NPTE REVIEW · STUDY GUIDE

Final Review Study Guide

The final review covers all fourteen chapters and goes with the Full Mock Exam. Each chapter here is shorter than in its numbered study guide: three paragraphs of what to know, the same diagram, the points to lock in, one key table, one worked case, the traps and six new board-style items. If a chapter feels shaky, go back to its study guide for the full treatment. The cram sheet at the end gathers every table from the seven study guides on one long page.

WHAT THIS GUIDE COVERS

- Exam skills and the musculoskeletal system: chapters 1 to 4 (how the NPTE works; tissue, kinesiology and spine; upper extremity; lower extremity and gait).
- Neuromuscular: chapters 5 to 7 (neuroanatomy, examination and motor control; stroke, brain and spinal cord injury; progressive, peripheral and vestibular disorders).
- Cardiopulmonary and integumentary: chapters 8 to 10 (physiology and monitoring; heart, lung, vascular and lymphatic conditions; wounds, burns and skin).
- Other systems and nonsystems: chapters 11 to 13 (metabolic, GI, GU, oncology and drugs; modalities and devices; safety, professional duties and evidence).
- Lifespan: chapter 14 (pediatrics, geriatrics, women's and men's health and integrated cases).
- Every chapter carries its diagram, a key table, a worked case, the traps and a six-item self-test; the cram sheet holds all the numbers and rules.

CHAPTER 1

How the NPTE Works and How to Think Like the Exam

Read it in full: **Chapter 1 in the textbook**. Practice it: **Practice Exam 1** and the **flashcards**.

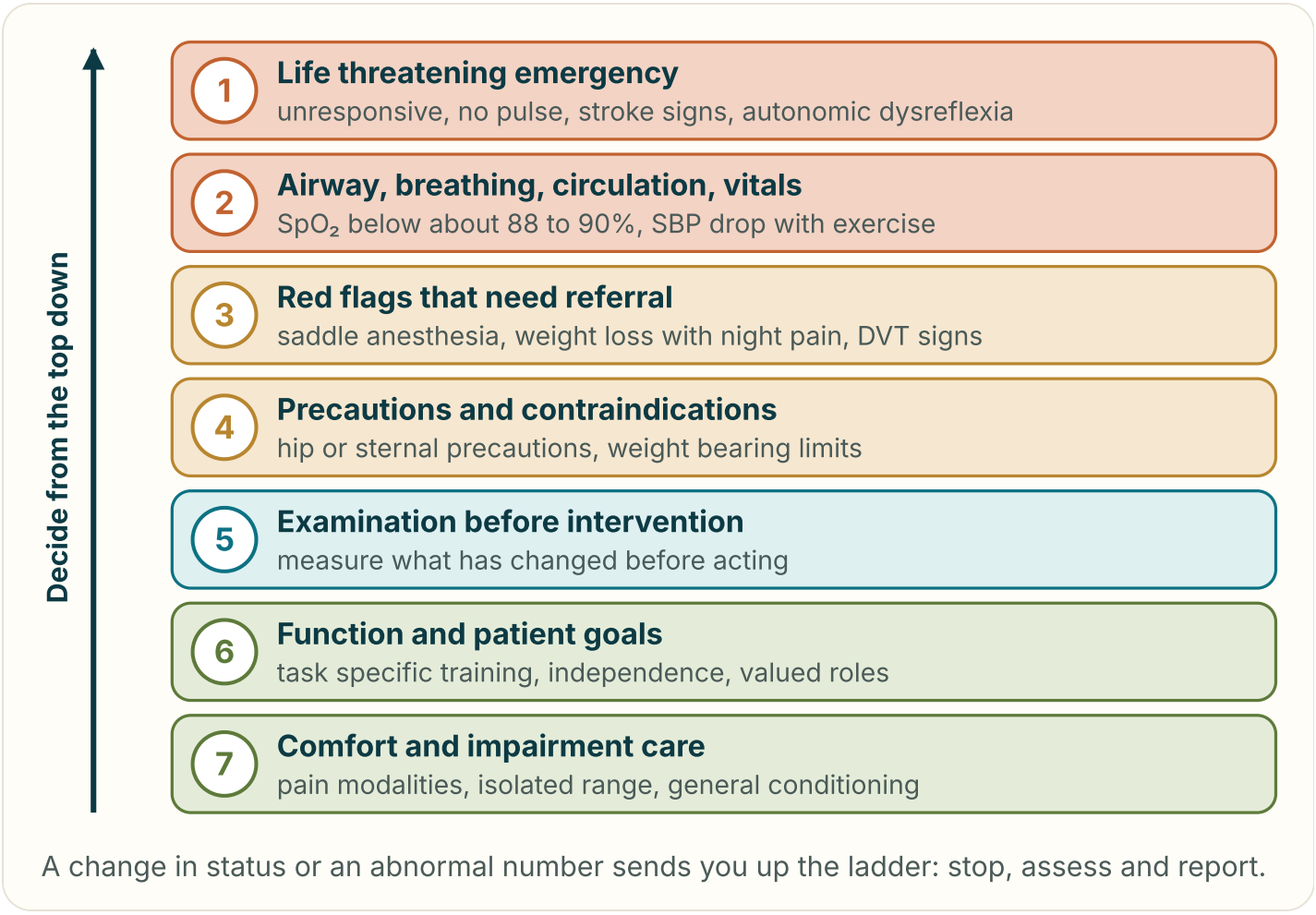
What to know

The NPTE is scored on a 200 to 800 scale with 600 as the passing standard, and unscored pretest items are mixed in invisibly. Read each stem for the patient, the setting and the task, predict an

answer, then knock out distractors that are true but irrelevant, mistimed, wrong for this patient, beyond scope or absolute.

The priority ladder decides most "first" questions: emergency, vital signs, red flags, precautions, examination, function, comfort. Care follows the patient and client management model, and the ICF sorts findings into impairment, activity (a task) and participation (a life role).

Every exam ends in treat, treat and refer, or refer. Settings have rules: inpatient rehab needs tolerance for about 3 hours a day, home health needs homebound status, and school PT must be educationally relevant. Only the PT evaluates, changes the plan of care and discharges.



The priority ladder. When several actions look right, the higher rung wins. New symptoms or abnormal numbers always push you up toward stop, assess and report.

LOCK THESE IN

- Scale 200 to 800; passing standard is a scaled score of 600. No penalty for guessing.
- Pretest items are unscored and invisible: reasoned guess, flag, move on.
- Patient, setting, task. Read the last sentence first and predict before you look.
- Priority ladder: emergency, vital signs, red flags, precautions, examination, function, comfort.
- A change in status or an abnormal number means stop, assess and report.
- ICF: activity is doing a task; participation is filling a life role; strength and range are body functions.
- Only the PT examines, evaluates, changes the plan of care, reexamines and discharges.
- Wells DVT (two level): 2 or more is likely, 1 or less unlikely. Homans sign is not reliable.

Keywords and the priority ladder

Item	What it tells you
First, initial, immediately	Sequence: choose the step that must come before the others, usually assessment or safety
Best, most appropriate	Several are reasonable: pick the most specific, evidence based and functional
Most likely	The common explanation that fits all the findings
Except, not, contraindicated	Negative item: find the one false or unsafe option
Ladder rung 1	Life threatening emergency: stop, call for help, start the protocol
Ladder rung 2	Airway, breathing, circulation, abnormal vitals (SpO_2 below about 88 to 90%)
Ladder rungs 3 to 4	Red flags needing referral; then precautions and contraindications
Ladder rungs 5 to 7	Examine before intervening; then function and goals; then comfort

Worked case

CASE 1.1 · A CHANGE IN STATUS DURING GAIT TRAINING

A 72 year old man on postoperative day 2 after total knee arthroplasty develops sudden shortness of breath and sharp pain on inspiration while walking. Heart rate is 118 and SpO_2 is 89 percent on room air. What should the therapist do first?

STEP 1 · FIND THE RISK WINDOW

Two days after a lower limb joint replacement is a classic window for venous thromboembolism.

STEP 2 · READ THE NUMBERS

Tachycardia, desaturation and pleuritic chest pain together point to possible pulmonary embolism, a medical emergency.

STEP 3 · APPLY THE LADDER

Abnormal vital signs and a possible emergency outrank finishing the gait session.

STEP 4 · CHOOSE THE ACTION

Stop, keep him seated and supported, stay with him, monitor vitals and notify the medical team at once; activate the emergency response if he worsens.

WHY NOT THE OTHERS

"Rest and resume" treats this as fatigue. "Return to bed" alone delays medical evaluation.

TRAPS PEOPLE FALL INTO

- **Chasing a fixed percent.** Equating means the raw score needed for 600 varies slightly by form.
- **Letting one odd item eat the clock.** Every item is worth the same and some odd items do not count.
- **Always choosing "assess" for "first."** If the danger is already clear (no breathing, a patient sliding to the floor), act first. If the stem already gave the assessment data, repeating it is a distractor.
- **Calling a life role an activity.** Walking, dressing and transfers are activities; worker, parent, student and league golfer are participation.

Chapter 1 self-test · six items

1. A stem says a patient on day 1 after surgery "suddenly becomes confused and diaphoretic." What should drive the answer?

A. The planned gait distance for the day
B. The change in status: stop and assess
C. The comfort measures listed in the chart
D. The patient's long term functional goal

B. The change in status: stop and assess A change in status moves you up the priority ladder: stop, assess and report.

2. A patient "needs moderate assistance to stand from a chair." In ICF terms this is:

A. An activity limitation
B. A body structure impairment
C. An environmental barrier
D. A participation restriction

A. An activity limitation Standing up is a task done by the person, so difficulty with it is an activity limitation.

3. A medically stable patient after stroke needs moderate assistance and can tolerate about 3 hours of therapy a day. Which setting fits best?

A. Home health with aide visits
B. Skilled nursing facility
C. Inpatient rehabilitation facility
D. Outpatient clinic, 3 days a week

C. Inpatient rehabilitation facility Inpatient rehab requires the ability to tolerate intensive interdisciplinary therapy, about 3 hours a day.

4. A candidate keeps changing right answers to wrong ones in practice. What is the best fix?

A. Spend more time on each hard item
B. Never change any answer at all
C. Always go with the second choice
D. Change only for a misread clue

D. Change only for a misread clue Second guessing is fixed by changing an answer only when a specific clue was misread.

5. Which item can a PTA perform?

A. Collect goniometry data
B. Write the initial plan of care
C. Perform a reexamination
D. Write the discharge summary

A. Collect goniometry data PTAs collect data and deliver interventions within the plan; the other tasks belong to the PT.

6. Under direct access, a patient's back pain began after lifting, changes with position and has no red flags. What is the decision?

A. Activate emergency services
B. Treat within physical therapy
C. Treat and refer for imaging
D. Refer before any treatment

B. Treat within physical therapy A mechanical pattern without red flags fits physical therapy, so the decision is to treat.

Musculoskeletal Foundations: Tissue, Kinesiology and the Spine

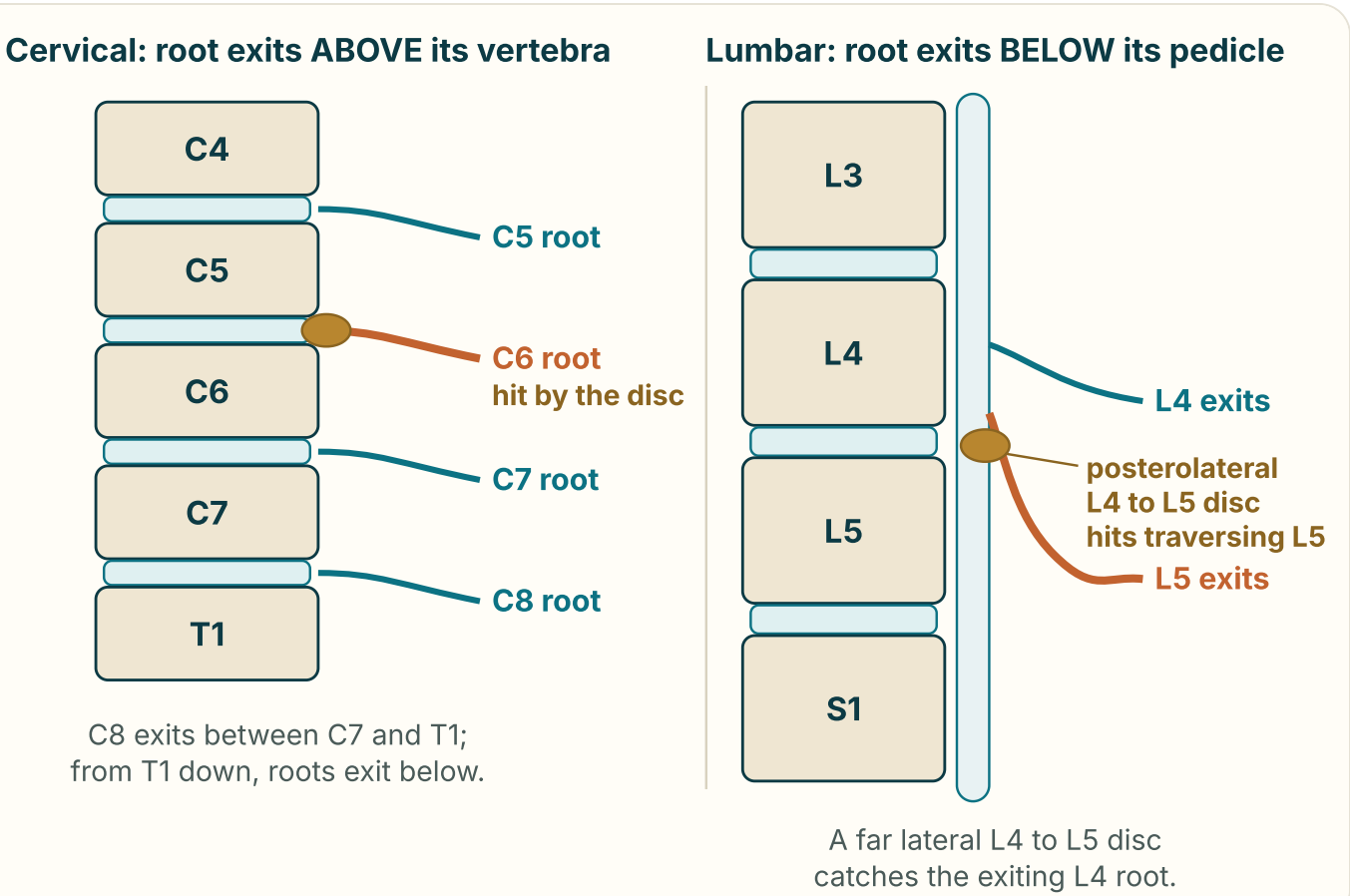
Read it in full: **Chapter 2 in the textbook**. Practice it: **Practice Exam 1** and the **flashcards**.

What to know

Soft tissue heals through inflammation, proliferation (type III collagen) and remodeling (type I), and the load should match the phase. Creep and stress relaxation explain why low load, long duration stretch works. A convex surface glides opposite to the bone movement; a concave surface glides the same way.

Screen the neck for fracture, instability, cervical arterial dysfunction and myelopathy before manual therapy. Radiculopathy is one sided with LMN signs; myelopathy is bilateral with UMN signs and needs referral. Cervical roots exit above their vertebra; lumbar roots exit below their pedicle, so an L4 to L5 posterolateral disc hits L5.

