Fractures, casts and traction

Fracture care, compartment syndrome, fat embolism, cast care, traction, hip and knee replacement

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1 AT A GLANCE

A fracture is more than a broken bone: swelling, bleeding and clots around it can cost the limb, or the client's life. The nurse keeps casts and traction working, and catches trouble early.

Compartment syndrome: a surgical emergency

	Finding and action
What happens	Swelling inside a closed muscle compartment raises the pressure until blood can't get in; the fascia doesn't stretch. Causes: fractures, crush injuries, surgery, a cast or bandage that's too tight
★ **First sign**	**Pain out of proportion** to the injury, worse on passive stretch, and not relieved by opioids or elevation. Easiest to miss in sedated or unconscious clients
★ **Then**	Tingling or numbness that spreads, a cool limb, pallor. Pulselessness and paralysis come late: **normal pulses don't rule it out**
★ **Act**	**Report it right away.** Don't wait for all six P's, and don't just give more pain medicine and wait. Irreversible damage can happen within hours; there's no safe time to wait
Limb and treatment	Keep the limb **near heart level, not raised**, to support blood flow. Urgent surgical assessment: a tight cast or dressing may be released, but fasciotomy is the definitive treatment

Six P's: Pain, paresthesia, poikilothermia (a cool limb), pallor, pulselessness, paralysis. It's an emergency: don't wait for the full set.

Fractures

- Closed: the skin is intact. Open: a wound reaches the break, even if no bone shows.
- Pain, swelling, deformity, tenderness, bruising, crepitus (a grating feel or sound).
- ★ **Below the break**: numbness, tingling, pallor, coolness, weak pulses or slow capillary refill mean danger.
- ★ Hip fracture, usually after a fall in an older adult with osteoporosis: the leg looks **shorter and turned outward**; can't bear weight. Surgery often follows within 48 hours, if the client is stable.
- Open reduction and internal fixation (ORIF): surgery to realign the bone, then pins, plates, rods or screws hold it.
- Pain relief often combines acetaminophen, anti-inflammatories and opioids, as ordered; some prescribers limit anti-inflammatories, which may slow healing.

Other complications

- ★ **Fat embolism**, after a long-bone or marrow-rich fracture like the femur or pelvis: breathlessness, confusion, a petechial rash, fever. Get emergency help, give oxygen, raise to high Fowler's.
- Chest pain, shortness of breath or a sudden cough with blood can be a clot in the lungs: an emergency.
- DVT: one-sided swelling, pain, warmth and redness. Early movement, anticoagulants and compression stockings help prevent it.
- Heavy bleeding can cause hypovolemic shock: IV fluids and blood. Open fractures and surgery can become infected.

Cast care

	What to do
New cast	Plaster can take 24 to 48 hours to dry: leave it uncovered. Handle it with your palms, not your fingertips (dents become pressure points), and support it on pillows. Remove rings
★ **Swelling**	Routinely, raise the limb above the heart; ice 10 to 20 minutes, with a barrier. **Suspected compartment syndrome: keep it near heart level, no ice, and report it**
★ **Check below**	Circulation, sensation and movement, often in the first day or two, per policy. Compare color, temperature and pulses with the other limb. A pressed nail bed pinks up in **under 2 seconds**
Get care right away	Pale, cold or blue fingers or toes, numbness or trouble moving them, pain that medicine doesn't relieve
Call the provider	Too tight or loose, itching or burning, cracks, or signs of infection like fever or a foul smell. A musty odor can mean tissue breaking down underneath
Teach	Keep it dry; cover it to shower. Nothing inside, no scratching, no powder or lotion. Wet? Hair dryer on cool, and call. No walking on it unless the provider says so

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Fractures, casts and traction

1 AT A GLANCE, CONTINUED

Traction

	What to do
Skin	Wraps on the skin, like Buck's traction on the leg; eases muscle spasm until surgery
Skeletal	Pins, wires or tongs in the bone; can pull harder
★ **Weights**	**Hang freely**, never resting on the bed or floor. Never removed from a client with a fracture unless the provider orders it
Setup	Ropes in the pulley grooves, knots away from the pulleys, body in line with the pull. The nurse corrects problems like these but doesn't change the ordered weight or setup; report concerns
Pin sites	Check and clean per policy, with sterile technique as ordered: drainage, redness, odor. Teach to report rising pain, redness, drainage or fever
Client care	Prevent the effects of lying still, like constipation and chest problems: deep breaths, exercise of the other limbs. A trapeze helps the client move

Hip and knee replacement

- ★ Hip: dislocation is the main danger, especially in the first months. **Don't cross the legs or ankles**; bending limits depend on the surgical approach and the surgeon's orders.
- Firm, high chair with arms, hips above knees; raised toilet seat. Sleeping per the same orders: for example, not on the operated side, a pillow between the thighs.
- Stairs: up with the good leg first, down with the operated leg first.
- ★ Knee: straight in bed, **pillow under the heel, not the knee**. No twisting, pivoting or kneeling.
- Either: blood thinners may be taken for 2 to 4 weeks; weight-bearing only as cleared.

2 PRIORITY AND SAFETY CALLS

★ Pain keeps rising despite morphine hours after a new cast, and the toes tingle: **report it now**, possible compartment syndrome. More morphine, raising the leg or waiting loses time.

★ A day after a femur fracture, confused and short of breath with petechiae on the chest: suspect fat embolism. Emergency help, oxygen, high Fowler's.

Cool, pale fingers with a weak pulse below a forearm fracture: report it.

Traction weights resting on the floor: help the client up in bed so they hang freely. Never remove them without an order.

Redness and foul-smelling drainage at a pin site: report it to the provider and document it.

A splint for a suspected fracture immobilizes the joints above and below it; then check circulation below.

3 EXAM ANCHORS

1. Rising pain under a new cast: report it. Treating it with more opioid alone is the trap.
2. Breathlessness and petechiae after a femur fracture: fat embolism.
3. A short, outwardly rotated leg after a fall: hip fracture.
4. Traps: traction weights on the floor, removing weights, and scratching under a cast.
5. Hip replacement: no low, soft chair. Knee replacement: no pillow under the knee.

4 SELF-QUIZ

1. The first sign of compartment syndrome is pain out of _____ to the injury.
2. The definitive treatment for compartment syndrome is _____.
3. A pressed nail bed should pink up in under _____ seconds.
4. A new plaster cast can take 24 to _____ hours to dry.
5. Skin traction on the leg is called _____ traction.
6. After a hip replacement, go up stairs with the _____ leg first.

ANSWER KEY 1. proportion · 2. fasciotomy · 3. 2 · 4. 48 · 5. Buck's · 6. good

5 SOURCES

1. Open RN, Health Alterations, 10.6 Fracture. wtcs.pressbooks.pub/healthalts/chapter/10-6-fracture
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6. Cochrane CD004551, Pin site care for external bone fixators. cochrane.org/evidence/CD004551_methods-pin-site-…
7. MedlinePlus, Hip replacement: discharge. medlineplus.gov/ency/patientinstructions/000169.htm
8. MedlinePlus, Knee joint replacement: discharge. medlineplus.gov/ency/patientinstructions/000170.htm

Built from RN PocketPal course lessons: Fractures, compartment syndrome and orthopedic surgery (c15-l01); Casts, splints, traction and braces (c03-l09). Every line on this sheet comes from those lesson scripts.

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