PART II CLINICAL SCIENCES · BOARD REVIEW

Study Guide 7

This guide covers the associated clinical sciences. Chapter 13 is geriatrics, dermatology, sexually transmitted infections, toxicology and emergency care. Chapter 14 is psychology, gynecology and obstetrics, pediatrics, and jurisprudence and ethics. You will learn how these areas reach the chiropractic office as back, pelvic and joint pain, which findings demand referral, how to respond in an office emergency, and the legal and ethical rules that protect patients. Work one chapter at a time, and finish each with its ten board-style items.

WHAT THIS GUIDE COVERS

- Chapter 13 · physiology of aging, falls and the TUG, osteoporosis, polypharmacy, delirium and dementia, adapting care, skin lesions, infections, papulosquamous and blistering disorders, skin cancer and ABCDE, gonorrhea, reactive arthritis, syphilis and tabes dorsalis, herpes, HPV and HIV, drug effects, toxidromes, CPR and AED, choking, shock, head injury, burns, heat illness, fractures, syncope, hypoglycemia and anaphylaxis.
- Chapter 14 · behavior theories, defense mechanisms, the biopsychosocial and fear avoidance models, flags, mental disorders, PHQ 9 and suicide screening, the menstrual cycle and its disorders, endometriosis, PID, gynecological and breast cancer, pregnancy physiology and complications, chiropractic care in pregnancy, APGAR, reflexes, milestones, congenital and childhood disorders, abuse recognition, scoliosis, negligence, consent and capacity, HIPAA, boundaries, reporting duties and billing ethics.

CHAPTER 13

Geriatrics, Dermatology, Sexually Transmitted Infections, Toxicology and Emergency Care

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

What to know

Aging is a loss of reserve (homeostenosis): stiffer arteries and isolated systolic hypertension, maximal heart rate about 220 minus age, GFR falling about 1 mL/min a year after 40 with a

creatinine that may stay normal, sarcopenia (type II fibers first), reduced ankle vibration and ankle reflexes, presbycusis and immunosenescence. Older adults present **atypically**: MI as dyspnea or confusion, infection as delirium or a fall, spinal infection without fever. A sudden change in function is a symptom.

Falls are the leading cause of injury death over 65; about one in four older adults falls each year. Screen with three questions (fallen, unsteady, worried). **Timed Up and Go 12 seconds or more** means increased risk; the 30 second chair stand tests leg strength; orthostatic hypotension is a fall of 20 systolic or 10 diastolic. Modifiable causes: weakness, balance and medications (psychoactive drugs, antihypertensives). Tai chi has good evidence. A fall with head strike on an anticoagulant, or new confusion days later, means evaluation for **chronic subdural hematoma**.

Osteoporosis: T score −2.5 or lower or a fragility fracture; labs are normal; glucocorticoids are the leading drug cause. Type I (postmenopausal) favors vertebral and distal radius fractures; type II (senile, over 70) hip fractures. A fracture above T7, a destroyed pedicle or a convex posterior border suggests a pathologic fracture. Management: calcium about 1,200 mg over 50, vitamin D 800 to 1,000 IU, resistance and balance exercise, bisphosphonates first line. Polypharmacy is five or more drugs; watch the prescribing cascade and Beers Criteria drugs (benzodiazepines, diphenhydramine, cyclobenzaprine, chronic NSAIDs); communicate with the prescriber rather than changing a prescription.

Delirium is acute, fluctuating and inattentive, caused by a medical condition or drug, and needs same day referral. **Dementia** is chronic and progressive with attention normal early. CAM: acute onset and fluctuation plus inattention, plus disorganized thinking or altered consciousness. MMSE 24 or below and MoCA below 26 suggest impairment. Dementias: Alzheimer (most common), vascular (stepwise), Lewy body (fluctuation, hallucinations, parkinsonism, antipsychotic sensitivity), frontotemporal (personality change), normal pressure hydrocephalus (gait, incontinence, dementia). Reversible contributors: hypothyroidism, B12 deficiency, depression, drugs, NPH, subdural hematoma, neurosyphilis. In older adults favor low force methods and avoid long levers and forceful thoracic P to A thrusts in osteoporosis.

Skin lesions (1 cm cutoff): macule flat under 1 cm, patch flat 1 cm or more, papule raised under 1 cm, plaque raised 1 cm or more, nodule 1 to 2 cm, tumor over 2 cm, vesicle fluid under 1 cm,

bulla 1 cm or more, pustule, wheal (gone within 24 hours). Secondary: scale, crust (honey colored in impetigo), erosion (epidermis only), ulcer (into dermis), excoriation, lichenification, scar. Infections: impetigo, cellulitis, **necrotizing fasciitis** (pain out of proportion; emergency), warts, **herpes zoster** (pain then dermatomal vesicles not crossing the midline; antivirals within 72 hours; ophthalmic involvement threatens vision), tinea (central clearing), scabies (nocturnal itch, finger webs), Lyme erythema migrans.

Psoriasis: silvery plaques on extensor surfaces with Auspitz and Koebner signs and nail pitting; psoriatic arthritis favors the DIP. Pityriasis rosea: herald patch then a Christmas tree pattern. **Nikolsky sign positive in pemphigus** (flaccid intraepidermal bullae, mouth first) and negative in bullous pemphigoid (tense subepidermal bullae, elderly). SJS under 10% and TEN over 30% of body surface are drug emergencies. Six or more cafe au lait spots suggest NF1; acanthosis nigricans suggests insulin resistance. Basal cell carcinoma is the most common skin cancer (pearly, rolled borders, telangiectasias); squamous cell follows actinic keratosis; **melanoma** is flagged by ABCDE (asymmetry, border, color, diameter 6 mm or more, evolving, the most important) and the ugly duckling sign; Breslow thickness drives prognosis; acral lentiginous is most common in darker skin.