Treatment based classification matches low back pain to manipulation, stabilization, specific exercise or traction; centralization is a good sign. Stenosis eases with flexion. Maitland I and II treat pain, III and IV treat stiffness, and V is a thrust.



Which root does the disc hit? Cervical roots exit above the vertebra of the same number. Lumbar roots exit below their pedicle, so the common posterolateral L4 to L5 disc catches the root passing down to the next level, L5.

LOCK THESE IN

- Type III collagen in proliferation (about day 3 to week 3 to 6); type I in remodeling (week 3 to over a year).
- Creep = constant load over time; stress relaxation = constant length, falling force.
- Convex moves on concave: glide opposite. Concave moves on convex: glide same.
- Cervical roots exit above their vertebra (C5 to C6 disc hits C6); lumbar roots below (L4 to L5 disc hits L5).
- Radiculopathy: one side, LMN signs. Myelopathy: both sides, UMN signs, refer, no manipulation.
- Manipulation rule: under 16 days, no symptoms below knee, FABQ work under 19, hypomobility, hip IR over 35 degrees; 4 of 5 predicts success.
- Stenosis likes flexion; vascular claudication eases with standing still and has poor pulses.
- Maitland I and II for pain, III and IV for stiffness, V is a thrust.

Mobilization glides by the convex concave rule

Joint and motion	Moving surface	Glide the moving bone
Shoulder abduction	Convex humerus	Inferior
Shoulder external rotation	Convex humerus	Anterior
Shoulder internal rotation	Convex humerus	Posterior
Hip flexion and IR	Convex femur	Posterior
Knee flexion (open chain)	Concave tibia	Posterior
Ankle dorsiflexion	Convex talus	Posterior
Wrist flexion	Convex carpals	Dorsal
MCP and IP flexion	Concave phalanx	Volar

Worked case

CASE 2.1 · APPLYING THE MANIPULATION RULE

A 28 year old has had low back pain for 8 days after lifting. Pain stays above the knee, FABQ work score is 12, spring testing shows hypomobility, and right hip IR is 40 degrees. No red flags. Which intervention fits?

STEP 1 · COUNT THE CRITERIA

Under 16 days: yes. No symptoms below the knee: yes. FABQ work under 19: yes. Hypomobility: yes. Hip IR over 35 degrees: yes. That is 5 of 5.

STEP 2 · APPLY THE RULE

Four or more of five strongly predicts rapid response to **lumbopelvic thrust manipulation followed by range of motion exercise**.

SAFETY

Red flag screening must come first; here it was negative.

TRAPS PEOPLE FALL INTO

- **Resting a healing ligament completely.** Protected motion aligns collagen; immobilization weakens insertions.

- **Gliding a convex bone the way it moves.** Convex on concave glides opposite to the motion.
- **Picking the wrong root.** A posterolateral L4 to L5 disc hits L5, and a C5 to C6 disc hits C6.
- **Stopping extension because back pain rose.** If leg symptoms centralize, back pain may rise. That is still a good response.

Chapter 2 self-test · six items

1. Six months after an Achilles repair, collagen is aligning along lines of stress. Which phase is this?

A. Remodeling
B. Hemostasis
C. Proliferation
D. Inflammation

A. Remodeling Remodeling replaces type III with aligned type I collagen over months to more than a year.

2. To gain knee flexion with the patient prone, which way is the tibia glided?

A. Anteriorly
B. Posteriorly
C. Medially
D. Distally only

B. Posteriorly The concave tibia glides in the same direction as it moves: posterior for flexion.

3. A hamstring stretch is done in long sitting with the hip flexed and the knee straight. Which property limits hip flexion here?

A. Passive insufficiency of the hip flexors
B. Active insufficiency of the hamstrings
C. Passive insufficiency of the hamstrings
D. Active insufficiency of the quadriceps

C. Passive insufficiency of the hamstrings A two joint muscle lengthened across both joints stops motion by passive tension.

4. Repeated lumbar extension makes leg pain spread from the thigh to the calf. What is the best response?

A. Add a lumbar roll and continue
B. Continue; this is centralization
C. Increase extension force to push through
D. Stop; that direction peripheralizes

D. Stop; that direction peripheralizes Peripheralization means avoid that direction for now.

5. A 72 year old has bilateral leg heaviness walking that eases sitting, normal pulses and good tolerance of cycling. What fits?

A. Lumbar disc herniation at S1
B. Peripheral artery disease
C. Lumbar spinal stenosis
D. Sacroiliac joint dysfunction

C. Lumbar spinal stenosis Relief with flexion and sitting, normal pulses and tolerance of cycling point to neurogenic claudication.

6. Which finding is a contraindication to cervical thrust manipulation?

A. Unilateral neck pain for 10 days
B. Bilateral hand clumsiness and hyperreflexia
C. Stiffness limiting rotation to 60 degrees
D. Pain with sustained slumped sitting

B. Bilateral hand clumsiness and hyperreflexia Bilateral UMN signs suggest myelopathy, a contraindication to manipulation.

CHAPTER 3

Musculoskeletal: The Upper Extremity

Read it in full: **Chapter 3 in the textbook**. Practice it: **Practice Exam 2** and the **flashcards**.

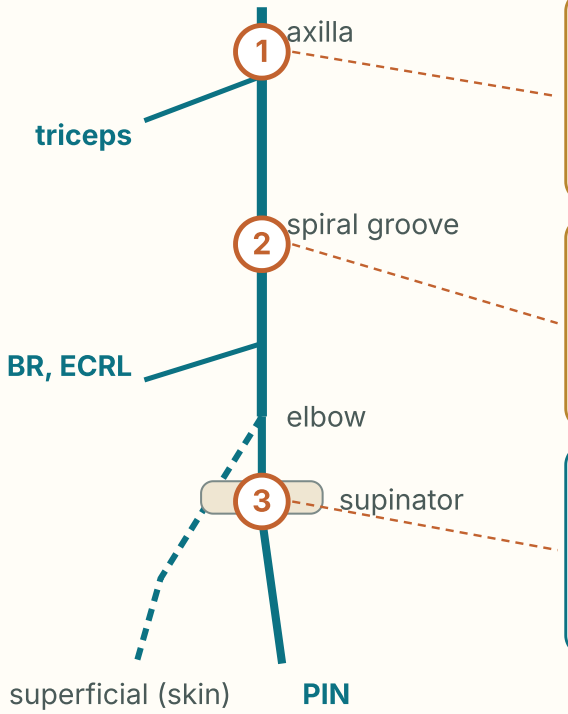
What to know

Shoulder elevation is about 2:1 glenohumeral to scapular. Full passive range with a painful arc is cuff tendinopathy; active far below passive is a tear or nerve; equal active and passive loss in a capsular pattern is capsulitis. Anterior dislocation threatens the axillary nerve.

After cuff repair, no active elevation for about 6 weeks; after reverse TSA, no extension with adduction and internal rotation for about 12 weeks. Supracondylar fractures threaten the forearm compartments. Carpal tunnel spares thenar skin; zone II flexor repairs are most fragile at days 5 to 21.

Radial nerve lesions are placed by the triceps and the skin; median lesions give the ape hand or benediction; ulnar lesions give the claw. Axonotmesis regrows about 1 mm a day, and EMG waits about 3 weeks.

Radial nerve, top to bottom



1 Axilla (crutch palsy)

Triceps weak AND wrist drop
Numb posterior arm, forearm and dorsal radial hand

2 Spiral groove (midshaft fracture)

Wrist drop; triceps spared (its branch leaves above)
Numb dorsal first web space

3 PIN at the supinator

Finger drop; wrist still extends, drifting radially (ECRL spared)
No sensory loss

One nerve, three lesion levels. Each branch that leaves above a lesion is spared. Triceps tells axilla from spiral groove, and the PIN has no skin branch.

LOCK THESE IN

- Elevation 2:1: about 120 degrees glenohumeral and 60 scapular.
- Active equals passive loss = capsule; active much less than passive = tear or nerve.
- Capsulitis: external rotation lost first; diabetes; treat by irritability.
- Cuff repair: no active elevation about 6 weeks. Reverse TSA: no extension plus adduction plus IR about 12 weeks.
- Carpal tunnel spares thenar sensation; splint in neutral at night.
- Zone II flexor repair: rupture risk peaks days 5 to 21; no gripping 6 to 8 weeks.
- Radial nerve: spiral groove spares triceps; axilla adds triceps; PIN spares wrist extension and sensation.
- Axonotmesis regrows about 1 mm per day; EMG after about 3 weeks.

Shoulder sorting and surgery

Item	Rule
Painful arc	About 60 to 120 degrees: subacromial pain or cuff tendinopathy
Drop arm, ER lag	Full thickness cuff tear
Lift off, belly press	Subscapularis tear
Apprehension then relocation	Anterior instability confirmed when relocation relieves apprehension
O'Brien	Deep pain thumb down, relieved palm up: SLAP
Cuff repair	Passive range within limits 0 to 6 weeks; active 6 to 12; resisted after about 12
Anatomic TSA	Intact cuff needed; protect subscapularis about 6 weeks
Reverse TSA	Deltoid powered; dislocation in extension, adduction and IR

Worked case

CASE 3.1 · LIVING WITH A REVERSE TSA

A 76 year old man is 3 weeks after reverse TSA. He asks how to manage toileting and getting up from his recliner.

STEP 1 · NAME THE DANGER POSITION

Extension, adduction and internal rotation together: the hand behind the back.

STEP 2 · MATCH IT TO HIS TASKS

Reaching behind for hygiene and pushing up with the arm behind him both use it.

STEP 3 · TEACH

Hygiene with the other hand or from the front with adaptive equipment; scoot forward and push up through the uninvolved arm.

SAFETY

A sudden clunk with loss of motion suggests dislocation: support the arm and notify the surgeon.

TRAPS PEOPLE FALL INTO

- **Starting active elevation after cuff repair.** The first 6 weeks are passive range within limits, pendulums and distal joints.
- **Strengthening the cuff after reverse TSA.** The deltoid and scapular muscles do the work; the cuff is absent.
- **Calling thenar numbness carpal tunnel.** The palmar cutaneous branch leaves above the tunnel, so thenar numbness points higher.
- **Elevating a limb with suspected compartment syndrome.** Keep it at heart level and call the physician.

Chapter 3 self-test · six items

1. Which test best identifies a subscapularis tear?

A. Belly press
B. Empty can
C. Hornblower
D. Drop arm

A. Belly press Lift off and belly press test the subscapularis.

2. Two weeks after a Bankart repair, which position must be avoided?

A. Elbow flexion and extension
B. Flexion to 60 degrees in the plane
C. Pendulum exercises in standing
D. Abduction with external rotation

D. Abduction with external rotation The apprehension position stresses the repaired anterior capsule and labrum.

3. Tenderness in the anatomical snuffbox after a fall, with a normal first x ray. What is the plan?

A. Mobilize the wrist into extension
B. Begin wrist strengthening today
C. Thumb spica and repeat imaging
D. Reassure and discharge from care

C. Thumb spica and repeat imaging Suspected scaphoid fractures are immobilized and reimaged because of the risk of avascular necrosis.

4. Which deformity follows rupture of the central slip?

A. Ulnar drift
B. Boutonniere
C. Mallet finger
D. Swan neck

B. Boutonniere Central slip rupture lets the lateral bands slip volarly: PIP flexion and DIP hyperextension.

5. A cyclist has weak intrinsics and numb palmar little finger with normal dorsal hand sensation. Where is the lesion?

A. Ulnar nerve at the elbow
B. C8 nerve root in the neck
C. Median nerve at the wrist
D. Ulnar nerve at the wrist

D. Ulnar nerve at the wrist Guyon canal compression spares the dorsal cutaneous branch.

6. A nerve injury shows a conduction block with no denervation and recovers fully in 6 weeks. What was it?

A. Wallerian degeneration
B. Neurapraxia
C. Axonotmesis
D. Neurotmesis

B. Neurapraxia Neurapraxia is a local myelin injury with the axon intact.

CHAPTER 4

Musculoskeletal: The Lower Extremity and Gait

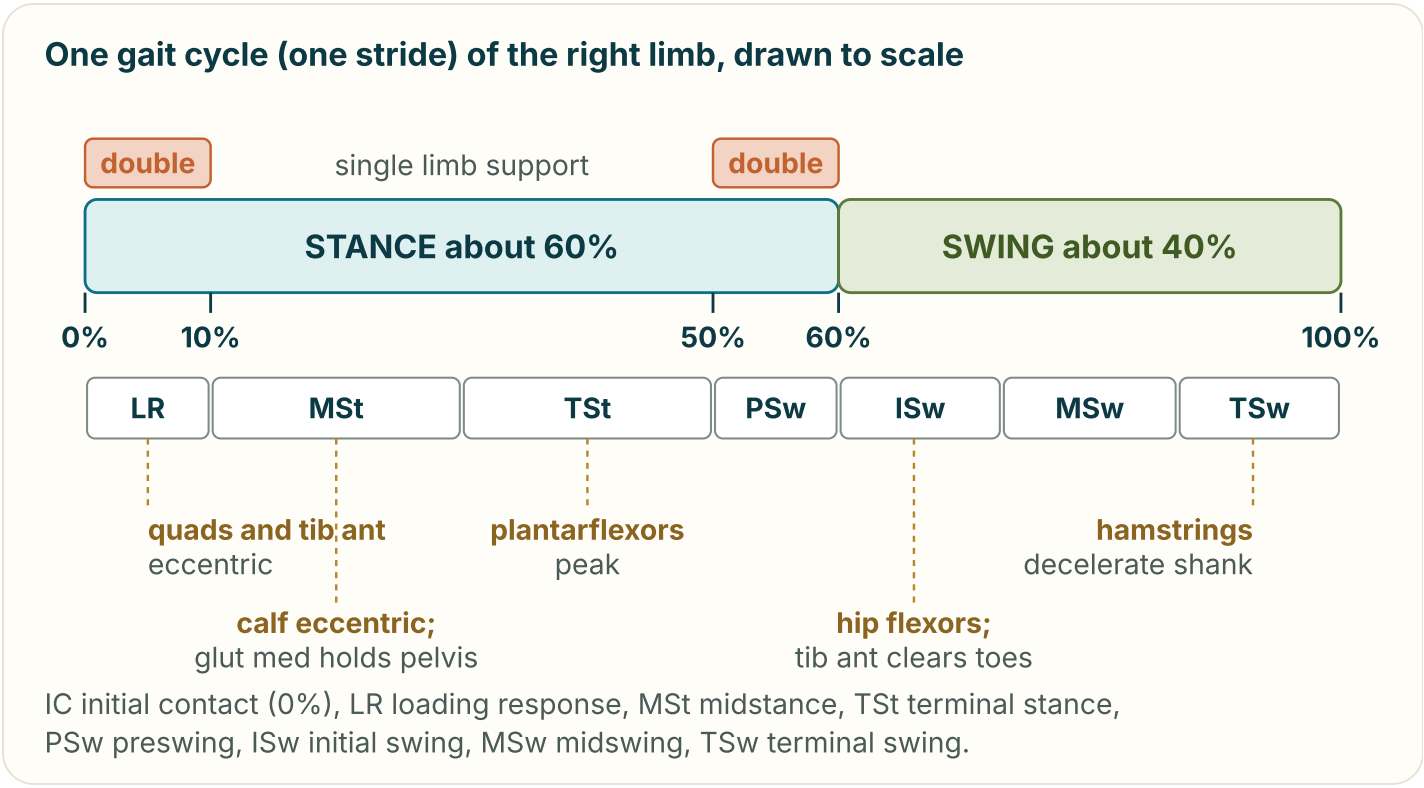
Read it in full: **Chapter 4 in the textbook**. Practice it: **Practice Exam 2** and the **flashcards**.

