MEDICAL-SURGICAL NURSING II · STUDY GUIDE

Exam 3 Study Guide

This guide covers chapters 5 and 6. You will learn to localize a weak limb from tone, reflexes and wasting, and to watch the one thing every neuromuscular patient can lose overnight: the strength to breathe and swallow. Then you will learn the neurovascular check that saves a limb, the calendar of orthopedic complications, and the positioning rules after joint replacement and amputation. Work one chapter at a time. Read the "what to know" paragraphs, study the tables, then try each worked case with the steps covered. Finish each chapter with its ten self-test items. The cram sheet at the end puts the numbers and rules in one place.

WHAT THIS GUIDE COVERS

- Chapter 5 · upper and lower motor neuron signs, neuromuscular junction and muscle disease, vital capacity and NIF, Bell palsy and trigeminal neuralgia, Parkinson disease and levodopa timing, multiple sclerosis and pseudo-relapse, myasthenia gravis and the drugs that worsen it, myasthenic versus cholinergic crisis, Guillain-Barre syndrome, ALS, Alzheimer disease and delirium, prioritizing and delegating.
- Chapter 6 · the six Ps and neurovascular charting, diagnostics and reference values, fracture types and healing, casts, traction and fixation, compartment syndrome, fat embolism, VTE and rhabdomyolysis, osteomyelitis, osteoarthritis, hip and knee arthroplasty, amputation, low back pain and cauda equina, osteoporosis drugs, osteomalacia and Paget disease.

CHAPTER 5

Neurologic Disorders: Degenerative and Neuromuscular Disease

Read it in full: **Chapter 5 in the textbook**. Practice it in the lab: **Localize the Failing Motor Unit, and Trend the Breath** and **Airway First, Label Second: Myasthenic, Cholinergic and Guillain-Barré**.

What to know

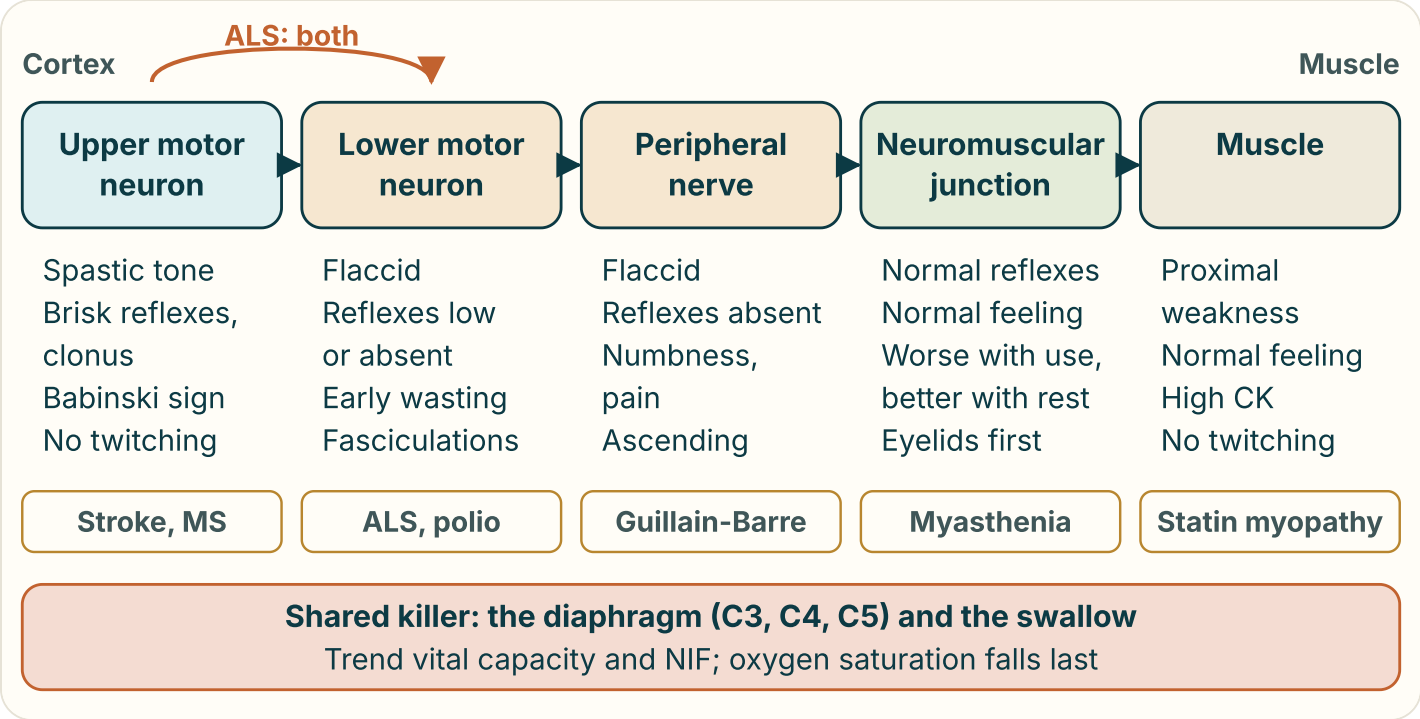
Movement runs through a relay: upper motor neuron (cortex to cord), lower motor neuron (anterior horn to nerve), neuromuscular junction, muscle. An **upper motor neuron** lesion gives spasticity, brisk reflexes, clonus and a Babinski sign, with little early wasting. A **lower motor neuron** lesion gives flaccid weakness, lost reflexes, wasting and fasciculations. **Neuromuscular junction** disease gives fatigable weakness with normal reflexes and normal sensation, often eyelids and swallowing first. Sensation helps sort: myasthenia and ALS do not cause numbness; Guillain-Barre and MS do.