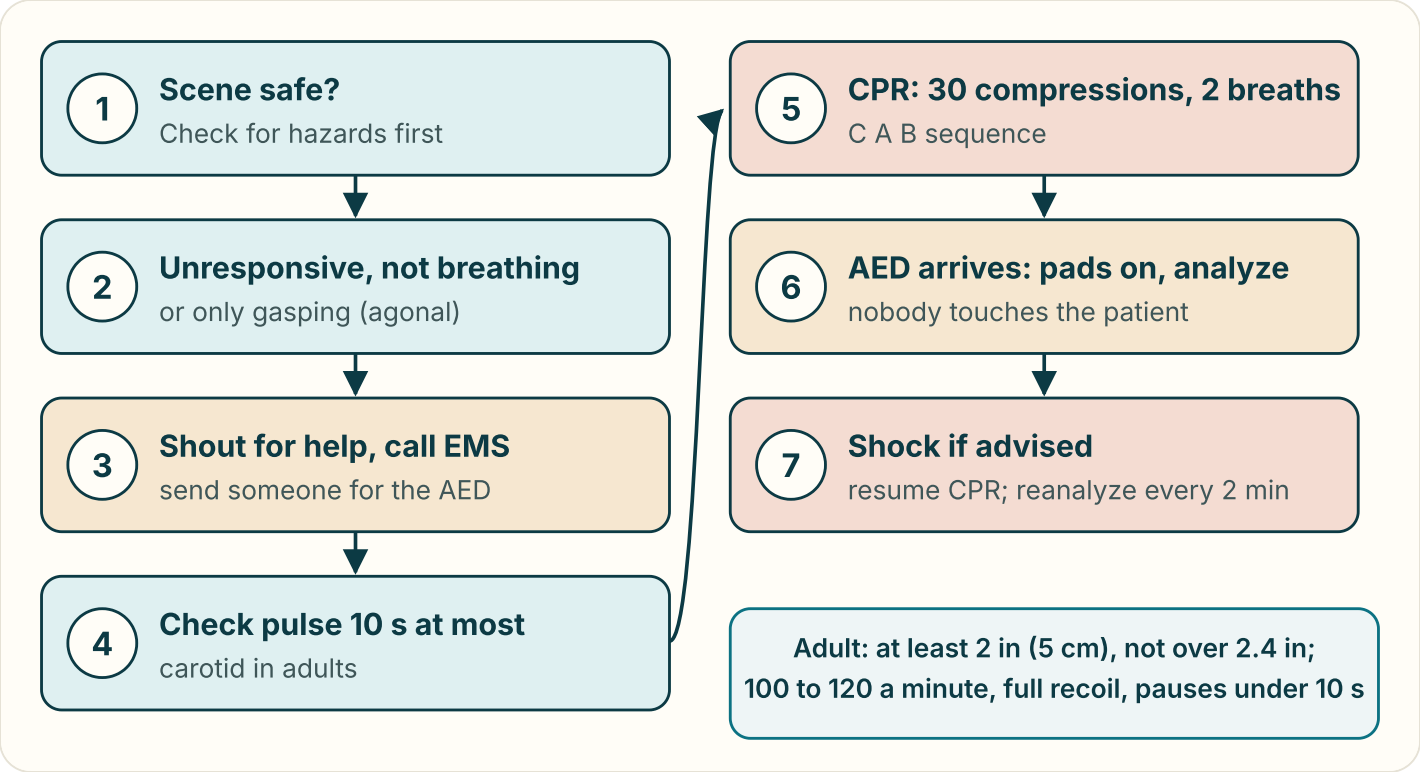
STIs: **disseminated gonococcal infection** is the most common septic arthritis in sexually active young adults (migratory polyarthralgia, tenosynovitis, a few pustules, or a purulent knee). **Reactive arthritis** follows chlamydia or enteric infection by 1 to 4 weeks: urethritis, conjunctivitis and arthritis, enthesitis at the Achilles and plantar fascia, asymmetric sacroiliitis, HLA-B27, keratoderma blennorrhagicum. Syphilis: painless chancre, then a rash on palms and soles with condylomata lata, then latent and tertiary disease. **Tabes dorsalis**: dorsal column loss, stamping gait, positive Romberg, lightning pains, absent reflexes, Argyll Robertson pupils and Charcot joints (knee, hip, spine; diabetes favors the foot, syringomyelia the shoulder). Nontreponemal tests track activity; treponemal tests stay positive. Genital herpes can cause sacral radiculitis that mimics sciatica. HPV 16 and 18 cause most cervical cancer. HIV: AIDS at CD4 under 200; undetectable equals untransmittable; universal precautions for everyone.

Drugs: statins (myopathy, rhabdomyolysis), **fluoroquinolones** (Achilles rupture, worse over 60 and with steroids), beta blockers (blunted heart rate), antihypertensives (orthostasis), SSRIs

(bleeding, hyponatremia, serotonin syndrome). NSAIDs block COX: COX 1 effects explain ulcers, bleeding and kidney injury (the triple whammy with ACE inhibitors and diuretics); aspirin is irreversible for 7 to 10 days. Acetaminophen overdose makes NAPQI and causes hepatic necrosis; the antidote is N acetylcysteine; maximum about 4 g a day. Opioid overdose: coma, pinpoint pupils, respiratory depression; naloxone, then transport. Chronic corticosteroids: osteoporosis, avascular necrosis, myopathy, masked infection, adrenal crisis if stopped abruptly. Warfarin is followed by PT/INR (target 2 to 3) and heparin by aPTT; a stable INR is not an absolute contraindication, but a supratherapeutic or unstable one is.

Toxidromes: anticholinergic (hot, dry, red, blind, mad; retention, tachycardia), cholinergic (DUMBELS; atropine and pralidoxime), opioid (naloxone), sympathomimetic (benzodiazepines, cooling), serotonin syndrome (clonus and hyperreflexia, worse in the legs). Call poison control; do not induce vomiting. Carbon monoxide binds hemoglobin about 200 times more avidly than oxygen and pulse oximetry reads falsely normal; give 100% oxygen.

