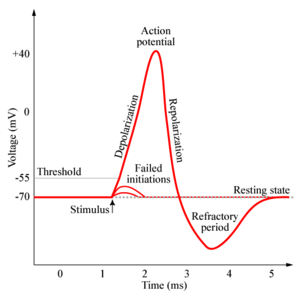
* Review for Anatomy Test II – I will kill you test
* Intro to Anatomy
* Approaches to anatomy include: regional, systemic, clinical, and surface anatomy (palpation of tendons, mm. bones, and arteries)
* Bottom of your foot and palm of your hand considered ventral/plantar. I think call 956-735-2214 if this is wrong.
* Ipsilateral – same side. Contralateral – opposite side.
* Ankle plantarflexion is extension of the ankle. Flexion is dorsiflexion
* Protrusion (ant.) and Retrusion (post.) – mandible, lips, tongue, TMJ
* *Protraction and Retraction - scapula*
* Thumb ab-ducts and ad-ducts in sagittal plane.
* Circumduction - is only possible at shoulder and hip. Flx/ext, abd/add
* Skin (also from integ. Power points)
  + Epidermis – no bld. Vessels, contain some nerve ending. Low pH
  + Dermis – composed of collagen and elastic fibers (contains Langer lines (tension lines)), elastic fibers deteriorate with age/not replaced. Fibroblasts – Collagen synthesis. Contains Macrophages. Contains dermal appendages (hair follicle, arrector pilli mm., sebaceous(oil) glands, sweat glands). If incisions and scars are parallel to tension lines= good, perpendicular =not good (keloid scarring). Contains, nn., bld vessels, lymphatic vessels. Innervated - temp, pn, touch, tickle, etc.
  + Subcutaneous (hypodermis) = superficial fascia – largely composed of adipose tissue (protection, insulation, cushiong, various depths), skin ligaments – controls mobility of skin over the deeper layers.
  + Deep fascia – dense and organized CT structure that surround deeper structures. Ex. Retinaculum – thickening of fascia around joints.
    - Clinical significance – contains or spreads injection., Compartment syndrome – fluid builds up in compartments, can cause necrosis of mm.
    - Investing fascia -
    - Intermuscular fascia – separates mm.
* Classification of burns injuries
  + Superficial – only epidermis, no blister, no scaring, pn is present. (2-5 days)
  + P.T. superficial – epidermis and partial dermis, blisters, blanching-quick refill, very painful, wnd is pink-red (7-14 days).
  + P.T. deep – deeper into dermis, + blanching but takes longer, red, yellow, white shades, moist, dry, no blisters. (4-10 wks), scar formation
  + F.T. – All layer including fat, no blanching, affects all systems of body, (black, brown, cherry red, waxy white colors) can be dry, painless
    - * + Classifying isn’t easy- better with experience
      * >20% affects all body systems
      * Can use rule of 9’s.
      * TBSA – total body surface area
* Bursae – closed sacs or envelopes of serous membrane, serve as a cushion and decreased friction between joint
* Synovial Sheaths – specialized elongated bursae that wrap around tendons.
* Axial skeleton – Head, neck, and trunk
* Appendicular skeleton – limbs, including pectoral and pelvic girdles.
* Bone -
* Medullary (marrow) cavity – provides blood cell and platelet formation.
* Periosteum which is a fibrous CT membrane around the bone is innervated with many pain fibers, since bone does not have many.
* Only short bones in the body are the carpals and tarsals, others are long, flat, irregular, and sesamoid (lie within tendon).
* Cartilage does not have any free ending nerves, serves as cushion, needed with there is flexibility, avascular, semi-rigid CT.
  + Articular Cartilage
  + Fibrocartilage
* There are different types of joints
  + Fibrous – united by fibrous tissues
    - Sutures, syndesmosis (interosseous membrane), gomphosis (teeth socket)
  + Cartilaginous – united by hyaline or fibrocartilage,
    - Primary – temporary - synchodrosis
    - Secondary - symphisis
  + Synovial – united by articular capsule, articular cartilage, capsule line by synovial membrane
    - Types of synovial joints – Plane, Hinge, Saddle, Condyloid, Ball and socket, Pivot
* Types of Muscles – skeletal, smooth, and cardiac
* Vascular system
  + Arteries - tunica adventitia, tunica media, tunica intima
  + Veins and capillaries
* Know the quality of bld supply of structure.
* Introduction to Neuroscience
* Two types of cells that make up nervous system: Nerve cells and glial cells
* Nerve cells = “neurons” – are the structural and functional units of the nervous system specialized for rapid communication.