What to know

Hip OA loses internal rotation and flexion first, and the cane goes in the opposite hand. Posterior THA precautions are flexion past 90, adduction and internal rotation; anterior precautions are extension and external rotation. Lachman is the most sensitive ACL test and the posterior drawer the best PCL test.

After ACL reconstruction restore extension and the quadriceps first; return to sport needs about 9 months and 90 percent symmetry. After TKA protect extension. The Ottawa rules use malleolar, fifth metatarsal and navicular tenderness and four steps.

Stance is about 60 percent of the gait cycle. A weak muscle shows in the phase where it should work: Trendelenburg for the gluteus medius, steppage for the dorsiflexors. Osteoporosis is a T score of −2.5 or lower.



The gait cycle, drawn to scale. A weak muscle shows up in the phase where it is supposed to work, so learn each phase with its muscle.

LOCK THESE IN

- Hip capsular pattern: IR and flexion first. Cane in the opposite hand.
- Posterior THA: no flexion past 90, adduction or IR. Anterior THA: no extension or ER.
- Lachman most sensitive ACL test; pivot shift most specific; posterior drawer for PCL.
- ACL return to sport: about 9 months and 90 percent limb symmetry.
- After TKA: full extension first, quadriceps with NMES, at least 90 degrees flexion.
- Ottawa: posterior edge or tip of either malleolus, base of 5th metatarsal, navicular, or four steps.
- Stance 60, swing 40; double support about 10 percent twice.
- Osteoporosis T score ≤ −2.5; avoid loaded spinal flexion.

Gait deviations and their causes

Deviation	Cause
Trendelenburg	Weak gluteus medius on the stance side; pelvis drops on the swing side
Backward trunk lean at contact	Weak gluteus maximus
Forward lean or hand on thigh in loading	Weak quadriceps
Foot slap	Mild dorsiflexor weakness at loading response
Steppage	Foot drop: common fibular nerve, L4 to L5, neuropathy
Circumduction, hip hiking, vaulting	Functionally long swing limb
No heel rise, short opposite step	Weak plantarflexors
Scissoring	Hip adductor spasticity

Worked case

CASE 4.1 · IS SHE READY TO CUT?

A 17 year old is 10 weeks after BTB ACL reconstruction with full motion and no effusion. Her quadriceps limb symmetry index is 72 percent. She wants to start cutting drills.

STEP 1 · PLACE THE GRAFT IN TIME

At 10 weeks the graft is still near its weakest point (6 to 12 weeks).

STEP 2 · COMPARE TO CRITERIA

72 percent is far below the 90 percent target.

STEP 3 · CHOOSE

Keep building the quadriceps (closed chain and open chain in a protected arc), neuromuscular and landing training, and a straight line running progression around 3 months if criteria are met.

WHY IT MATTERS

Early return and asymmetry predict a second ACL injury in either knee.

TRAPS PEOPLE FALL INTO

- **Cane in the same hand as the painful hip.** It goes in the opposite hand to lower abductor demand.
- **Mixing up approach precautions.** Posterior: flexion, adduction, IR. Anterior: extension and ER.
- **Clearing an ACL patient on time alone.** Use strength and hop symmetry of at least 90 percent, full motion and no effusion.
- **A pillow under the knee after TKA.** It feeds a flexion contracture; use a towel under the ankle.

Chapter 4 self-test · six items

1. A young athlete has groin pain with prolonged sitting and deep squats; FADIR is negative. What does this suggest?

A. Intra-articular cause is less likely
B. Cam impingement is now confirmed
C. Hip OA is the most likely cause
D. A labral tear is now confirmed

A. Intra-articular cause is less likely FADIR is very sensitive, so a negative result helps rule out intra-articular pathology.

2. A dashboard injury caused a posterior tibial sag. Which test is most accurate?

A. McMurray test
B. Lachman test
C. Posterior drawer
D. Pivot shift test

C. Posterior drawer The posterior drawer is the most accurate PCL test.

3. A runner has pain at the medial calcaneal tubercle with the first morning steps. What is most likely?

A. Calcaneal stress fracture
B. Midportion Achilles tendinopathy
C. Tarsal tunnel syndrome
D. Plantar heel pain (fasciitis)

D. Plantar heel pain (fasciitis) First step morning pain at the medial tubercle is classic plantar heel pain.

4. During loading response the knee snaps back into hyperextension. What is a likely cause?

A. Weak hip flexors
B. Quadriceps weakness
C. Weak hamstrings only
D. Weak gluteus medius

B. Quadriceps weakness Weak quadriceps lock the knee back; plantarflexor spasticity can do the same.

5. A patient is toe touch weight bearing on the left. Which describes it?

A. Foot touches for balance only
B. Any amount the patient tolerates
C. No contact with the floor at all
D. Up to 50 percent of body weight

A. Foot touches for balance only Toe touch or touch down weight bearing allows contact for balance only.

6. A new transtibial amputee asks how to sit in his wheelchair. What is the best advice?

A. Cross the residual limb over the other
B. Sit with the knee flexed for comfort
C. Keep the knee extended on a board
D. Rest the knee bent over a pillow

C. Keep the knee extended on a board Transtibial amputees develop knee flexion contractures; a board keeps the knee extended.

CHAPTER 5

Neuromuscular Foundations: Neuroanatomy, Examination and Motor Control

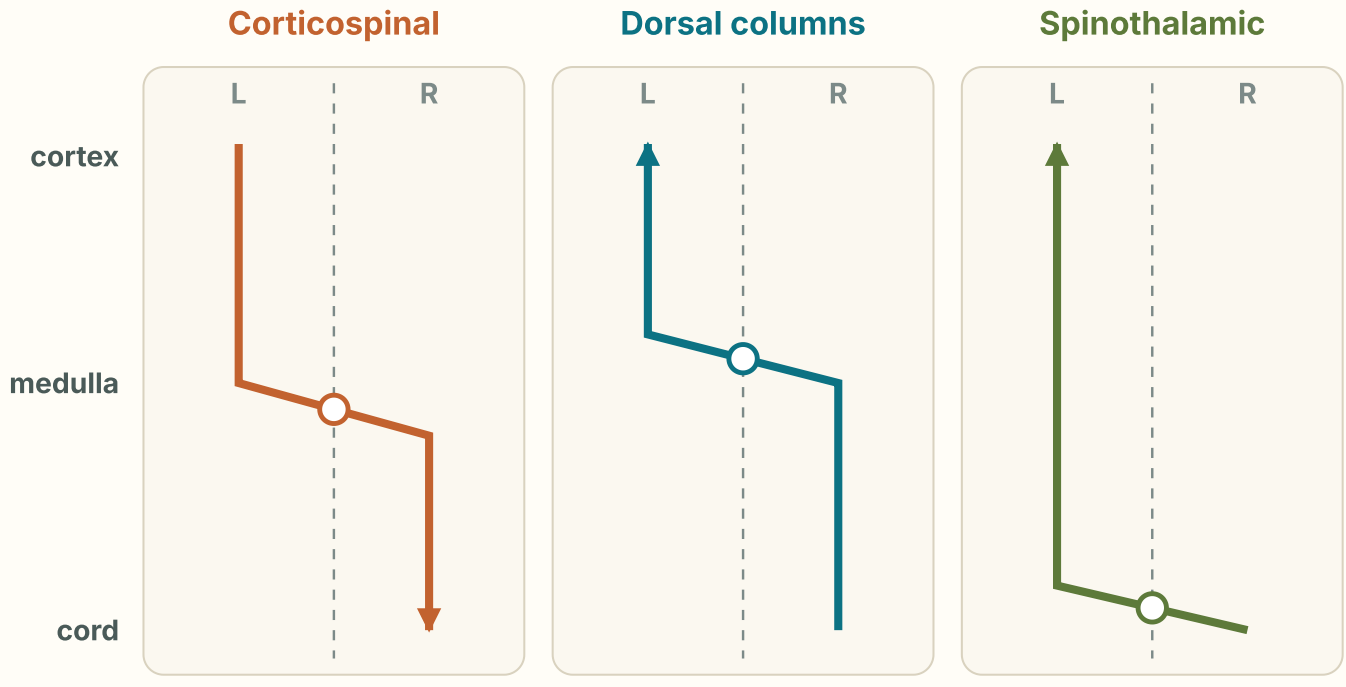
Read it in full: **Chapter 5 in the textbook**. Practice it: **Practice Exam 3** and the **flashcards**.

What to know

Localize first. The ACA supplies the leg area and the MCA the face and arm. The corticospinal tract crosses at the pyramids, the dorsal columns in the medulla and the spinothalamic tract within one or two segments. Cerebellar signs are ipsilateral and never cause weakness.

Spasticity is velocity dependent and graded with the Modified Ashworth Scale; rigidity is not. Learning is measured by retention and transfer; random practice and reduced feedback help retention even though they lower in-session performance.

Fall risk cutoffs: Berg below 45, TUG 13.5 s or more, DGI 19 or less, FGA 22 or less. For walking after neurologic injury, use moderate to high intensity stepping practice; CIMT needs 20 degrees of wrist and 10 degrees of finger extension.



A lesion above the crossing gives contralateral signs; a lesion below it gives ipsilateral signs. A cord hemisection splits them: Brown-Sequard syndrome.

Where the long tracts cross. Find the crossing level and the side of the deficit flips there. That one rule explains Brown-Sequard syndrome and most lateralization items.

LOCK THESE IN

- ACA = leg more than arm. MCA = face and arm more than leg.
- CST crosses at the pyramids; dorsal columns cross in the medulla; spinothalamic within 1 to 2 segments.
- Cerebellar signs are ipsilateral and never cause weakness.
- Spasticity is velocity dependent (MAS); rigidity is not.
- Learning = retention and transfer. Random practice and reduced feedback help retention.
- Berg < 45, TUG ≥ 13.5 s, DGI ≤ 19, FGA ≤ 22, ABC < 67%.
- Gait speed: < 0.4 household, 0.4 to 0.8 limited, > 0.8 community.
- CIMT: 20 degrees wrist and 10 degrees finger extension.

Balance and outcome measures

Test	Scoring and cutoff
Berg Balance Scale	14 items, max 56; below 45 increased fall risk
Timed Up and Go	3 m out and back; 13.5 s or more (12 s common screen)
Dynamic Gait Index	8 items, max 24; 19 or less
Functional Gait Assessment	10 items, max 30; 22 or less
Functional reach	Under 6 in high risk; 6 to 10 in moderate
Tinetti POMA	Max 28; 18 or less high, 19 to 23 moderate
ABC scale	0 to 100%; below 67% fall risk
Fugl-Meyer motor	100 (UE 66, LE 34)
ARAT; FIM	ARAT max 57; FIM 18 to 126

Worked case

CASE 5.1 · LOCALIZING A CROSSED SYNDROME

A 66 year old has two days of vertigo, right arm dysmetria, a hoarse voice, dysphagia, reduced pain sensation on the right face and reduced pain and temperature on the left arm and leg. Strength is 5/5.

STEP 1 · SPOT THE CROSSING

Right face with left body sensory loss is a crossed pattern: brainstem.

STEP 2 · FIND THE LEVEL

Hoarseness and dysphagia point to the medulla (CN IX and X).

STEP 3 · ADD THE ATAXIA

Right ataxia without weakness fits the right inferior cerebellar peduncle.

STEP 4 · NAME AND ACT

Right lateral medullary (Wallenberg) syndrome: stop and refer urgently for emergency evaluation. A peripheral vestibular problem would not cause sensory loss or dysphagia.

TRAPS PEOPLE FALL INTO

- **Calling a positive Romberg cerebellar.** It shows proprioceptive or vestibular loss.
- **Reporting MMT grades in strong synergy.** Describe motor control (Brunnstrom stage, Fugl-Meyer) instead.
- **Judging learning by today's session.** Blocked practice and constant feedback look good today and fade by the next visit.
- **Giving feedback on every trial for retention.** Faded, bandwidth or summary feedback produces better learning.

Chapter 5 self-test · six items

1. A patient has left leg weakness, left loss of vibration and right loss of pain below T10. What is this?

A. Left Brown-Sequard syndrome
B. Anterior cord syndrome
C. Central cord syndrome
D. Right Brown-Sequard syndrome

A. Left Brown-Sequard syndrome Ipsilateral motor and dorsal column loss with contralateral pain loss is a left hemisection.

2. Which sign points to a basal ganglia lesion rather than the cerebellum?

A. Intention tremor near the target
B. Dysmetria on finger to nose testing
C. Rebound on release of resistance
D. Rest tremor that eases with movement

D. Rest tremor that eases with movement Resting tremor is basal ganglia; intention tremor is cerebellar.

3. A patient learning to use a walker is given feedback only when his step length falls outside a set range. What schedule is this?

A. Summary feedback
B. Average feedback
C. Bandwidth feedback
D. Concurrent feedback

C. Bandwidth feedback Feedback given only when error exceeds a set range is bandwidth feedback.

4. On the mCTSIB, a patient is steady in every condition except foam with eyes closed, where she loses balance. Which system is most likely impaired?

A. Somatosensory
B. Vestibular
C. Cerebellar
D. Visual

B. Vestibular Foam degrades somatosensation and closing the eyes removes vision, so only vestibular input is left; failing only there points to a vestibular deficit.

5. A community dwelling older adult walks at 0.7 m/s. How is this classified?

A. Limited community ambulator
B. Normal speed for her age
C. Household ambulator only
D. Full community ambulator

A. Limited community ambulator 0.4 to 0.8 m/s is limited community walking.

6. A peroneal FES device is planned for foot drop. Which condition must be present?

A. Absent ankle reflexes
B. Flaccid plantarflexors
C. An intact peripheral nerve
D. A complete spinal cord injury

C. An intact peripheral nerve FES depolarizes the motor nerve, so the peripheral nerve must be intact.

CHAPTER 6

Neuromuscular: Stroke, Brain Injury and Spinal Cord Injury

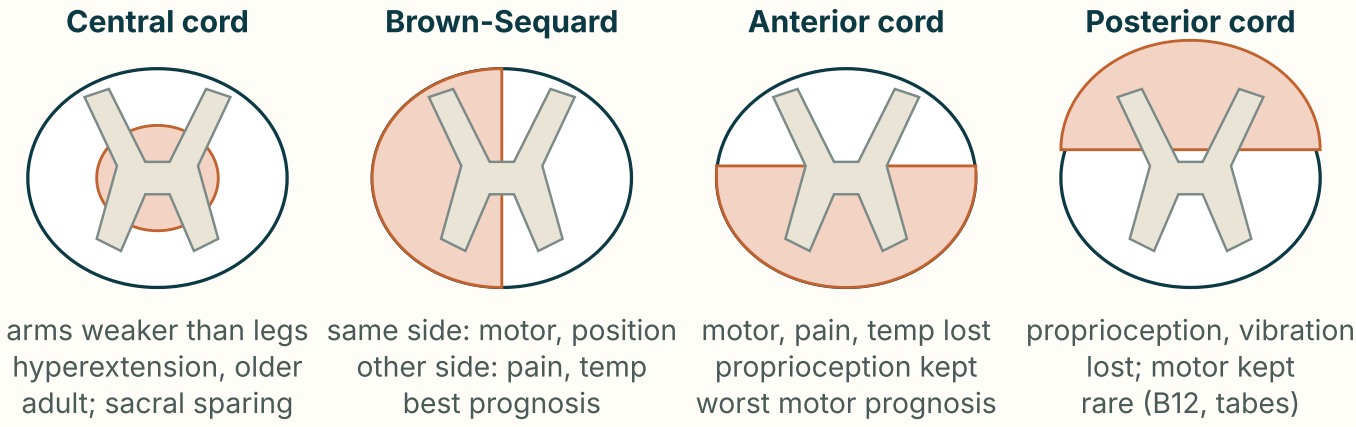
Read it in full: **Chapter 6 in the textbook**. Practice it: **Practice Exam 3** and the **flashcards**.

