

 MUSCULOSKELETAL SYSTEM

TRACTION

Application of a pulling force to align bones, reduce fractures, decrease muscle spasm, and immobilize an injured body part.

NGN NCLEX 2026 • High-Yield Review

 SECTION 1

Definition & Overview

What is it? Traction is the application of a **pulling force** on a body part using weights, ropes, and pulleys to align bones or reduce a fracture.

Why it matters: Traction **reduces fractures, decreases muscle spasm, immobilizes** the extremity, corrects deformities, and helps relieve pressure on nerves.

Key principle — COUNTER-TRACTION: For traction to work, an equal and opposite force (countertraction) must be applied. This is usually provided by the patient's body weight with the **head of bed slightly elevated** or the **foot of bed raised**.



SECTION 2

Types of Traction

EXTERNAL

Skin Traction

- ▶ **Buck's Traction**
 - straight pull on leg; used for hip/femur fractures pre-op
- ▶ **Russell's Traction**
 - knee suspension + Buck's pull; femur fractures
- ▶ **Bryant's Traction**
 - bilateral vertical pull; children < 2 yrs, < 30 lbs with femur fx (buttocks off bed)
- ▶ **Cervical Traction**
 - head halter for cervical strain
- ▶ **Pelvic Traction**
 - belt around pelvis for low back pain
- ▶ **Max weight:**
 - 5–10 lbs (avoid skin damage)

INTERNAL

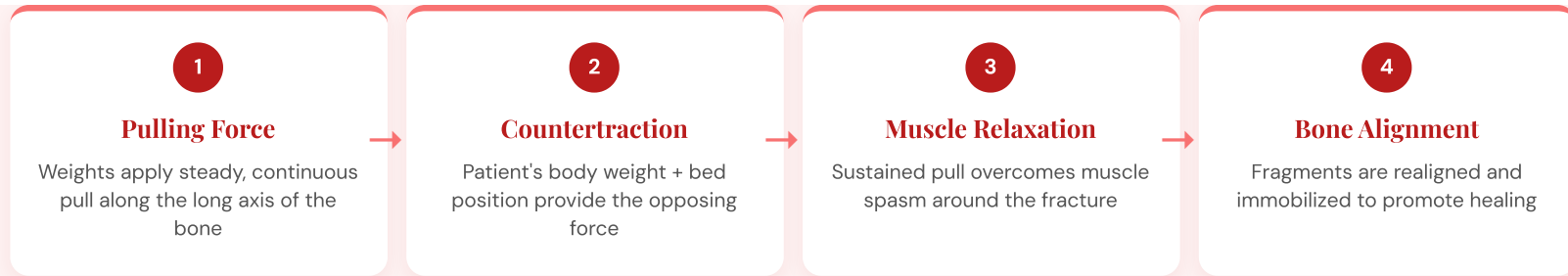
Skeletal Traction

- ▶ **Pins/wires/tongs**
 - inserted directly into the bone
- ▶ **Crutchfield / Gardner–Wells Tongs**
 - cervical spine fractures
- ▶ **Halo Vest**
 - cervical/thoracic spine immobilization (allows ambulation)
- ▶ **Steinmann pins / Kirschner wires**
 - long bone fractures
- ▶ **Weights:**
 - 15–30 lbs (stronger pull than skin)
- ▶  **Major risk: PIN-SITE INFECTION & osteomyelitis**



SECTION 3

How Traction Works



SECTION 4

Signs & Symptoms (Problems to Detect)

Early / Mild Findings

- Mild discomfort at pin site
- Slight serous drainage from pin site (expected in first 48–72 hrs)
- Pink, warm extremity with brisk capillary refill
- Muscle stiffness from immobility
- Mild pruritus or skin tightness under skin traction

Late / Severe — RED FLAGS

- 🚨 Purulent, odorous drainage → **infection / osteomyelitis**
- 🚨 Fever, chills, rising WBC
- 🚨 Cool, pale, cyanotic, or mottled extremity
- 🚨 Absent or diminished pulses distal to traction
- 🚨 Unrelieved or escalating pain = **COMPARTMENT SYNDROME**
- 🚨 Sudden dyspnea, chest pain, petechiae → **fat embolism / PE**
- 🚨 Calf pain, warmth, edema → **DVT**
- 🚨 Loose or backed-out pin (skeletal traction)

🚨 PRIORITY ASSESSMENT — THE 6 P'S OF NEUROVASCULAR CHECK

Perform every
1–2 hours

initially, then every 4 hours. Compare to the unaffected limb.

P

Pain

P

Pallor

P

Pulse

P

Paresthesia

P

Paralysis

P

Poikilothermia



SECTION 5

Priority Nursing Interventions

1

 **Weights MUST hang freely.** NEVER lift, remove, or let weights rest on the floor, bed, or chair. Doing so eliminates the pulling force.

2

 **Ensure continuous, uninterrupted pull.** Ropes must be in the center of the pulley track, knots secure, and lines free of frays.

3

Perform neurovascular checks (6 P's) every 1–2 hrs initially, then every 4 hrs. Compare bilaterally.