Emergencies: scene safety, call EMS and get the AED, then ABCDE with AVPU. Adult CPR: compressions at least 2 inches (5 cm) but not over 2.4 inches, 100 to 120 per minute, full recoil, interruptions under 10 seconds, **30:2**; child and infant **15:2 with two rescuers**; infant depth about 1.5 inches; pulse check 10 seconds max (brachial in infants). C A B sequence; jaw thrust if spinal injury suspected. Choking: abdominal thrusts (chest thrusts in pregnancy or obesity); infants get 5 back blows and 5 chest thrusts. Shock: neurogenic shock has hypotension with **bradycardia** and warm skin. Head injury red flags: lucid interval (epidural), fixed dilated pupil (uncal herniation), Battle sign and raccoon eyes, Cushing triad. Burns: rule of nines; cool with running water about 20 minutes; never ice or butter. Heat stroke: over 40°C with CNS dysfunction; cool immediately. Hypoglycemia: rule of 15 (15 to 20 g fast sugar, recheck in 15 minutes). Anaphylaxis: **intramuscular epinephrine** in the anterolateral thigh (0.3 mg adult, 0.15 mg small child) first, then EMS.



Recognize, call, compress, shock. Early recognition, an immediate call for EMS and the AED, high quality compressions with minimal pauses and early defibrillation are what save adults in cardiac arrest.

LOCK THESE IN

- Older adults present atypically; a sudden change in function is a symptom.
- TUG 12 seconds or more means fall risk; psychoactive drugs and orthostasis are modifiable.
- Delirium: acute, fluctuating, inattentive, same day referral. Dementia: chronic, attention normal early.
- ABCDE: evolving is the most important; Breslow depth drives melanoma prognosis.
- Nikolsky positive in pemphigus, negative in bullous pemphigoid.
- Gonococcal: tenosynovitis, pustules, septic joint. Reactive: sterile, HLA-B27, conjunctivitis, enthesitis.
- Tabes dorsalis: dorsal columns, positive Romberg, Argyll Robertson pupils, Charcot joints.
- CPR 100 to 120 a minute, at least 2 inches, 30:2 (15:2 for two rescuers on a child). Epinephrine first in anaphylaxis.

Emergency numbers

Item	Value	Note
Adult compressions	At least 2 in (5 cm), not over 2.4 in; 100 to 120 per minute	30:2, full recoil
Child / infant	15:2 with two rescuers; infant about 1.5 in	Pulse check: carotid or femoral / brachial
AED pads	Below right clavicle and left lateral chest	Pediatric pads under 8 if available
Rule of nines	Head 9; each arm 9; front 18; back 18; each leg 18; perineum 1	Palm about 1%
Burn cooling	Cool running water about 20 minutes	No ice, butter or ointment
Heat stroke	Over 40°C with CNS dysfunction	Cold water immersion; EMS
Hypothermia	Core below 35°C	Handle gently; remove wet clothing
Hypoglycemia	Under 70 mg/dL; 15 to 20 g sugar, recheck in 15 min	Unconscious: nothing by mouth, EMS
Anaphylaxis	IM epinephrine 0.3 mg adult, 0.15 mg small child	Repeat in 5 to 15 min if needed

Skin and STI patterns

Condition	Hallmark	Action
Herpes zoster	Pain, then dermatomal vesicles not crossing midline	Refer; antivirals within 72 hours
Necrotizing fasciitis	Pain out of proportion, rapid spread, crepitus	Surgical emergency
Melanoma	ABCDE, ugly duckling	Refer for biopsy
Pemphigus vs pemphigoid	Flaccid, Nikolsky positive vs tense, Nikolsky negative	Pemphigus potentially fatal
Disseminated gonococcal	Migratory arthralgia, tenosynovitis, pustules	Refer; ceftriaxone
Reactive arthritis	Urethritis, conjunctivitis, arthritis, enthesitis	Refer; sterile joint
Tabes dorsalis	Stamping gait, positive Romberg, Argyll Robertson	Neurosyphilis; refer
HIV	AIDS at CD4 under 200	Universal precautions

Worked cases

WORKED CASE 1 · DELIRIUM OR DEMENTIA

An 84 year old with mild memory loss for 3 years is brought in because since yesterday she has been drowsy, then agitated, cannot follow a conversation and is worse at night. She started a new sleeping pill this week.

STEP 1 · FEATURE 1

Acute onset and fluctuating course: yes, since yesterday and variable.

STEP 2 · FEATURE 2

Inattention: yes, she cannot follow a conversation.

STEP 3 · FEATURE 3 OR 4

Altered level of consciousness: yes, drowsy then agitated.

STEP 4 · CONCLUDE

CAM positive: **delirium** on top of dementia. Dementia is the strongest risk factor for delirium.

STEP 5 · ACT

Same day medical referral. A new sedative hypnotic is a Beers list drug and a likely trigger; also consider infection, retention and subdural hematoma.

WORKED CASE 2 · RULE OF NINES

An adult has partial thickness burns over the front of the trunk and the whole of both arms after a kitchen fire.

STEP 1 · FRONT OF TRUNK

18%.

STEP 2 · EACH ARM

9% × 2 = **18%**.

STEP 3 · TOTAL

18 + 18 = **36%** of body surface.

STEP 4 · ACT

This is a large burn: cool with running water about 20 minutes, cover loosely, keep warm and call EMS. Large burns always go to the emergency department.

WORKED CASE 3 · AN OFFICE EMERGENCY AFTER AN ADJUSTMENT

Right after a cervical adjustment, a patient becomes pale, sweaty and light headed, then reports double vision and slurred speech.

STEP 1 · SEPARATE THE TWO PICTURES

Pallor, sweating and light headedness alone fit a **vasovagal** reaction.

STEP 2 · FIND THE RED FLAGS

Diplopia and dysarthria are 2 of the 5 Ds: possible vertebrobasilar ischemia or dissection.

STEP 3 · ACT

Stop treatment, keep the patient still and supine, do a brief neurologic check, and call EMS.

STEP 4 · DOCUMENT

Record the time, the findings and the actions taken.

WORKED CASE 4 · HYPOGLYCEMIA AND ANAPHYLAXIS

A patient on insulin who skipped lunch is sweaty, shaky and confused but can swallow. Later, another patient stung by a bee develops lip swelling, wheeze and dizziness.

