

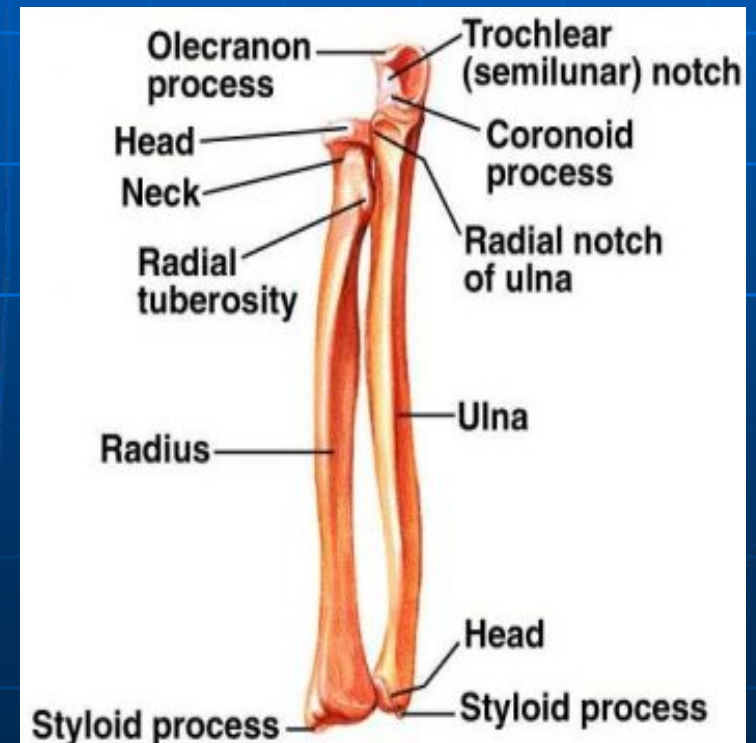
Nursing Care on Patient with Forearm Fracture

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Anatomy

Bone

- Radius
 - The shorter of the two bones of the forearm
 - Runs along the thumb side of the arm
- Ulna
 - The longer of the two bones of the forearm
 - Runs along the little finger side of the arm
 - Upper border is olecranon process



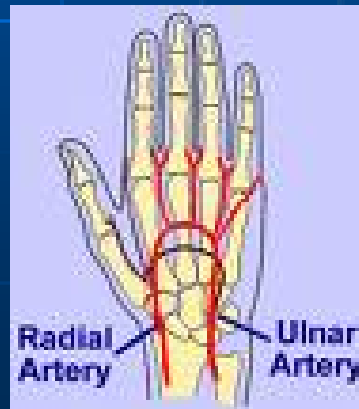
Nerve Supply

- Radial Nerve
 - Sensory supply : dorsolateral hand and 1st 3 fingers
- Median Nerve
 - Sensory supply : palmer side of thumb, index and middle finger, half the ring finger
- Ulnar Nerve
 - Sensory supply : 5th fingers and medial half of ring finger