Every patient in this chapter can die of the same thing: a weak diaphragm and a failing swallow. Pulse oximetry falls late. Trend **forced vital capacity** (normal about 60 to 70 mL/kg) and **negative inspiratory force** (normal more negative than -60 cm H2O). The **20/30/40 rule** flags impending failure: VC below 20 mL/kg, NIF weaker than -30, maximal expiratory pressure below 40. At the bedside, a single-breath count that stops in the low teens, a weak cough or a head that cannot lift from the pillow are warnings.

Parkinson disease is loss of dopamine neurons in the substantia nigra; symptoms show only after 60 to 80 percent are gone. Remember TRAP: resting tremor, rigidity, akinesia, postural instability. Carbidopa-levodopa is **time critical**: give it within about 30 minutes of the home schedule, about 30 minutes before meals (protein competes for absorption), and never stop it abruptly. Avoid dopamine blockers: metoclopramide, prochlorperazine, promethazine, haloperidol. Aspiration pneumonia is the leading cause of death, so screen the swallow.

Multiple sclerosis scatters demyelinating plaques in space and time; MRI and CSF oligoclonal bands support the diagnosis. Heat worsens symptoms (Uhthoff). A true relapse lasts more than 24 hours without fever or infection; a **pseudo-relapse** is old deficits brought back by infection or heat. New weakness means check temperature and urine first, then think steroids (methylprednisolone 1 g IV daily for 3 to 5 days, with glucose checks). **Myasthenia gravis** is an antibody attack on acetylcholine receptors: weakness worse with use, better with rest. Pyridostigmine goes 30 to 45 minutes before meals. Flag magnesium, aminoglycosides, fluoroquinolones and macrolides. In crisis, support the airway first, then sort myasthenic from cholinergic.

Guillain-Barre syndrome is an ascending, symmetric, flaccid weakness with early loss of reflexes, often 1 to 3 weeks after an infection such as Campylobacter. CSF shows high protein with a normal cell count. About one in four needs ventilation, and autonomic swings can be fatal. Treat with IVIG 0.4 g/kg daily for 5 days **or** plasma exchange, not both, and **no steroids**. **ALS** combines upper and lower motor neuron signs with intact sensation; plan noninvasive ventilation and a gastrostomy before FVC falls below about 50 percent. In dementia, an abrupt change is **delirium** until proven otherwise; avoid restraints and antipsychotics.



Where the relay breaks decides the findings. ALS is the one common disease that hits both the upper and lower motor neuron at once. Whatever the level, the patient dies of a weak diaphragm and a failing swallow.

LOCK THESE IN

- UMN: spastic, brisk, Babinski. LMN: flaccid, absent reflexes, wasting, fasciculations. NMJ: fatigable, normal reflexes and sensation.
- 20/30/40: VC below 20 mL/kg, NIF weaker than -30, MEP below 40 means impending failure. Oximetry is late.
- Levodopa: on the home schedule within about 30 minutes, before meals, never stopped abruptly.
- No metoclopramide, prochlorperazine, promethazine or haloperidol in Parkinson disease.
- New MS weakness: temperature and urinalysis before steroids.
- Myasthenia: airway first in any crisis; flag magnesium, aminoglycosides, fluoroquinolones, macrolides.
- Guillain-Barre: IVIG or plasma exchange, never both, no steroids; watch autonomic swings and VC every 2 to 4 hours.
- Sudden confusion in dementia is delirium until proven otherwise.