* Endoneurium (immediately surrounding nerve cells), perineurium (enclosed fascicle of nerve fibers), and epineurium (encloses bundle of fascicle); are layers of the nerve, from innermost to outermost.
* Neuronal parts
  + Cell bodies (grey matter) – synthesis macromolecules and integrate electrical signals.
  + Dendrites – receive and collect information from other neurons.
  + Axon (white matter) – convey electrical signals to other neurons.
  + Synaptic ending – transmit signal (Neurotransmitter – ex. Nor-epin. Or acetylcholine), either stimulate or inhibit.
* There are two ways to classify neurons – by their “shape and size”(unipolar, bipolar, and multipolar(most common)) and “Function”(sensory, motor, interneuron, project).
* Glial Cells – approximately five times as abundant as neurons. Are non-neuronal, non-excitable cells, serve by supporting, insulating, and nourishing the neurons.
* Schwann cells: produce myelin, metabolic support, electrical insulation and conduction, nodes of ranvier
* Glial cells are found in the CNS and PNS
  + CNS – Oligodendrocytes (myelin sheaths), astrocytes (structural support), ependymal (lines ventricles), and microglial cells (NS response to injury).
  + PNS – Schwann Cells which produce myelin, electrical insulation and conduction, metabolic support, nodes of ranvier
* CNS – Brain and Spinal Cord – UMN (upper motor neuron)
* PNS – Everything else – LMN (lower motor neuron)
* Grey matter – sites of neuronal information processing
* White matter – connection between sites
* Neuronal parts
  + Grey matter – cell bodies, nuclei and cortex.
  + White matter – axons, fasciculus. Terms specific to CNS (Funiculus, Lemniscus, Peduncle, Tract)
* Resting potential is when inside of neuron is at -70mV. ECF (high Na and low K). When the conc. Changes is may or may not cause a AP. Signal transport from cell body to axon is AP mediated.
* AP have a threshold (think it’s +35mV), if it does not reach this it will not fire (all or none).
* Repolarization phase (during this period when Na is flowing in and K is flowing out), another AP cannot be conducted.
* Stimulus, depolarization (AP), repolarization, and refractory phase.
  + See figure on next page, it will make more sense.
    - * + 
* Axon characteristics
  + Myelinated – salutatory conduction – fast conduction
  + Non-myelinated – slow conduction
  + The larger the diameter of the axon is the faster conduction it has. Diameter has a + correlation with conduction.
* Type IV and C fibers are the only ones mentioned that are un-myelinated.
* Largest to smallest – Type IA, IB, A alpha, Type II – A beta, A gamma, Type III – A delta, B, and lastly the unmyelinated ones.
* Electrical signaling can be obstructed by damaging of the oligendondrocytes cell body or the myelin sheath: can be unknown cause (MS, central pontine myelinolysis), genetic factor (leukodystrophies), or inflammation (not important right now but this is why you want to reduce swelling after an injury, to stop the inflammation response from hurting other tissues. Inflammation is good too much bad). Examples of inflammation that reduces electrical signals are Guillain-Barre (post-infectious), progressive multifocal leukoencephalopathy (viral), subacute sclerosing panencephalitis (measles)
* Electrical signals can also be damaged by toxins.
* Synaptic transmission (Trip to Miami) We are transmitted
  + Pre-synaptic ending – chemical released (jose in Austin)
  + Synaptic-cleft – chemical traveling (jose in airplane having a beer)
  + Post-synaptic ending – chemical binds – receptors (jose in Miami)
* Rapid NT, point-to-point transmission
  + Acetylcholine – in the PNS
  + Amino Acids – in the CNS
* Slow, diffuse transmission
  + Amines and neuropeptides (serotonin, catecholamines)
* Spinal Cord Anatomy – is the major reflex center and conduction pathway between the body and brain.
* The H-shaped area is the grey matter while the embedded matrix is the white matter. We know from previous discussion that grey matter has the cell bodies and processes the signal while the white matter serves more as a transporter.
  + There are anterior and posterior; and left and right horns. Anterior are fat like Alaska and Posterior are skinny like a point.
* The covering the Spinal cord and the peripheral nerves, respectively
  + Dura mater (elastic tissue) – epineurium (directly covers the peripheral nerve, endoneurium encloses the myelin sheath of a nerve fiber within a fasciculus, perineurium surrounds a group of fascicles (bundle of nerve fibers))
  + Arachnoid (avascular, fibrous and elastic tissue) – perineurium (enclosed fascicles of nerve fibers)
  + Pia mater (denticulate ligaments consist of fibrous sheet) – perineurium (encloses bundle of fascicle)
* What are dorsal sulcus and ventral sulcus of the spinal cord?
