REVIEW VERTEBRAE, SPINAL NERVES, REFLEXES

1) VERTEBRAE - NORMAL SPINAL CURVATURES: Primary = Concave Anterior - (fetal curvature); preserved in adult Thorax, Sacrum

Secondary = Concave Posterior (develop in childhood) - Cervical (support head), Lumbar (support body)

ABNORMAL CURVATURES - all can cause pain from compression of spinal nerves

	Curvature	Location (Most common)	Cause
Kyphosis	Exaggerated Concave **Anterior**	Often in **Thoracic Region (Hump back)**	Osteoporosis, etc. - loss of bone in bodies of vertebrae
Scoliosis	Exaggerated **Lateral**	**Thoracic, Lumbar** most common	Hemivertebra (half of vertebral body does not form in development), etc.
Lordosis	Exaggerate Concave **Posterior**	**Lumbar** (normal in pregnancy)	Obesity, etc.

SUMMARY OF LIGAMENTS OF VERTEBRAE AND DISC HERNIATION

Ligament	Connects	Clinical
Anterior Longitudinal Ligament	Anterior side of bodies of vertebrae	Broad band; **Prevents disc herniation anteriorly**
Posterior Longitudinal Ligament	Posterior side of bodies of vertebrae (inside canal)	Narrow band; (**intervertebral discs herniate in postero-lateral direction, lateral to ligament**)
Ligamenta Flava	Elastic layer connecting Laminae of vertebrae	Last layer penetrated by needle in **Epidural anesthesia**; (Note: **Dura is last** in **Lumbar Puncture** spinal tap)
Interspinous and Supraspinous ligaments	Spines of vertebrae	Thickened in neck to form Ligamentum nuchae (extends from Ext. Occipital Protuberance to C7)

Note: **Herniation of Nucleus pulposus = 'Slipped Disc'** - Nucleus pulposus bulges out through Annulus fibrosus; usually in a **Posterolateral direction** (lateral to the Posterior Longitudinal Ligament); **Most common at levels L4-L5 or L5-S1**.

Note: **Cervical Intervertebral Disc Herniation** - Second most common region for disc herniation; **Lower cervical disc hernation** - **Symptoms in Upper Extremity, if below C4 (Brachial Plexus C5-C8, T1)**

SUMMARY OF SOME FEATURES OF VERTEBRAE ON CT, LANDMARKS AND SOME CLINICAL SIGNS

Vertebra	ID Features on CT	Clinical, Associated Structures on CT
Cervical (7)	**Foramina Tranversaria transmit Vertebral Artery** (C1-C6) **C1** = Atlas - **no body** **C2** = Axis - **dens** C7 = Vertebra prominens (long palpable spine)	1) **Damage to vertebral artery** - brainstem symptoms **2) Upper cervical fracture** (C1 or dens of C2) - **Quadriplegia**; **3) Disc Herniation in Lower Cervical Vertebrae** - symptoms in upper extremity (Brachial plexus)
Thoracic (12)	**Ribs abut bodies** (head of rib), **transverse processes** (tubercle of rib);	**Landmark: Thoracic aorta** anterolateral to bodies
Lumbar (5)	**Large bodies; No surrounding bones**	**Landmarks: Erector spinae** posterior; **Psoas major** lateral; **IVC** and **Abdominal aorta** anterior to bodies

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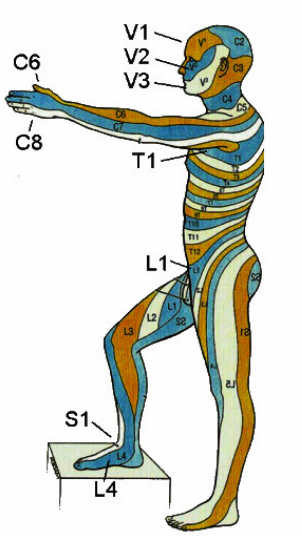
2) GROSS ANATOMY OF SPINAL CORD AND SPINAL NERVES