What to know

MCA strokes cause face and arm weakness with aphasia or neglect; ACA strokes cause leg weakness with bladder and behavior change; PCA strokes cause field loss and thalamic pain; lacunar strokes are pure motor or sensory. Treat pusher syndrome with vision, not force.

Brunnstrom stages run from flaccidity through synergy to isolated movement. Keep BP below 180/105 for 24 hours after thrombolysis. GCS 3 to 8 is severe; Rancho IV needs a calm, consistent approach.

ASIA A is complete with no sacral sparing; C and D split at half the key muscles grade 3. C6 gives tenodesis and C7 independent transfers. Autonomic dysreflexia at T6 and above: sit up, lower the legs, find the trigger.



Incomplete cord syndromes at a glance. The shaded area tells you which tracts are lost, and so which functions go and which stay.

LOCK THESE IN

- MCA: face and arm; aphasia (dominant) or neglect (nondominant). ACA: leg, bladder, abulia.
- Aphasia: fluency, comprehension, repetition.
- Pusher syndrome: use vision of vertical, never force.
- Thrombolysis: BP below 180/105 for 24 hours. No thrombolysis: up to about 220/120.
- GCS 13 to 15 mild, 9 to 12 moderate, 3 to 8 severe.
- AIS A complete; B sensory incomplete; C and D split at half the key muscles grade 3.
- C6 tenodesis; C7 independent transfers.
- AD: sit up, legs down, find the trigger. Orthostatic hypotension: recline, legs up.

Stroke and brain injury

Item	Rule
MCA	Face and arm > leg; hemianopia; aphasia or neglect
ACA	Leg > arm, face spared; incontinence, abulia
PCA	Hemianopia with macular sparing; thalamic pain
Lacunar	Pure motor or pure sensory; no cortical signs
Brunnstrom 3	Spasticity peaks; movement only in synergy
GCS	Eyes 4 + verbal 5 + motor 6 = 15; severe 3 to 8
CPP	MAP − ICP; aim about 60 to 70 mmHg
Rancho IV	Calm, consistent, short familiar tasks, no restraints if avoidable

Worked case

CASE 6.1 · AUTONOMIC DYSREFLEXIA ON THE MAT

A 30 year old with T4 AIS A develops a pounding headache and blurred vision. Her face is flushed and sweaty, heart rate 54, BP 168/96; her usual BP is 98/62.

STEP 1 · CHECK THE LEVEL

T4 is above T6, so AD is possible.

STEP 2 · COMPARE TO BASELINE

168 − 98 = a 70 mmHg rise in systolic pressure.

STEP 3 · ACT

Sit her up, lower the legs, loosen clothing and leg bag straps, check the catheter and bladder, recheck BP every 2 to 5 minutes and call for help.

TRAP

Laying her flat raises the pressure further.

TRAPS PEOPLE FALL INTO

- **Pulling a pusher upright.** Force increases the push; use vision and reaching.
- **A sling all day for the flaccid arm.** Use it only for standing and walking; it holds adduction and IR.
- **Overhead pulleys after stroke.** They cause impingement and pain.
- **Restraining a Rancho IV patient.** Restraints increase agitation; use a calm room and an enclosed bed.

Chapter 6 self-test · six items

1. A patient speaks fluently but with jargon, cannot follow commands and seems unaware of errors. Which aphasia?

A. Broca
B. Anomic
C. Wernicke
D. Conduction

C. Wernicke Fluent, empty speech with poor comprehension is Wernicke aphasia.

2. A patient after stroke can put his hand behind his back and pronate with the elbow at 90 degrees. Which Brunnstrom stage?

A. Stage 4
B. Stage 3
C. Stage 2
D. Stage 6

A. Stage 4 Stage 4 brings the first movements out of synergy.

3. A hemiplegic shoulder is subluxed in the flaccid stage. Which intervention is most appropriate?

A. A sling worn constantly, day and night
B. NMES to supraspinatus and posterior deltoid
C. Overhead pulley exercise twice a day
D. Pulling on the arm to assist transfers

B. NMES to supraspinatus and posterior deltoid NMES to these muscles reduces subluxation; pulleys and pulling cause injury.

4. A concussed athlete is symptom free at rest after 48 hours. What is the next step?

A. Return to full contact practice
B. Strict rest in a dark room for weeks
C. Same day return if he feels well
D. Light subsymptom aerobic exercise

D. Light subsymptom aerobic exercise Brief relative rest is followed by graded, subsymptom aerobic activity.

5. An injury has motor function below the level, with more than half of the key muscles below grade 3. What is the AIS?

A. C
B. B
C. A
D. D

A. C Motor incomplete with fewer than half the key muscles at grade 3 or more is AIS C.

6. A patient with T3 paraplegia becomes lightheaded with a BP of 82/50 when sat up. What is the first action?

A. Check the bladder for distension
B. Sit fully upright and lower the legs
C. Loosen the abdominal binder
D. Recline and elevate the legs

D. Recline and elevate the legs This is orthostatic hypotension, treated the opposite way from autonomic dysreflexia.

CHAPTER 7

Neuromuscular: Progressive, Peripheral and Vestibular Disorders

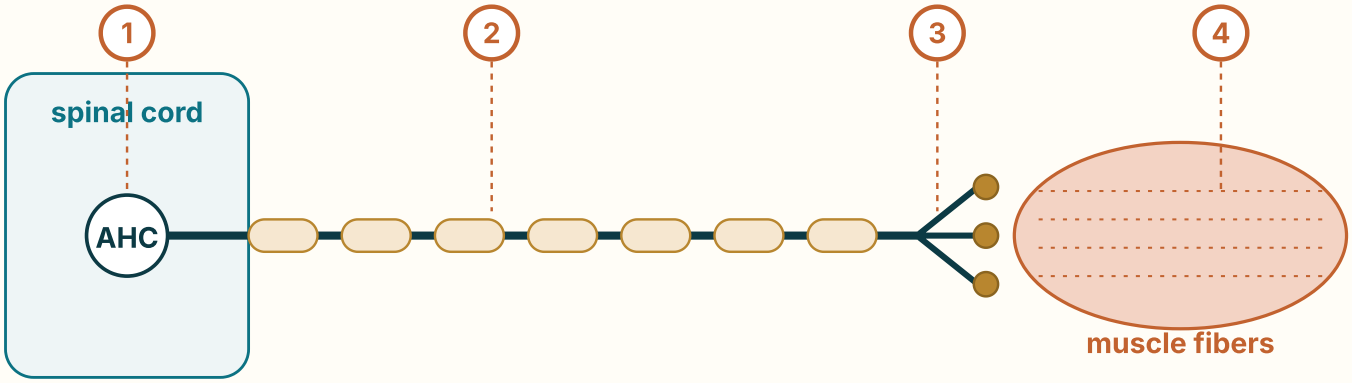
Read it in full: **Chapter 7 in the textbook**. Practice it: **Practice Exam 4** and the **flashcards**.

What to know

Parkinson disease brings rest tremor, rigidity, bradykinesia and later postural instability; train in the on period and use external cues for freezing. MS is CNS demyelination with heat sensitivity; keep the patient cool and paced. ALS mixes UMN and LMN signs with spared sensation.

Guillain Barre, ALS and post polio syndrome share one rule: avoid overwork weakness. Myasthenia worsens with use; Lambert Eaton improves with use. A hot, swollen insensate foot is Charcot until proven otherwise.

Posterior canal BPPV gives upbeating torsional nystagmus on Dix-Hallpike and is treated with Epley. A normal head impulse in acute vertigo suggests a central cause. Bell palsy involves the forehead; a central palsy spares it.



1 Horn cell (AHC)	2 Peripheral nerve	3 Junction (NMJ)	4 Muscle
ALS, polio, SMA	GBS, CIDP, diabetes	myasthenia, LEMS	dystrophy, myopathy
patchy; fasciculations; sensation normal	distal; stocking glove loss; reflexes low	fatigable; reflexes normal in MG	proximal; high CK; Gowers sign

Find the site first, then dose the exercise to it: no overwork at sites 1 and 2 (ALS, GBS, post polio), time it to medication at site 3, avoid eccentric work at site 4 (Duchenne).

Four places weakness can start. Each site leaves a fingerprint in the pattern of weakness, reflexes and sensation, and each changes how you dose exercise.

LOCK THESE IN

- PD: TRAP; postural instability = Hoehn and Yahr 3; train in the on period.
- Freezing: external cues and wide arc turns.
- MS: cool, paced, morning; Uhthoff resolves with cooling.
- GBS, ALS, post polio: avoid overwork weakness.
- Myasthenia worse with use; Lambert Eaton better with use.
- Posterior canal BPPV: upbeating torsional on Dix-Hallpike; Epley.
- Normal head impulse in acute vertigo = think central.
- Bell palsy hits the forehead; central palsy spares it.

Where is the weakness coming from?

Site	Fingerprint
Anterior horn cell	Patchy, asymmetric; fasciculations; normal sensation (ALS adds UMN signs)
Peripheral nerve	Distal; stocking glove sensory loss; reflexes low or absent
Neuromuscular junction	Fatigable; ptosis and bulbar signs in MG; normal sensation
Muscle	Proximal and symmetric; high CK; Gowers sign
Guillain Barre	Ascending, areflexic, autonomic swings; IVIG or plasma exchange
Post polio	New weakness 15 or more years later; pace and unload
Duchenne	X linked; age 2 to 5; Gowers; avoid eccentric work

Worked case

CASE 7.1 · WHICH EAR, WHICH MANEUVER?

A 68 year old has brief spins when rolling onto her left side or looking up. Left Dix-Hallpike: after 3 seconds, upbeating torsional nystagmus toward the left ear for 20 seconds. Right test negative.

STEP 1 · READ THE NYSTAGMUS

Upbeating and torsional on Dix-Hallpike: posterior canal.

STEP 2 · READ THE TIMING

Latency and under 60 seconds: canalithiasis.

STEP 3 · CHOOSE

Left canalith repositioning (Epley), starting in the left Dix-Hallpike position.

SAFETY

Screen the neck and vertebral arteries first; let her sit a few minutes before standing.

TRAPS PEOPLE FALL INTO

- **Calling peak dose dyskinesia disease progression.** It is too much dopamine effect.
- **Calling Uhthoff a relapse.** It resolves with cooling; a relapse lasts 24 hours or more without fever.

- **Progressive resistance in acute GBS.** Protect, position and monitor vital capacity; avoid overwork.
- **Gaze stabilization for BPPV.** BPPV needs a repositioning maneuver.

Chapter 7 self-test · six items

1. A patient with Parkinson disease shows involuntary writhing movements an hour after his dose. What are these?

A. Festinating gait
B. Peak dose dyskinesias
C. Wearing off tremor
D. Freezing of gait episodes

B. Peak dose dyskinesias Too much dopamine effect causes peak dose dyskinesia.

2. What does an EDSS of 6.0 mean in MS?

A. A unilateral device for about 100 m
B. Fully ambulatory for about 500 m
C. Bilateral assistance is needed to walk
D. Essentially restricted to a wheelchair

A. A unilateral device for about 100 m EDSS 6.0 means a unilateral assistive device for about 100 meters.

3. A smoker has new proximal weakness that briefly improves with repeated effort, plus a dry mouth. What should be suspected?

A. Guillain Barre syndrome; ROM
B. Post polio syndrome; pace
C. Myasthenia gravis; rest only
D. Lambert Eaton syndrome; refer

D. Lambert Eaton syndrome; refer Facilitation with effort and dry mouth suggest Lambert Eaton, often with small cell lung cancer.

4. A boy of 4 climbs up his thighs to stand and has large calves. Which exercise rule applies?

A. Use heavy eccentric training daily
B. Train to exhaustion every single day
C. Avoid eccentric and high resistance work
D. Progress to maximal lifting quickly

C. Avoid eccentric and high resistance work In Duchenne dystrophy, eccentric contraction tears fragile fibers.

5. Vestibular neuritis on the right: which way does the spontaneous nystagmus beat?

A. It changes direction with gaze
B. Toward the right, into the lesion
C. Straight up, purely vertical beats
D. Toward the left, away from the lesion

D. Toward the left, away from the lesion Peripheral nystagmus beats away from the lesion and is suppressed by fixation.

6. A patient with bilateral vestibular loss after gentamicin reports that the world bounces when he walks. What is this?

A. Diplopia
B. Vertigo
C. Oscillopsia
D. Presyncope

C. Oscillopsia Bilateral loss causes oscillopsia, usually without vertigo.

CHAPTER 8

Cardiovascular and Pulmonary Foundations: Physiology, Examination and Monitoring

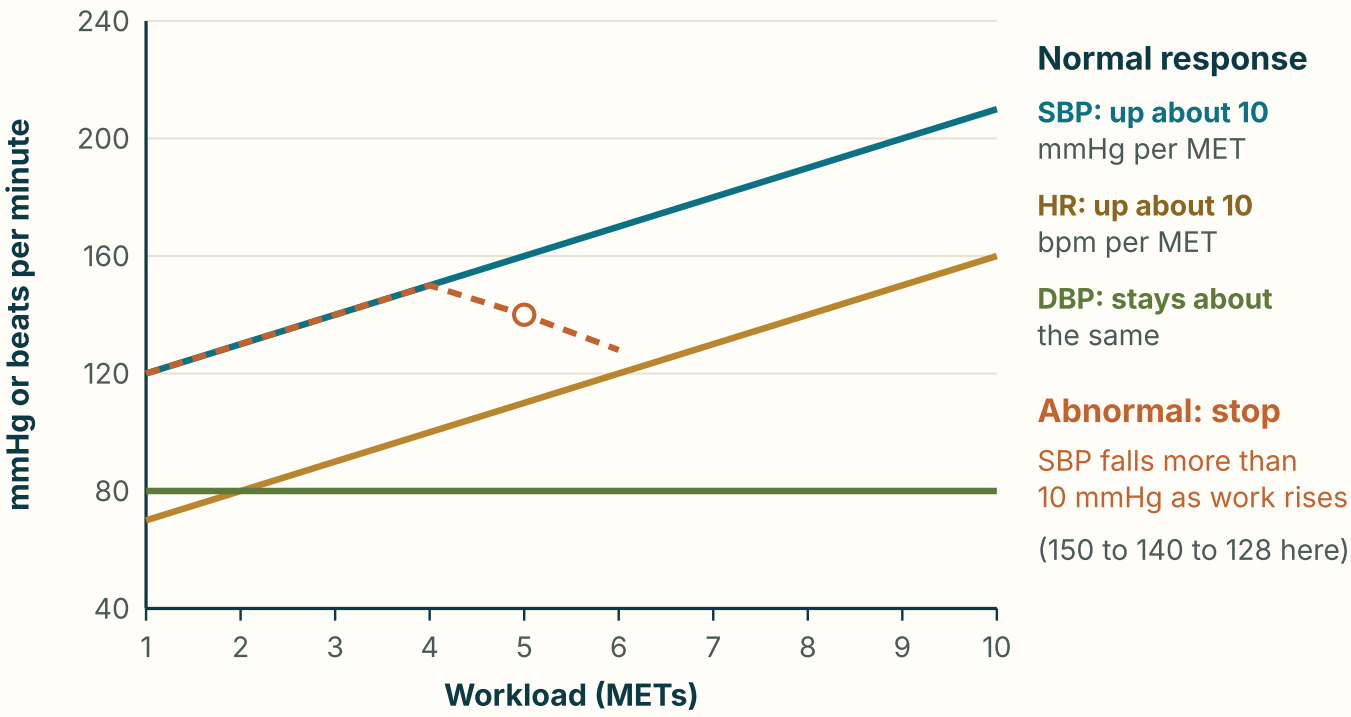
Read it in full: **Chapter 8 in the textbook**. Practice it: **Practice Exam 4** and the **flashcards**.

