

In the name of Allah

Page 9: very important, you will see every day in clinical field

- ☒ MRI : Magnetic resonance imaging, MRI scanners use strong magnetic fields and radio waves to form images of the body

- ☒ MRI types:

*T1-weighted; brain tissue >> grey to white, fluids (CSF or blood) >> black

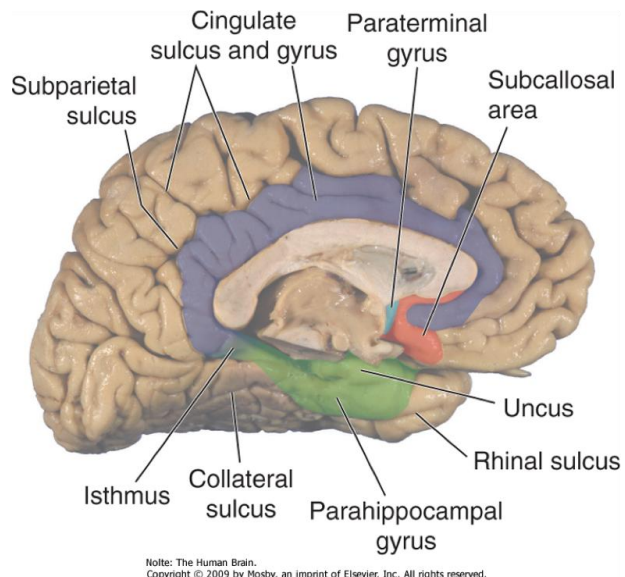
*T2-weighted; brain tissue >> black , fluids (CSF or blood) >> white

- ☒ severing or lesioning of the corpus callosum >>split-brain syndrome, also called callosal disconnection syndrome
BUT we do cut corpus callosum surgically to treat epilepsy, and prevent irritant focus from spreading between the two cerebral hemispheres
Meningitis do an inflammatory rxn in cortex, then fibrosis occurs, finally it eill become an irritant focus has an abnormal activity; epilepsy

- ☒ Stereognosis: put an object in pt's **right** hand, and because of sensory decussation he will sense it by 3,1,2 on the **left**, which will send the information to area of speech; on the left
Every cerebral hemisphere comprehends, send to area of speech on the left hemisphere

- ☒ Above corpus callosum; cingulate gyrus; which is part of limbic system

- ☒ Limbic system (limbic loop)
"emotional behavior and memory"
:
Contents': cingulate gyrus, Isthmus, parahippocampal gyrus and uncus



- ☒ Above cingulate gyrus and sulcus; **marginal sulcus** and in front of it **paracentral lobule**
- ☒ Paracentral lobule represent **lower limbs and sphincters**
Meningioma of falx cerebri leads to Paracentral lobule lesion on both sides; result in paraplegia and incontinence
- ☒ Occipital loop; above the calcarine >> cuneus, Below it >>lingual gyrus
Each contain 17, 18 and 19 areas
- ☒ Thin membrane Below corpus callosum >> septum pellucidum
- ☒ Puncture septum pellucidum to get in >> lateral ventricle (contains CSF and appears black in T1-weighted)
- ☒ Axon bundle behind septum pellucidum >> fornix
These axon's cell bodies are in hippocampus in temporal loop, their terminates are in pineal body
- ☒ parahippocampal gyrus is on the lower surface of cerebral cortex, while hippocampus inside it

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Amygdala + hippocampus are in temporal loop

- ☒ behind fornix >> thalamus and hypothalamus
- Between rt and lt thalamus >> third ventricle
- Below thalamus >> mid brain, pons and medulla
- American university assume thalamus as a part of brain stem, may be anatomically it's on their Extension, but functionally it's not
- Brain stem contains: *nuclei of cranial nerves
- *ascending and descending tract
- *reticular formation
- ☒ dorsal part of mid brain >> tectum
- ☒ cerebral aqueduct: connect between third and fourth ventricle
- ☒ fourth ventricle: is the cavity of hind brain, anterior to it pons and the upper part of medulla, posterior to it cerebellum
- ☒ vermis: middle part of cerebellum
- ☒ examples on practical exam questions: (he will put the pic and numbers on it's parts)
 - *fornix and cingulate gyrus are parts of limbic system (V)
 - *thalamus is purely sensory organ (F) >> it contains sensory and motor nuclei
 - *mid brain contains 5, 6, 7, 8 nuclei (F) >> it contains 3, 4
 - Pons >> contains 5, 6, 7, 8 nuclei
 - Medulla >> contains 9, 10, 11, 12

Page 10, page 11 (the upper pic):

The patient with cut corpus callosum appears normal but with diagnosis you will find the Disturbances

Page 11 (the lower pic):

