NPTE REVIEW · STUDY GUIDE

Study Guide 3

This guide goes with Practice Exam 3 and opens the neuromuscular half of the exam. Chapter 5 gives you the tools: where each tract crosses, how to examine tone, reflexes and coordination, how people learn movement, and which balance test and cutoff fits which patient. Chapter 6 puts the tools to work on stroke, brain injury and spinal cord injury, where the lesion predicts the deficit, the prognosis and the danger. Study each diagram until you can redraw it, work the cases with the steps covered, then take the ten board-style items for each chapter.

WHAT THIS GUIDE COVERS

- Chapter 5 · cortex, homunculus and blood supply, the three long tracts and where they cross, cerebellum, basal ganglia, cranial nerves, sensation, reflex grades, the Modified Ashworth Scale, coordination, UMN versus LMN, motor learning stages, practice and feedback, neuroplasticity, balance systems and strategies, SOT, fall risk cutoffs, gait speed, CIMT, walking intensity and FES.
- Chapter 6 · MCA, ACA, PCA, vertebrobasilar and lacunar syndromes, aphasia types, neglect and pusher syndrome, Brunnstrom stages and synergies, the hemiplegic shoulder, stroke blood pressure limits, GCS and Rancho levels, concussion return, ASIA classification, incomplete cord syndromes, function by level, autonomic dysreflexia, orthostatic hypotension, HO, pressure injury and spasticity.

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

Every neuro item is a localization problem first. The motor homunculus puts the **leg and foot on the medial surface** (ACA territory) and the trunk, arm, hand and face progressively lateral (MCA territory). The dominant hemisphere (usually left) holds language; the nondominant parietal lobe

governs spatial attention, so damage there causes **neglect and anosognosia**. Frontal damage brings impulsivity and poor insight, which matter more for safety than strength.

Three tracts answer most side questions. The **lateral corticospinal tract** crosses at the pyramidal decussation in the caudal medulla: a lesion above it gives contralateral weakness, a cord lesion gives ipsilateral weakness below. The **dorsal columns** (vibration, proprioception, discriminative touch) ascend on the same side and cross in the medulla. The **spinothalamic tract** (pain, temperature) crosses within one or two segments of entry. A cord hemisection therefore gives Brown-Sequard syndrome.

The cerebellum corrects timing, force and direction; it never causes weakness, and its signs are on the **same side** as the lesion (dysmetria, intention tremor, dysdiadochokinesia, wide based gait). The basal ganglia scale and select movement; dopamine loss gives the hypokinetic Parkinson picture. Crossed findings (an ipsilateral cranial nerve deficit with contralateral body signs) localize to the brainstem and posterior circulation, and new ones are an emergency.

Examine in order: cognition and safety first, superficial before cortical sensation, reflexes and tone before function. Reflexes are graded 0 to 4+; 4+ with clonus is an UMN sign. **Spasticity** is velocity dependent and graded with the Modified Ashworth Scale (0, 1, 1+, 2, 3, 4). **Rigidity** is not velocity dependent (lead pipe or cogwheel). UMN signs: spasticity, hyperreflexia, clonus, Babinski, Hoffmann. LMN signs: flaccidity, hyporeflexia, atrophy, fasciculations. Mixed signs with normal sensation suggest ALS.

Coordination tests separate causes. A sensory ataxia worsens a lot with the eyes closed; cerebellar ataxia changes little. A positive **Romberg** (stable with eyes open, falls with eyes closed) points to a proprioceptive or vestibular problem, not the cerebellum. Intention tremor is cerebellar; resting tremor is basal ganglia.