Key terms and comparisons: where is the lesion

Level	Tone and reflexes	Wasting and twitching	Sensation	Example
Upper motor neuron	Spastic; brisk, clonus, Babinski	Late disuse wasting; no fasciculations	Varies	Stroke, MS cord plaque
Lower motor neuron	Flaccid; reduced or absent	Early wasting; fasciculations	Intact if pure anterior horn	ALS, polio
Peripheral nerve	Low; absent, often distal first	Wasting over weeks	Numb, painful	Guillain-Barre, diabetic neuropathy
Neuromuscular junction	Normal; normal	None	Normal	Myasthenia gravis
Muscle	Normal or low; normal until severe	Proximal wasting; no fasciculations	Normal	Statin or inflammatory myopathy

Key terms and comparisons: myasthenic versus cholinergic crisis

Feature	Myasthenic crisis	Cholinergic crisis
Cause	Too little drug or a trigger (infection, surgery, drug)	Too much cholinesterase inhibitor
Timing	Often a missed or late dose; improves after a dose	Within about an hour of a dose
Pupils	Normal	Constricted
Autonomic	Dry, tachycardic, anxious	SLUDGE, bradycardia, sweating, fasciculations, copious secretions
Treatment	Airway, IVIG or plasma exchange, steroids, treat trigger	Hold the drug, atropine, airway support

Worked cases

WORKED CASE 1 · THE NUMBERS BEFORE THE CRASH

Mrs. Castellano, 60 kg, has generalized myasthenia and pneumonia. Levofloxacin was started last night. Her vital capacity was 1.9 L at 1000 and is 1.1 L at 1400. NIF is -22 cm H2O. Saturation is 95% on room air. Her voice has become nasal.

STEP 1 · CONVERT VC TO ML/KG

1900/60 = 31.7 mL/kg earlier; 1100/60 = 18.3 mL/kg now.

STEP 2 · APPLY 20/30/40

18.3 is below 20 mL/kg, and -22 is weaker than -30. Both say failure is near.

STEP 3 · IGNORE THE REASSURING NUMBER

95% saturation is a late, lying indicator in neuromuscular weakness.

STEP 4 · ACT

Raise the head of bed, stop oral intake, continuous monitoring, call the provider and rapid response, prepare for elective intubation.

STEP 5 · FIND THE TRIGGER

Fluoroquinolones carry a boxed warning for worsening myasthenia. Ask for a different antibiotic; expect IVIG or plasma exchange.

RULE

Airway first. Labeling myasthenic or cholinergic comes after the patient is safe.

WORKED CASE 2 · THE LEVODOPA SCHEDULE

Mr. Ferrante, 74, with Parkinson disease, takes carbidopa-levodopa at 0600, 1000, 1400 and 1800 at home. The unit's standard times are 0900 and 2100. Nausea is ordered as metoclopramide 10 mg IV as needed.

STEP 1 · RECONCILE THE SCHEDULE

Enter the home times and flag the drug as time critical: give within about 30 minutes of each time.

STEP 2 · TIME IT WITH MEALS

About 30 minutes before meals; protein competes for absorption.

STEP 3 · SCREEN THE ANTIEMETIC

Metoclopramide blocks central dopamine and can make him rigid within a day. Ask for ondansetron or trimethobenzamide instead.

STEP 4 · GUARD THE SWALLOW

Screen for coughing with meals, pocketing or a wet voice; sit fully upright and stay upright 30 to 60 minutes after eating.

WORKED CASE 3 · GUILLAIN-BARRE ON THE MOVE

Mr. Osei, 70 kg, had diarrhea two weeks ago. Now his legs are weak and his reflexes are gone. VC is 18 mL/kg and NIF -26 cm H2O. IVIG is ordered.

STEP 1 · READ THE NUMBERS

VC 18 mL/kg is below 20; NIF -26 is weaker than -30. Notify now; move to a monitored or intensive care bed.

STEP 2 · COMPUTE THE IVIG

0.4 g/kg x 70 kg = 28 g daily for 5 days, 140 g total. (Worked calculation example only.)

STEP 3 · CHECK THE PLAN

IVIG or plasma exchange, not both. If steroids are ordered, question it: they do not help Guillain-Barre.

STEP 4 · WATCH THE AUTONOMIC SYSTEM

Cardiac monitor, slow position changes, careful suctioning (bradycardia), bowel sounds and retention.