Syndrome/ Procedure	Anatomy	Structures	Clinical, ID Features on CT
Spinal Nerve Compres-sion	**Convention**: Cervical spinal nerves **C1-C7 exit Above** corresponding vertebrae; **C8 and All other spinal nerves exit Below** corresponding vertebrae	**Dermatomes** - area of distribution of single nerve root to skin; **[V1 - Face (above eyes *) V2 - Face (below eyes*) V3- Face (below mouth)*] C5 - Shoulder C6 - Thumb C8 - Little finger T1 - Armpit T4 - Nipple T7 - Xiphoid T10 - Umbilicus L1 - Inguinal lig. L4 - Big toe S1 - Little toe [* Note: V - also Oral, Nasal Cav., Cranial Dura Mater - headache]**	**Symptoms of compression of nerve root - Paresthesia, pain, sensory loss, hyporeflexia, muscle weakness**  **Note:** overlap of dermatomes in region of trunk: sensory loss in trunk only with Two Thoracic spinal roots
Lumbar Puncture	Inferior end of Spinal Cord = **Conus medullaris**	Conus medullaris at 1. In **Newborn**, vertebral level **L3** 2. In **Adult**, conus at vertebral level **L1**	**Lumbar Puncture** done below Conus Medullaris (region of Cauda Equina); Level: **1. Children** - **L4-L5** **2. Adult** - **L3-L4 or L4-L5**
Metastasis to Vertebral Column	**Epidural Space** (outside Dura) Dura is separated from inner side of vertebral canal; Note: in Skull, there is no epidural space	**Internal Vertebral Venous plexus** - inside vertebral canal in Epidural Space; drains to **External Venous plexus** (outside vertebrae) by Radicular and Intervertebral veins	**Disease processes (ex. cancer) can spread to vertebrae** and spinal cord v**ia anastomoses of Vertebral venous plexus and intervertebral veins** with **Lumbar veins** (ex. carcinoma of prostate can metastasize to vertebral column) .

LAYERS PENETRATED IN EPIDURAL ANESTHESIA/LUMBAR PUNCTURE (superficial to deep)

1. Skin, 2. Superficial Fascia, (3. Supraspinous ligament, 4. Interspinous ligament)
5. Ligamentum Flavum (sudden yield, first 'pop') - now inside vertebral canal in Epidural space
6. Epidural Space - **STOP HERE FOR EPIDURAL ANESTHESIA**
7. Dura Mater (sudden yield, second 'pop')
(8. Arachnoid - adherent to inner side of dura mater)
9. **Subarachnoid Space (Lumbar Cistern)** - **STOP HERE FOR LUMBAR PUNCTURE/SAMPLE CSF**

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3) SPINAL REFLEXES AND DIAGNOSIS OF UPPER AND LOWER MOTOR NEURON LESIONS

REFLEX	STIMULUS/SENSE ORGAN(S) EXCITED	RESPONSE	CLINICAL/ABNORMAL RESPONSES
Stretch (Myotatic, Deep Tendon) Reflex	**Rapid Stretch of muscle (test: tap on muscle tendon) Excites Muscle Spindle Primary (Ia) and Secondary (II) sensory neurons (NOT Golgi Tendon Organ)**	**Stretched muscle contracts rapidly (monosynaptic connection); also excite synergist and Inhibit antagonist Note: Gamma motor neurons can enhance stretch reflexes (Gamma dynamic motor neurons specifically enhance Ia sensitivity; tell patient to relax before test)**	**Hyporeflexia - decrease in stretch reflexes occurs in Lower Motoneuron Diseases, Muscle atrophy etc. Hyperreflexia - (increase) characteristic of Upper Motor Neuron lesions (ex. spinal cord injury, damage Corticospinal tract); note: Clonus = hyperreflexia with repetitive contractions to single stimulus**
Autogenic Inhibition (Inverse Myotatic Reflex)	**Large force on tendon excites Golgi Tendon Organ Ib (test: pull on muscle when resisted)**	**Muscle tension decreases; Also inhibit synergist muscles; excite antagonist muscles**	**Clasped Knife Reflex - occurs in Upper Motor Neuron lesions - forceful stretch of muscle is first resisted then collapses**
Flexor Reflex	**Sharp, painful stimulus, as in stepping on nail; Excites - Cutaneous and pain receptors**	**Limb is rapidly withdrawn from stimulus; protective reflex; also inhibit extensors of same limb and excite extensors of opposite limb (Crossed Extensor Reflex)**	**Babinski sign- toes extend (dorsiflex) to cutaneous stimulus of sole of foot (normally plantar flex); characteristic of Upper Motor Neuron lesion**

