Neuroanatomical Breakdown of Acquired Expressive Speech Disorders

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Introduction

- Acquired expressive speech disorders are variable when seen in practice
- Injury to similar area can cause expressive disorders that look very different
- Common site for strokes: Frontal lobe (due to blood supply)
- When focusing on lesions in the left frontal lobe, 3 speech disorders are possible: Broca’s aphasia, Apraxia of Speech, and neurogenic stuttering
Introduction

- All expressive speech disorders, production is altered
- Injuries to different regions of the brain result in different speech disorders
- Neuroimaging is currently used to predict deficits based on lesion location (ex. Wernicke’s aphasia)
Research Question: Where is the neuroanatomical breakdown in acquired apraxia, expressive aphasia, and neurogenic stuttering?
Speech disorders

Expressive Aphasia (Broca’s Aphasia)

● Dysfluent, effortful speech, grammatical errors, difficulty naming

Apraxia of Speech (AOS)

● Motor speech deficit, slow speech, segmented syllables, difficulty with repetition

Neurogenic Stuttering

● Repetitions, blocks, prolongations in productions of sounds/syllables
Directions Into Velocities Articulators (DIVA model)
Neuroanatomy: Expressive Aphasia

Inferior left frontal gyrus

Speech sound map
Neuroanatomy: Apraxia of Speech

Premotor cortex and adjacent precentral gyrus

Feedforward control map
Neuroanatomy: Stuttering

Multiple possible locations based on case studies: basal ganglia, thalamus, pons

Stroke location associations: left middle cerebral artery, left temporal lobe, right parietal, left occipital infarcts
Discussion

- More cases of Broca’s aphasia, more researched and easier to map.
- AOS comorbidity because of location, aligning with AOS location on DIVA model
- Stuttering: is it one specific location? Location could be in more than 1 part of DIVA model; arterial supply to subcortical structures (survival rate) vs. neurodegenerative disease that may affect the structure specifically.
Conclusion

- Research Question: Where is the neuroanatomical breakdown in acquired apraxia, expressive aphasia, and neurogenic stuttering?
- After examining models and comparing to lesion studies, able to come to this conclusion.
- AOS and Expressive aphasia overlap with locations in the IFG, precentral gyrus, and premotor cortex, also overlap in DIVA model.
- Clinicians can benefit from knowing the true disorder presenting by lesion location (when a patient’s symptoms may overlap) providing optimum therapy for spontaneous recovery period.
References