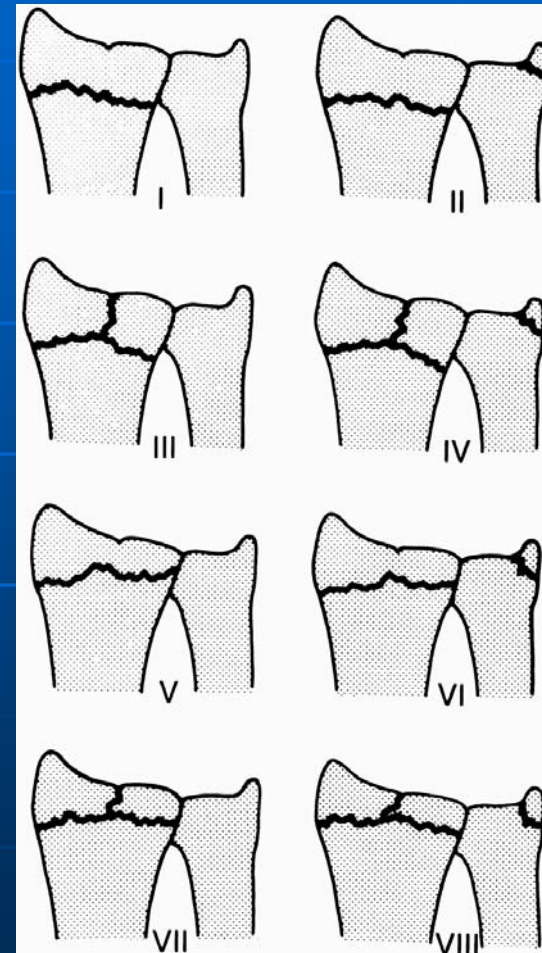
Blood Supply

- Radial Artery
 - Passes down the radial or lateral side of the forearm to the wrist
- Ulnar Artery
 - Runs downwards on the ulnar or medial aspect of the forearm to cross the wrist and pass into the hand



Fracture Distal Radius

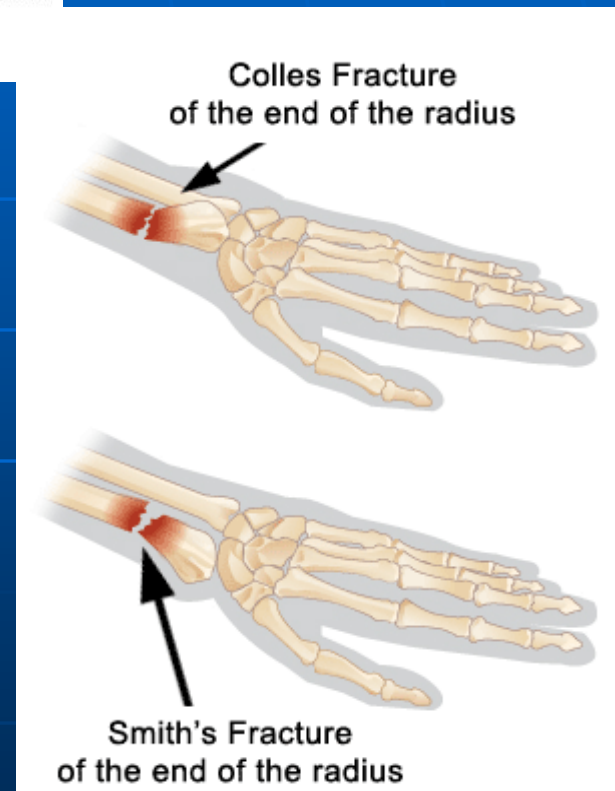
- Frykman Classification
 - I. Extra-articular, no fracture of ulna
 - II. Extra-articular, fracture of ulna
 - III. Intra-articular radio-carpal, no fracture of ulna
 - IV. Intra-articular radio-carpal, fracture of ulna
 - V. Intra-articular radio-ulnar, no fracture of ulna
 - VI. Intra-articular radio-ulnar, fracture of ulna
 - VII. Intra-articular radio-carpal & radio-ulnar, no fracture of ulna
 - VIII. Intra-articular radio-carpal & radio-ulnar, fracture of ulna



Fracture Distal Radius

■ Anatomical Classification

- Colles' fracture
 - Fall on dorsiflexed hand
 - Fragment displaced dorsally
 - Classical "dinner fork" deformity
- Smith fracture
 - Fragment displaced volarly
- Barton's fracture
 - Fracture of the distal radius with dislocation of the radiocarpal joint



Treatment for Distal Radius Fracture

Initial treatment with marked swelling

- Short arm $\frac{3}{4}$ slab
- Cover $\frac{3}{4}$ circumference on dorsoradial surface of the forearm
- The $\frac{1}{4}$ circumference leftover for the expansion of the swelling of the forearm