Note: **Infant Stepping** - reflexes are used to check motor function in neonates; some infant reflexes probably represents activation of Central Pattern Generators (CNS interneurons that produce rhythmic movements, ex. walking)

LOWER AND UPPER MOTOR NEURON LESIONS

Lesion	Structure Affected	Symptoms	Examples
Lower Motor Neuron Lesion (Flaccid Paralysis)	**Lower Motor Neurons = Alpha Motor neurons with axons that innervate skeletal muscles**	**Muscle is effectively denervated: 1) Decrease Stretch (Deep Tendon) Reflexes 2) Decreased Muscle Tone 3) Muscle atrophy; Fasciculations (twitches) precede atrophy 4) No Babinski sign**	**1) Compression of spinal nerve 2) Poliomyelitis - viral infections affecting motor neurons**
Upper Motor Neuron Lesion (Spastic Paralysis)	**Upper Motor Neurons = All descending neurons that affect Lower Motor Neurons (ex. Corticospinal Reticulospinal neurons)**	**Disrupt voluntary control and regulation of reflexes (remove inhibition): 1) Increase Stretch (Deep Tendon) Reflexes 2) Increased Muscle Tone 3) No Fasciculations 4) Babinski sign 5) Clasped Knife Reflex**	**1) Damage to Corticospinal (corticobulbar) tracts - can occur at all levels from cortex to spinal cord (brainstem)**

Note: Some diseases produce both Upper and Lower Motor Neuron Symptoms - (ex. ALS Amyotrophic Lateral Sclerosis)

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REVIEW: CLINICAL EMBRYOLOGY OF HEAD AND NECK

Clinical Condition	Normal development	Abnormal	Signs/ Symptoms	Treatment
Cleft Lip (cheiloschisis)	Fusion of medial nasal and maxillary processes forms upper lip	**Failure of fusion of medial nasal and maxillary processes**	Cleft at philtrum of upper lip	Surgical repair
Cleft Palate (palatoschisis)	Anterior - Fusion of medial nasal processes (Primary palate) and maxillary processes (Secondary Palate); Posterior - Secondary palate formed by Maxillary processes of two sides	**Failure of fusion**	Anterior - Cleft anterior to Incisive foramen; Posterior - Cleft posterior to Incisive foramen	Surgical repair
Malformation of nasolacrimal duct (dacryostenosis)	Duct forms as cord between maxillary and frontonasal processes that extends from lacrimal sac (at medial canthus of eye) to nasal cavity (inferior meatus)	**Cord fails to canalize**	Continuous flow of tears over lower lid onto face	Surgical repair
First Arch (Treacher Collins) Syndrome	First brachial arch forms skeletal elements: 1) malleus, incus 2) contributes to mandible (Meckel's cartilage)	**Neural crest cells do not migrate into Arch 1**	1) Mandibular hypoplasia 2) Conductive hearing loss 4) Facial malformation	Some surgical repair
Thyroglossal duct cysts	Thyroid forms as evagination at foramen cecum of tongue; tissue migrates ant. to Hyoid bone in midline of neck to location below Cricoid cartilage	**Glandular tissue or cysts develop anywhere along path of migration**	Mass in **midline** of neck	Surgical removal (remove tract to tongue)
Abnormal location/ Accidental Removal of parathyroid glands	Normally posterior to thyroid gland or embedded in it; develop from branchial pouches 3 and 4 Inferior parathyroid - pouch 3 Superior parathyroid - pouch 4	**Can be located within thyroid gland or ectopic**	Normally no symptoms; If accidentally remove parathyroid during thyroid removal, signs of calcium imbalance	Treat calcium imbalance pharmaco-logically, etc.

