

NGN NCLEX 2026 · VISUAL STUDY LIBRARY · MUSCULOSKELETAL

Care of the Client in *Traction*

A high-yield clinical reference covering traction types, neurovascular monitoring, pin care, complications, and the priority interventions that protect alignment, circulation, and skin integrity.

System: Musculoskeletal

Priority: Safety / Tissue Perfusion

★ High-Yield NGN Topic

NCJMM Scenario Included

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SECTION ONE

Definition & Overview

Traction is the application of a pulling force to a part of the body — typically a limb or the cervical spine — to reduce or realign a fracture, immobilize a body part, decrease painful muscle spasm, prevent or correct deformity, and promote healing.

PURPOSE

Reduce & Align

Realign fractured bone ends and restore length to the limb.

PURPOSE

Immobilize

Hold the fracture in position until healing or surgery occurs.

PURPOSE

Reduce Spasm

Continuous gentle pull relieves muscle spasm and pain.



GOLDEN RULE OF TRACTION

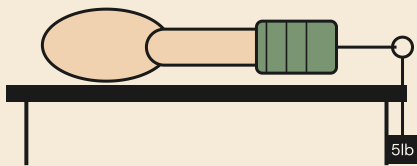
Weights must hang FREELY at all times. Never lift, support, or rest the weights on the bed or floor. If weights touch anything, traction is interrupted and the therapeutic pull is lost — the bones can shift and the patient can be seriously injured.

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SECTION TWO

Types of Traction

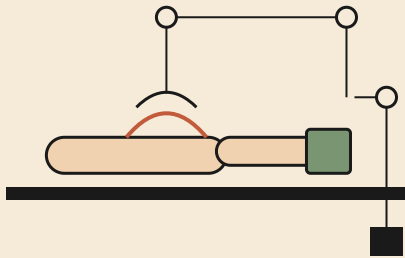
Traction is divided into two major categories — **SKIN** traction (force applied to the skin, lower weight, short-term) and **SKELETAL** traction (force applied directly to the bone via pins, higher weight, long-term).



SKIN • LOWER EXTREMITY

Buck's Traction

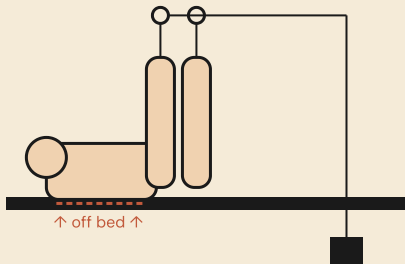
Most common skin traction. Used pre-op for hip fractures to reduce muscle spasm. Boot or foam wrap; **5–10 lb max**.



SKIN • KNEE/FEMUR

Russell's Traction

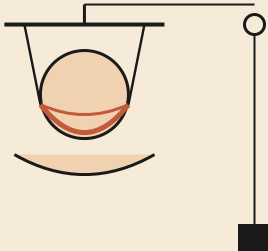
Buck's + a knee sling that suspends the leg. Combines horizontal & vertical pull for femur fractures.



SKIN • PEDIATRIC

Bryant's Traction

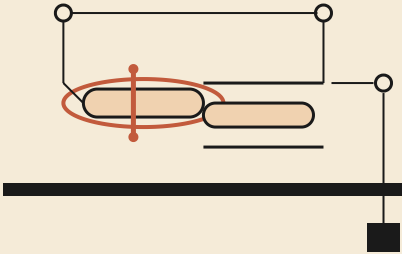
Children < 2 yrs / < 30 lb with femur fracture. Both legs extended **vertically**; buttocks lifted off bed.



SKIN • CERVICAL

Cervical Halter

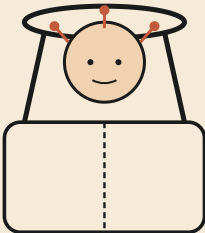
Head halter for cervical strain/spasm. **Monitor for chin/jaw breakdown** and TMJ pain.



SKELETAL • FEMUR

Balanced Suspension

Thomas splint + Pearson attachment with a pin through bone. Allows movement & bathing without disrupting alignment.