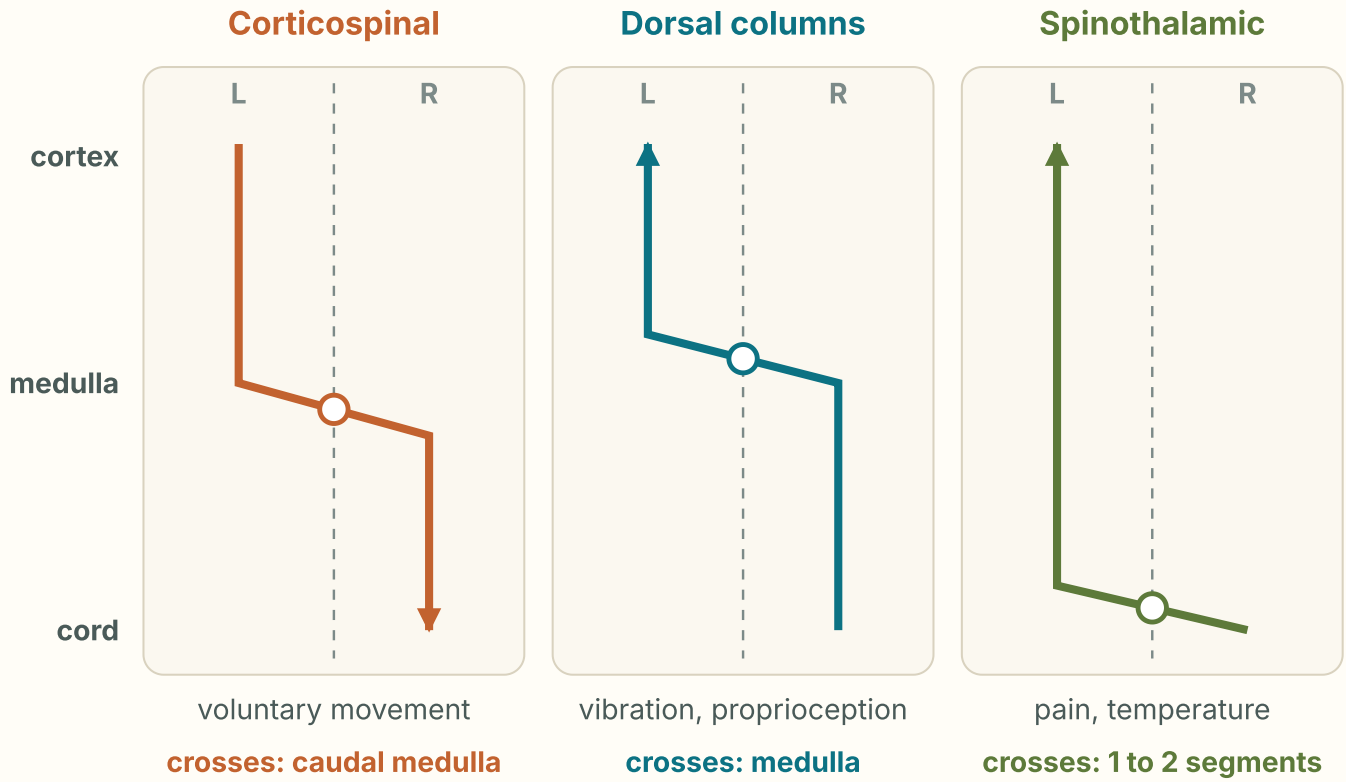
Learning is shown by retention and transfer, not by performance in the session. In the cognitive stage use demonstration, guidance, blocked practice and frequent feedback. In the associative and autonomous stages fade feedback and move to random and variable practice in open settings. Random practice lowers in-session performance but improves retention: the **contextual**

interference effect. Faded, bandwidth and summary feedback beat feedback on every trial. Plasticity needs specificity, repetition, intensity and salience; learned nonuse is its enemy.

Balance uses somatosensory, visual and vestibular input. On firm ground in good light, somatosensory input dominates; standing on foam degrades it, closing the eyes removes vision, and in SOT conditions 5 and 6 only vestibular input is accurate. The ankle strategy handles small, slow perturbations; the hip strategy larger or faster ones or narrow surfaces; stepping happens when the center of mass leaves the base of support.

Usual fall risk cutoffs: **Berg below 45** (of 56), **TUG 13.5 s or more**, **DGI 19 or less** (of 24), **FGA 22 or less** (of 30), functional reach under 6 inches high risk, ABC below 67 percent. Gait speed is a vital sign: under 0.4 m/s household, 0.4 to 0.8 limited community, over 0.8 community; under about 1.0 in older adults flags risk. A history of falls is the strongest single predictor; challenging balance exercise about three hours a week is the core of prevention.