- ☒ Horizontal sec from occipital loop posteriorly to thalamus and caudate anteriorly
- ☒ Cerebral hemispheres from inside >> white matter and masses of grey matter
- ☒ Caudate and thalamus medially, lenti form laterally
- ☒ Caudate + lenti form = basal ganglia (basal nuclei)
 - Ganglion: collection of neurons outside CNS
 - Nucleus: collection of neurons in CNS
 - So basal ganglia is a misnomer
- ☒ Lenti form; outer part >> putamen
 - Inner part >> Globus pallidus; E (external segment), I (internal segment)
- ☒ Caudate and putamen, anatomically separated by anterior limb of internal capsule, but functionally they are related (caudate + putamen = striatum)
- ☒ Basal ganglia, like cerebellum; receive information and send programs
 - Reception part >> striatum (caudate + putamen)
 - Programs exit through GPI Globus pallidus I (internal segment) to cortex
- ☒ Posterior limb of internal capsule >> between thalamus and lenti form
 - The most important part of internal capsule is posterior limb because of pyramidal and extra pyramidal which pass through it
- ☒ Internal capsule contain motor fibers descending and sensory ascending (from thalamus to sensory cortex; sensory radiation)

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- ☒ If internal capsule sensory fibers degenerate, pt will **temporary** contralateral lose sensation

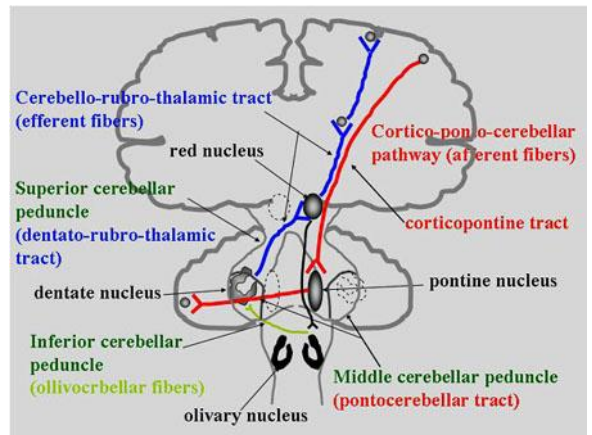
Page 12:

- ☒ Part of the cortex lateral to lenti form, pass inside lateral fissure, below it temporal, and above it frontal and parietal >> insula

Page 14:

- ☒ functional divisions of cerebellum:
 - *spinocerebellum *cerebrocerebellum *vestibulocerebellum
- ☒ connect cerebellum with pons and it's the bigger most peduncle >> middle cerebellar peduncle
- ☒ cortico ponto cerebellar pathway: bring information from association areas to cerebrocerebellum
cell bodies are in pons

- ☒ middle peduncle: mainly inputs
It performs the cerebellum about intended performance
- ☒ superior peduncle: mainly efferent
dentato rubro thalamic cortical tract
Dentate: from dentate nucleus
Rubro: to red nucleus in mid brain
Carry **corrective signals**



- ☒ The most serious injury (serious ataxia) :
superior cerebellar peduncle (dentate rubro thalamo cortical)
- ☒ Sometimes, cerebellum diseases reflex disease in its peduncles, and the most important one corrective signal

Page 15:

- ☒ The body represented upside down
- ☒ Representation depends on accuracy of movements not the organ size
- ☒ Area 6 >> plan
Area 4 >> perform
- ☒ Complex movements need programs (area 6)
Simple once done by area 4 (without a program)
- ☒ Premotor area: responsible for posture preparation for coming movements
Premotor area lesion >> grasp reflex
Grasp reflex: present in newborns and premotor area lesion pts, knit your finger between thumb and index or palm of newborns, and he will hold your finger
- ☒ Supplementary motor area: regulation of complex bilateral movement
Inputs come to it from posterior parietal cortex, and it sends outputs to cerebellum and basal ganglia,
Also it sends to area 4 to sleep

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And to brain stem to inhibit pontine reticulospinal tract

Page 16:

- ☒ Paracentral lobule which represent lower limbs and sphincter
Paracentral lobule lesion >> paraplegia and incontinence

Page 17:

- ☒ Area 3,1,2: somatic sensory cortex
Somatosensory (American accent :/), in the past (primary sensory cortex)
Receive from the contralateral half of the body somatic sensation;
Pain, temperature, touch from skin
Sense of position, sense of movement, proprioception from muscles and joints
- ☒ The body is represented upside down, precisely but disproportionately
In motor areas >> representation proportion reflex accuracy of move
In sensory areas >> representation proportion reflex accuracy of sense
- ☒ Fingertips are full of sensory nerve endings, and receptive field is small (full of neurons)
- ☒ Every column responds to one type of stimulation, and receives sensation of one receptive field
- ☒ Somatic sensory cortex lesion or lesion in its efferent axons >> **contralateral hemi anesthesia temporary**
- ☒ Somatosensory cortex is important and thalamus can't compensate its role in:
 - *stereognosis
 - *tactile localization
 - *2 point discrimination
 - *intensity of stimulus determinationIntensity of stimulus determination depends on:
 - Number of sensory fiber stimulated
 - Frequency of action potential within each fiber
- ☒ Retina : right half and left half
Can be divided into: temporal half and nasal half
- ☒ Visual field: right half and left half
Visual field: close one eye, and all what you see by the other one is its field
- ☒ Primary visual cortex lesion on the right side; ischemia, necrosis... or whatever,
Doesn't respond to right half of retina, and doesn't respond to left half of visual field
Ex; area 17 lesion on the right side, Doesn't respond to right half of retina of both eyes,
and doesn't respond to left half of visual field,
And this result in hemianopia
17, 18, 19 lesion result in visual agnosia

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