What to know

Cardiac output is heart rate times stroke volume. Ventilation and perfusion are greatest at the bases, but the V/Q ratio is highest at the apex; put the good lung down. PaO_2 60 matches an SaO_2 of about 90.

With exercise, HR and SBP rise while DBP stays flat; a falling SBP means stop. Use RPE on beta blockers. ECG: small box 0.04 s, large box 0.20 s; three PVCs in a row is VT; Mobitz II and complete block rule out exercise.

FEV_1/FVC below 0.70 is obstruction and a low TLC is restriction. Read gases with ROME. Treat glucose below 70 first, check ketones above 250, and weigh every lab against its trend and the symptoms.



The normal exercise response, and the one that means stop. Systolic pressure and heart rate climb with the workload while diastolic pressure stays flat. A systolic pressure that falls as work rises is always abnormal.

LOCK THESE IN

- CO = HR × SV; EF 55 to 70%; MAP ≥ 65.
- V/Q highest at apex; good lung down in adults.
- PaO_2 60 = SaO_2 about 90.
- Exercise: HR and SBP up, DBP flat. SBP drop > 10 = stop.
- Beta blocker: use RPE 11 to 13.
- Small box 0.04 s, large box 0.20 s; rate = 300 ÷ large boxes.
- VT, Mobitz II, third degree block: stop or do not start.
- FEV_1/FVC < 0.70 obstruction; low TLC restriction; ROME for gases.

Formulas and numbers

Item	Value or formula
Cardiac output	HR × SV; about 5 L/min at rest
Karvonen	THR = (HRmax − HRrest) × % + HRrest
Age predicted max	220 − age; Tanaka 208 − 0.7 × age
Rate pressure product	HR × SBP
MET	3.5 mL O_2/kg/min
CaO_2	(1.34 × Hb × SaO_2) + (0.003 × PaO_2)
ECG rate	300 ÷ large boxes; 1,500 ÷ small boxes
ABG normals	pH 7.35 to 7.45; $PaCO_2$ 35 to 45; HCO_3 22 to 26

Worked case

CASE 8.1 · READING A BLOOD GAS

A 72 year old with a COPD exacerbation has pH 7.31, $PaCO_2$ 58, HCO_3 29, PaO_2 56 on 2 L/min.

STEP 1 · PH

7.31 is below 7.35: acidemia.

STEP 2 · ROME

$PaCO_2$ is high, opposite to pH: **respiratory acidosis**.

STEP 3 · COMPENSATION

HCO_3 29 is above 26 and pH is still abnormal: **partially compensated**, typical of chronic CO_2 retention made worse.

STEP 4 · PLAN

Forward lean sitting, pursed lip and diaphragmatic breathing, short low intensity bouts, oxygen within the order (often SpO_2 88 to 92 percent). Report drowsiness or rising CO_2.

TRAPS PEOPLE FALL INTO

- **Trusting HR on a beta blocker.** Use RPE, BP and symptoms.
- **Calling a flat DBP abnormal.** DBP normally stays about the same with exercise.
- **Lying the bad lung down for pneumonia.** Good lung down, unless abscess or bleeding.
- **Treating Wenckebach like Mobitz II.** Mobitz II and third degree block are the dangerous ones.

Chapter 8 self-test · six items

1. Which heart sound suggests a volume overloaded ventricle in an adult?

A. S4
B. S2
C. S1
D. S3

D. S3 S3 in early diastole is a classic sign of heart failure in adults.

2. A patient's SpO_2 reads 99 percent after a house fire, but he is confused and short of breath. Why might the reading mislead?

A. Anemia raises the oximeter value
B. Carbon monoxide is read as oxygen
C. Pulse oximetry measures CO_2
D. Cold fingers raise the reading

B. Carbon monoxide is read as oxygen Carboxyhemoglobin is read as oxyhemoglobin, giving a falsely normal value.

3. A rhythm strip shows no P waves, a wavy baseline and an irregularly irregular QRS. What is it?

A. Atrial fibrillation
B. Atrial flutter
C. Sinus arrhythmia
D. First degree block

A. Atrial fibrillation No P waves with an irregularly irregular rhythm is atrial fibrillation.

4. Spirometry shows FEV_1/FVC 0.82 and a low TLC. What pattern is this?

A. Mixed obstructive
B. Normal
C. Restrictive
D. Obstructive

C. Restrictive A normal or high ratio with a low TLC is restriction.

5. pH 7.30, $PaCO_2$ 38, HCO_3 16. How is it read?

A. Partly compensated respiratory acidosis
B. Uncompensated metabolic acidosis
C. Compensated metabolic acidosis
D. Uncompensated respiratory acidosis

B. Uncompensated metabolic acidosis Low pH with low HCO_3 (equal direction) is metabolic; normal CO_2 means no compensation.

6. A patient's platelet count is 35,000. Which activity fits?

A. Light walking and active ROM
B. Heavy resistance training
C. No activity of any kind today
D. High impact jumping drills

A. Light walking and active ROM 20,000 to 50,000 allows light exercise and active ROM without heavy resistance.

CHAPTER 9

Cardiovascular, Pulmonary and Lymphatic Conditions and Rehabilitation

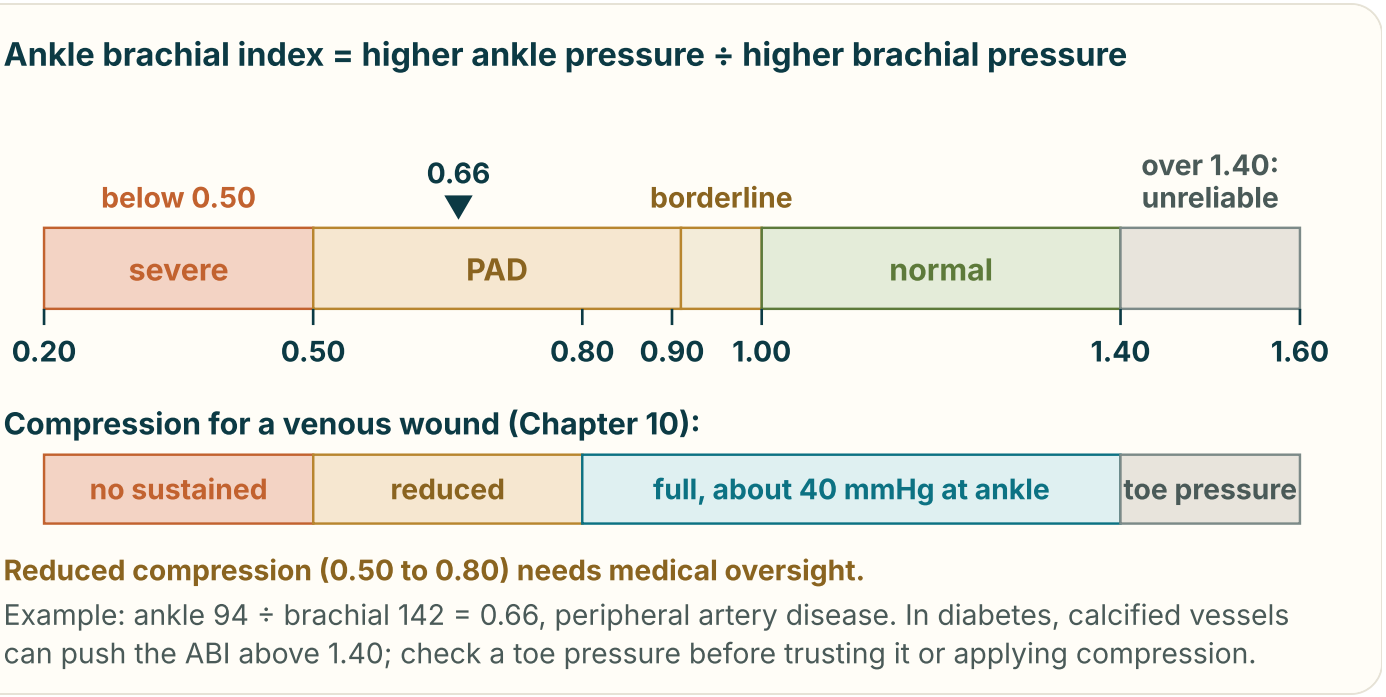
Read it in full: **Chapter 9 in the textbook**. Practice it: **Practice Exam 5** and the **flashcards**.

What to know

New, rest or crescendo angina is an acute coronary syndrome: stop. Left heart failure floods the lungs and right heart failure floods the body. Sternal precautions last about 6 to 8 weeks. Phase II cardiac rehab trains at 40 to 80 percent of HRR, at least 10 beats below the ischemic threshold.

In COPD use pursed lip breathing, forward lean and oxygen near 88 to 92 percent. Airway clearance techniques each have contraindications. The ABI is the higher ankle over the higher brachial pressure; 0.90 or less is PAD and below 0.50 rules out sustained compression.

Screen DVT with the Wells criteria. Lymphedema is staged 0 to III and treated with CDT, starting MLD proximally; cellulitis, acute DVT and decompensated heart failure stop treatment.



Reading the ankle brachial index. Divide the higher ankle pressure by the higher brachial pressure. The number tells you whether the patient has arterial disease and how much compression is safe.

LOCK THESE IN

- New, rest or crescendo angina: stop and get help.
- Left HF floods lungs; right HF floods the body. Weight up 2 to 3 lb a day or 5 a week: hold.
- Sternal precautions about 6 to 8 weeks; no pushing up with the arms.
- Phase II: 40 to 80% HRR, at least 10 beats below the ischemic threshold.
- COPD SpO_2 target 88 to 92%; pursed lip breathing and forward lean.
- ABI ≤ 0.90 PAD; < 0.50 no sustained compression; > 1.40 unreliable.
- Wells DVT: 2 or more likely; never rely on Homans.
- MLD starts proximal and clears healthy nodes first.

Heart failure and cardiac rehab

Item	Rule
HFrEF; HFpEF	EF ≤ 40%; EF ≥ 50%
NYHA III	Marked limitation: less than ordinary activity causes symptoms
NYHA IV	Symptoms at rest
Phase I limits	HR rise about 20 after MI, 30 after surgery; RPE ≤ 13
Phase II intensity	40 to 80% HRR or RPE 12 to 16
Ischemic threshold	Stay at least 10 bpm below it
ICD	Train 10 to 20 bpm below detection rate
LVAD	Doppler MAP about 70 to 90; protect the driveline

Worked case

CASE 9.1 · KARVONEN WITH AN ISCHEMIC THRESHOLD

Phase II after MI: resting HR 70; exercise test on his usual beta blocker reached 150 peak; 1.5 mm ST depression appeared at 130. Prescribe at 70% HRR.

STEP 1 · RESERVE

150 − 70 = 80.

STEP 2 · 70 PERCENT

80 × 0.70 = 56; 56 + 70 = 126.

STEP 3 · APPLY THE CEILING

Ischemia at 130, so the upper limit is 130 − 10 = **120**.

STEP 4 · DECIDE

Set the top at **120 bpm** and use RPE 11 to 13 as a cross check. The ischemic threshold overrides the formula.

TRAPS PEOPLE FALL INTO

- **Lowering intensity for unstable angina.** Stop and activate medical care.
- **Using 220 minus age on a beta blocker.** Use the measured test or RPE.
- **Ignoring an ischemic threshold.** Stay at least 10 bpm below it, whatever the formula says.
- **Raising oxygen far above the order in COPD.** Titrate within the order to about 88 to 92%.

Chapter 9 self-test · six items

1. What is the most common cause of right sided heart failure?

A. Left sided heart failure
B. Acute pulmonary embolism
C. Systemic hypertension
D. Aortic valve stenosis

A. Left sided heart failure Fluid backs up from a failing left ventricle into the lungs and then the right heart.

2. A transplant recipient asks why his heart rate rises so slowly when he exercises. What explains it?

A. A blocked coronary artery
B. A fixed rate pacemaker
C. The heart is denervated
D. A beta blocker in his regimen

C. The heart is denervated A denervated heart responds to circulating catecholamines, so the rise is slow and delayed.

3. Which drug most clearly blunts the heart rate response to exercise?

A. Furosemide
B. Lisinopril
C. Atorvastatin
D. Metoprolol

D. Metoprolol Beta blockers lower HR at rest and at every workload.

4. A patient with severe COPD becomes dyspneic walking. Which position best eases it?

A. Side lying with the head tilted down
B. Forward lean sitting, forearms on thighs
C. Supine with the head of bed flat
D. Standing upright with arms overhead

B. Forward lean sitting, forearms on thighs Forward lean restores some diaphragm dome and fixes the shoulder girdle.

5. A diabetic patient has an ABI of 1.55. What is the next step before compression?

A. Apply full compression
B. Discharge as normal flow
C. Start claudication walking
D. Measure a toe pressure

D. Measure a toe pressure Above 1.40 the ABI is unreliable because vessels are calcified.

6. A lymphedematous leg pits and the swelling goes down overnight with elevation. What ISL stage is it?

A. Stage III
B. Stage I
C. Stage II
D. Stage 0

B. Stage I Stage I is soft pitting swelling that reverses with elevation.

CHAPTER 10

Integumentary: Wounds, Burns and Skin

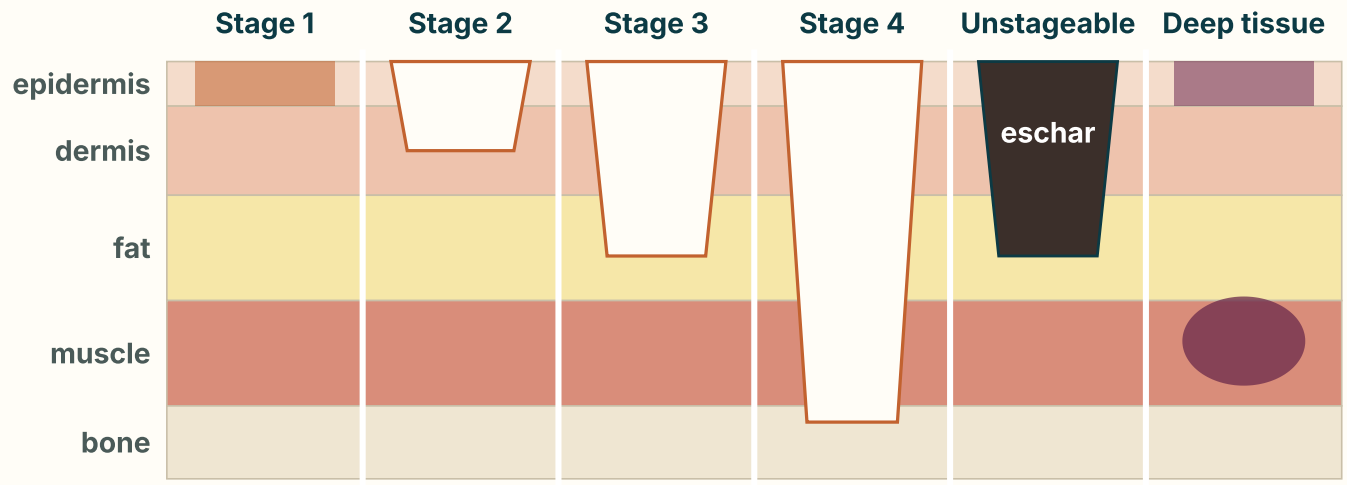
Read it in full: **Chapter 10 in the textbook**. Practice it: **Practice Exam 5** and the **flashcards**.