SKELETAL • CERVICAL SPINE

Halo Traction / Vest

Ring fixed to skull with 4 pins; bars connect to a rigid vest. For unstable cervical fractures. **Keep wrench at bedside!**

QUICK REFERENCE

Skin vs. Skeletal — At a Glance

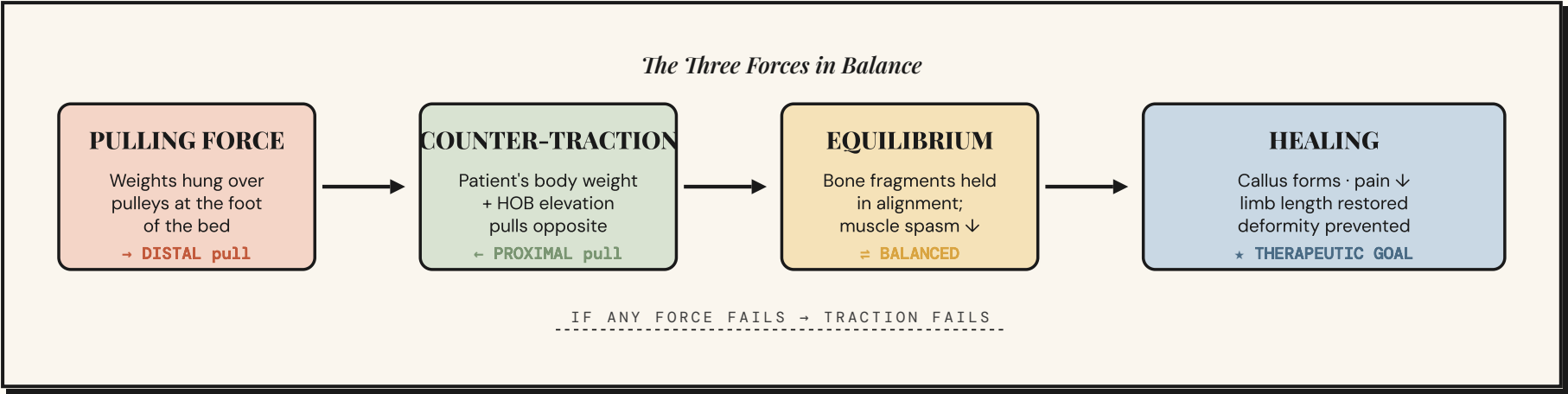
FEATURE	SKIN TRACTION	SKELETAL TRACTION
Force applied to	Skin / soft tissue	Bone via pin, wire, or tong
Weight	5–10 lb (max)	15–30 lb (or more)
Duration	Short-term (hours–days)	Long-term (weeks–months)
Can be removed	Yes — intermittently	NO — continuous
Examples	Buck's, Russell's, Bryant's, Cervical halter	Halo, Crutchfield tongs, Balanced suspension, 90–90

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SECTION THREE

The Mechanics: How Traction Works

Therapeutic traction requires **three forces in balance**: the pulling force (weights), counter-traction (patient's body weight + bed angle), and friction reduction (smooth, in-line ropes & pulleys).



1. Continuous Pull

The straight, in-line pull of the weights overcomes muscle spasm and restores alignment. Interruption = lost therapy.

2. Counter-Traction

Usually the patient's **body weight + foot of bed elevated**. Without it, traction would just pull the patient down the bed.

3. Friction Control

Ropes must run freely in the pulley groove with **no knots**, and weights must **hang freely** — never touching bed, floor, or anything else.

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SECTION FOUR

Complications & Signs to Watch

A patient in traction is at risk for complications from **immobility**, **pressure**, and the **device itself** (pins, ropes, weights). The most time-critical assessment is neurovascular.

 The 5 P's of Neurovascular Compromise

Assessed distal to the injury and traction site every 1–2 hours initially, then per protocol.

P

Pain

Unrelieved by meds; out of proportion → compartment syndrome

P

Pallor

Pale, dusky, or cyanotic skin distal to injury

P

Pulselessness

Diminished or absent distal pulse — late, ominous sign

P

Paresthesia

Numbness, tingling — early nerve compression

P

Paralysis

Inability to move toes/fingers — late, irreversible if not treated



COMPARTMENT SYNDROME — A SURGICAL EMERGENCY

Pain that is **severe, deep, throbbing, and not relieved by opioids**, especially with passive stretch of the digits, is the earliest and most reliable sign. **Notify the HCP immediately.** Do NOT elevate the limb above heart level and do NOT apply ice — both reduce perfusion further.