STEP 1 · FIRST PATIENT

Give 15 to 20 g of fast sugar (juice, glucose tablets), recheck in 15 minutes, then a snack: the **rule of 15**. If unsure whether it is high or low and the patient can swallow, sugar is the safe choice.

STEP 2 · IF UNCONSCIOUS

Nothing by mouth; call EMS; glucagon if available.

STEP 3 · SECOND PATIENT

Anaphylaxis: **IM epinephrine** in the anterolateral thigh (0.3 mg adult) at once and call EMS. Repeat in 5 to 15 minutes if needed.

STEP 4 · AFTER

Antihistamines do not treat airway or circulation. A biphasic reaction can recur, so every patient goes to the emergency department.

TRAPS PEOPLE FALL INTO

- **Waiting for fever before suspecting infection in an older adult.** Immunosenescence blunts fever. Confusion or a fall may be the only sign.
- **Treating delirium as routine dementia.** Delirium is acute and an emergency with high mortality. Refer the same day.
- **Calling a burning dermatomal pain an intercostal strain.** Pre-eruptive zoster can come before the rash. Look at the skin and recheck in a few days.
- **Reading a negative Nikolsky as pemphigus.** Pemphigus is Nikolsky positive; bullous pemphigoid is negative.
- **Treating reactive arthritis with antibiotics alone.** The joint is sterile. Antibiotics treat the trigger, not the arthritis.
- **Trusting pulse oximetry in carbon monoxide poisoning.** It reads falsely normal. Give 100% oxygen and get the patient out.
- **Giving antihistamines first in anaphylaxis.** IM epinephrine is first; delay in epinephrine is the main factor in deaths.
- **Using 30:2 for two rescuers on a child.** Children and infants get 15:2 with two rescuers; adults stay 30:2.

Chapter 13 self-test · ten items

1. An 81 year old takes 14 seconds on the Timed Up and Go and uses a benzodiazepine at night. What is the most appropriate interpretation?

A. A test result that needs repeating
B. Cerebellar disease until proven otherwise
C. Normal for age; no action needed
D. Increased fall risk; review medications

D. Increased fall risk; review medications A TUG of 12 seconds or more indicates increased fall risk, and benzodiazepines are a key modifiable contributor.

2. Which finding best distinguishes delirium from dementia?

A. Short term memory loss
B. Gradual onset over years
C. Acute fluctuating inattention
D. Normal level of alertness kept

C. Acute fluctuating inattention Inattention with acute onset and fluctuation is the hallmark of delirium. Attention is normal early in dementia.

3. A 6 mm mole on the back has grown and darkened over 3 months and has two shades of brown. What should you do?

A. Recheck it again in one year
B. Refer for dermatologic evaluation
C. Treat it as a seborrheic keratosis
D. Reassure, since it is not raised

B. Refer for dermatologic evaluation Color variation, a diameter of 6 mm and evolution meet ABCDE criteria. Any changing pigmented lesion needs referral.

4. Flaccid blisters and oral erosions appear in a 55 year old, and rubbing normal skin near a blister makes the epidermis shear away. Most likely?

A. Pemphigus vulgaris
B. Herpes zoster
C. Contact dermatitis
D. Bullous pemphigoid

A. Pemphigus vulgaris A positive Nikolsky sign with flaccid intraepidermal bullae and mouth involvement is pemphigus vulgaris.

5. A 22 year old has migratory joint pain, tenosynovitis over the dorsal wrist and a few painless pustules on the hands. Best explanation?

A. Early rheumatoid arthritis
B. Psoriatic arthritis flare
C. Disseminated gonococcal infection
D. Reactive arthritis after chlamydia

C. Disseminated gonococcal infection The arthritis dermatitis syndrome (migratory arthralgia, tenosynovitis, pustules) is disseminated gonococcal infection.

6. A patient has a stamping wide based gait, falls with eyes closed, lightning leg pains and small pupils that do not react to light but do accommodate. Diagnosis?

A. Tabes dorsalis
B. Neuropathy
C. Myelopathy
D. Cerebellar atrophy

A. Tabes dorsalis Dorsal column loss with lightning pains and Argyll Robertson pupils is tabes dorsalis, late neurosyphilis.

7. A 66 year old taking ciprofloxacin and prednisone feels a snap at the back of the ankle while climbing stairs. What should you suspect?

A. Plantar fascia strain
B. Achilles tendon rupture
C. Ankle syndesmosis sprain
D. Posterior tibial tendinitis

B. Achilles tendon rupture Fluoroquinolones, age over 60 and corticosteroids raise the risk of Achilles tendinopathy and rupture. Perform a Thompson test and refer.

8. A farm worker has pinpoint pupils, drooling, sweating, diarrhea and muscle twitching after spraying crops. Which treatment is indicated?

A. Naloxone and oxygen
B. Benzodiazepines and cooling
C. N acetylcysteine
D. Atropine and pralidoxime

D. Atropine and pralidoxime This is the cholinergic toxidrome of organophosphate poisoning; decontaminate and protect yourself.

9. You and a colleague are giving CPR to a collapsed 6 year old at a school event. How many compressions do you give for each set of breaths, and how many breaths?

A. 30:1
B. 15:2
C. 30:2
D. 5:1

B. 15:2 Children and infants receive 15:2 when two rescuers are present; single rescuers use 30:2.

10. After a cervical spine injury, a patient is hypotensive with a heart rate of 48 and warm, dry skin. What type of shock is this?

A. Neurogenic shock
B. Obstructive shock
C. Hypovolemic shock
D. Cardiogenic shock

A. Neurogenic shock Loss of sympathetic tone from a cord injury above T6 gives hypotension with bradycardia and warm skin.