What to know

Partial thickness wounds regenerate from surviving appendages; full thickness wounds heal by scar. Pressure injuries are staged by the deepest tissue seen and never reverse staged; Braden 18 or less is at risk.

Name wounds by location: arterial distal and painful, venous medial and wet, neuropathic plantar and painless. Selective debridement is sharp, enzymatic, autolytic and larval; leave stable dry eschar on heels and ischemic limbs. Match the dressing to drainage.

Burn depth comes from blisters, color, blanching and sensation; size by the rule of nines. Position against contracture from day one, and use pressure garments about 23 hours a day. Refer ABCDE lesions.



Stage 1 intact, nonblanchable red · Stage 2 dermis exposed or serum blister · Stage 3 fat visible
Stage 4 muscle, tendon or bone · Unstageable: base hidden · Deep tissue: maroon or purple

Stage by the deepest tissue you can see. A healing stage 4 stays a stage 4; never reverse stage.

Pressure injury stages by depth. Each stage is named for the deepest tissue exposed. Slough or eschar that hides the base makes it unstageable until the base is seen.

LOCK THESE IN

- Partial thickness regenerates from appendages; full thickness heals by scar.
- Undermining spans clock hours; a tunnel goes one direction; 12 is the head.
- Stage by the deepest tissue; never reverse stage.
- Braden ≤ 18 at risk.
- Medial and wet = venous; lateral and toes, painful = arterial; plantar, callus, painless = neuropathic.
- Leave stable dry eschar on heels and ischemic limbs.
- Dry: hydrogel. Heavy: alginate or hydrofiber. Infected: never occlusive.
- Rule of nines: arm 9, leg 18, front trunk 18; count partial and full thickness only.

Dressings and debridement

Choice	When
Hydrogel	Dry or painful wounds; adds moisture
Film	Superficial, stage 1 to shallow 2; allows inspection
Hydrocolloid	Clean, light drainage; avoid with infection
Foam	Moderate to heavy drainage; cushioning
Alginate, hydrofiber	Heavy drainage, cavities and tunnels
Antimicrobial	Local infection, limited trial (about 2 weeks)
Selective debridement	Sharp, enzymatic, autolytic, larval
Nonselective debridement	Wet to dry, whirlpool, pulsed lavage

Worked case

CASE 10.1 · SIZING A BURN

A 34 year old has burns of the whole right arm (front and back), the anterior trunk and the anterior right leg. The arm and trunk are mottled red and white with slow refill; the leg is red with intact blisters. What is the TBSA and the depth?

STEP 1 · ARM

Whole right arm = 9%.

STEP 2 · TRUNK

Anterior trunk = 18%.

STEP 3 · LEG

Anterior right leg = half of 18 = 9%.

STEP 4 · ADD

9 + 18 + 9 = **36% TBSA**.

STEP 5 · DEPTH

Arm and trunk: deep partial thickness. Leg: superficial partial thickness (blisters).

POSITION

Shoulder abducted about 90 degrees; watch the circumferential arm for lost pulses or refill.

TRAPS PEOPLE FALL INTO

- **Calling a channel undermining.** Undermining spans clock hours; a tunnel is one narrow track.
- **Reverse staging a healing stage 4.** It stays a healing stage 4.
- **Calling a purple heel a stage 1.** Persistent maroon or purple is a deep tissue pressure injury.
- **Debriding a dry heel eschar on an ischemic limb.** Leave it, keep it dry and refer for vascular care.

Chapter 10 self-test · six items

1. Which cell is key to the inflammatory phase of wound healing?

A. Keratinocyte
B. Macrophage
C. Myofibroblast
D. Fibroblast

B. Macrophage Macrophages clear debris and signal repair.

2. A stage 4 sacral wound is now filling with granulation. How is it documented?

A. Healing stage 4
B. Healing stage 3
C. Unstageable wound
D. Healing stage 2

A. Healing stage 4 Pressure injuries are never reverse staged.

3. A shallow, wet wound sits above the medial malleolus with brown skin staining. What is the core treatment?

A. Keep it dry with eschar intact
B. Leg dependency to improve flow
C. Total contact cast offloading
D. Compression after an ABI check

D. Compression after an ABI check This is a venous wound; compression treats the cause.

4. Which debridement method is nonselective?

A. Larval therapy
B. Autolytic dressing
C. Wet to dry gauze
D. Collagenase ointment

C. Wet to dry gauze Wet to dry removes viable and nonviable tissue alike.

5. A burn is mottled red and white, blanches slowly and has reduced light touch. What depth?

A. Superficial
B. Superficial partial thickness
C. Full thickness
D. Deep partial thickness

D. Deep partial thickness Mottled, slow blanching and reduced sensation fit deep partial thickness.

6. A raised red scar has grown beyond the edges of the original burn. What is it?

A. A hypertrophic scar
B. A keloid scar
C. A mesh pattern
D. A mature scar

B. A keloid scar A keloid grows beyond the wound boundary; a hypertrophic scar stays within it.

CHAPTER 11

Other Systems and System Interactions

Read it in full: **Chapter 11 in the textbook**. Practice it: **Practice Exam 6** and the **flashcards**.

What to know

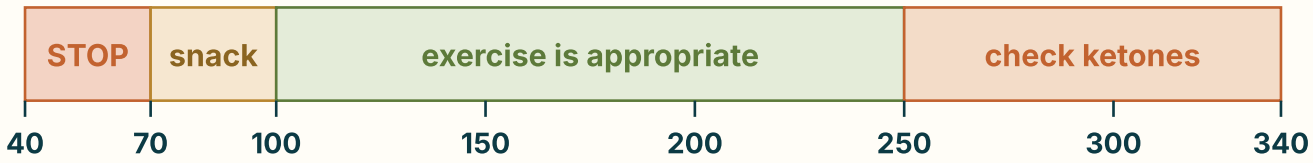
Check glucose before exercise in patients on insulin or sulfonylureas: below 70 treat, 70 to 100 snack, above 250 check ketones. Osteoporosis calls for loading without loaded flexion. Incontinence types map to mechanisms: stress, urge, overflow and functional.

In pregnancy use RPE and avoid prolonged supine after the first trimester. During cancer treatment check platelets, hemoglobin and ANC each session: platelets below 20,000 or ANC below 500 sharply restrict activity.

Visceral pain does not change with movement and links to organ function. A history of cancer is the strongest single red flag for malignancy. Know drugs by consequence: beta blockers, anticoagulants, steroids, opioids and fluoroquinolones.

Pre-exercise glucose (mg/dL) for patients on insulin or a sulfonylurea

Below 70: do not start. 15 g fast carbs,
recheck in 15 min.



70 to 100:
15 to 30 g carbs first.

Usual range for activity.
Watch for delayed hypoglycemia after.

Ketones present:
no vigorous exercise, contact provider.

Hypoglycemia: shaky, sweaty, fast heart, then confusion. A beta blocker can hide the tremor and tachycardia, leaving sweating. Unresponsive: give nothing by mouth and call emergency services.

Glucose zones before exercise. Check glucose before every session in patients on insulin or a sulfonylurea, and act on the zone the number falls in.

LOCK THESE IN

- Glucose < 70 treat; 70 to 100 snack; 100 to 250 go; > 250 check ketones.
- Beta blockers mask hypoglycemia; sweating remains.
- Osteoporosis: no loaded flexion or flexion with rotation.
- Stress: closure; urge: detrusor; overflow: refer; functional: access.
- Pregnancy: RPE 12 to 14; no prolonged supine after first trimester.
- Platelets < 20,000: essential activity only; ANC < 500: neutropenic precautions.
- Visceral pain does not change with movement.
- Beta blocker: RPE. Anticoagulant plus head strike: immediate evaluation.

Blood counts and exercise

Value	Guide
Platelets > 50,000	Progressive exercise as tolerated
Platelets 20,000 to 50,000	Light aerobic, active ROM, no heavy resistance
Platelets < 20,000	Essential ADLs and walking only, after consulting
ANC < 1,500	Neutropenia
ANC < 500	Severe: treat in the room, masks, strict hand hygiene
Hemoglobin 8 to 10	Light, symptom guided
Hemoglobin < 8	Defer or limit to essential activity; consult
Fever with low ANC	Emergency (neutropenic fever)

Worked case

CASE 11.1 · READING THE COUNTS

A 56 year old on chemotherapy has Hgb 9.2, platelets 18,000 and ANC 1,800. He wants to keep lifting free weights.

STEP 1 · HEMOGLOBIN

9.2: light, symptom guided activity.

STEP 2 · ANC

1,800: acceptable.

STEP 3 · PLATELETS

18,000 is below 20,000: high risk of spontaneous bleeding.

STEP 4 · DECIDE

Defer resistance work; essential mobility and light walking after talking with oncology, with fall prevention. Watch for petechiae, nosebleeds and headache.

TRAPS PEOPLE FALL INTO

- **Calling sweaty confusion a vasovagal episode.** In diabetes it is hypoglycemia until proven otherwise.
- **Crunches for an osteoporotic spine.** Loaded flexion drives wedge fractures.
- **Strengthening a painful high tone pelvic floor.** Downtrain and relax first.
- **Supine bridging at 28 weeks.** Prolonged supine after the first trimester risks supine hypotension.

Chapter 11 self-test · six items

1. A patient with diabetes is unresponsive and sweaty during therapy. What is correct?

A. Lay flat and recheck in 30 minutes
B. Give juice to drink right away
C. Give insulin for presumed high sugar
D. Call EMS; give nothing by mouth

D. Call EMS; give nothing by mouth An unresponsive patient gets nothing by mouth; activate emergency services.

2. A patient has heat intolerance, tremor, weight loss and atrial fibrillation. Which exercise approach fits until treated?

A. High intensity interval training
B. Low intensity with HR monitoring
C. Heavy resistance to failure
D. No change from the usual plan

B. Low intensity with HR monitoring Untreated hyperthyroidism raises resting HR and arrhythmia risk.

3. An older woman with dementia leaks because she cannot find and undress for the toilet. What type?

A. Mixed stress and urge
B. Stress incontinence
C. Functional incontinence
D. Overflow incontinence

C. Functional incontinence Barriers outside the bladder cause functional incontinence.

4. A pregnant patient at 32 weeks reports a severe headache, blurred vision and swollen hands. What is the concern?

A. Preeclampsia; urgent medical care
B. Normal late pregnancy fluid shift
C. Tension headache from posture
D. Carpal tunnel from edema only

A. Preeclampsia; urgent medical care These signs with high BP suggest preeclampsia, which needs urgent attention.

5. A patient with prostate cancer has new constant back pain worse at night. What should be suspected?

A. Mechanical strain; manipulate
B. Bone metastasis; refer
C. Facet arthritis; stretch
D. Disc herniation; traction

B. Bone metastasis; refer Prostate cancer spreads to bone; constant night pain needs evaluation.

6. A patient on warfarin trips and hits her head but feels fine. What is the action?

A. Ice the area and finish the session
B. Continue and monitor for a week
C. Immediate medical evaluation
D. Document only if she has pain later

C. Immediate medical evaluation Anticoagulation turns a head strike into a possible intracranial bleed.

CHAPTER 12

Therapeutic Modalities, Equipment and Devices

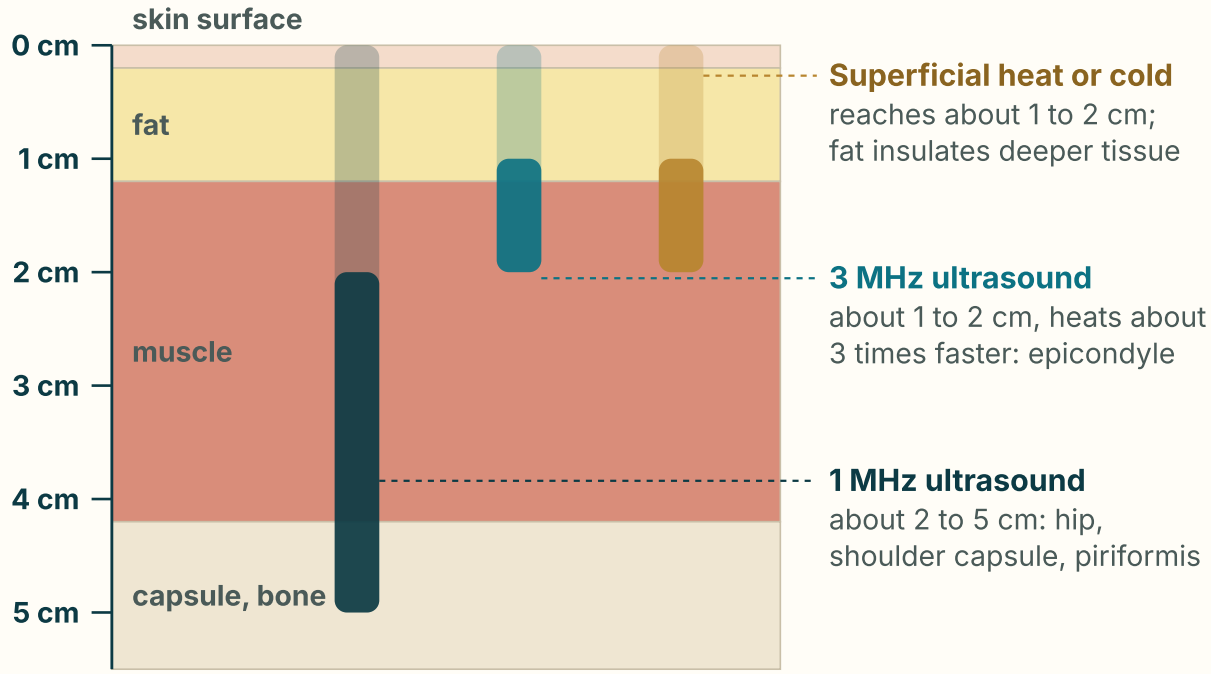
Read it in full: **Chapter 12 in the textbook**. Practice it: **Practice Exam 6** and the **flashcards**.

What to know

Choose heat by depth: superficial agents 1 to 2 cm, 3 MHz ultrasound 1 to 2 cm, 1 MHz 2 to 5 cm. Continuous ultrasound heats; pulsed is nonthermal. Avoid heat on acute, bleeding, clotting, malignant or insensate tissue.

Conventional TENS is high rate, short phase and sensory; NMES uses 35 to 50 pps with long rests; iontophoresis uses DC, like repels like, and 40 mA·min is typical. Check the ABI before compression. Water unloads by depth.

Fit devices to the wrist crease with 20 to 30 degrees of elbow flexion; the cane goes opposite. Up with the good, down with the bad. Ramps are 1:12. Vaulting means a functionally long prosthesis.



Dark part of each bar = the stated reach, drawn to depth. Continuous ultrasound heats; pulsed is nonthermal. Absorption is highest in collagen rich tissue (tendon, capsule) and lowest in fat.

