



Cerebral Vascular Structures and Disorders

Psychology 372

Physiological Psychology

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Circulatory System Overview

- View Figure 99 in DeArmond et Al
- From the Heart, blood enters the Aorta
- Branches off into two arteries
 - Carotid
 - Subclavian

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Carotid Artery

- Again, comes from the Aorta
- Is the artery in the neck and under the jaw
- Branches into the internal carotid artery
- Enters the cranium
- Traverses the sinuses
- Branches off the ophthalmic artery
- Penetrates the dura
- Branches into the Anterior and Middle cerebral arteries
- Emerges from the sinuses and branches off anterior choroidal artery

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Anterior Cerebral Artery

- Supplies
 - the cortex
 - White matter of the inferior frontal lobe
 - Medial surface of frontal and parietal lobes
 - Anterior corpus callosum
 - Branches into smaller branches

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Also Supplies

- Deep cerebrum
- Diencephalon
- Limbic structures
- Head of the caudate
- Anterior limb of the internal capsule

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Middle Cerebral Artery

- Supplies
 - Most of the cortex and white matter
- Smaller branches supply
 - Deep white matter
 - Diencephalic structures
 - Posterior limb of the internal capsule
 - Putamen
 - Outer Globus Pallidus
 - Body of the Caudate

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Anterior Choroidal Artery

- Supplies
 - Anterior hippocampus
 - Posterior limb of the internal capsule

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Subclavian Artery

- Come from the Aorta or Innominate artery Supply the upper extremities (arms)
- Each sends off a branch called vertebral artery
- Vertebral artery enters the cranium through the Foramen Magnum
- Each gives off anterior spinal artery and a posterior inferior cerebellar artery.
- Join at the junction of the pons and medulla to form the basilar artery

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Basilar Artery

- Divides into the Posterior Cerebral arteries
- Supplies
 - Inferior Temporal Lobe
 - Medial Occipital Lobe

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Circle of Willis

- Is a collection of major vessels that all connect together
- Is located at the bottom of the cerebral cavity
- Generally loops around the brain stem
- Nice place for tumors to develop

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Structures

- Anterior Communicating Artery
- Internal Carotid
- Anterior Cerebral Arteries
- Posterior Communicating arteries
- Posterior cerebral arteries

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Loop

- Two anterior cerebral arteries are connected by anterior communicating artery.
- Two posterior cerebral arteries are connected to the internal carotid by the posterior communicating arteries

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Anastomoses

- Are interconnections between blood vessels
- Generally protect the brain or other structures when blood supplies are blocked.
- E.g. Circle of Willis

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Cerebral Vascular Accidents

- Strokes

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Two Major Types

- Occlusive
- Hemorrhagic
- Are due to problems with some blood vessels.

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Occlusive

- Blood flow in the brain is obstructed for some reason.
- There is no blood loss
- Unless blood gets to the tissue, it will die – insufficient supply
 - Called ischemia

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Hemorrhagic

- Occurs from the rupture of a vein or artery
- Blood flows out of veins and/or arteries
 - Blood is acidic
 - Destroys membranes and kills neurons
- We all may have some small, minor strokes
- Good clotting, damage is minimal or does not occur
- If damage occurs to a major artery, it can be a serious problem.

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Brain Damage

- Depends on which structure is blocked or ruptured.
- Depends on the duration of blockage
- Symptoms are related to the vessels that are impacted

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Middle Cerebral Artery

- Is the most frequent disorder
- Symptoms
 - Contralateral weakness
 - Sensory loss
 - Visual problems
 - May have language problems

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Damage

- Affects arms and face more due to location of the damage
- Motor and sensory loss greatest in the hands
- May get aphasia or other language problems
- Other symptoms

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Symptoms of CVA's

- Sudden weakness or numbness in a body structure.
- May also be gradual
 - Mistake for old age problems
- Lack of coordination
- Loss of memory, confusion
- Pupils may not be equal or constrict together
- May be unconscious

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Treatment

- If having gradual weakness or problems with one side, see your physician
- Sudden symptoms
- Keep the person from moving around
- Get the person to a hospital ASAP
- Lots of newer drugs in development

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