Other Major Complications

SKIN / PRESSURE

Pressure Injury

Heels, sacrum, scapulae, elbows, occiput. Inspect q2h; use heel-protective devices.

PIN SITE

Pin-Site Infection / Osteomyelitis

Purulent drainage, erythema, warmth, fever, increased pain. Crusting alone is normal.

VASCULAR

DVT & PE

Calf pain, swelling, warmth; sudden dyspnea/chest pain = PE. SCDs + anticoagulants prn.

RESPIRATORY

Atelectasis / Pneumonia

Immobility ↓ lung expansion. Incentive spirometer q1h while awake; cough & deep breathe.

GI

Constipation / Ileus

Decreased peristalsis from bed rest + opioids. Fiber, fluids, stool softeners.

METABOLIC

Renal Calculi / Disuse Osteoporosis

Calcium leaves immobilized bones → kidney stones. Push fluids, encourage isometrics.

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SECTION FIVE

Priority Nursing Interventions

The 4 Cardinal Principles



Continuous

Traction is NEVER interrupted unless ordered. Don't remove for repositioning.



Weights Hang Free

Never lift, support, rest, or remove the weights. Check after every position change.



Body Alignment

Patient centered in bed, in-line with pull. No twisting of the limb.



Ropes & Pulleys

Free of knots; ropes in the pulley groove; pulleys turn smoothly.

Step-by-Step Nursing Care

- ◆ **Assess neurovascular status** (5 P's) every 1–2 hours initially, then per protocol. Compare bilaterally.
- ◆ **Inspect the skin** under any boot, sling, or wrap every 8 hours — especially the heel, malleoli, and Achilles tendon.
- ◆ **Provide pin care** per facility protocol (typically chlorhexidine 2 mg/mL with sterile applicators, q8h to daily). Document drainage character.
- ◆ **Verify the setup every shift:** weights hanging freely, ropes in pulley grooves, no knots, body aligned, foot of bed elevated if ordered.
- ◆ **Reposition safely:** for skin traction → may briefly intermittent per order; for skeletal → use the trapeze, log-roll only as ordered, never remove weights.
- ◆ **Promote pulmonary hygiene:** incentive spirometer q1h awake, cough & deep breathe, encourage trapeze use to expand chest.
- ◆ **DVT prevention:** SCDs to uninvolved leg, ankle pumps, isometric exercises (quad sets, gluteal sets), anticoagulation prn.
- ◆ **Prevent constipation:** ↑ fluids (2–3 L/day if not contraindicated), high-fiber diet, stool softener, bedpan/fracture pan.
- ◆ **Pain management:** scheduled analgesics, ice to swelling sites (NOT to ischemic limb), distraction.
- ◆ **Psychosocial support:** address boredom, helplessness, body image. Encourage family, hobbies, normal sleep-wake cycle.

HALO VEST — BEDSIDE ESSENTIALS



Keep the Wrench at the Bedside

Tape a torque wrench to the front of the halo vest at all times. In a cardiac arrest, the **front of the vest must be removed** to perform chest compressions. Inspect skin under the vest daily (use a flashlight); never use lotion or powder under the vest. Sheepskin liners may be changed by the HCP only.