TRAPS PEOPLE FALL INTO

- **Charting "respiratory status stable" because the saturation is 96%.** In neuromuscular weakness saturation falls last. Trend VC, NIF, cough and head lift.

- **Folding levodopa into the 0900 med pass.** It is time critical. A late dose can leave the patient rigid and unable to swallow.
- **Giving steroids for new MS weakness right away.** Rule out infection first. A pseudo-relapse from a UTI gets worse with steroids.
- **Ordering steroids for Guillain-Barre.** They do not help. IVIG or plasma exchange, one or the other.
- **Restraining an agitated patient with dementia.** Restraints raise injury, delirium and death. Search for the cause: pain, retention, infection, a new drug.

Chapter 5 self-test · ten items

1. A patient has a weak, wasted hand with twitching and absent reflexes, and normal sensation. Where is the lesion?

A. At the neuromuscular junction of the hand
B. In the sensory nerve roots of the cervical cord
C. In the lower motor neuron at the anterior horn
D. In the upper motor neuron in the motor cortex

C. In the lower motor neuron at the anterior horn Wasting, fasciculations and lost reflexes with normal sensation point to the anterior horn cell.

2. Which finding best shows a patient with Guillain-Barre is nearing respiratory failure?

A. A saturation of 95% on room air
B. A respiratory rate of 18 per minute
C. Bilateral leg weakness to the knees
D. A vital capacity of 17 mL/kg

D. A vital capacity of 17 mL/kg VC below 20 mL/kg meets the 20/30/40 warning rule. Saturation falls late.

3. Which antiemetic is safest for a patient with Parkinson disease?

A. Ondansetron
B. Promethazine
C. Metoclopramide
D. Prochlorperazine

A. Ondansetron The other three block central dopamine and worsen parkinsonism.

4. A patient's levodopa is due at 0730 and the morning med pass starts at 0900. What should the nurse do?

A. Give it with breakfast so the protein helps it
B. Give it at 0730, since it is a time-critical drug
C. Give it with the 0900 med pass for efficiency
D. Hold it until the provider makes rounds today

B. Give it at 0730, since it is a time-critical drug Levodopa should be given within about 30 minutes of its time, before meals.

5. A patient with MS has two days of worsening leg weakness. What should the nurse check first?

A. An MRI with gadolinium contrast
B. The next disease-modifying drug dose
C. Blood glucose before starting steroids
D. Temperature and a urinalysis with culture

D. Temperature and a urinalysis with culture A pseudo-relapse from infection or heat must be ruled out before high-dose steroids.

6. Which order should the nurse question for a patient with myasthenia gravis?

A. IV magnesium sulfate for a low magnesium
B. Cefazolin before a minor procedure
C. Oral acetaminophen for a mild headache
D. Pyridostigmine 45 minutes before meals

A. IV magnesium sulfate for a low magnesium Magnesium blocks acetylcholine release and can trigger crisis.

7. A myasthenic patient weakens within an hour of a dose and has tiny pupils and copious secretions. What is likely?

A. A normal response to the morning dose
B. An allergic reaction to the medication
C. Cholinergic crisis from too much drug
D. Myasthenic crisis from a missed dose

C. Cholinergic crisis from too much drug Miosis and SLUDGE signs soon after a dose suggest excess cholinesterase inhibitor. Airway first, then hold the drug.

8. Which CSF finding supports Guillain-Barre syndrome?

A. High white cells with a low glucose level
B. High protein with a normal white cell count
C. Oligoclonal bands with high pressure
D. Cloudy fluid with many neutrophils

B. High protein with a normal white cell count Albuminocytologic dissociation is the hallmark after the first week.

9. A patient with ALS has an FVC of 55% predicted and has lost weight. What should be raised now?

A. A high-dose steroid trial for strength
B. A trial of pyridostigmine with meals
C. Noninvasive ventilation and a gastrostomy
D. A sleep study in about six months

C. Noninvasive ventilation and a gastrostomy Both are planned before FVC falls below about 50 percent, when procedures are safer.

10. A calm patient with dementia is suddenly agitated and pulling at lines on day two. What is the priority?

A. Look for a delirium cause, such as retention or infection
B. Apply soft wrist restraints to protect the IV line
C. Give a scheduled dose of haloperidol each night
D. Chart it as the expected progression of dementia

A. Look for a delirium cause, such as retention or infection An abrupt change is delirium until proven otherwise. Look for the cause; avoid restraints.

CHAPTER 6

Musculoskeletal Disorders and Orthopedic Trauma

Read it in full: **Chapter 6 in the textbook**. Practice it in the lab: **The Six Ps: Early, Late and What You Chart** and **The Complication Calendar and the Call You Make**.