For walking in chronic stroke, SCI or brain injury, the guideline favors **moderate to high intensity stepping practice**: 60 to 80 percent of heart rate reserve or 70 to 85 percent of age predicted maximum, or RPE about 15 to 17. Use RPE with beta blockers. **CIMT** needs at least 20 degrees of active wrist extension and 10 degrees of thumb and finger extension. FES needs an intact peripheral nerve; typical motor settings are about 30 to 50 pps, 200 to 350 μs, with on:off starting near 1:3 to 1:5.



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

Practice and feedback

Choice	When it fits
Blocked practice	Early acquisition; cognitive impairment
Random practice	Retention and transfer once the idea is learned
Distributed practice	Low endurance, fatigue (MS), injury risk
Part practice	Discrete serial tasks such as a transfer
Whole practice	Continuous tasks such as walking
Knowledge of performance	Goal reached with an abnormal pattern
Faded, bandwidth, summary feedback	Better long term retention
External focus	"Push the floor away" beats "straighten your knee"

Worked cases

WORKED CASE 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.

WORKED CASE 2 · UMN PLUS LMN

A 52 year old has six months of hand weakness and tripping, atrophy and fasciculations of both hands, 4+ patellar reflexes with three beats of clonus, a positive Hoffmann and normal sensation.

STEP 1 · SORT THE SIGNS

Atrophy and fasciculations are LMN. Hyperreflexia, clonus and Hoffmann are UMN.

STEP 2 · NOTE WHAT IS SPARED

Sensation is normal.

STEP 3 · CONCLUDE

Most consistent with motor neuron disease (ALS); refer to a physician. Myelopathy must be excluded but usually brings some sensory change.

WORKED CASE 3 · SETTING A TRAINING HEART RATE

A 58 year old eight months after stroke walks at 0.52 m/s and takes no beta blocker. What heart rate range fits moderate to high intensity stepping at 70 to 85 percent of age predicted maximum?

STEP 1 · ESTIMATE MAXIMUM

220 − 58 = 162 beats per minute.

STEP 2 · LOWER BOUND

0.70 × 162 = 113.4, about **113**.

STEP 3 · UPPER BOUND

0.85 × 162 = 137.7, about **138**.

STEP 4 · PLACE HER SPEED

0.52 m/s is limited community; her goal of the store needs more than 0.8 m/s. Add an AFO or peroneal FES for the foot drop.

WORKED CASE 4 · MATCHING PRACTICE TO STAGE

A 74 year old two weeks after left MCA stroke, with mild expressive aphasia, is learning a wheelchair to bed transfer and forgets the brakes. How should practice look now?

STEP 1 · NAME THE STAGE

Cognitive stage of a serial task, with aphasia limiting words.

STEP 2 · CHOOSE THE STRUCTURE

Demonstration, short consistent cues or gestures, part practice of the trouble steps then the whole, blocked practice and frequent feedback.

LATER

Random practice with summary feedback is the goal later. Now, errors in a transfer mean falls.

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.
- **Choosing balance board work for walking in chronic stroke.** High intensity, variable stepping practice is the answer.
- **Offering CIMT to a flaccid hand.** It needs 20 degrees of wrist and 10 degrees of finger extension.

Chapter 5 self-test · ten items

1. A stroke causes weakness of the left leg much more than the left arm, with urinary incontinence and abulia. Which artery is involved?

A. Left anterior cerebral artery
B. Right posterior cerebral artery
C. Right anterior cerebral artery
D. Right middle cerebral artery

C. Right anterior cerebral artery The leg area lies medially in ACA territory. Left sided weakness means a right hemisphere lesion.

2. A knife wound hemisects the left side of the cord at T8. Which finding is expected?

A. Left sided loss of pain below the lesion
B. Right sided loss of proprioception below
C. Right sided weakness below the lesion
D. Right sided loss of pain below the lesion

D. Right sided loss of pain below the lesion The spinothalamic tract has already crossed, so pain loss is contralateral. Weakness and proprioceptive loss are ipsilateral.

