA Inclusion criteria

- Clinical diagnosis of ischemic stroke causing measurable neurologic deficits
- Onset of symptoms **<4.5 hrs before beginning treatment**; if exact time not known it is defined as the last time the client was known to be normal
- Age >18

TPA Exclusion criteria

- **Stroke or head trauma in the previous 3 months**
- Previous intracranial hemorrhage
- **Intracranial neoplasm, AV malformation, or aneurysm**
- Recent intracranial or intraspinal surgery
- Arterial puncture at a non-compressible site in the previous 7 days
- Symptoms suggestive of subarachnoid hemorrhage
- **Persistent BP elevation (SBP >185 or DBP >110)**
- Active internal bleeding
- Age >80
- **Oral anticoagulant use ****regardless of INR**
- Severe stroke (NIHSS score >25)

Methods of communication

- Talk at a normal rate/talk to them like any other patient
- Do not have lengthy conversations; be brief

Spinal Cord Injury

Injury to cervical spine = quadriplegia

Injury below T1 = paraplegia

- * the level involved dictate the consequences of the spinal cord
 - Autonomic dysreflexia interventions
 - ****INITIAL interventions: Sit pt in a sitting position to decrease HTN**
 - O2-First priority
 - Monitor for hypotension, edema, loss of temp regulation
 - May be NPO- regulate fluids/nutrition
 - May need catheters/ stool softeners
 - Change position every 2 hours
- Risk factors
 - Male clients age 16-30

- high risk activities (extreme sports or high speed driving)
- participation in impact sports
- acts of violence (GSW or knife wounds)
- alcohol or drug use
- disease (metastatic cancer or arthritis of spine)
- falls (especially older adults)

Head injuries:

- Epidural hematoma- Blood collection in the space between the **skull and the dura**
 - Manifestations
 - Patient may have a brief loss of consciousness -- > with return of lucid state, then as hematoma expands increased ICP will often suddenly reduce LOC- **Emergency situation- may need a craniotomy**
- Subdural hematoma- Collection of blood between the **dura and brain**
 - Manifestations
 - Acute or subacute
 - Acute: symptoms develop over 24 to 48 hours
 - Subacute: symptoms develop over 48 hours to 2 weeks
 - Requires immediate craniotomy and control of ICP
 - Chronic
 - Develops over weeks to months
 - Causative injury may be minor and forgotten
 - Clinical signs and symptoms may fluctuate
 - Treatment is evacuation of the clots
- Basal Skull Fracture
 - Nursing interventions
 - Test CSF leakage for glucose
 - CSF leakage from nose and ears can indicate **basilar skull fracture** ("halo" sign: yellow stain surrounded by blood on a paper towel; **fluid tests positive for glucose**)

Craniotomy

- Post-op monitoring/identifying signs of complications
 - Goal is to **decrease cerebral edema**;
 - medications such as mannitol and dexamethasone can be administered every **6 hrs for 24-72 hrs** postoperatively

- Monitor ICP; If elevated, requires intervention
 - Normal ICP : 10 -15
 - Other potential complications: **severe neurological impairment, infection, persistent seizures, neuro deficits**

Meningitis

- Nursing interventions
 - Isolate the client as soon as meningitis is suspected/ Maintain isolation precautions per hospital policy.
 - The nurse should initiate **droplet precautions**, which require a private room. Continue droplet precautions until antibiotics have been administered for 24 hr and oral and nasal secretions are no longer infectious. Clients who have bacterial meningitis might need to remain on droplet precautions continuously.
 - Standard precautions are implemented for all clients who have meningitis.
 - Implement fever-reduction measures, such as a cooling blanket, if necessary.
 - Report meningococcal infections to the public health department.
 - Decrease environmental stimuli/ **Provide a quiet environment**
 - Minimize exposure to bright light (natural and electric)
 - Maintain bed rest with the **head of the bed elevated to 30°**
 - Monitor for increased ICP
 - Tell the client to avoid coughing and sneezing, which increase ICP
 - Maintain client safety, such as seizure precautions
 - Replace fluid and electrolytes as indicated by laboratory values
- Pharmacologic treatment options
 - **Rifampin*******
 - **Ceftriaxone or cefotaxime in combination with vancomycin**: Antibiotics given until culture and sensitivity results are available. Effective for bacterial infections
 - **Phenytoin**: Anticonvulsants given if ICP increases or client experiences a seizure.
 - **Analgesics** for headache and/or fever.
 - *******Nonopioid to avoid masking changes in the level of consciousness**
 - Prophylactic antibiotics given to individuals in close contact with the client
 - Prophylactic treatment if exposed