

NGN NCLEX 2026 · MUSCULOSKELETAL

Compartment Syndrome

Orthopedic emergency · Ischemia within 4–6 hours · The 6 P's

MS / ORTHO

EMERGENCY

1

Definition & Overview

A surgical emergency — know it in one glance

WHAT IT IS

Pressure trap inside a muscle compartment

- Rising pressure in a **closed fascial space**
- Compresses vessels → **ischemia to muscle + nerves**
- Most common: **forearm and lower leg (tibia)**
- Untreated → permanent contracture, amputation, death

 **Time is tissue.** Muscle/nerve damage becomes irreversible within 4–6 hours of onset.

WHY IT MATTERS

Top orthopedic emergency on NCLEX

- Classic **priority question** — "which patient first?"
- Tests recognition of **pain out of proportion**
- Traps students into **elevating or icing** (wrong!)
- Definitive treatment = **fasciotomy** (surgical release)

 On NCJMM cases: this is a **Recognize Cues → Take Action NOW** pattern.

⚠️ COMMON CAUSES



Fractures

Tibia #1 · Forearm



Crush Injury

MVA, trauma



Tight Cast

Or dressing / splint



Burns

Circumferential



IV Infiltration

Large-volume



Bleeding

Anticoagulants



Reperfusion

Post-vascular sx



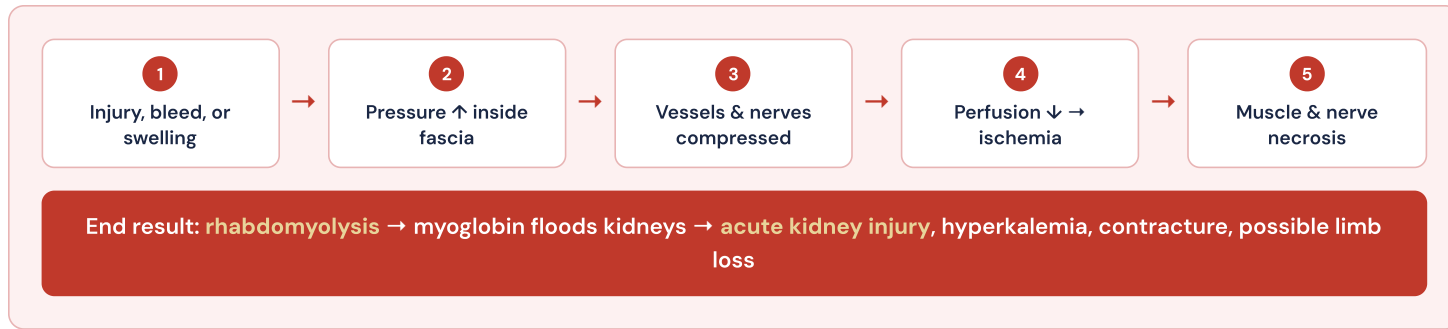
Snake Bite

Envenomation

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Pathophysiology

Follow the pressure — from injury to tissue death



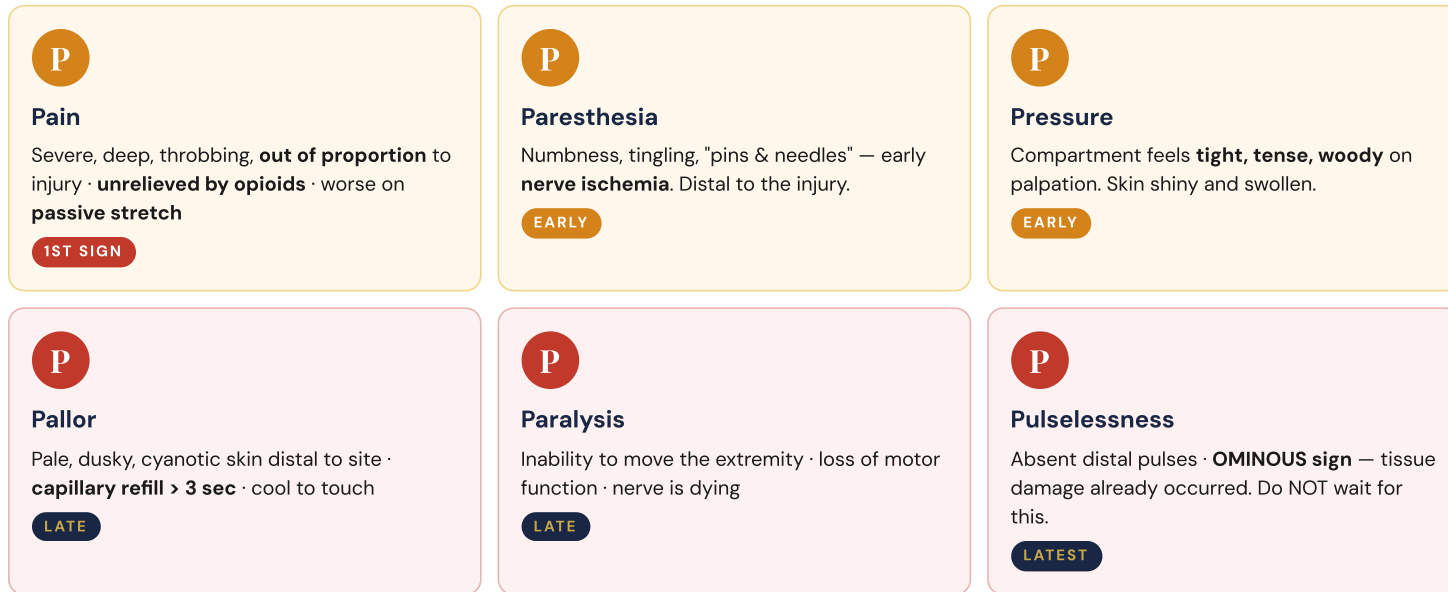
4–6 HOURS Beyond this window, **nerve and muscle damage is permanent**. Normal compartment pressure is under 10 mmHg — compartment syndrome occurs at **> 30 mmHg** or within 30 mmHg of diastolic BP.

3 Signs & Symptoms — The 6 P's

Early cues catch it in time · Late cues = damage already done

The 6 P's of Compartment Syndrome

Pain is **first and most reliable** · Pulselessness is **last and ominous**





RED FLAG #1: Pain out of proportion + pain on passive stretch in a patient with a fracture, cast, or crush injury. This is compartment syndrome until proven otherwise — **notify HCP STAT**.

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Priority Nursing Interventions

ABC · Safety · Perfusion-focused