Treatment for Distal Radius Fracture

- Close Reduction
 - Keep cast/pop for 4 weeks then change to short arm brace for 2 weeks
- Operation
 - Open reduction + internal fixation
 - External fixation

Nursing Assessment on Cast/POP Application

- Circulation of the fingers
 - must be checked, split or loosen the bandage if the fingers are swollen, cyanosed or painful
- Compression Nerve injury
- Any tightness or pressure point
- Fingers or shoulder stiffness
 - Advise to have mobilization exercise

Nursing Assessment

Illustration on assessing Sensation and Motor function		
Nerve	Sensation	Motor function
radial	 <p>Using the sharp end of a pin, touch the web space between the thumb and index finger</p>	 <p>Have the patient hyperextend his thumb, then his wrist. Have him hyperextend the four fingers at the metacarpophalangeal joints.</p>
ulnar	 <p>Using the sharp end of a pin, touch the distal fat pad of the small finger.</p>	 <p>Have the patient abduct all fingers</p>
median	 <p>Using the sharp end of a pin, touch the distal surface of the index finger</p>	 <p>Have the patient oppose the thumb small finger. Note whether he can flex his wrist.</p>

Operation

- Open reduction + internal fixation
 - Short arm brace for 1st week
 - Active mobilization exercise is allowed if stable fixation
- External fixation + primary cancellous bone graft
 - Indication
 - Unstable fracture with or without articular involvement
 - Comminuted intra-articular fracture



External fixation is removed at the end of 3rd weeks. A short arm brace blocks the extension of wrist and allows full flexion

At the end of 6th weeks, the brace is taken off for full range of movement and strengthening exercise

Complication

- Pin tract infection
- Nerve injuries: median nerve, radial nerve
- Stiffness of fingers, wrist and elbow
- Sudeck's atrophy
 - Reflex Sympathetic Dystrophy Syndrome (RSDS)
 - Happened 3 months post trauma
 - Occur 5% of all traumatic injuries
 - caused by a dysfunction of the sympathetic nervous system
 - Vasodilatation → decrease blood supply → ischaemic → dystrophy

Care of External Fixator

- Change pin tract dressing daily & if necessary
- Adequate analgesic before dressing
- Inspect pin sites for any signs & symptoms of infection
- Massage skin around pin sites to encourage exudate drainage
- Remove crust around pin sites
- Cleanse pin sites with NS, Betadine then NS again
- Open dressing to promote drainage and easy observation
- Observe for any loosening of pin and tighten up screw & clamp if necessary

Care of External Fixator

- Education to patient
 - Observe for any loosening of pins and clamp
 - Any crack or broken part of the device
 - Any redness, sore formation or excessive oozing from the pins
 - Use appropriate appliance to aid movement
 - Elevate the affected limb with pillow
 - Mobilization exercise of unaffected joints
 - Wear split sleeves dress

Fracture of Radius and Ulna shafts

- Result from moderate to high energy trauma
- Traffic accidents and falls
- Classification
 - Proximal, middle or distal
 - One or both forearm bones
 - Open or close



Complication

- Closed forearm fracture
 - Compartment syndrome



- Open forearm fracture
 - Infection



Compartment Syndrome

A condition in which increased pressure within a limited space compromises the circulation and function of the tissues within that space

Untreated compartment syndrome leads to tissue necrosis result in permanent functional impairment

In forearm compartment syndrome, Volkman ischaemic contracture presented with claw hand



Signs and Symptoms

The timing of identification and intervention with compartment syndrome is crucial to a positive patient outcome. The syndrome may develop as quickly as within the first 30 minutes to 1-2 hours post-trauma. Or it may develop postoperatively, post-fracture reduction, or in as late as 5-6 days

Signs and Symptoms

-“6 P’s”

-1. Paresthesia

- First symptom

- Tingling or burning sensation

- Loss of 2-point discrimination

- Can lead to numbness

Signs and Symptoms

-2. Pain

- Out of proportion to the injury
- Increased by the movement of the distal digits
- Described as throbbing or deep, either localized or diffuse
- Increases with elevation of the extremity
- Unrelieved by narcotics