* Stretch Reflex
* A involuntary and stereotypical response to a stimulus
* Different reflexes
  + Primitive – sucking, babinski reflex
  + Monosynaptic stretch reflex or deep tendon reflex – response to a stimulus, for example patella knee reflex.
* Muscle spindle – located in the belly of muscles and contain both motor and sensory nerves.
  + Intrafusal (2)
    - Nuclear chain – sensitive to length changes- stretching
    - Nuclear bag – sensitive to rate of changes – contraction or tone
  + Sensory Endings (2)
    - Primary – annulospiral endings
    - Secondary – flower-spray endings
  + Receive Motor Innervations (LMN)
    - Alpha motor supply extrafusal (large)
    - Gamma motor supply intrafusal (small)
* Basically what’s going on is that the person stretches, so the annulospiral ending of the nuclear chain sense stretching of the muscle, then signal travels up to respective spinal segment, in the grey matter it is transmitted to a motor neuron which will come back, alpha and gamma motor neurons will cause contraction, increased tone. The purpose of contraction is so that mm. will not be stretched beyond its limit, that is why this process must be fast (that’s why it doesn’t travel to the medulla or where ever in the brain for processing)
* Brain Goss Anatomy
* Cerebrum – outer brain
* Gyrus are folds and sulcus are grooves.
* The Diencephalon differentiates into thalamus and hypothalamus
* Lobes and their importance
  + Frontal (motor) – prefrontal (executive function)
  + Parietal (sensory) –
  + Occipital (visual)
  + Temporal (auditory)
  + Limbic (drives, emotion, memory)
* Basal Ganglia – has movement control and has related structures in the brainstem.
* Hippocampus (memory) and Amygdala (emotion) – Major components of the limbic system.
* Cerebellum – “little brain” The vermis is in charge of coordination of trunk movements. The hemispheres coordinate limb movements.
* Brainstem – Houses Cranial nerves 3-12. The brainstem has 3 divisions
  + Midbrains – continuous with the diencephalon
  + Pons – is connected to the cerebellum.
  + Medulla – continuous with the spinal cord
* The CNS is wired through sensory and motor neurons
  + Second order neurons project to the thalamus
  + Third order neuron project from thalamus to the cortex

**The Big Three**

* Fasciculus: tract, bundle of axonal fibers with similar connection
  + Suprasegmental tracts: long ascending fibers from SC to brain, cerebellum, or thalamus
  + Long descending fibers from cortex or brainstem to SC
  + Segmental tracts: intersegmental fibers within SC
* Funiculus: found in SP= collection of tracts: anterior, posterior, lateral, anteriolateral system
* Dorsal columns: found in post. Funiculus: Proprioception, vibration, discriminative touch
  + Fasciculus Gracilis: LE (located medially)
  + Fasciculus Cuneatus: UE (T6 and above) (located laterally)
* Dorsal columns crosses in internal arcuate fibers in medulla, then becomes medial lemniscus pathway, where it ascends through brainstem, synapse in thalamus, ascend in internal capsule, synapse in postcentral gyrus, parietal lobe
* Lateral corticospinal tract found in lat. Faniculus: controls volitional movement (85%, other 15% is ant. Corticospinal tract): crosses at decussation of the pyramids in the medulla
* Fibers from precentral gyrus (frontal lobe), descend through int. capsule, midbrain and pons, cross in medulla, and synapse with alpha motor neurons in ant. Grey horn
* Spinothalamic tract: located in anteriolateral system (ALS): carries pain, temp., and crude touch. Crosses at the spinal level (sometimes 1 or 2 levels above or below).
* Ascends in ALS, synapse in thalamus, up through int. capsule, synapse in postcentral gyrus (parietal lobe)
* Axonal tracts carry information in a somatotopic pattern:
  + Dorsal columns: LE medially, then trunk, UE laterally
  + Corticospinal and spinothalamic: UE medially, then trunk, LE laterally
* All tracts are bilateral, neuronal axons give off many collaterals on the way to their primary target, ascending and descending tracts typically influence multiple sites within CNS, and the loss of a single tract can often be partially compensated for by other tracts.
* Spinal shock: occurs during initial period following traumatic injury: begins to resolve within 24 hours, generally resolves within a few weeks of injury: causes flaccid paralysis, areflexia, and sensory loss below level of lesion. As it resolves, hyperreflexive, and spasticity develop