CHAPTER 14

Psychology, Gynecology and Obstetrics, Pediatrics, Jurisprudence and Ethics

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

What to know

Behavior theories: psychodynamic (Freud, Erikson), classical conditioning (Pavlov: pain and fear linked to movements), **operant conditioning** (Skinner: pain behavior reinforced by attention or time off), social learning (Bandura: modeling and self efficacy), cognitive (Beck, Ellis: catastrophizing), humanistic (Maslow, Rogers), stages of change (Prochaska and DiClemente). Defense mechanisms: denial, projection, displacement (angry at the boss, yells at the receptionist), regression, sublimation, somatization.

The **biopsychosocial model** explains chronic pain (over 3 months) through biology, psychology and social context, with central sensitization. The **fear avoidance model**: pain interpreted catastrophically leads to fear, avoidance and hypervigilance, then disuse, disability and depression, which feed more pain; a non threatening interpretation leads to confrontation and recovery. Flags: red (serious pathology), yellow (psychological), blue (work perceptions), black (system obstacles), orange (psychiatric disorder). Tools: STarT Back, FABQ, Pain Catastrophizing

Scale, Orebro. Respond with specific reassurance, pain neuroscience education, graded activity and CBT referral.

Disorders: major depression (2 weeks), GAD (6 months), panic (rule out cardiac causes), PTSD (over 1 month; trauma informed care), somatic symptom disorder, conversion disorder (Hoover sign), **factitious disorder** (conscious, for the sick role) and **malingering** (conscious, for external gain). Waddell signs (3 of 5) flag nonorganic features, not lying. Screens: PHQ 2 then PHQ 9 (5, 10, 15, 20 mark mild to severe; item 9 must be followed up), GAD 7 (5, 10, 15), CAGE (2 or more). Asking about suicide does not increase risk; prior attempt is the strongest predictor. A plan, means or intent is an emergency (do not leave the patient alone); passive thoughts need a same day handoff and the 988 Lifeline.

Gynecology: take a menstrual and gynecological history from every woman with pelvic or low back pain. Cycle about 28 days (21 to 35); LH surge triggers ovulation about day 14; luteal phase fixed at about 14 days. Primary amenorrhea: none by 15 with sexual characteristics; secondary: absent 3 months (regular) or 6 (irregular), **pregnancy first**. Primary dysmenorrhea is prostaglandin mediated; secondary comes from endometriosis, adenomyosis, fibroids or PID. PCOS needs 2 of 3. The female athlete triad brings stress fractures, including the pars. **Postmenopausal bleeding** is endometrial cancer until proven otherwise.

Endometriosis: cyclic pelvic pain, secondary dysmenorrhea, deep dyspareunia, dyschezia, infertility; can cause cyclic sacral pain and rarely catamenial sciatica; diagnosed at laparoscopy. PID (chlamydia, gonorrhea): cervical motion tenderness, fever; complications include infertility and ectopic pregnancy. **Ectopic pregnancy**: missed period, unilateral pain, spotting; rupture brings shoulder tip pain (Kehr sign) and shock. Ovarian torsion is a surgical emergency. Cancers: cervical (HPV 16 and 18), endometrial (unopposed estrogen; most common gynecological cancer in developed countries), ovarian (vague, late, deadliest; no effective screening). Breast: fibroadenoma under 30 is mobile and rubbery; concerning features are hard, fixed, painless masses, dimpling, peau d'orange, new nipple retraction, bloody unilateral discharge. Most cancers arise in the **upper outer quadrant**; breast is a common source of spinal metastasis.

Pregnancy: about 40 weeks; Naegele rule adds 1 year, subtracts 3 months, adds 7 days to the LMP. Blood volume up 40 to 50%; supine hypotensive syndrome after about 20 weeks (use left lateral

position or a wedge under the right hip); hypercoagulable (DVT risk highest postpartum); gestational diabetes screened at 24 to 28 weeks; **relaxin** loosens ligaments; the center of gravity moves forward and lordosis increases; carpal tunnel and meralgia paresthetica are common. Pelvic girdle pain tests: P4 thigh thrust, active SLR. Fundal height in cm approximates weeks after 20 weeks. Folic acid 400 µg before conception. Teratogens: alcohol, isotretinoin, warfarin, valproate, ACE inhibitors, tetracyclines, lithium. Labor has four stages; breech is 3 to 4% at term. Postpartum blues resolve within 2 weeks; depression persists; psychosis is an emergency.

Obstetric complications: **painless** bright red third trimester bleeding is **placenta previa**; **painful** bleeding with a rigid tender uterus is **abruption**; new hypertension of 140/90 after 20 weeks with headache, visual change or epigastric pain is **preeclampsia** (eclampsia, HELLP). Preterm labor may present as rhythmic low back pain before 37 weeks. Chiropractic care in pregnancy: pregnancy table or side lying, low force, no abdominal pressure, mind ligament laxity, coordinate with the obstetric provider. The Webster technique is generally safe, but evidence that it turns a breech baby is limited. Stop and refer for bleeding, leaking fluid, contractions, reduced fetal movement, severe headache, sudden swelling, calf swelling or chest pain.