✓ DO — ACT FAST

- ✓ **Notify HCP immediately** — surgical emergency
- ✓ **Loosen or bivalve** the cast / remove tight dressings
- ✓ Keep extremity at **heart level** (not elevated, not dependent)
- ✓ **Neurovascular checks q1h** (or more): 6 P's, cap refill, sensation, motor
- ✓ Assess for **tea/cola-colored urine** — rhabdomyolysis
- ✓ Monitor **CK, creatinine, BUN, K⁺**
- ✓ Prep patient for **fasciotomy** (definitive)
- ✓ IV fluids to protect kidneys from myoglobin
- ✓ Pain management + anxiety support

✗ DO NOT — NEVER DO THIS

- ✗ **DO NOT elevate** above heart — reduces arterial flow, worsens ischemia
- ✗ **DO NOT apply ice / cold** — vasoconstriction worsens perfusion
- ✗ DO NOT dismiss pain as "post-op normal" or drug-seeking
- ✗ DO NOT wait for pulselessness — damage is done by then
- ✗ DO NOT give repeat opioid doses without reassessing the limb
- ✗ DO NOT apply a tight dressing over the fasciotomy site
- ✗ DO NOT delay notifying the provider to "watch it"

NCLEX PRIORITY PATH

1. Recognize pain out of proportion

2. Remove/loosen constriction

3. Keep limb at heart level

4. Call HCP

5. Prep for fasciotomy

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Pharmacology

Supportive drugs — surgery is the real fix

*There is no drug that cures compartment syndrome — **fasciotomy is definitive**. Medications are supportive: pain control, fluid resuscitation, and protecting the kidneys from rhabdomyolysis.*

IV Morphine / Fentanyl

OPIOID ANALGESIC

Use: Severe pain. **Watch:** Respiratory depression, hypotension. **Red flag:** If opioids don't touch the pain, suspect compartment

0.9% Normal Saline / LR

CRYSTALLOID — IV FLUIDS

Use: Aggressive hydration to flush myoglobin and prevent AKI. **Monitor:** Urine output (goal ≥ 0.5 mL/kg/hr), lung sounds.

syndrome.

Sodium Bicarbonate

ALKALINIZING AGENT

Use: Alkalize urine to protect kidneys from myoglobin. **Monitor:** ABGs, K⁺, calcium.

Mannitol

OSMOTIC DIURETIC

Use: Promote diuresis, flush myoglobin, reduce edema. **Monitor:** I&O, electrolytes, signs of fluid overload.