3. A patient overshoots on right finger to nose and has right sided intention tremor with normal strength. Where is the lesion?

A. Right cerebellar hemisphere
B. Left internal capsule area
C. Left cerebellar hemisphere
D. Right basal ganglia nuclei

A. Right cerebellar hemisphere Cerebellar signs are on the same side as the lesion and do not include weakness.

4. Passive elbow extension shows a catch followed by minimal resistance through less than half of the remaining range. What is the MAS grade?

A. 2
B. 1+
C. 1
D. 3

B. 1+ A catch with minimal resistance through less than half the remaining range is 1+. Grade 1 is a catch and release or resistance only at end range.

5. A patient stands steadily with feet together and eyes open but sways and steps when the eyes close. Which deficit is most likely?

A. A lesion of the basal ganglia
B. Weakness of the ankle dorsiflexors
C. A lesion of the cerebellar vermis
D. Loss of proprioception in the feet

D. Loss of proprioception in the feet A positive Romberg means the patient relies on vision because proprioceptive or vestibular input is poor.

6. A patient has learned the steps of a stand pivot transfer and now makes fewer errors. Which plan best improves retention?

A. Random practice with summary feedback
B. Hand over hand guidance on every trial
C. Blocked practice with feedback each trial
D. Concurrent feedback throughout each trial

A. Random practice with summary feedback In the associative stage, random practice and reduced feedback build retention through contextual interference.

7. A therapist says, "Push the floor away as you stand." What kind of cue is this?

A. An internal focus of attention
B. Concurrent manual guidance
C. An external focus of attention
D. Knowledge of results after the task

C. An external focus of attention Directing attention to the effect of the movement is an external focus, which generally produces better learning.

8. An older adult scores 47 on the Berg, 11 s on the TUG and 17 on the DGI. Which result suggests increased fall risk?

A. The Berg Balance Scale score
B. The Dynamic Gait Index score
C. The Timed Up and Go time
D. None of the three scores

B. The Dynamic Gait Index score DGI 19 or less signals risk. Berg 47 is above 45 and a TUG of 11 s is below 13.5 s.

9. A patient eight months after stroke has 15 degrees of active wrist extension and 5 degrees of finger extension. Is CIMT appropriate?

A. Yes, if the mitt is worn all waking hours
B. No, CIMT works only in the first month
C. No, the minimum motor criteria are not met
D. Yes, any voluntary movement is enough

C. No, the minimum motor criteria are not met The classic criteria are at least 20 degrees of active wrist extension and 10 degrees of finger extension.

10. Which setting is typical for NMES to produce a fused functional contraction?

A. About 35 pulses per second
B. About 2 pulses per second
C. About 150 pulses per second
D. About 1,000 pulses per second

A. About 35 pulses per second About 30 to 50 pps produces a tetanic contraction; higher frequencies fatigue faster.

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

About 85 to 87 percent of strokes are ischemic; the rest are hemorrhagic. Hypertension is the most important modifiable risk factor. A TIA is a warning: new or recurring symptoms need emergency referral. The **MCA** stroke (most common) gives face and arm more than leg weakness, a homonymous hemianopia and either aphasia (dominant) or neglect (nondominant). The **ACA** gives leg more than arm with incontinence and abulia. The **PCA** gives hemianopia with macular sparing and thalamic pain. Vertebrobasilar strokes give crossed signs, vertigo and ataxia; lacunar strokes are pure motor or pure sensory without cortical signs.

Classify aphasia by fluency, comprehension and repetition. **Broca**: nonfluent, comprehension fairly intact, aware and frustrated; use yes or no questions and gestures. **Wernicke**: fluent but empty, comprehension impaired; use short sentences and demonstration. Global loses all three. **Pusher syndrome** (posterolateral thalamus) pushes toward the weak side and resists correction; treat with vision of vertical and reaching toward the stronger side, never by force.