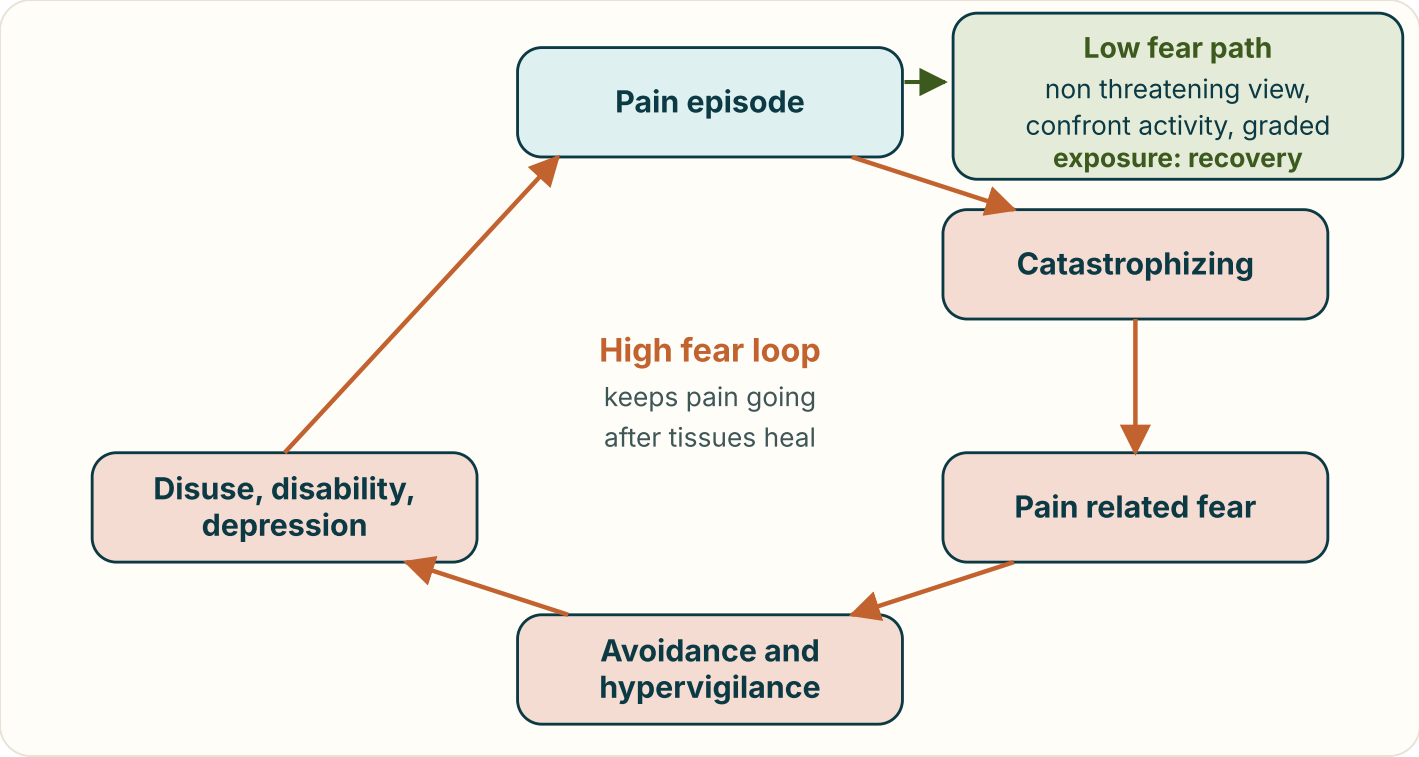
Pediatrics: **APGAR** at 1 and 5 minutes, five signs scored 0 to 2 (7 to 10 reassuring, 4 to 6 moderate, 0 to 3 low). Posterior fontanelle closes by about 2 months, anterior by about 18 months. The clavicle is the most commonly fractured bone at birth. Erb palsy (C5 to C6, waiter's tip) and Klumpke palsy (C8 to T1, claw hand, possible Horner). Primitive reflexes: Moro, rooting, palmar grasp, ATNR and Galant gone by about 4 to 6 months; Babinski by 12 to 24 months; plantar grasp by 9 to 12 months. Birth weight doubles by 4 to 5 months and triples by 12. Milestones: sits alone and crawls at 9 months, walks about 12 months (by 18), two word phrases at 2 years, tricycle at 3, hops at 4, skips at 5. Regression is always a red flag.

Congenital and childhood conditions: DDH (Ortolani reduces, Barlow dislocates; unreliable after about 3 months; ultrasound before 4 to 6 months), spina bifida (occulta, meningocele, myelomeningocele; folic acid prevents), congenital torticollis (head tilts toward and chin rotates away from the tight SCM), clubfoot (Ponseti casting), **Down syndrome** (atlantoaxial instability), Duchenne (Gowers sign, calf pseudohypertrophy), osteogenesis imperfecta (blue sclerae; mimics abuse). Infections: measles (Koplik spots), rubella, varicella (avoid aspirin, Reye), roseola, fifth

disease (slapped cheek), pertussis, scarlet fever, Kawasaki (coronary aneurysm), meningitis (emergency). Hip pain by age: DDH infancy; transient synovitis and septic hip 3 to 10 (Kocher criteria); Perthes 4 to 8; SCFE in obese adolescents. Always examine the hip in a child with knee pain.

Abuse is suspected when the history is vague, changing or does not fit, care was delayed, or injuries are at different stages: bruising in a child who does not cruise, TEN 4 (torso, ears, neck under 4; any bruise under 4 months), patterned injuries, immersion burns, **posterior rib and metaphyseal corner fractures**, a femoral spiral fracture in a nonambulatory infant, subdural and retinal hemorrhages. Mimics: osteogenesis imperfecta, bleeding disorders, Mongolian spots, coining, rickets. Chiropractors are mandated reporters: reasonable suspicion is enough, proof is not required, good faith reports are immune. Scoliosis: Cobb 10 degrees or more; adolescent idiopathic is usually right thoracic; scoliometer 7 degrees (some use 5) prompts films; observe under about 20 to 25 degrees, brace about 25 to 40 in a growing child, consider surgery above 45 to 50; left thoracic or painful curves need MRI. Spinal care is not a treatment for ADHD or autism.

Law and ethics: malpractice needs the **4 Ds**: duty, dereliction, direct cause and damages. Most claims involve failure to diagnose or refer. Res ipsa loquitur infers negligence (a hot pack burn); respondeat superior makes employers liable; comparative negligence reduces recovery; the statute of limitations often runs from discovery. Battery is touching without consent; abandonment is ending care without notice. Capacity is a clinical, decision specific judgment; **competence is decided by a court**. HIPAA permits disclosure for treatment, payment and operations; minimum necessary does not apply to treatment; business associates sign agreements; Tarasoff creates a duty to warn. Sexual contact with a current patient is always unethical. Billing fraud: upcoding, unbundling, billing for services not rendered, routine copay waivers, kickbacks (Anti Kickback Statute), Stark self referral, dual fee schedules. CMT codes 98940 (1 to 2 regions), 98941 (3 to 4), 98942 (5), 98943 (extraspinal). Medicare covers active care documented by PART; an ABN precedes maintenance care. Collection ratio = collections ÷ net charges; overhead is commonly 50 to 60% of collections.