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BRANCHIAL ARCHES AND DERIVATIVES

ARCH (NERVE)	SKELETAL	LIGAMENTS	MUSCLES
First (V)	1) Malleus 2) Incus	1) Ant. ligament of malleus 2) Spheno-mandibular ligament	1) Muscles of Mastication 2) Tensor tympani 3) Tensor palati 4) Mylohyoid 5) Ant. belly of Digastric
Second (VII)	1) Stapes 2) Styloid process 3) Hyoid bone - lesser horn, upper half of body	Stylohyoid ligament	1) Muscles of Facial Expression 2) Stapedius 3) Stylohyoid 4) Post. belly of Digastric
Third (IX)	Hyoid bone - greater horn, lower half of body	----------	Stylopharyngeus
Fourth (X)	Cartilages of Larynx	----------	1) All muscles of Larynx 2) All muscles of Pharynx (except Stylopharyngeus) 3) All muscles of Soft Palate (except Tensor palati)
Sixth (XI)	----------	----------	1) Sternocleidomastoid 2) Trapezius

STRUCTURES DERIVED FROM BRANCHIAL POUCHES, CLEFT AND MEMBRANE: BRANCHIAL 'CLEFT' CYSTS (FISTULI = channels from pharynx to skin)

POUCH	FORMS	CLINICAL
First	1) Auditory tube 2) Tympanic cavity	First Branchial 'Cleft' cyst - tract to external auditory meatus or auditory tube
Second	Lining (crypts) of palatine tonsils	Second Branchial 'Cleft' cyst - tract to tonsillar fossa (palatine tonsils) - **MOST COMMON CYST**
Third	1) Inferior parathyroid gland 2) Thymus	Third Branchial 'Cleft' cyst - tract to thyrohyoid membrane or piriform recess
Fourth	1) Superior parathyroid gland 2) C-cells of Thyroid	rare

Note: Pouch 3 structures migrate below (caudal) to Pouch 4 structures.
Note: Location of Cysts and Fistuli - in **lateral neck**, **anterior to Sternocleidomastoid muscle**

Note: **First Branchial Cleft forms External Auditory Meatus; First Branchial Membrane forms Tympanic Membrane**

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CLINICAL ANATOMY OF HEAD AND NECK

Clinical	Anatomy	Cause	Sign/Symptom
Anterior Cranial Fossa - Cranial nerve I, Nasal Cavity			
Fracture of cribriform plate of ethmoid bone	Nasal septum continuous with crista galli of ethmoid bone; Olfactory nerve passes through cribriform plate of ethmoid bone	Blow to nose; fracture produces **continuity between subarachnoid space and nasal cavity**	**Leakage of CSF from nose** ('runny nose')
Middle Cranial Fossa - Cranial nerves II-VI Orbit, Eye Movements, Face			
Rapid loss of vision in one eye	Central artery of retina (branch of Ophthalmic artery from Int. Carotid) is an end artery with no functional anastomoses	**Occlusion of Central Artery of Retina**	Sudden onset blindness in one eye (one eye only, artery visible through ophthalmoscope)
Slow loss of vision in one eye	Dura mater and subarachnoid continue over optic nerve; **optic nerve function can be affected by CSF pressure**	**Communicating hydrocephalus** (many causes)	Decreased visual function both eyes (diagnose as **papilledema** in ophthalmoscope); also other signs increased intracranial pressure (headache, etc.)
Abducens nerve palsy	Abducens nerve innervates only Lateral Rectus muscle (action: abduction of eye)	Damage Abducens nerve VI (causes ex. increased intracranial pressure, Cavernous sinus thrombosis)	**Diplopia and Medial strabismus**
Trochlear nerve palsy	Trochlear nerve innervates only Superior Oblique muscle (action: abduct, depress and medially rotate eye)	Damage Trochlear nerve (ex. trauma)	**Inability to look down and out** (difficulty walking down stairs); **Head tilted toward side opposite lesion**
Oculomotor nerve palsy	Oculomotor nerve innervates Superior, Medial and Inferior Rectus and Inferior Oblique; part of Levator palpebrae superioris; also provides parasympathetics to pupillary constrictor, ciliary muscles	Damage Oculomotor nerve (frequently idiopathic)	**Lateral strabismus, dilated pupil, ptosis; also loss of accommodation (near vision) due to paralysis of ciliary muscles**