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SECTION SIX

Pharmacology

CLASS / DRUG	MECHANISM	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Opioid Analgesics <i>Morphine, Hydromorphone, Oxycodone</i>	μ-receptor agonist; central analgesia	Sedation, respiratory depression, constipation, hypotension	Monitor RR (<12 = hold); add scheduled stool softener; assess pain & sedation with each dose
NSAIDs <i>Ibuprofen, Ketorolac</i>	COX-1/COX-2 inhibition; ↓ prostaglandins	GI bleed, renal injury, ↑ BP, platelet dysfunction	Give with food; monitor BUN/Cr; max 5 days ketorolac; assess for melena
Acetaminophen	Central COX inhibition	Hepatotoxicity (dose-dependent)	Max 4 g/day (3 g if elderly/liver disease); count combo products (Percocet, Norco)
Muscle Relaxants <i>Cyclobenzaprine, Methocarbamol, Diazepam</i>	CNS depression; ↓ skeletal muscle tone	Drowsiness, dry mouth, dizziness, urinary retention	Fall precautions; avoid alcohol; not for elderly (anticholinergic burden)
Anticoagulants (DVT prophylaxis) <i>Enoxaparin (Lovenox), Heparin</i>	↓ clotting factors (Xa, thrombin)	Bleeding, thrombocytopenia (HIT), bruising	Monitor platelets, Hgb/Hct; check INR (warfarin) or anti-Xa; bleeding precautions
Stool Softeners / Laxatives <i>Docusate, Senna, Polyethylene glycol</i>	↑ water in stool / stimulate peristalsis	Cramping, diarrhea, electrolyte loss	Pair with opioids automatically; encourage fluids/fiber
Antibiotics (if pin infection) <i>Cephalexin, Vancomycin, Cefazolin</i>	Inhibit bacterial cell wall synthesis	Allergy, GI upset, nephrotoxicity (vanc), C. difficile	Obtain culture before first dose; monitor trough levels for vanc; assess renal fxn
Calcium / Vitamin D	Bone mineralization; offset disuse osteoporosis	Constipation, hypercalcemia, renal stones	Adequate hydration; not with iron or tetracycline (binds & ↓ absorption)

CRITICAL DRUG PEARL

Always Pair Opioids with a Bowel Regimen

Bed rest + opioid + decreased fluid intake = near-guaranteed constipation. NCLEX expects you to **anticipate, not react** — initiate docusate ± senna with the first opioid dose.

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SECTION SEVEN

NCLEX Test Traps

Wrong answers students are *trained* to pick — and what the right answer actually is.

⚠️ WRONG MOVE

Lift the weights briefly while moving the patient up in bed.

✓ CORRECT ACTION

Never lift, support, or remove weights. Use a trapeze bar and have the patient pull themselves up; the weights stay freely hanging.

⚠️ WRONG MOVE

Elevate the affected limb above heart level to "reduce swelling" when the patient reports severe deep pain.

✓ CORRECT ACTION

Suspect compartment syndrome. Keep the limb at heart level (NOT elevated), remove constricting devices, and notify the HCP STAT. Elevation worsens ischemia.

⚠️ WRONG MOVE

Loosen the halo vest to give the patient "more room to breathe."

✓ CORRECT ACTION

NEVER loosen or adjust halo bolts. Only the HCP/orthopedist adjusts the device. Reassess respiratory status and call the HCP.

⚠️ WRONG MOVE

Report serous, clear drainage and slight crusting at a pin site as "infection."

✓ CORRECT ACTION

Serous drainage and slight crusting are normal. Infection = purulent (yellow/green) drainage, erythema spreading >1 cm, warmth, fever, increased pain.

⚠️ WRONG MOVE

Confuse Bryant's traction (kids) with Buck's traction (adults).

✓ CORRECT ACTION

Bryant's = Babies (B/B). Both legs vertical, buttocks off bed. **Buck's = adults with hip fracture pre-op**; horizontal pull.

⚠️ WRONG MOVE

Massage reddened bony prominences to "improve circulation."

✓ CORRECT ACTION

Never massage reddened or bony areas — it can worsen tissue injury. Offload pressure with heel boots, pillows, and turning.

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SECTION EIGHT

Patient & Family Education

Empower the patient and family to recognize problems early and to participate safely in care.

1

Don't touch the equipment

Don't lift weights, untie ropes, or reposition the splint. Call the nurse for anything that looks off.

2

Use the trapeze bar

Pull yourself up to shift weight and reposition. Don't push with your heels — protects the skin and the affected leg.

3

Move what you can

Wiggle toes/fingers, ankle pumps, deep breaths, incentive spirometer hourly. Prevents clots and pneumonia.

4

Report symptoms immediately

New numbness, tingling, cold/pale skin, severe pain not relieved by meds, fever, calf pain, chest pain, or shortness of breath.

5

Eat for healing

High protein, calcium, vitamin D, vitamin C, and fiber. Drink 2–3 L of water daily (unless restricted).

6

Pin-site care at home (if d/c)

Clean as taught (typically chlorhexidine). Watch for redness, warmth, pus, or worsening pain. Don't pick crusts.

7

Halo vest precautions

Sponge bathe only — no tub or shower. Don't drive. Sleep on your back. Keep the wrench taped to the vest at all times.