Recovery runs through the **Brunnstrom stages**: 1 flaccid, 2 synergies begin, 3 spasticity peaks with movement only in synergy, 4 some out of synergy, 5 more complex combinations, 6 isolated

movement. The strongest UE flexion component is elbow flexion; in UE extension it is shoulder adduction with internal rotation and forearm pronation. The leg usually sits in extension synergy, which helps standing but causes toe drag and circumduction.

Protect the hemiplegic shoulder: never pull on the arm, support it on a lap tray, use a sling only for standing and walking in the flaccid stage, avoid overhead pulleys, and use NMES to the supraspinatus and posterior deltoid. Blood pressure limits: below **180/105** for 24 hours after thrombolysis; permissive up to about **220/120** in the first 24 to 48 hours without it; a lower target (systolic about 140) after hemorrhage. Very early, high dose mobilization in the first 24 hours did worse.

TBI severity: **GCS** 13 to 15 mild, 9 to 12 moderate, 3 to 8 severe (eyes 4, verbal 5, motor 6). Motor 3 is decorticate, 2 is decerebrate (worse). Post traumatic amnesia longer than a week suggests severe injury. Keep ICP below about 20 mmHg and CPP (MAP minus ICP) about 60 to 70; avoid Valsalva, isometrics, neck flexion, hip flexion past 90 and head down positions. An older adult whose cognition declines after a minor fall may have a chronic subdural hematoma.

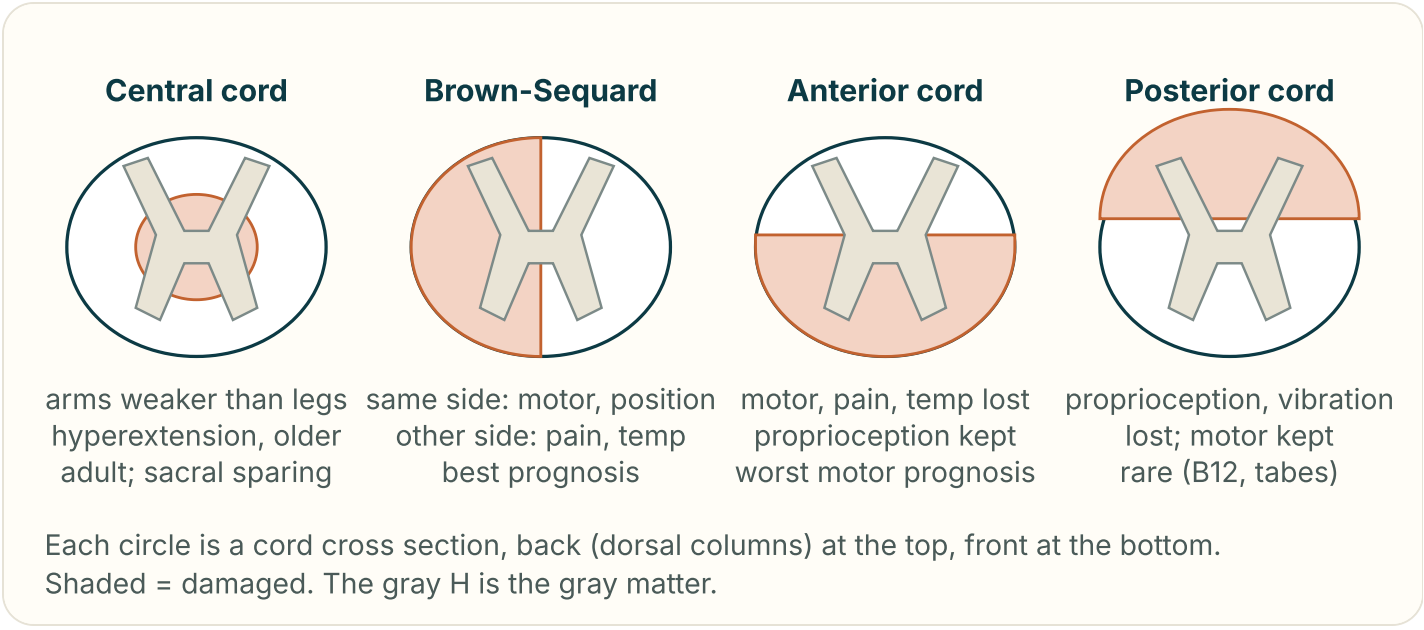
Rancho IV (confused, agitated) needs a calm, low stimulation room, one consistent therapist, short familiar tasks such as walking, simple commands, redirection and an enclosed bed rather than restraints. After concussion: no same day return, screen red flags (worsening headache, repeated vomiting, seizure, unequal pupils), brief relative rest of about 24 to 48 hours, then subsymptom aerobic exercise. Second impact syndrome is the reason for caution.