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Clinical	Anatomy	Cause	Sign/Symptom
Horner's Syndrome	Sympathetics in head innervate smooth muscle part of Levator Palpebrae Superioris; Pupillary dilator muscle; sweat glands of skin; **Pathway**: pre-ganglionic neurons arise at T1,2; ascend in chain; post-ganglionics in Sup. Cerv. Ganglion; distributed with arteries (ex. Ophthalmic A.)	Block conduction in Sympathetics to head (tumors, etc)	**Ptosis (**drooping eyelid from smooth muscle part of Levator Palpebrae Superioris); **Constricted pupil** (miosis due to paralyze Dilator pupillae); **Anhydrosis** of forehead (denervate sweat glands)
Cavernous sinus thrombosis	Branches of cranial nerves (III, IV, V1, V2, VI) and Internal carotid artery pass through wall of cavernous sinus; Cavernous sinus drains ophthalmic veins which anastomose with branches of Facial Vein; veins have no valves	ex. **Infection in cav. sinus spread from infection of face** (angle of nose or upper lip particularly dangerous)	**Diplopia** (blurred vision) due to disruption of eye movements; increased venous pressure produces **engorgement in veins of retina (view in ophthalmoscope)**
Epidural Hematoma	**Middle Meningeal artery** (branch of Maxillary artery that passes through foramen spinosum) supplies bone of calvarium	**Blow to side of head (fracture skull in region of pterion)**	Patient conscious after accident; loses consciousness within hours; coma, death (Note: **hematoma is lens-shaped** on CT)
Subdural Hematoma	**Bridging veins** link Superficial cerebral veins on surface of brain and Superior Sagittal sinus (also other venous sinuses)	**Blow to head; in elderly can occur without distinct event**	**Slow onset** of neurological symptoms, headache (often hours to days) (Note: **hematoma is crescent-shaped** on CT)
Communicating Hydrocephalus due to decreased CSF reabsorption (in elderly)	CSF produce in choroid plexus; reabsorbed from subarachnoid space at arachnoid villi into venous sinuses	**Calcification of arachnoid villi** (arachnoid granulations)	**Headache, papilledema**
Numbness of regions of face	V is major sensory nerve of face and head; V1 above lateral margin eyelids; V2 eyelids to upper lip; V3 below lateral margins of lips	Many; ex. Trigeminal Anesthesia	Numbness in specific region can be **correlated with specific division of V**
Pain in external auditory meatus following Facial paralysis	Skin of ear and external auditory meatus receive sensory innervation from V, VII, IX and X	**Bell's palsy**	Ear ache (following or accompanying Facial paralysis)