How fear keeps pain going. Catastrophic interpretation of pain drives fear, avoidance and disuse, which feed back into more pain. Accurate reassurance, pain education and graded activity move the patient onto the recovery path.

LOCK THESE IN

- Fear avoidance: catastrophizing, fear, avoidance, disuse, depression, more pain. Reassure, educate, grade activity.
- Malingering is for external gain; factitious is for the sick role; Waddell signs do not prove lying.
- A suicide plan, means or intent is an emergency; prior attempt is the strongest predictor.
- Pelvic or back pain with a late period: pregnancy, then ectopic pregnancy, first.
- Painless third trimester bleeding is previa; painful is abruption; hypertension with headache after 20 weeks is preeclampsia.
- APGAR at 1 and 5 minutes; 7 to 10 reassuring.
- Posterior rib and metaphyseal corner fractures suggest abuse; reasonable suspicion means report.
- Negligence: duty, dereliction, direct cause, damages. Capacity is clinical; competence is legal.

APGAR score

Sign	0	1	2
Appearance	Blue or pale all over	Pink body, blue extremities	Pink all over
Pulse	Absent	Under 100	100 or more
Grimace	No response	Grimace	Cry, cough or sneeze
Activity	Limp	Some flexion	Active motion
Respiration	Absent	Slow, irregular, weak cry	Good, strong cry

Pediatric and obstetric numbers

Item	Value	Note
Fontanelles	Posterior by about 2 months; anterior by about 18 months	Bulging: raised ICP; sunken: dehydration
Primitive reflexes	Moro, rooting, grasp, ATNR, Galant gone by 4 to 6 months	Babinski by 12 to 24 months
Growth	Weight doubles 4 to 5 months, triples by 12	Length up 50% in year one
Walking	About 12 months; independent by 18	Regression is a red flag
Pregnancy	About 40 weeks; Naegele +1 year −3 months +7 days	Supine hypotension after about 20 weeks
Screening in pregnancy	Gestational diabetes 24 to 28 weeks; GBS 36 to 38	Anti D at about 28 weeks if Rh negative
Preeclampsia	140/90 or higher after 20 weeks	Headache, vision, epigastric pain
PHQ 9 / GAD 7	5, 10, 15, 20 / 5, 10, 15	Item 9 always followed up
Scoliosis	Cobb 10°; brace about 25 to 40°	Surgery above about 45 to 50°
CMT codes	98940, 98941, 98942, 98943	1 to 2, 3 to 4, 5 regions, extraspinal

Worked cases

WORKED CASE 1 · SCORING AN APGAR

At 1 minute a newborn has a pink body with blue hands and feet, a heart rate of 110, grimaces to suction, shows some flexion of the limbs and has a strong cry.

STEP 1 · APPEARANCE

Pink body, blue extremities: **1**.

STEP 2 · PULSE

110, at least 100: **2**.

STEP 3 · GRIMACE

Grimace only: **1**.

STEP 4 · ACTIVITY

Some flexion: **1**.

STEP 5 · RESPIRATION

Strong cry: **2**.

STEP 6 · TOTAL

1 + 2 + 1 + 1 + 2 = **7**: reassuring (7 to 10). Repeat at 5 minutes, which better reflects response.

WORKED CASE 2 · DUE DATE BY NAEGELE RULE

A patient's last menstrual period began March 10, 2026. Estimate the due date.

STEP 1 · ADD 1 YEAR

March 10, 2027.

STEP 2 · SUBTRACT 3 MONTHS

December 10, 2026.

STEP 3 · ADD 7 DAYS

December 17, 2026.

CHECK

Counting 280 days (40 weeks) from March 10 gives December 15, 2026. The two differ by a couple of days because months vary in length; both are estimates, and ultrasound dating refines them.

WORKED CASE 3 · THIRD TRIMESTER BLEEDING

Two pregnant patients at 32 weeks call. One has painless bright red bleeding. The other has painful bleeding, a hard tender abdomen and new low back pain after a car crash.

STEP 1 · FIRST PATIENT

Painless bright red bleeding fits **placenta previa**: emergency evaluation, and no pelvic examination.

STEP 2 · SECOND PATIENT

Painful bleeding with a rigid tender uterus after trauma fits **placental abruption**: an emergency for mother and fetus.

STEP 3 · EITHER WAY

Stop any chiropractic care and send both for emergency obstetric evaluation.

WORKED CASE 4 · A NEGLIGENCE CLAIM

A chiropractor treats a 61 year old with a history of prostate cancer for 8 weeks of worsening thoracic pain without taking a cancer history or imaging. A metastasis causes cord compression and paraplegia.

STEP 1 · DUTY

Accepting the patient for care created a duty.

STEP 2 · DERELICTION

Failing to ask about cancer history and to image or refer with red flags fell below the standard of care, as an expert would testify.

STEP 3 · DIRECT CAUSE

The delay allowed cord compression to progress.

STEP 4 · DAMAGES

Paraplegia, costs and lost earnings.

STEP 5 · LESSON

All four Ds are present. Prior cancer is the strongest predictor of spinal malignancy, and documentation of a red flag screen is the best defense.

TRAPS PEOPLE FALL INTO

- **Calling Waddell signs proof of malingering.** They flag nonorganic features and psychosocial distress, not conscious deception.
- **Avoiding the word suicide.** Asking directly does not increase risk. Ask about thoughts, plan, means and intent.
- **Forgetting pregnancy in a young woman with back pain.** Ask about the last menstrual period; think ectopic pregnancy with a late period and pelvic pain.
- **Treating a breech with Webster as an obstetric fix.** Evidence that it turns a breech baby is limited. Breech is an obstetric matter.
- **Examining only the knee in a limping child.** Hip disease often refers to the knee. Always examine the hip.
- **Waiting for proof before reporting abuse.** Reasonable suspicion is enough; good faith reports are immune; failing to report is an offense.
- **Confusing capacity and competence.** Capacity is a clinical, decision specific judgment; competence is decided by a court.
- **Routinely waiving copays.** Systematic waivers while billing insurers the full fee misrepresent the charge. Hardship waivers must be individual and documented.