The **ASIA** exam tests 10 key muscles and 28 sensory points per side plus S4 to S5. An injury is complete (AIS A) when there is no sacral sparing. B is sensory incomplete; C and D are motor incomplete, split by whether at least half of the key muscles below the level reach grade 3 (D) or not (C). Central cord: arms weaker than legs, from hyperextension in an older adult. Brown-Sequard: best prognosis. Anterior cord: worst motor prognosis, proprioception spared.

Function by complete level: C1 to C3 ventilator and sip and puff; C4 may breathe on its own; C5 elbow flexion, power chair with hand control, dependent transfers; **C6 tenodesis**, manual chair on level surfaces, possible sliding board transfers; **C7 independent transfers**; T10 to L2 household

walking with KAFOs; L3 and below community walking with AFOs. Never stretch the finger flexors with the wrist extended.

Autonomic dysreflexia (T6 and above) is a hypertensive emergency from a noxious trigger below the lesion, most often the bladder. Systolic 20 to 40 mmHg above baseline, pounding headache, flushing above the lesion. **Sit up, lower the legs, loosen clothing, check the catheter and bladder, monitor every 2 to 5 minutes and call for help.** Orthostatic hypotension is the opposite: recline and raise the legs. Also watch for heterotopic ossification (warm, swollen hip with falling range), pressure injury (relief every 15 to 30 minutes) and DVT.



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

Spinal cord injury

Item	Rule
Motor level	Lowest key muscle ≥ 3 with all above 5
Complete	No sensation at S4 to S5, no deep anal pressure, no anal contraction
Central cord	Arms weaker than legs; sacral sparing
Brown-Sequard	Ipsilateral motor and position loss; contralateral pain loss
Anterior cord	Motor and pain lost; proprioception kept; worst motor prognosis
C5; C6; C7	Elbow flexion; tenodesis; independent transfers
Pressure relief	Every 15 to 30 min for 1 to 2 min; leans beat push ups
Orthostatic hypotension	SBP drop ≥ 20 or DBP ≥ 10 within 3 min

Worked cases

WORKED CASE 1 · PUSHER SYNDROME

A 71 year old right handed woman, day 3 after stroke, sits tilted left and pushes hard with her right hand and leg when the therapist tries to bring her upright. She ignores the left side and has left weakness.

STEP 1 · LOCALIZE

Left weakness and left neglect: right hemisphere.

STEP 2 · NAME THE BEHAVIOR

Active pushing toward the weak side and resistance to correction: **pusher syndrome**.

STEP 3 · TREAT

Visual feedback of vertical and functional reaching to the right so she shifts toward midline herself.

SAFETY

Manual correction triggers more pushing. Guard on the left, use a gait belt and keep items on her right for now.

WORKED CASE 2 · BLOOD PRESSURE AFTER THROMBOLYSIS

Day 2 after a left MCA stroke treated with thrombolysis 30 hours ago, a man's pressure is 176/98 at rest and 188/104 sitting at the edge of the bed. He coughs when drinking water and has a subluxed right shoulder.

STEP 1 · COMPARE TO THE CEILING

188/104 exceeds the commonly used 180/105 ceiling.

STEP 2 · ACT ON IT

Return him to a supported position, recheck and notify the physician for parameters rather than stand him.

STEP 3 · HANDLE THE OTHER FLAGS

Coughing with thin liquids: keep the head of bed up and confirm a speech pathology swallow evaluation. Support the arm and teach staff not to pull it.

WORKED CASE 3 · SCORING THE GCS

After a fall, a patient opens his eyes only to pain, makes incomprehensible sounds and withdraws from pain. What is his GCS and severity?