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Clinical	Anatomy	Cause	Sign/Symptom
Weakness of muscles mastication	Muscles mastication innervated by V3; Lateral Pterygoid opens mouth; all other muscles Mastication close mouth	ex. **Tumor at foramen ovale**	When open mouth, **jaw deviates toward paralyzed side**
Posterior Cranial Fossa - Cranial Nerves VII-XII, face, ear, pharynx, tongue			
Facial paralysis (with effect on VIII)	CN VII and VIII exit post. cranial fossa via Internal auditory meatus; VIII ends in temporal bone; VII enters facial canal and gives off branches in temporal bone; 1) parasymp. to Lacrimal gland, mucous glands of nose, palate; 2) Nerve to Stapedius muscle; 3) Chorda tympani - taste to ant. 2/3 of tongue; parasymp. to Submandibular, Sublingual salivary glands	**Acoustic neuroma**	Loss or reduction of hearing in one ear; **Full Facial nerve palsy (Bell's palsy)** symptoms: 1) **Facial paralysis and loss of Corneal reflex** (V1 sensory, VII motor) 2) **Loss of taste to ant. 2/3 of tongue** 3) **Decreased secretion tears and saliva** 4) **Hyperacousia**
Facial paralysis (no effect on VIII)	Facial nerve exits skull via Stylomastoid foramen; only has motor branches after leaving skull	**Parotid tumor**	**Facial paralysis**; Loss of corneal reflex but **no loss of taste or decrease in tears or saliva; no hypercousia**
Loss of function of IX and X	IX is major sensory nerve to pharynx (oropharynx); X is motor to all muscles of pharynx except Stylopharyngeus; all muscles of palate (except Tensor palati)	**Tumor at Jugular Foramen**	Difficulty in swallowing; **Absence of gag reflex**; (Gag reflex - IX sensory, X motor)
Hoarse voice after thyroid surgery	X is motor to all muscles of larynx; also sensory to larynx; Recurrent Laryngeal nerve passes posterior to Thyroid gland with Inf. Thyroid artery; is motor to all laryngeal muscles except Cricothyroid	**Damage Recurrent Laryngeal nerve during Thyroid surgery**	Hoarse voice due to unilateral **paralysis of all laryngeal muscles (except Cricothyroid)**
Torticollis	XI innervates Sternocleidomastoid and Trapezius	Torticollis can be congenital or acquired	Contracture of Sternocleidomastoid - head is rotated with face directed to opposite side (Note: **Trapezius - clinical test for XI - shrug shoulders**)
Paralysis of muscles of tongue	XII is motor to all muscles of tongue (no sensory component)	XII hypoglossal nerve palsy	Atrophy of muscles of tongue on one side; **protruded tongue deviates toward side of lesion due to Genioglossus) in Lower Motor Neuron Lesion**

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LOWER EXTREMITY CLINICAL/ANATOMICAL REVIEW

Clinical Condition	Anatomy	Cause	Symptom
Hip/Pelvis			
Femoral Hernia	Femoral ring is a weak point in abdomino-pelvic cavity; Lymphatic vessels course through Femoral ring to Femoral Canal in medial part of Femoral sheath (which surrounds Fem. Art, Vein, Lymph)	Increase in pressure in abdomen (lifting heavy object, cough, etc.) can force loop of bowel into Femoral Canal (out Saphenous opening)	**Bulge in anterior thigh below Inguinal Ligament**
Hip Pointer	Anterior Superior Iliac spine (origin of Sartorius, Tens. Fasc. Lata m.) is subcutaneous	Fall on hip causes contusion at spine	**Bruise on hip**
Pulled Groin	Adductor muscles of thigh take origin from pubis	**Tear in Adductor muscles** can occur in contact sports	Pain in groin (at or near pubis)
Hamstring Pull	Hamstring muscles of post. thigh have common origin at Ischial Tuberosity	Excessive contraction (often in running) produces tear or avulsion of hamstring muscles from Ischial tuberosity	**Agonizing pain in posterior thigh** if muscles are avulsed
Gluteal Gait	Gluteus Medius and Minimus act to support body weight when standing (essential when opposite leg is lifted in walking)	Damage to Superior Gluteal Nerve or polio	Gluteal Gait (Trendelenberg Sign): **pelvis tilts to down toward non-paralyzed side** when opposite (non-paralyzed) leg is lifted in walking
Collateral circulation at hip	Cruciate anastomosis links Inf. Gluteal artery (from Int. Iliac.) and Profunda Femoris (**Med. and Lat. Fem. Circumflex**)	**Damage to External Iliac or Femoral arteries (stab wounds, etc.**)	Bleeding (can **ligate between Internal Iliac and Profunda femoris**)
Avascular necrosis of head of femur	**Medial Femoral Circumflex artery** supplies head of femur (also small supply from Obturator Artery)	Falls (common in elderly) can produce **fracture of neck of femur** (treatment is hip replacement)	**Leg is rotated laterally** (by action of Gluteus Maximus and short posterior rotator muscles)
Dislocate Hip (head of femur displaced superiorly)	Hip joint ligaments usually strong	**Congenital** - Upper lip of acetabulum can fail to form	**Leg is rotated medially** (by action of Gluteus Medius and Minimus)