What to know

Bone has a blood supply, a nerve supply and a metabolism. A femur fracture can hide 1 to 2 liters of blood in the thigh. Fascial compartments do not stretch, so swelling inside one can cut off flow while the distal pulse still feels normal. The **neurovascular check** (the six Ps: pain, paresthesia,

pallor, pulselessness, paralysis, poikilothermia) is done on admission, after any cast or surgery, often hourly for 24 hours, and whenever the patient complains. Compare with the other limb and the last entry, and chart findings, not "neurovascular intact."

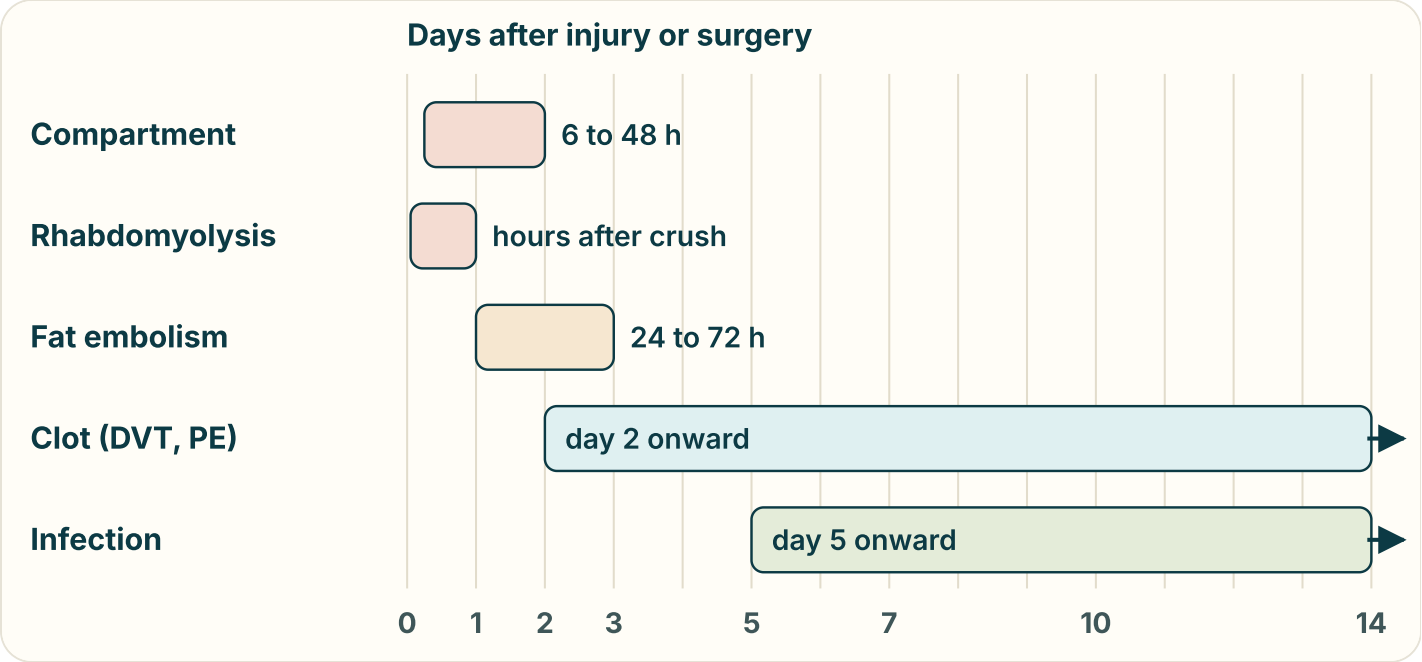
Fractures heal in four stages: hematoma, soft callus (days 3 to 14), bony callus (weeks 3 to 12), remodeling (months to years). An **open fracture** needs IV antibiotics within one hour, tetanus prophylaxis, a sterile moist cover and surgery. A new cast is elevated above the heart with ice for 24 to 48 hours; handle a wet cast with palms. Skin traction is limited to about 5 to 10 lb; skeletal traction (15 to 30 lb) is continuous: weights hang free and are **never removed**. Never lift a limb by an external fixator frame.