Chapter 14 self-test · ten items

1. A patient with low back pain gets extra attention from family and time off work whenever he limps, and the limping increases. Which theory best explains this?

A. Humanistic theory
B. Psychodynamic defense
C. Operant conditioning
D. Classical conditioning

C. Operant conditioning Pain behavior reinforced by its consequences (attention, time off) is operant conditioning, described by Skinner.

2. A patient knowingly exaggerates neck pain to win a lawsuit settlement. What is this called?

A. Factitious disorder
B. Conversion
C. Somatization
D. Malingering

D. Malingering Malingering is conscious feigning for external gain. Factitious disorder is conscious but for the sick role.

3. A patient with chronic pain says he has thought about ending his life and has a stockpile of pills at home. What is the right action?

A. Give him the crisis line and reschedule
B. Stay with him and call emergency services
C. Send a routine letter to his physician
D. Note it and recheck at the next visit

B. Stay with him and call emergency services Ideation with means and a plan is an emergency: do not leave the patient alone, remove means if safe, and call emergency services.

4. A 26 year old with low back pain reports a missed period, right sided pelvic pain, spotting and new right shoulder tip pain with dizziness. Most likely?

A. Ruptured ectopic pregnancy
B. An endometriosis flare
C. Primary dysmenorrhea
D. Right sacroiliac sprain

A. Ruptured ectopic pregnancy Missed period, unilateral pelvic pain and shoulder tip pain with dizziness suggest a ruptured ectopic pregnancy, an emergency.

5. At 34 weeks, a patient has a blood pressure of 152/96, severe headache, blurred vision and swelling of the face and hands. What should you suspect?

A. Hyperemesis
B. Abruption
C. Placenta previa
D. Preeclampsia

D. Preeclampsia New hypertension after 20 weeks with headache, visual change and edema is preeclampsia until proven otherwise; refer urgently.

6. Why is prolonged supine positioning avoided after about 20 weeks of pregnancy?

A. The fetus cannot move when supine
B. The uterus compresses the vena cava
C. Lordosis disappears when lying flat
D. Relaxin peaks in the supine position

B. The uterus compresses the vena cava The gravid uterus compresses the inferior vena cava, causing supine hypotensive syndrome; use side lying or a right hip wedge.

7. A 9 month old should be able to do which of the following?

A. Copy a drawn circle
B. Ride a tricycle alone
C. Sit alone, pull to stand
D. Hop on one foot in place

C. Sit alone, pull to stand At 9 months infants sit alone, crawl and pull to stand. Hopping is about 4 years and tricycles and circles about 3.

8. Which radiographic finding in an infant is most specific for abuse?

A. Posterior rib fractures
B. A toddler's tibial fracture
C. A clavicle fracture at birth
D. A buckle fracture of the radius

A. Posterior rib fractures Posterior rib fractures (from squeezing) and metaphyseal corner fractures are highly specific for abuse.

9. A 13 year old girl has a right thoracic Cobb angle of 30 degrees and a Risser sign of 1. What is the usual recommendation?

A. Spinal manipulation to reduce it
B. Immediate surgical fusion
C. Observation only, recheck in a year
D. Bracing to limit progression

D. Bracing to limit progression A curve of about 25 to 40 degrees in a skeletally immature patient is usually braced; manipulation alone has not been shown to reduce curves.

10. A hot pack left on too long burns a patient. Which legal doctrine lets negligence be inferred from the event itself?

A. Res ipsa loquitur
B. Statute of limitations
C. Comparative negligence
D. Respondeat superior

A. Res ipsa loquitur Res ipsa loquitur ("the thing speaks for itself") applies when the injury would not ordinarily occur without negligence.

ONE PAGE

Cram sheet

Everything from chapters 13 and 14 in one place. Cover the right columns and see if you can rebuild each row.

Numbers to know

Item	Value	Note
TUG	12 seconds or more	Fall risk
MMSE / MoCA	24 or below / below 26	Cognitive impairment
Calcium and vitamin D	About 1,200 mg over 50; 800 to 1,000 IU	Bisphosphonates first line
Skin lesion size	1 cm cutoff	Nodule 1 to 2 cm; tumor over 2 cm
Melanoma diameter	6 mm or more	Evolving is most important
HIV	AIDS at CD4 under 200	PCP under 200; CMV under 50
Acetaminophen	Max about 4 g a day	N acetylcysteine
Warfarin INR	Usually 2 to 3	Unstable INR: no thrust
CPR	100 to 120 a minute; at least 2 in; 30:2	Child two rescuers 15:2
Epinephrine	0.3 mg adult; 0.15 mg small child, IM thigh	Repeat in 5 to 15 minutes
Cycle	28 days (21 to 35); ovulation about day 14	Luteal phase about 14 days
Pregnancy	Supine hypotension after 20 weeks; GDM 24 to 28	Preeclampsia 140/90 after 20 weeks
APGAR	1 and 5 minutes; 7 to 10 reassuring	0 to 3 low
Fontanelles	Posterior 2 months; anterior 18 months	

Rules that decide questions

Topic	The rule
Older adults	Atypical presentation; confusion or a fall may be infection or MI.
Delirium	Acute, fluctuating, inattentive: same day referral.
Blisters	Pemphigus flaccid, Nikolsky positive; pemphigoid tense, negative.
Hot knee, young adult	Gonococcal (pustules, tenosynovitis) versus reactive (sterile, HLA-B27).
Tabes dorsalis	Romberg positive, Argyll Robertson pupils, Charcot joints.
Emergencies	Scene, EMS and AED, ABC; sugar if they can swallow; epinephrine first.
Psychology	Malingering external gain; factitious sick role; Waddell is not lying.
Women with pain	Pregnancy first; previa painless, abruption painful.
Children	Examine the hip for knee pain; regression is a red flag.
Abuse	Reasonable suspicion: report; proof not needed.
Law	Four Ds; capacity clinical, competence legal; HIPAA treatment, payment, operations.

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