4

Maintain proper body alignment in the center of the bed. Do NOT allow the patient to slide down — this removes countertraction.

5

Pin site care per facility protocol (typically sterile; chlorhexidine or saline). Assess for redness, purulent drainage, warmth, loose pins.

6

Prevent skin breakdown — assess bony prominences (heels, sacrum, elbows) every 2 hrs; use trapeze bar to lift off bed for skin care.

- 7 **Prevent DVT** — encourage active range-of-motion (ROM) of unaffected extremities; ankle pumps; SCDs as ordered; adequate hydration.
- 8 **Prevent respiratory complications** — incentive spirometry, deep breathing, cough every 2 hrs. Watch for fat embolism (femur fx).
- 9 **Prevent constipation** — high-fiber diet, fluids, stool softeners. Immobility + opioids = constipation.
- 10 **Pain management** — scheduled analgesics + muscle relaxants; unrelieved pain is a RED FLAG for compartment syndrome, not a sign to increase opioids.
- 11 **Halo Vest:** KEEP the special wrench taped to the vest at all times (for emergency removal during CPR/cardiac arrest).

SOS

SECTION 6

Complications & Management

COMPLICATION	KEY ASSESSMENT FINDINGS	NURSING MANAGEMENT
Compartment Syndrome 	Severe unrelieved pain , pain with passive stretch, tense/hard compartment, pallor, paresthesia, pulselessness (late)	NOTIFY HCP IMMEDIATELY. DO NOT elevate above heart. DO NOT apply ice. Remove constrictive dressings. Prepare for emergency fasciotomy .
Pin-Site Infection / Osteomyelitis	Purulent drainage, redness >2 cm around pin, warmth, fever, elevated WBC, loose pin	Notify HCP. Culture drainage. Administer IV antibiotics . Sterile pin care per protocol. Monitor temp and WBC.

COMPLICATION	KEY ASSESSMENT FINDINGS	NURSING MANAGEMENT
Fat Embolism Syndrome (FES)	Classic triad: hypoxemia, neurologic changes, petechial rash (chest/axilla/neck). Occurs 24–72 hrs after long bone fx.	Administer O₂ , place in high-Fowler's , IV fluids, corticosteroids as ordered. Notify HCP STAT. Prepare for possible intubation.
Deep Vein Thrombosis (DVT)	Unilateral calf pain, warmth, edema, redness. Homan's sign is unreliable.	DO NOT massage leg. Bed rest, elevate limb, anticoagulants (heparin/enoxaparin). Monitor for PE : sudden dyspnea, chest pain.
Pulmonary Embolism (PE)	Sudden dyspnea, pleuritic chest pain, tachycardia, hypoxia, anxiety, hemoptysis	High-Fowler's, O₂ , notify HCP STAT, prepare for anticoagulation/thrombolytics, continuous monitoring.
Skin Breakdown / Pressure Injury	Redness, blisters, non-blanching erythema on heels, sacrum, elbows	Reposition every 2 hrs (within limits of traction), trapeze bar use, pressure-relieving mattress, skin barrier care, nutrition/protein intake.
Disuse Syndrome / Muscle Atrophy	Muscle weakness, contractures, foot drop, decreased ROM	Active/passive ROM to unaffected joints, isometric exercises (quad & gluteal sets), foot board to prevent foot drop, PT consult.
Constipation / Paralytic Ileus	Absent bowel sounds, abdominal distention, no BM	High-fiber diet, 2–3 L fluids daily, stool softeners, early ambulation when cleared, monitor bowel sounds.
Urinary Stasis / UTI / Renal Calculi	Cloudy, foul-smelling urine, flank pain, hematuria, dysuria	Increase fluids to 2–3 L/day, monitor I&O, acidify urine (cranberry juice), promote voiding in upright position when possible.
Halo Vest Loosening	Loose pins, head movement within halo, visible pin migration	DO NOT adjust pins. Notify HCP immediately. Keep wrench taped to vest for emergency CPR access. Assess skin under vest daily.



Pharmacology

DRUG / CLASS	USE IN TRACTION	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Opioids (morphine, hydrocodone, oxycodone)	Moderate to severe fracture pain	Respiratory depression, constipation, sedation, hypotension	Monitor RR > 12; have naloxone available; add stool softener; fall risk
NSAIDs (ibuprofen, ketorolac)	Mild–moderate pain, inflammation	GI bleed, renal impairment, platelet inhibition	Give with food; monitor BUN/Cr; limit ketorolac to 5 days
Muscle relaxants (cyclobenzaprine, baclofen, diazepam)	Reduce muscle spasm around fracture	Drowsiness, dizziness, dry mouth, hypotension	Fall precautions; avoid alcohol; don't drive; taper diazepam/baclofen
Anticoagulants (enoxaparin, heparin)	DVT / PE prophylaxis	Bleeding, bruising, HIT (heparin-induced thrombocytopenia)	Monitor aPTT (heparin), platelets; assess for bleeding; no IM injections
Stool softeners (docusate) / Laxatives	Prevent immobility/opioid constipation	Abdominal cramping, diarrhea	Administer daily; encourage fluids and fiber
Antibiotics (cefazolin, vancomycin)	Treat or prevent pin-site infection / osteomyelitis	GI upset, nephrotoxicity (vanco), "red man" syndrome (vanco)	Infuse vanco slowly over ≥ 60 min; monitor trough levels, renal function
Calcium + Vitamin D	Promote bone healing	Constipation, hypercalcemia	Take with food; adequate fluid intake



SECTION 8

NCLEX Test Traps

Trap #1

Trap #2

"The weights are dragging on the floor..."