The complications keep a calendar. **Compartment syndrome** (6 to 48 hours): pain out of proportion, pain on passive stretch, a tense compartment; pulse and color are late. Loosen anything tight, put the limb at **heart level** (not above), remove ice and call the surgeon. Pressure above about 30 mmHg, or diastolic minus compartment pressure below 30, means fasciotomy. **Fat embolism** (24 to 72 hours): hypoxemia, confusion and a petechial rash on the chest and axillae. **VTE** from day 2: never massage a swollen calf. Infection from day 5. Rhabdomyolysis gives tea-colored urine and a CK above about five times normal; give IV fluids at once.

After a **posterior hip** replacement avoid flexion beyond 90 degrees, crossing the legs and internal rotation; after an anterior approach avoid hyperextension and external rotation. A pop with a short, internally rotated leg is a dislocation: keep still, call the surgeon, NPO. After a **knee** replacement, never put a pillow under the knee; keep it in extension. After an **amputation**, elevate the residual limb only for the first 24 hours, then lie prone 20 to 30 minutes three or four times a day, keep a tourniquet at the bedside, and treat phantom limb pain as real. Cauda equina syndrome (saddle numbness, retention, bilateral weakness) is a surgical emergency.

Osteoporosis has normal labs; the diagnosis is a T-score of -2.5 or lower (or a fragility fracture). Osteomalacia has low calcium and phosphate with high ALP and low vitamin D. Paget disease has a very high ALP with normal calcium. Everyone gets calcium 1,000 to 1,200 mg a day (no more than 500 to 600 mg at a time) and vitamin D 800 to 1,000 IU. **Alendronate**: first thing in the morning, empty stomach, full glass of plain water, stay upright 30 minutes, nothing else by mouth.

Correct calcium and vitamin D before any antiresorptive, get a dental exam, and never stop denosumab without a plan.



Assess for what the calendar points at. Each complication has its window. On day 1 think compartment; on days 1 to 3 think fat embolism; from day 2 think clot; from day 5 think infection.

LOCK THESE IN

- Earliest sign of compartment syndrome: pain out of proportion and pain on passive stretch. Pulselessness is last.
- Suspected compartment syndrome: loosen, limb at heart level, remove ice, call the surgeon. Do not elevate.
- Calendar: compartment 6 to 48 h; fat embolism 24 to 72 h; VTE from day 2; infection from day 5.
- Skeletal traction weights hang free and are never removed.
- Posterior hip: no flexion past 90, no crossing, no internal rotation. Knee: no pillow under the knee.
- Amputation: tourniquet at bedside; elevate 24 h only; prone lying three or four times a day.
- T-score: above -1.0 normal; -1.0 to -2.5 low bone mass; -2.5 or lower osteoporosis.
- Alendronate: empty stomach, 6 to 8 oz plain water, upright 30 minutes, nothing else by mouth.

Key terms and comparisons: the complication calendar

Complication	Timing	Hallmark	First action
Compartment syndrome	6 to 48 h	Pain out of proportion; pain on passive stretch; tense	Release constriction, heart level, remove ice, call surgeon
Fat embolism syndrome	24 to 72 h	Hypoxemia, confusion, petechiae on chest and axillae	Oxygen, upright, rapid response, ABG
Deep vein thrombosis	Day 2 to 14 and beyond	Unilateral calf swelling, warmth, tenderness	Do not massage; notify; duplex ultrasound
Pulmonary embolism	Any time after surgery	Sudden dyspnea, pleuritic pain, tachycardia	Oxygen, upright, rapid response, CT angiography
Rhabdomyolysis	Hours after crush	Tea-colored urine, CK above about 5 x normal, high K	Isotonic fluids now; trend K, creatinine, output
Infection	Day 5 onward	Fever, rising pain, drainage, rising CRP	Culture before antibiotics; notify surgeon

Key terms and comparisons: bone chemistry fingerprints

Condition	Calcium	Phosphate	ALP	Other
Osteoporosis	Normal	Normal	Normal	T-score -2.5 or lower
Osteomalacia	Low or low-normal	Low	High	Vitamin D low, PTH high
Paget disease	Normal	Normal	Very high	Bowing, skull growth, hearing loss
Hyperparathyroidism	High	Low	Normal or high	PTH high
Reference values	8.6 to 10.2 mg/dL	2.5 to 4.5 mg/dL	30 to 120 U/L	Vitamin D sufficient 30 to 100 ng/mL

Worked cases

WORKED CASE 1 · THE PINK FOOT THAT IS NOT FINE

Mr. Brannigan, 22, had a closed tibial fracture splinted six hours ago. Pain is 10 of 10 after two doses of IV morphine. He screams when his toes are passively extended and has numbness in the first web space. The dorsalis pedis pulse is palpable and the foot is pink. Blood pressure is 118/70; compartment pressure is measured at 48 mmHg.