Signs and Symptoms

- 3. Pressure
 - Feel tense and warm on palpation
 - Skin is tight and shiny

Signs and Symptoms

-4. Pallor

- Late sign
- Pale, grayish or whitish
- Prolonged capillary refill (> 3 sec)
- Feel cool upon palpation

Signs and Symptoms

- 5. Paralysis
 - Late sign
 - Weakness in active movement of involved or distal joints
 - Leads to inability to move joints or digits actively
 - No response to direct neural stimulation

Signs and Symptoms

-6. Pulselessness

- Late sign

- Very weak or lack of palpable or doppler audible pulse

Diagnosis

- Clinical suspicion is the most important, 6 P's
- Measured the Intracompartmental pressure by "*Stryker Intracompartmental Pressure Monitor System*"
 - Normal < 15mmHg
 - Compartment syndrome > 40 mmHg



Treatment

Fasciotomy

- Surgical decompression
 - Without a tourniquet to avoid further ischaemia
- Performed in less than 6 hours and no later than 12 hours after symptoms onset to prevent neural deficit
- Single or multiple incisions in lengthwise fashion
- After fasciotomy, the extremity is splinted in functional position with frequent neurovascular check
- The wounds are left open to prevent “rebound”. Sterile saline wet dressings are used to loosely pack the wounds and the area is covered with a loose bulky wrap.



Post-fasciotomy Care

- Continuous monitoring of vital sign
- Close neurovascular observation of the affected limb
- Maintain adequate fluid replacement & monitor

I & O

- Change dressing when soaked through & avoid tight dressing
- Adequate pain control

Prevention

- Splinting, traction, early closed reduction with casting to prevent motion at the fracture sites so as to reduce bleeding or control inflammation
- Close observation on neurovascular status on the affected limb
- Position the limb at the level of the heart will help to minimize edema.
- Loosening of external constrictive dressings or cutting a cast when initial signs and symptoms are noted can prevent the progression of compartment syndrome
- Maintain adequate hydration to maintain adequate perfusion

Open Fracture

- Open (Compound) fracture
 - Fracture exposed to the outside through the wound
 - The bigger the wound, the higher the chance of infection



Priorities in Open Fracture Treatment

- Life saving
- Limb saving
- Prevent infection
- Preserve function

Immediate Management

30% of patients with an open fracture have other life threatening injuries

Nursing Assessment:

- A - Airway
- B - Breathing & Bleeding
- C - Circulation
- Homodynamic status
- Inspect wound for location, size, colour, bleeding, bone expose & the surrounding skin

An Open Fracture
is not
“ A Fracture with a Wound”

It is
“A Wound complicated with a
Fracture

Wound Infection

- 70% of open fractures are contaminated with bacteria at the time of injury



Wound Care

- Give adequate analgesic before wound inspection
- Give adequate support to the limb during wound inspection
- Wound swab for culture before antibiotics
- Remove obvious foreign body with sterile technique
- Initial cleansing, flush the wound gently with 1-2L of sterile normal saline by aseptic techniques
- Serial clinical photos of the wound
- Digital exploration is not recommended because it risks contamination & profuse bleeding
- Cover the wound with sterile dressing & crepe with firm bandage after inspection
- Keep sterile dressing with minimal opening before OT
- Observe signs & symptoms of infection
- Give antibiotics as soon as possible

Prevent Infection

- Systemic antibiotics
- Local antibiotics e.g. beads
- Dressing changes in OT
- Repeated Debridement
- Repeated copious lavage
- Discard de-vitalised bone fragment
- Delayed wound closure, within a week
- Bring in blood supply - flaps

Post-operative Wound Care

- Give adequate analgesic before wound inspection
- Give adequate support to the limb during wound care
- Apply aseptic technique during dressing change
- Observe wound condition for any signs & symptoms of infection
- Pin tract care

Thankyou