Tetanus Prophylaxis

TD / TDAP BOOSTER

Use: Open fractures or fasciotomy wounds if last dose > 5 years ago.
Give: Before discharge.

IV Antibiotics

BROAD-SPECTRUM (CEFAZOLIN)

Use: Post-fasciotomy infection prevention. **Monitor:** WBC, wound drainage, temp.

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NCLEX Test Traps

Where students lose the easy points

1

X Elevate the casted extremity on pillows

✓ Keep the limb at HEART LEVEL

Elevation is right for a normal post-op limb, but in compartment syndrome it **reduces arterial inflow** and worsens ischemia. Heart level preserves perfusion while reducing venous pooling.

2

X Apply an ice pack to reduce swelling

✓ NO cold — remove constriction instead

Cold causes **vasoconstriction**, dropping already-compromised perfusion. Priority is releasing the pressure (bivalve cast, loosen dressing).

3

X Give another morphine dose — pain is 10/10

✓ Assess the limb & notify HCP first

Pain unrelieved by opioids = compartment syndrome red flag, not drug-seeking. Medicating without assessing masks a surgical emergency.

4

X Wait for loss of pulse before calling the HCP

✓ Call as soon as pain is out of proportion

Pulselessness is a **LATE** sign — by then, muscle and nerve are already dying. Act on pain + paresthesia, not pulses.

5

X A palpable pulse rules out compartment syndrome

✓ Pulses may be PRESENT in early stages

Arterial pressure can still push blood through even as tissue pressure climbs. **Don't rule it out by pulses alone** — trust the pain and paresthesia.

6

X "Reassess in an hour" order seems reasonable

✓ This is an emergency — intervene NOW

The nurse must advocate and escalate. Tissue damage begins within **4–6 hours**. Don't accept a passive order — bivalve cast, notify HCP, prepare for OR.

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Patient Education

Empower patients and families to catch it early

HOME CARE AFTER CAST OR INJURY

- **Call the HCP immediately** for severe pain that won't go away with meds
- Report **numbness, tingling, or coolness** below the cast or splint
- Report a cast that **feels tighter** than when it was applied
- Wiggle fingers/toes often and check sensation hourly the first 24 hrs
- Keep extremity **at heart level** — no ice packs directly on the cast
- Don't stick anything inside the cast to scratch

AFTER FASCIOTOMY

- Wound may be left **open with wet-to-dry or VAC dressing** for days
- Delayed closure or **skin graft** often needed
- Watch for signs of infection: **fever, pus, increased pain, redness**
- Finish entire antibiotic course; complete tetanus booster if due
- Stay hydrated — protects kidneys during recovery
- Physical therapy helps prevent **contractures and foot drop**

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NCJMM Clinical Judgment

How this case looks on a Next Generation NCLEX item

NEXT GENERATION NCLEX · CLINICAL JUDGMENT MODEL

Recognize → Analyze → Prioritize → Evaluate

01

RECOGNIZE

Pain out of proportion, unrelieved by opioids, worse with passive stretch. Tight, tense compartment. Paresthesia.

02

ANALYZE

Rising compartment pressure → ischemia of muscle and nerves. Risk factors: fracture, tight cast, crush, burn. Distinguish from normal post-op pain.

03

PRIORITIZE / ACT

Remove constriction (bivalve cast), keep limb at heart level, notify HCP STAT, NPO, prep for fasciotomy, aggressive IV fluids.

04

EVALUATE

Pain relief, return of sensation/motor, cap refill < 3 sec, urine clear (no myoglobin), CK trending down, no AKI.

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Memory Boosters

Lock it in for exam day

MASTER MNEMONIC

The 6 P's

If any two show up after trauma, a cast, or a burn — **act immediately**.

QUICK RULE #1

"Pain out of PROPORTION = PRIORITY"

Most reliable early sign. If opioids don't work, it's not drug-seeking — it's compartment syndrome.

P

Pain

P

Paresthesia

P

Pressure

P

Pallor

P

Paralysis

P

Pulseless

QUICK RULE #2

"Don't ELEVATE. Don't ICE."

Both drop perfusion. Keep the limb at heart level. Release the pressure instead.

QUICK RULE #3

"Fasciotomy = Fix it fast"

Surgical release is the only cure. Nurse's job is to **recognize and escalate** within the 4–6 hour window.

NGN NCLEX 2026 STUDY SERIES

Compartment Syndrome · Musculoskeletal Emergency

Recognize pain out of proportion · Release pressure · Prep for fasciotomy · Protect the kidneys