How deep each heating agent reaches. Pick the agent by the depth of the target: superficial heat and 3 MHz for shallow tissue, 1 MHz for deep tissue.

LOCK THESE IN

- Superficial agents about 1 to 2 cm; 3 MHz 1 to 2 cm; 1 MHz 2 to 5 cm.
- Treat 2 to 4 times the ERA; continuous heats, pulsed is nonthermal.
- Conventional TENS high rate short phase sensory; low rate is motor and opioid.
- NMES 35 to 50 pps, on:off 1:3 to 1:5 at first.
- Iontophoresis: DC, like repels like, 40 mA·min.
- Lumbar traction to separate about 50% body weight; cervical start 8 to 10 lb.
- Water: neck 10%, xiphoid 25 to 35%, waist 50% weight bearing.
- Wrist crease, 20 to 30 degrees elbow flexion; up with the good, down with the bad.

Electrical stimulation settings

Goal	Typical parameters
Conventional TENS	80 to 150 pps, 50 to 100 µs, sensory level
Acupuncture-like TENS	2 to 10 pps, 150 to 250+ µs, visible twitch
Brief intense TENS	100 to 150 pps, long phase, max tolerable, ≤ 15 min
NMES strengthening	35 to 50 pps, 200 to 400 µs, 1:3 to 1:5, 2 s ramp
Russian current	2,500 Hz carrier in 50 bursts per second
Denervated muscle	Phase over about 10 ms or DC
Iontophoresis dose	mA × minutes; often 40 mA·min
Negative electrode drugs	Dexamethasone, acetic acid, salicylate, iodine

Worked case

CASE 12.1 · AN IONTOPHORESIS DOSE

A dexamethasone patch is ordered at 40 mA·min. The patient tolerates 2.5 mA. How long should the treatment run, and under which electrode does the drug go?

STEP 1 · REARRANGE

Time = dose ÷ current.

STEP 2 · DIVIDE

40 ÷ 2.5 = **16 minutes**.

STEP 3 · POLARITY

Dexamethasone sodium phosphate is negative, so it goes under the **negative electrode (cathode)**.

SKIN

The cathode makes an alkaline reaction; inspect the skin after.

TRAPS PEOPLE FALL INTO

- **3 MHz for a deep target.** 3 MHz is superficial; use 1 MHz.

- **Putting dexamethasone under the positive electrode.** Like repels like: it is negative.
- **Conventional TENS to strengthen a quadriceps.** Use NMES at 35 to 50 pps.
- **Compression with an ABI of 0.45.** Below about 0.5 compression is contraindicated.

Chapter 12 self-test · six items

1. Which modality heats by convection?

A. Ultrasound
B. Fluidotherapy
C. Paraffin bath
D. Moist hot pack

B. Fluidotherapy Moving heated particles or water transfer heat by convection.

2. What sequence does a patient usually feel with an ice pack?

A. Numbness, then cold, then burning
B. Warmth, then cold, then numbness
C. Cold, burning or aching, then numbness
D. Aching, then warmth, then cold

C. Cold, burning or aching, then numbness Cold, burning or aching, then numbness in about 5 to 10 minutes.

3. Which drug is delivered under the positive electrode in iontophoresis?

A. Iodine
B. Acetic acid
C. Dexamethasone
D. Lidocaine

D. Lidocaine Lidocaine is positive; like repels like.

4. A patient wants pain relief that lasts after the unit is off. Which TENS mode fits?

A. Low rate, at motor level
B. High rate, short phase only
C. Brief intense for 10 minutes
D. Conventional, sensory level

A. Low rate, at motor level Low rate TENS releases endogenous opioids with longer carryover.

5. How should a cane be fitted?

A. Handle at the hip with the elbow straight
B. Wrist crease height, 20 to 30 degrees
C. Handle at the waist with the elbow straight
D. Handle at the elbow with 45 degrees flexion

B. Wrist crease height, 20 to 30 degrees Fit at the greater trochanter or wrist crease with 20 to 30 degrees of elbow flexion.

6. A child with crouch gait and weak plantarflexors needs an orthosis. Which fits?

A. Hinged AFO with free motion
B. Posterior leaf spring AFO
C. Supramalleolar orthosis
D. Floor (ground) reaction AFO

D. Floor (ground) reaction AFO An anterior shell creates a knee extension moment in stance.

CHAPTER 13

Safety, Professional Responsibilities and Evidence

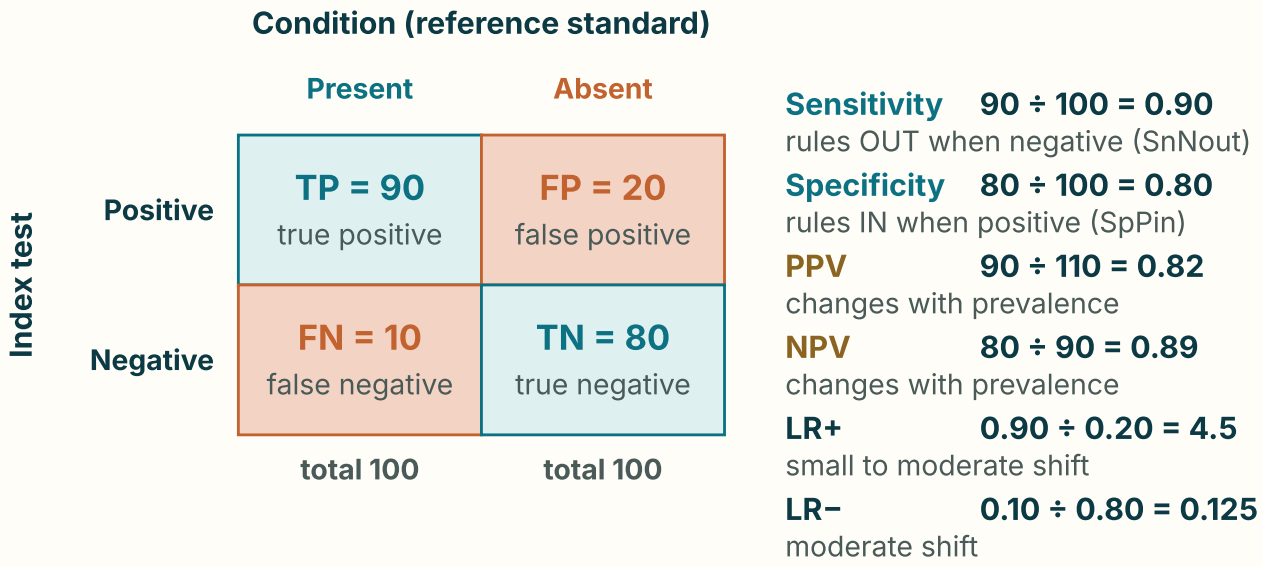
Read it in full: **Chapter 13 in the textbook**. Practice it: **Practice Exam 7** and the **flashcards**.

What to know

Add contact, droplet or airborne precautions by organism; use soap and water for C. difficile. Don gown, mask, eyewear, gloves; doff gloves first. The PTA treats within the plan but never evaluates, changes the plan or discharges.

Bill timed codes with the 8 minute rule. Medicare needs recertification by 90 days and a progress report every 10 visits. Report suspected abuse on reasonable suspicion. HIPAA allows disclosure for treatment, payment, operations and mandated reporting.

SnNout and SpPin; LR+ above 10 or LR− below 0.1 is a large shift; predictive values change with prevalence. Change must exceed the MDC and should reach the MCID; NNT is 1 ÷ ARR. Teach with teach back and plain language.



From a 2 by 2 table to every accuracy number. Sensitivity and specificity belong to the test; predictive values belong to the test in a particular population.

LOCK THESE IN

- Contact: gown and gloves. Droplet: mask. Airborne: N95 and negative pressure.
- Soap and water for C. difficile, norovirus and visible soil.
- Don gown, mask, eyewear, gloves; doff gloves first.
- PTA never evaluates, changes the plan or discharges.
- Medicare: recert every 90 days; progress report every 10 visits.
- 8 minute rule: 8 to 22 = 1, 23 to 37 = 2, 38 to 52 = 3, 53 to 67 = 4.
- Report abuse on reasonable suspicion; ramp 1:12; door 32 in.
- SnNout, SpPin; LR+ > 10 or LR− < 0.1 is large; NNT = 1/ARR.

Formulas for the evidence items

Measure	Formula or rule
Sensitivity	TP ÷ (TP + FN)
Specificity	TN ÷ (TN + FP)
PPV; NPV	TP ÷ (TP + FP); TN ÷ (TN + FN)
LR+; LR−	sens ÷ (1 − spec); (1 − sens) ÷ spec
Odds and probability	odds = p ÷ (1 − p); p = odds ÷ (1 + odds)
SEM; MDC95	SD × √(1 − r); SEM × 1.96 × √2
ARR; NNT	CER − EER; 1 ÷ ARR, round up
Ramp length	Rise (in) × 12 = minimum run (in)

Worked case

CASE 13.1 · FROM A 2 BY 2 TABLE TO A POST-TEST PROBABILITY

A test is studied in 200 people: 100 have the condition (90 test positive) and 100 do not (80 test negative). Your patient has a 30 percent pretest probability and tests positive.

STEP 1 · SENSITIVITY

90 ÷ 100 = 0.90.

STEP 2 · SPECIFICITY

80 ÷ 100 = 0.80.

STEP 3 · LR+

0.90 ÷ (1 − 0.80) = **4.5**, a small to moderate shift.

STEP 4 · PRETEST ODDS

0.30 ÷ 0.70 = 0.43.

STEP 5 · POST-TEST ODDS

0.43 × 4.5 = 1.93.

STEP 6 · BACK TO PROBABILITY

1.93 ÷ 2.93 = about **66 percent**.

TRAPS PEOPLE FALL INTO

- **Alcohol rub after C. difficile.** It does not kill spores; wash with soap and water.
- **A mask for C. difficile.** It is contact, not droplet or airborne.
- **A PTA "reevaluating and updating goals."** Always wrong.
- **Waiting for proof before reporting abuse.** Reasonable suspicion is the standard.

Chapter 13 self-test · six items

1. Which organism needs droplet precautions?

A. Tuberculosis

B. MRSA

C. Influenza

D. Varicella

C. Influenza Influenza spreads by large droplets; a surgical mask is used.

2. A PT corrects an error in a paper chart. What is correct?

A. Line through it, then date and initial
B. Blacken the error with a marker
C. Use correction fluid and rewrite it
D. Tear out the page and recopy it

A. Line through it, then date and initial Nothing is erased or obliterated in the legal record.

3. Which disclosure requires the patient's written authorization under HIPAA?

A. Billing the patient's health insurer
B. Giving records to the patient's employer
C. Mandated reporting of suspected abuse
D. Sending notes to a treating physician

B. Giving records to the patient's employer Disclosure to an employer is outside treatment, payment and operations.

4. A study enrolls only healthy 20 year old athletes. Which validity is limited?

A. Test retest reliability
B. Internal validity
C. Content validity
D. External validity

D. External validity A restricted sample limits generalizability.

5. Falls occur in 20 percent of controls and 15 percent of a treated group. What is the NNT?

A. 15
B. 5
C. 20
D. 35

C. 20 ARR = 0.20 − 0.15 = 0.05; NNT = 1 ÷ 0.05 = 20.

6. What is the best way to confirm a patient understands hip precautions?

A. Ask her, "Do you understand them?"
B. Give her a handout to read later
C. Ask her family if she understood
D. Ask her to show and explain them back

D. Ask her to show and explain them back Teach back confirms understanding.

CHAPTER 14

Lifespan, Special Populations and Integrated Cases

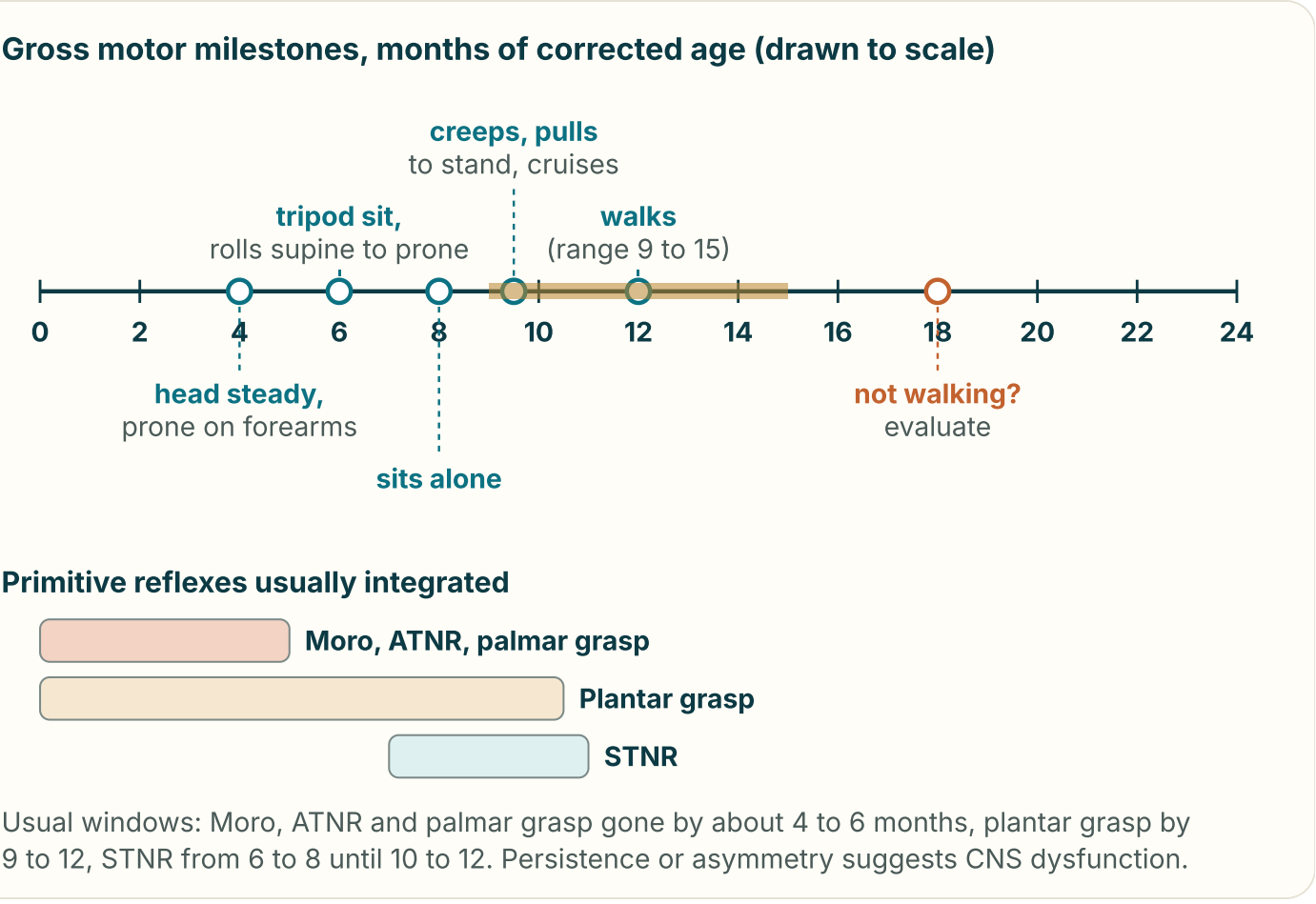
Read it in full: **Chapter 14 in the textbook**. Practice it: **Practice Exam 7** and the **flashcards**.