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KNEE			
Tear Anterior Cruciate Ligament (ACL)	Anterior Cruciate Ligament extends from Lateral Condyle of Femur to Ant. part of Intercondylar eminence of tibia; limits ant. movement of tibia	Rapidly rotate body when foot planted on ground	**Anterior drawer test - pull tibia anteriorly**
Terrible Triad	Medial Meniscus is firmly attached to Medial Collateral ligament	In sports, blow to lateral side of leg **tears Medial Meniscus, Medial Coll. Lig, ACL**	**Pain and high mobility** (ACL - positive Anterior Drawer test)
LEG, ANKLE and FOOT			
Foot drop	**Common Peroneal nerve** is subcutaneous when passing around head of fibula at knee	**Blow to lateral leg** at head of fibula or sustained pressure in wearing a leg cast	**Inability to dorsiflex foot**); cannot lift foot from ground in walking
Anterior Leg Syndrome	Fascia of anterior muscular compartment of leg is very tight	Exercise or fracture of tibia; **compress of Deep Peroneal nerve in anterior compartment**	**Foot drop** (inability to dorsiflex foot); cannot lift foot from ground in walking
Tarsal Tunnel Syndrome	Tendons and vessels pass under Flexor retinaculum on medial side of ankle (Tom, Dick and Harry: Tibialis posterior, Flexor Digitorum longus, Posterior Tibial Artery and Tibial Nerve, Flexor Hallucis longus)	**Swelling of tendons under flexor retinaculum** produces compression of Tibial Nerve	**Numbness of sole of foot and toes, weakness in flexion of toes**
Intermittent Claudication	Posterior tibial artery (from Popliteal artery) supplies posterior compartment of leg and most of foot	**Atherosclerosis** produces narrowing of artery, limiting blood supply to leg and foot	**Painful cramps after exercise that subsides with rest**
Ankle sprain	Ligaments on lateral side of ankle are weaker than medial side	Excessive Inversion produces **stretch of Anterior Talofibular and Calcaneofibular ligaments**	**Pain on lateral side of ankle**
Pott's Fracture	Deltoid ligament on medial side of ankle is strong	Excessive eversion of ankle **fractures distal tibia (medial malleolus) and fibula**	Pain in ankle
Fallen Arch (Pes planus)	Medial arch of foot held by **Plantar Calcaneonavicular ligament**	Loss or decrease in medial arch; can be developmental or related to use	**Foot pain, particularly on medial side**

NOTE: DERMATOMES - L1 INGUINAL REGION; L4 BIG TOE, S1 LITTLE TOE
PATELLAR TENDON REFLEX - TEST L3-L4; ACHILLES TENDON REFLEX - TEST S1
FEMORAL TRIANGLE - STRUCTURES LAT. TO MED. - NAVL (Femoral Nerve, Artery, Vein, Lymphatics)

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