STEP 1 · EYES

To pain = 2.

STEP 2 · VERBAL

Incomprehensible sounds = 2.

STEP 3 · MOTOR

Withdraws = 4.

STEP 4 · ADD AND CLASSIFY

2 + 2 + 4 = **8: severe**. A score of 8 or less generally means coma and the need to protect the airway.

WORKED CASE 4 · 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.
- **Stretching fingers with the wrist extended at C6.** It destroys tenodesis.
- **Laying an AD patient flat.** Sit up and lower the legs.

Chapter 6 self-test · ten items

1. A right handed man has right face and arm weakness and speaks in short, effortful phrases but follows commands well. Which lesion is most likely?

A. Left MCA, inferior frontal gyrus
B. Right MCA, inferior parietal lobe
C. Left ACA, medial frontal lobe
D. Left MCA, superior temporal gyrus

A. Left MCA, inferior frontal gyrus Nonfluent speech with good comprehension is Broca aphasia from the dominant inferior frontal gyrus, MCA territory.

2. A patient has a left homonymous hemianopia with macular sparing and severe burning pain over the left body. Which artery is involved?

A. Basilar artery to the pons
B. Right posterior cerebral artery
C. Right middle cerebral artery
D. Left posterior cerebral artery

B. Right posterior cerebral artery Hemianopia with macular sparing and thalamic pain point to the PCA, opposite the field loss.

3. A patient after stroke can flex the elbow only with shoulder abduction and supination, and spasticity is at its peak. Which Brunnstrom stage is this?

A. Stage 4
B. Stage 2
C. Stage 3
D. Stage 5

C. Stage 3 Stage 3 is peak spasticity with voluntary movement only within synergy.

4. Which is the strongest component of the upper extremity flexion synergy?

A. Scapular elevation
B. Forearm supination
C. Shoulder abduction
D. Flexion of the elbow

D. Flexion of the elbow Elbow flexion is the strongest flexion synergy component; shoulder adduction with IR is the strongest extension component.

5. Twelve hours after thrombolysis for ischemic stroke, BP is 184/100. What is the best action?

A. Proceed with standing at a lower intensity
B. Proceed, since up to 220/120 is allowed
C. Hold activity and notify the medical team
D. Lay the patient flat and recheck in an hour

C. Hold activity and notify the medical team For 24 hours after thrombolysis, pressure is kept below 180/105.

6. A patient opens his eyes to voice, is confused but conversant, and localizes pain. What is his GCS?

A. 10
B. 12
C. 13
D. 11

B. 12 Eyes to voice 3, confused 4, localizes 5: 3 + 4 + 5 = 12, a moderate injury.

7. A patient two weeks after severe TBI is restless, shouting and pulling at lines, and cannot attend for more than a minute. Which approach fits?

A. A quiet room, one therapist and short walks
B. A busy gym to build community tolerance
C. Firmly confronting the patient's behavior
D. Teaching new memory strategies each visit

A. A quiet room, one therapist and short walks This is Rancho IV. Use a calm, consistent, low stimulation approach with familiar gross motor tasks.

8. After a diving injury, an exam shows no sensation or motor function at S4 to S5 and no deep anal pressure. How is the injury classified?

A. AIS C, motor incomplete
B. AIS D, motor incomplete
C. AIS B, sensory incomplete
D. AIS A, a complete injury

D. AIS A, a complete injury No sacral sparing at all means a complete injury.

9. An older man falls forward and hyperextends his neck. His arms are much weaker than his legs. Which syndrome is this?

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

A. Central cord syndrome Hyperextension in an older adult with spondylosis causes central cord syndrome, arms weaker than legs.

10. A man with C7 complete tetraplegia is planning discharge. Which goal is realistic?

A. Household walking with KAFOs
B. Dependent on others for feeding
C. Independent level transfers
D. A power chair with sip and puff control

C. Independent level transfers C7 adds elbow extension, the key level for independent depression transfers.

ONE PAGE

Cram sheet

One page for Study Guide 3. Cover the right column and say the answer before you look.

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

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