8

Emotional well-being

Bed rest is hard. Visit with family, read, listen to music. Tell the team if you feel sad, anxious, or sleepless.

9

SECTION NINE

Memory Boosters & Mnemonics

5 P's

The neurovascular assessment — applies to all extremity injuries, casts, and traction.

Pain

Pallor

Pulselessness

Paresthesia

Paralysis

TRACTION

Mnemonic for traction care priorities.

Temperature/color distal

Ropes free / pulleys aligned

Alignment of body

Circulation checks

Type & location verified

Increase fluids/fiber

Overhead trapeze

No weights on bed/floor

B's

Match the traction to the patient.

Bryant's = Babies

Buck's = Big people (adult hip fx)

Balanced = Bone (skeletal/femur)

HALO Safety

Quick-recall checklist.

Hold the wrench at bedside

Assess pin sites & skin

Log-roll only

Only HCP adjusts bolts

Compartment Syndrome — "6 P's"

Same as 5 P's + Poikilothermia (coolness).

Pain (unrelieved)

Pallor

Pulselessness

Paresthesia

Paralysis

Poikilothermia (cool)

Pattern Pearls

Reliable visual cues for question stems.

Weight on floor → **FIX FIRST**

Rope knotted → reposition rope

Severe deep pain → **compartment**

Halo + arrest → wrench OFF front

Pin site oozing pus → infection

10

SECTION TEN

NCJMM Clinical Judgment Scenario

CASE

Mr. R., 68, Day 2 post-MVA

Mr. R. was admitted with a closed mid-shaft right femur fracture and is in **balanced suspension skeletal traction** with 20 lb of weight via a pin through the distal femur. He has been stable on hydromorphone PCA. At 0700 you receive report; at 0830 he calls out: *"My leg feels like it's on fire. The pain is so much worse than yesterday — the pump isn't helping."* His toes on the right are dusky and cool; he reports tingling. Pedal pulse is faintly palpable. The Thomas splint feels tight at the calf. Vitals: T 37.1, HR 112, RR 22, BP 148/92, SpO₂ 96%.

1

RECOGNIZE CUES

What is concerning?

Severe pain not relieved by PCA · pain disproportionate to injury · dusky/cool toes · tingling (paresthesia) · diminished pulse · tight splint · tachycardia · hypertension.

2

ANALYZE CUES

What do these cues mean together?

The cluster — disproportionate pain + neurovascular changes + a tight splint — points to **acute compartment syndrome of the right lower leg**. This is a surgical emergency; without rapid fasciotomy, ischemia > 4–6 hours causes irreversible muscle and nerve damage (Volkmann's contracture, limb loss).

3

PRIORITIZE HYPOTHESES

What's the most likely & most urgent problem?

1 Compartment syndrome (PRIORITY — life/limb threat). **2** Inadequate analgesia. **3** DVT. **4** Anxiety. Compartment syndrome is treated first because of the narrow ischemic window.

4

GENERATE SOLUTIONS

What actions will address the problem?

Keep the limb at heart level (do NOT elevate, do NOT ice) · loosen the splint/wrap if possible · maintain traction weights freely hanging · notify the HCP/orthopedist STAT · prepare for compartment pressure measurement and possible fasciotomy · obtain IV access, type & screen, NPO · continue neurovascular checks every 15 min · provide reassurance.

5

TAKE ACTION

What does the nurse do right now?

Stay with the patient · place limb at heart level · loosen the constricting splint · call HCP immediately ("SBAR — concerned for compartment syndrome, right leg") · do not give additional opioid as primary treatment · document NV findings · prepare OR consent if surgery is indicated. **Do NOT remove the skeletal traction weights yourself.**

6

EVALUATE OUTCOMES

How will the nurse know it worked?

Pain decreasing toward baseline · toes pink, warm, with brisk capillary refill < 3 sec · palpable pedal pulse · resolved paresthesia · ability to move toes · compartment pressures < 30 mmHg (or < 30 below diastolic) · stable vitals · no further deterioration. If symptoms worsen → emergency fasciotomy.

Content drawn from standard NGN NCLEX 2026 references (Saunders, ATI, Lippincott); traction notes were not included in the uploaded study set.