STEP 1 · READ THE CUES

Pain out of proportion, pain on passive stretch and new paresthesia are the early signs of compartment syndrome. A pulse is expected early.

STEP 2 · COMPUTE THE DELTA PRESSURE

Diastolic 70 minus compartment 48 = 22 mmHg. Below 30 means fasciotomy is indicated; the absolute 48 is also above about 30.

STEP 3 · ACT IN ORDER

Loosen the splint wrap, place the leg at heart level, remove ice, call the surgeon now. Keep him NPO for possible fasciotomy.

STEP 4 · PLAN FOR THE MUSCLE

Watch CK, potassium, creatinine and urine color for rhabdomyolysis.

RULE

Do not elevate above the heart and do not medicate and recheck in an hour.

WORKED CASE 2 · TWO DAYS AFTER A FEMUR FRACTURE

Ms. Iwu, 26, had femoral fixation two days ago. She is restless and confused, respiratory rate 32, saturation 86% on room air, with fine petechiae on her chest and in her axillae.

STEP 1 · CHECK THE CALENDAR

24 to 72 hours after a long-bone fracture fits fat embolism syndrome.

STEP 2 · MATCH THE TRIAD

Hypoxemia, neurologic change and petechiae. The rash separates it from pulmonary embolism.

STEP 3 · ACT

Oxygen, sit upright, rapid response, ABG, prepare for possible ventilation. There is no specific antidote.

PREVENTION

Early immobilization and fixation within about 24 hours lower the risk.

WORKED CASE 3 · WHO FIRST ON THE ORTHO UNIT

Four patients: (A) day 3 after ORIF, temperature 38.1 C, incision clean; (B) day 1 after amputation asking if phantom sensation is normal; (C) day 2 after hip fracture repair, sudden dyspnea, pleuritic pain, heart rate 122; (D) new leg cast, itching underneath.

STEP 1 · FIND THE ABC PROBLEM

C has breathing and circulation signs in the highest-VTE-risk group: likely pulmonary embolism. See C first: oxygen, upright, rapid response.

STEP 2 · NEXT

A needs assessment of a low fever (often atelectasis at day 3, but check).

STEP 3 · THEN

D: check for a hidden pressure area and teach never to put objects under the cast.

STEP 4 · LAST

B: important teaching; phantom sensation is normal.

TRAPS PEOPLE FALL INTO

- **Waiting for a lost pulse before calling.** Pulselessness is the latest sign. Pain on passive stretch is early.
- **Elevating a limb with suspected compartment syndrome.** Elevation lowers inflow to an ischemic compartment. Heart level only.
- **Lifting skeletal traction weights to boost a patient up in bed.** The pull is continuous. Reposition so the weights hang free.
- **Putting a pillow under the knee after knee replacement.** It causes a flexion contracture. Elevate the whole leg under the calf.
- **Trusting a clean hip X-ray in an older adult who cannot bear weight.** Occult fractures hide for days. MRI is next.

Chapter 6 self-test · ten items

1. Which finding is the earliest sign of acute compartment syndrome?

A. Pain on passive stretch of the muscles
B. Pale, cool skin over the compartment
C. Inability to move the toes at all
D. Absent pulse below the injured area

A. Pain on passive stretch of the muscles Pain out of proportion and pain on passive stretch come first. The others are late.

2. Compartment syndrome is suspected in a casted forearm. What should the nurse do with the arm?

A. Lower it below the heart and apply heat
B. Place it at heart level and remove the ice
C. Raise it on two pillows above the heart
D. Keep ice on it and recheck in one hour

B. Place it at heart level and remove the ice Elevation above the heart and ice reduce inflow to an already ischemic compartment.

3. A patient in skeletal traction has weights resting on the floor. What is the best action?

A. Shorten the rope by tying a new, higher knot
B. Remove the weights while the patient is moved
C. Reposition the patient so the weights hang free
D. Rest the weights on the bed frame for a while

C. Reposition the patient so the weights hang free Skeletal traction is continuous. Never remove the weights; keep them hanging freely.