Students try to REMOVE the weights or adjust the patient.

- ✓ Pull the patient UP in bed (restores countertraction). Weights must hang freely — never remove them unless ordered.

Patient complains of severe, unrelieved pain

Don't automatically give more pain medication.

- ✓ Assess for compartment syndrome FIRST (6 P's). Notify HCP. Opioids mask the warning sign.

Trap #3

Pin site has clear/serous drainage

Students think this is always infection.

- ✓ Small amount of serous drainage is EXPECTED in first 48–72 hrs. Purulent + fever + erythema > 2 cm = infection.

Trap #4

Patient in Buck's traction needs repositioning

Students completely remove traction to reposition.

- ✓ Skin traction may be intermittent (HCP order). Skeletal traction is NEVER removed by the nurse — it is continuous.

Trap #5

Halo vest patient goes into cardiac arrest

Students don't know how to do CPR.

- ✓ Use the WRENCH taped to the vest to release the front panel for chest compressions.

Trap #6

Calf pain in a traction patient

Students massage the leg to relieve pain.

- ✓ NEVER massage a suspected DVT — risk of dislodging the clot → PE. Notify HCP; elevate; anticoagulate.



SECTION 9

Patient & Family Education



Don't touch the weights.

Never lift, prop, or remove weights — even when repositioning.



Stay centered in bed.

Slipping down removes countertraction and ruins the pulling force.



Ankle pumps & quad sets.

Perform every hour while awake to prevent DVT and muscle atrophy.



Drink 2–3 L of fluids daily

unless contraindicated — prevents constipation, UTI, and kidney stones.



Report immediately:

numbness, tingling, severe pain, cold/pale extremity, or chest pain/dyspnea.



Deep breathe + use incentive spirometer

every 1–2 hours to prevent pneumonia and atelectasis.



High-fiber diet + protein + calcium/Vit D

to promote bone healing and regular bowel movements.



Halo Vest care:

sponge-bathe only, inspect skin under vest daily, never grab the vest to pull up.

SECTION 10



Memory Boosters & Mnemonics

"TRACTION" — Care Bundle

- T** **Temperature** of extremity (warm vs cool)
- R** **Ropes** hang freely, in pulley tracks
- A** **Alignment** — patient centered in bed
- C** **Circulation** check (6 P's)
- T** **Type & location** of traction verified
- I** **Increased** fluid + fiber
- O** **Overhead trapeze** for movement
- N** **No weights** on floor or lifted

"6 P's" — Neurovascular Check

- P** **Pain** (unrelieved = compartment syndrome)
- P** **Pallor** (pale, cool extremity)
- P** **Pulse** (diminished or absent)
- P** **Paresthesia** (numbness, tingling)
- P** **Paralysis** (inability to move)
- P** **Poikilothermia** (cool to touch)

"Fat Embolism Triad"

- H Hypoxemia** — sudden SOB, low O₂ sat
- N Neuro changes** — confusion, restlessness
- P Petechiae** — chest, axilla, conjunctiva

Onset: 24–72 hrs after long-bone fracture (especially femur).

Quick-Recall Rules

- 1 Weights **NEVER** on the floor
- 2 Skeletal traction is **CONTINUOUS** — don't remove
- 3 Unrelieved pain = **compartment syndrome until proven otherwise**
- 4 Halo vest = **wrench taped to vest** always
- 5 Bryant's traction = child's **buttocks off the bed**



NCJMM FRAMEWORK

NGN Clinical Judgment Measurement Model



Recognize Cues

Identify abnormal neurovascular findings (6 P's), pin site drainage/erythema, unrelieved pain, calf pain, sudden dyspnea, petechiae. Differentiate expected (serous) from unexpected (purulent) findings.



Analyze Cues

Connect clusters: Unrelieved pain + tense compartment = compartment syndrome. Dyspnea + petechiae 24–72 hrs post-fx = fat embolism. Unilateral calf pain + warmth = DVT.



Prioritize Hypotheses

Life-threatening first: fat embolism / PE / compartment syndrome > infection > immobility complications > comfort. Apply ABCs and safety in that order.



Generate → Take → Evaluate Actions

Notify HCP STAT for red flags, remove constrictive dressings, elevate only when appropriate, administer O₂, anticoagulants, IV antibiotics. Reassess neurovascular status, pain, vitals, and O₂ sat to confirm resolution.

You've Got This, Future Nurse! 💪

NGN NCLEX 2026 Study Library • Traction: Musculoskeletal System