What to know

Infants sit at about 6 to 8 months and walk at about 12; evaluate if not walking by 18 and use corrected age for prematurity. Most primitive reflexes integrate by 4 to 6 months. CP is graded by GMFCS I to V.

In spina bifida watch for shunt malfunction and tethered cord; in Down syndrome screen for atlantoaxial instability. Part C uses an IFSP in natural environments; Part B uses an IEP with educationally relevant goals.

Sudden confusion in an older adult is delirium until proven otherwise. Fall risk: TUG 12 s or more, Berg 45 or below. In integrated cases act in order: life threat, red flag, safety, function, impairment.



Milestones and reflex windows on one timeline. Judge a preterm infant by corrected age. A milestone that is late, lost or one sided matters more than any single date.

LOCK THESE IN

- Sit about 6 to 8 months; walk about 12; evaluate if not walking by 18.
- Corrected age = chronological age minus weeks premature, until about 2 years.
- Most primitive reflexes gone by 4 to 6 months; plantar grasp lasts to 9 to 12.
- GMFCS I to V; spastic diplegia follows PVL.
- Shunt malfunction = emergency; Down syndrome = check C1 to C2.
- Torticollis: tilt toward, rotate away from the tight SCM.
- Part C: IFSP, natural environment. Part B: IEP, educationally relevant.
- Sudden confusion in an older adult = delirium until proven otherwise.

Milestones and reflexes

Item	Typical age
Head steady, prone on forearms	About 4 months
Rolls supine to prone, tripod sit	About 6 months
Sits independently	About 8 months
Creeps, pulls to stand, cruises	9 to 10 months
Walks independently	About 12 months (9 to 15)
Stairs reciprocal up; hops	3 years; 4 years
ATNR, Moro, palmar grasp	Integrate by about 4 to 6 months
Plantar grasp	Integrates by about 9 to 12 months

Worked case

CASE 14.1 · THREE PROBLEMS, ONE FIRST

Two days after posterior THA, a 68 year old with diabetes, heart failure and mild dementia has HR 112, SpO_2 89% (baseline 95%) and new pleuritic chest pain before gait training.

STEP 1 · RANK

Life threat first: tachycardia, new hypoxemia and pleuritic pain after hip surgery suggest PE.

STEP 2 · ACT

Do not mobilize; keep him at rest, notify the nurse and provider at once, call the rapid response team if he worsens.

LATER

Hip precautions and glucose checks matter, but they come after the threat to life.

TRAPS PEOPLE FALL INTO

- **Using chronological age for a preterm infant.** Correct for prematurity until about 2 years.
- **Stretching a torticollis toward the tilt.** Tilt away and rotate toward the tight side.

- **Calling a sick child with a shunt "viral."** Headache, vomiting and lethargy mean possible shunt failure.
- **Moving early intervention to the clinic.** Part C services belong in natural environments.

Chapter 14 self-test · six items

1. A baby born at 32 weeks is 6 months old. What is her corrected age?

A. About 8 months
B. About 2 months
C. About 6 months
D. About 4 months

D. About 4 months 8 weeks early is about 2 months: 6 − 2 = 4 months corrected.

2. A preterm child has legs much more involved than arms, with spasticity. Which CP type is most likely?

A. Spastic diplegia
B. Dyskinetic
C. Ataxic
D. Spastic hemiplegia

A. Spastic diplegia Periventricular leukomalacia in preterm infants classically causes spastic diplegia.

3. A 3 month old has a positive Ortolani test. What is the treatment?

A. Hip extension splint worn at night
B. Observation until she starts walking
C. Pavlik harness in flexion and abduction
D. Weight bearing in a prone stander

C. Pavlik harness in flexion and abduction Under about 6 months, DDH is treated with a Pavlik harness.

4. In early intervention, who chooses the outcomes in the plan?

A. The pediatrician
B. The child's family
C. The physical therapist
D. The school district

B. The child's family The IFSP is family centered, with outcomes the family chooses.

5. An older adult has slow onset memory loss over 2 years with normal attention. What is most likely?

A. Dementia
B. Delirium
C. Depression
D. Normal aging

A. Dementia Insidious, progressive decline with intact attention suggests dementia.

6. At 26 weeks of pregnancy, a patient reports regular painful contractions during exercise. What is the action?

A. Lower the intensity and continue
B. Stop; call her obstetric provider
C. Teach pelvic floor contractions
D. Switch to supine abdominal work

B. Stop; call her obstetric provider Regular painful contractions are a warning sign to stop.

Cram sheet

Every cram table from Study Guides 1 to 7, in order. Cover the right column and say the answer before you look.

Exam and reasoning

Topic	Rule
Score	200 to 800 scale; passing is 600; equated across forms
Pretest items	Unscored and unmarked; guess, flag, move on
Every stem	Patient, setting, task; predict before reading options
Priority ladder	Emergency, vitals, red flags, precautions, examination, function, comfort
Management model	Examination, evaluation, diagnosis, prognosis, intervention, outcomes
ICF	Impairment (body), activity (task), participation (role), environment, personal
Three decisions	Treat; treat and refer; refer (or emergency)
PT only	Exam, evaluation, plan of care changes, reexamination, discharge
Settings	IRF about 3 h/day, 5 days/week; home health homebound; IEP educationally relevant
Study	Spaced, retrieved, interleaved; miss log by error type

Spine and tissue

Topic	Rule
Healing	Inflammation 3 to 7 days; proliferation to week 3 to 6 (type III); remodeling months (type I)
Laws	Wolff for bone, Davis for soft tissue, SAID for both
Glides	Convex moves: opposite. Concave moves: same
CAD screen	5 Ds and 3 Ns; no manual therapy; urgent referral
Wainner cluster	Spurling, distraction, ULTT A, rotation under 60 degrees
Myelopathy cluster	Gait, Hoffmann, inverted supinator, Babinski, age over 45
Lumbar red flags	Cauda equina (emergency), cancer, fracture, infection, AAA
TBC	Manipulation, stabilization, specific exercise, traction
Meyerding	I to 25%, II to 50%, III to 75%, IV to 100%, V beyond
Laslett	2 of first 4, or 3 or more of 5 positive

Upper extremity

Topic	Rule
Rhythm	2:1, about 120 GH and 60 scapular
Sorting	Full passive + arc = tendinopathy; active < passive = tear or nerve; equal loss = capsule
Dislocation	95% anterior; Bankart, Hill Sachs, axillary nerve
Cuff repair	No active elevation about 6 weeks; resisted about 12
Reverse TSA	No extension + adduction + IR about 12 weeks
Elbow	ECRB tendinopathy; UCL for valgus; supracondylar = compartment watch
Wrist	CTS spares thenar skin; de Quervain = APL, EPB; snuffbox = scaphoid
Flexor zone II	Dorsal blocking orthosis; days 5 to 21 riskiest
Nerves	Radial wrist drop; median ape or benediction; ulnar claw
Seddon	Neurapraxia full; axonotmesis 1 mm/day; neurotmesis surgery

Lower extremity and gait

Topic	Rule
Hip OA	IR and flexion lost; cane opposite
THA	Posterior: flexion > 90, adduction, IR. Anterior: extension, ER
Knee tests	Lachman, pivot shift, posterior drawer, McMurray, Thessaly
ACL	Graft weakest 6 to 12 weeks; RTS about 9 months, LSI ≥ 90%
TKA	Extension first; at least 90 degrees flexion; NMES
Ottawa	Malleoli posterior edge or tip, 5th MT base, navicular, four steps
Gait	Stance 60, swing 40; speed 1.2 to 1.4 m/s
Stroke speed	< 0.4 household; 0.4 to 0.8 limited; > 0.8 community
Bone	Clinical union about 6 to 8 weeks; T ≤ −2.5 osteoporosis
Amputation	TF: hip flexion and abduction contracture; TT: knee flexion

Neuro foundations

Topic	Rule
Tracts	CST at pyramids; DCML in medulla; STT within 1 to 2 segments
Cerebellum	Ipsilateral signs, no weakness
Brainstem	Crossed signs; new = emergency
Tone	Spasticity velocity dependent (MAS 0, 1, 1+, 2, 3, 4); rigidity not
UMN; LMN	Hyperreflexia, clonus, Babinski; flaccid, atrophy, fasciculations
Learning	Retention and transfer; random practice; faded feedback
Strategies	Ankle small and slow; hip large or narrow; step beyond base
Cutoffs	Berg < 45; TUG ≥ 13.5; DGI ≤ 19; FGA ≤ 22; ABC < 67%
Walking dose	60 to 80% HRR, 70 to 85% HRmax, RPE 15 to 17
CIMT	Wrist 20 and finger 10 degrees active extension

Stroke, TBI, SCI

Topic	Rule
Arteries	MCA face and arm; ACA leg; PCA vision; VB crossed
Aphasia	Fluency, comprehension, repetition
BP	< 180/105 after lysis; to 220/120 without; about 140 SBP after bleed
GCS	Mild 13 to 15; moderate 9 to 12; severe 3 to 8
ICP and CPP	ICP < 20; CPP 60 to 70
Concussion	Out today; 24 to 48 h relative rest; subsymptom aerobic work
AIS	A, B, C, D, E; sacral sparing decides complete
Syndromes	Central arms; B-S best; anterior worst
Levels	C5 elbow flex; C6 tenodesis; C7 transfers; T10 to L2 KAFO
AD	T6 and above; sit up, legs down, bladder first

Progressive and vestibular

Topic	Rule
PD	TRAP; on period 45 to 60 min after dose; cues for freezing
MS	Cool, paced; Uhthoff resolves; four Ps
ALS	UMN + LMN; spares sensation and eyes; FVC < 50% discuss NIV
Overwork	GBS, ALS, post polio: submaximal, rested
NMJ	MG worse with use; LEMS better with use
Neuropathy	10 g monofilament; hot swollen foot = Charcot
BPPV	Posterior: upbeat torsional, Epley. Horizontal: roll test
Central signs	Direction changing nystagmus, normal head impulse, skew
Bell palsy	Whole half face; protect eye; no grimacing
HD	Autosomal dominant; chorea, cognition, mood

Cardiopulmonary foundations

Topic	Rule
Vitals	HR 60 to 100; RR 12 to 20; BP < 120/80; SpO_2 95 to 100%
Exercise	SBP up about 10 per MET; DBP flat; stop if SBP falls > 10
Hypertensive stop	SBP > 250 or DBP > 115
Intensity	Karvonen; RPE with beta blockers; RPP = HR × SBP
ECG	PR 0.12 to 0.20; QRS < 0.12; 3 PVCs in a row = VT
Blocks	1st and Wenckebach usually OK; Mobitz II and 3rd = no
ST	Depression ischemia; elevation injury; Q old infarct
PFT	FEV_1/FVC < 0.70 obstruction; low TLC restriction
ABG	ROME; compensation if the other value moves
Labs	Glucose < 70 treat; > 250 ketones; INR 2 to 3 OK

Heart, lung, vessels, lymph

Topic	Rule
ACS	New, rest or crescendo angina: stop, get help
HF	Left: lungs. Right: body. Weight 2 to 3 lb/day or 5/week: hold
Sternal	6 to 8 weeks; no pushing up; splint cough
Rehab	Phase I +20 MI, +30 surgery; Phase II 40 to 80% HRR
Devices	ICD 10 to 20 below detection; LVAD Doppler MAP; transplant RPE
COPD	$FEV_1/FVC < 0.70$; SpO_2 88 to 92%; pursed lips
Airway clearance	No head down with raised ICP, GERD, hemoptysis
ABI	≤ 0.90 PAD; < 0.50 no compression; > 1.40 unreliable
DVT	Wells ≥ 2 likely; walk once anticoagulated
Lymphedema	Stages 0 to III; CDT; MLD proximal first

Skin and wounds

Topic	Rule
Healing	Inflammation, proliferation, maturation; scar about 80%
Staging	1 red, 2 dermis, 3 fat, 4 muscle, tendon or bone; DTPI; unstageable
Braden	6 to 23; ≤ 18 at risk; ≤ 9 very high
Wound types	Arterial lateral, venous medial, neuropathic plantar
Debridement	Selective: sharp, enzymatic, autolytic, larval
Dressings	Dry hydrogel; wet alginate or hydrofiber; foam moderate
Compression	Full at ABI ≥ 0.8; reduced 0.5 to 0.8
Burns	Blisters = superficial partial; leathery = full
Rule of nines	9, 9, 9, 18, 18, 18, 18, 1
ABCDE	Evolution is the most important sign

Other systems

Topic	Rule
Glucose	< 70 treat; 70 to 100 snack; > 250 ketones
Hypoglycemia	15 g fast carbohydrate, recheck in 15 min; unresponsive = EMS
Osteoporosis	T ≤ −2.5; no loaded flexion or rotation
Incontinence	Stress PFMT; urge diary and suppression; overflow refer
Pregnancy	RPE 12 to 14; no prolonged supine; stop for bleeding or calf swelling
Counts	Platelets < 20,000 essential only; ANC < 500 precautions
RA	Symmetric, > 1 h stiffness, C1 to C2 instability
Visceral	Not changed by movement; tied to organ function
Red flag	History of cancer is the strongest for malignancy
Drugs	Beta blocker RPE; anticoagulant head strike = evaluate

Modalities and devices

Topic	Rule
Depth	Superficial 1 to 2 cm; 3 MHz 1 to 2; 1 MHz 2 to 5
Ultrasound	2 to 4 × ERA; continuous heats; pulsed nonthermal
TENS	Conventional 80 to 150 pps sensory; low rate 2 to 10 motor
NMES	35 to 50 pps; 1:3 to 1:5; ramp 2 s
Ionto	DC; like repels like; 40 mA·min
Traction	Cervical 8 to 10 lb start; lumbar 50% BW to separate
Water	Neck 10%, xiphoid 25 to 35%, waist 50%
Devices	Wrist crease; 20 to 30 degrees; cane opposite
Wheelchair	18 × 16 in; ramp 1:12; door 32 in
Prosthetics	K1 to K4; vaulting = functionally long limb

Safety, law and evidence

Topic	Rule
Precautions	Contact gown and gloves; droplet mask; airborne N95
PPE	On: gown, mask, eyewear, gloves. Off: gloves first
CPR	100 to 120/min, at least 2 in, 30:2
Roles	PT evaluates and discharges; PTA treats within plan
Medicare	Recert 90 days; progress report 10 visits
8 minute rule	8 to 22 = 1; 23 to 37 = 2; 38 to 52 = 3
Abuse	Reasonable suspicion; personal duty
Access	Ramp 1:12; door 32 in; turn 60 in
Diagnosis	SnNout; SpPin; LR+ > 10 or LR− < 0.1 strong
Change	Exceed MDC; reach MCID; NNT = 1/ARR

Lifespan

Topic	Rule
Milestones	Head 4 mo; sit 6 to 8; creep 9 to 10; walk 12; refer by 18
Reflexes	Most integrate 4 to 6 mo; plantar grasp 9 to 12
CP	GMFCS I to V; diplegia from PVL
Spina bifida	Shunt failure emergency; tethered cord; latex
Torticollis	Tilt toward, rotate away; stretch opposite
IDEA	Part C IFSP birth to 3; Part B IEP 3 to 21
Cognition	Delirium acute; dementia insidious
Falls	TUG ≥ 12 s; Berg ≤ 45; speed < 1.0 m/s
Pregnancy	150 min/week; no prolonged supine; stop signs
Priority	Life threat, red flag, safety, function, impairment

Dr. Garg Learning · CC BY-SA 4.0