4. Two days after a femur fracture, a patient is confused and hypoxic with a chest petechial rash. What is most likely?

A. Septic arthritis
B. Compartment syndrome
C. Pulmonary embolism
D. Fat embolism syndrome

D. Fat embolism syndrome The 24 to 72 hour window plus hypoxemia, confusion and petechiae is classic for fat embolism.

5. After a posterior-approach hip replacement, which action should the nurse stop?

A. Lying with a wedge between the legs
B. Using a raised toilet seat at home
C. Crossing the legs at the ankles in bed
D. Sitting in a firm chair with arms

C. Crossing the legs at the ankles in bed Adduction past midline can dislocate a posterior-approach hip.

6. A patient one day after knee replacement has a pillow under the knee. What should the nurse do?

A. Remove all pillows from the bed
B. Move the pillow to under the calf
C. Add a second pillow under the knee
D. Leave it, since it helps comfort

B. Move the pillow to under the calf A pillow under the knee holds it flexed and causes a contracture.

7. After a below-knee amputation, which position is taught from day two?

A. Lying prone for 20 to 30 minutes several times a day
B. Keeping the stump raised on a pillow all day long
C. Placing a pillow between the thighs at night
D. Sitting with the knee bent for several hours daily

A. Lying prone for 20 to 30 minutes several times a day Prone lying prevents hip flexion contracture. Elevation is for the first 24 hours only.

8. A patient has calcium 9.4 mg/dL, phosphate 3.4 mg/dL, ALP 118 U/L and a T-score of -3.1. What is this?

A. Paget disease
B. Hyperparathyroidism
C. Osteomalacia
D. Osteoporosis

D. Osteoporosis Normal chemistry with a T-score of -2.5 or lower is osteoporosis.

9. A patient starting weekly alendronate asks how to take it. Which instruction should the nurse give?

A. Stay upright for 30 minutes after taking it
B. Take it with orange juice at breakfast
C. Take it at bedtime with a calcium tablet
D. Lie down if you feel dizzy after the dose

A. Stay upright for 30 minutes after taking it Upright 30 minutes, plain water only, empty stomach, nothing else by mouth. This protects the esophagus.

10. A patient reports numbness in the perineum, urinary retention and weak legs. What does the nurse suspect?

A. A muscle strain needing rest and heat packs

B. Sciatica needing an NSAID and stretching

C. Cauda equina syndrome needing urgent surgery

D. A urinary infection needing antibiotics

C. Cauda equina syndrome needing urgent surgery Saddle anesthesia, retention and bilateral weakness are a surgical emergency.

ONE PAGE

Cram sheet

One page of signs, times and positions for both chapters. Cover the right column and say each rule out loud.

Neuromuscular disease

Item	Rule or value
Localize	UMN spastic and brisk; LMN flaccid, wasting, fasciculations; NMJ fatigable with normal reflexes
Breathing	VC normal 60 to 70 mL/kg; warning VC below 20, NIF weaker than -30, MEP below 40
Parkinson	Levodopa on time, before meals; no dopamine blockers; screen swallow; orthostatic drop 20/10
MS	Relapse over 24 h without fever; rule out UTI; methylprednisolone 1 g IV daily 3 to 5 days
Myasthenia	Pyridostigmine 30 to 45 min before meals; flag magnesium, aminoglycosides, quinolones, macrolides
Crisis	Airway first; cholinergic has miosis and SLUDGE; myasthenic treated with IVIG or plasma exchange
Guillain-Barre	Ascending, areflexic; CSF high protein, normal cells; IVIG 0.4 g/kg x 5 days or plasma exchange; no steroids
ALS	UMN plus LMN, sensation intact; NIV and gastrostomy before FVC below 50%; riluzole
Bell palsy	Whole half face; prednisone within 72 h; protect the cornea
Dementia	Sudden change is delirium; no restraints; antipsychotics last resort

Musculoskeletal

Item	Rule or value
Six Ps	Pain and paresthesia early; pallor, pulselessness, paralysis late; cap refill under 3 s
Compartment	Pressure above about 30, or diastolic minus pressure below 30: fasciotomy; heart level, no ice
Calendar	Compartment 6 to 48 h; FES 24 to 72 h; VTE day 2 on; infection day 5 on
Open fracture	IV antibiotics within 1 h, tetanus, sterile moist cover, surgery
Traction	Skin 5 to 10 lb; skeletal 15 to 30 lb; weights hang free, never removed
Hip and knee	Posterior hip: no flexion past 90, no crossing, no internal rotation; knee kept in extension
Amputation	Tourniquet at bedside; elevate 24 h only; prone 20 to 30 min three or four times daily
Crutches	Elbows flexed 20 to 30 degrees; 2 to 3 finger widths below axilla; cane on the strong side
Bone foundation	Calcium 1,000 to 1,200 mg (500 to 600 per dose); vitamin D 800 to 1,000 IU
CK	Normal 30 to 170 U/L; rhabdo above about 5 x normal; above 5,000 high kidney risk

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