



WEBINAR SERIES

Neuroanatomy and Functional Impairment

By: Danielle Huber Psy.D. & Megan Samples, M.S.

Disclosures

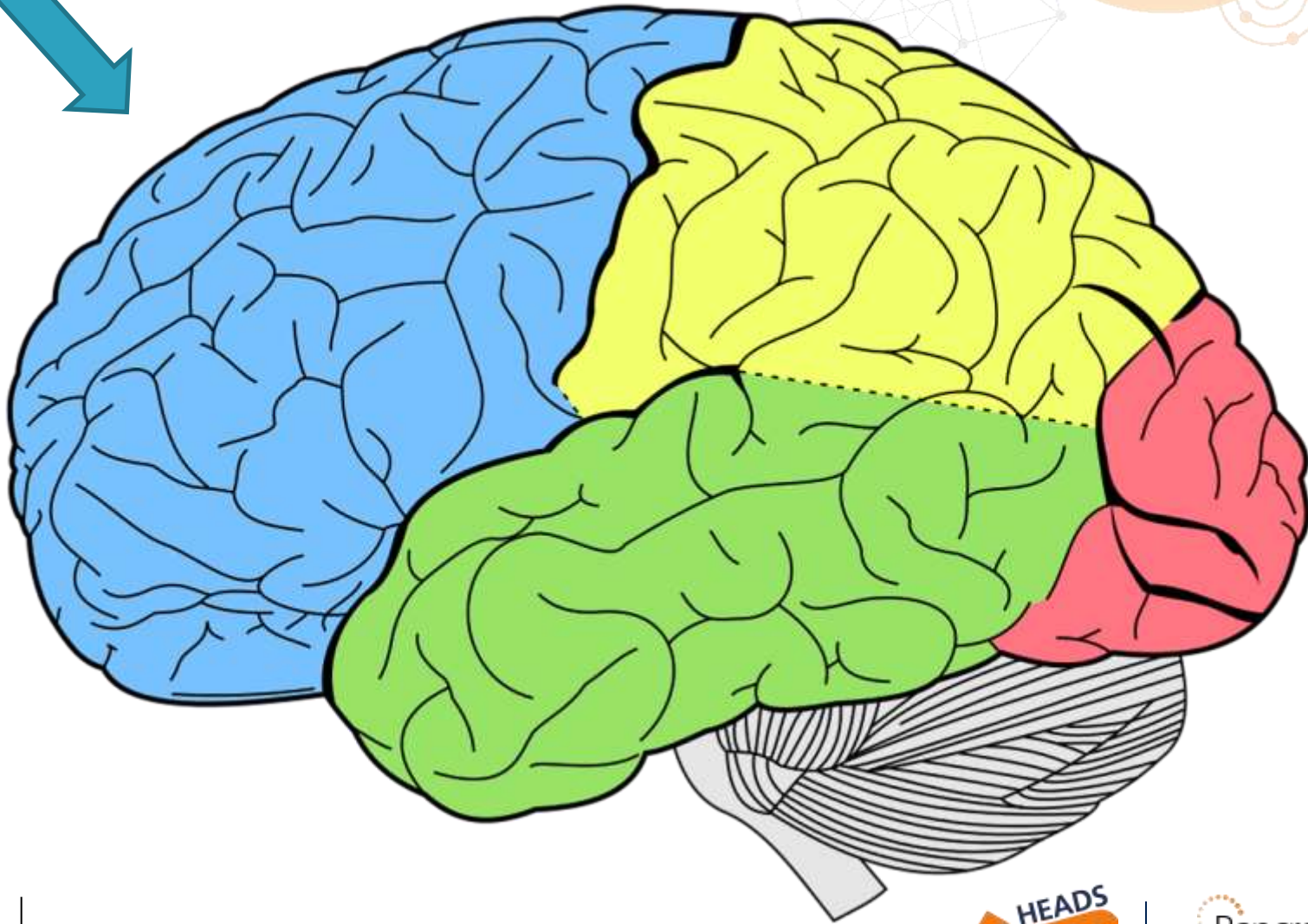
- Danielle Huber, PsyD – Nothing to disclose
- Megan Samples, MS - Nothing to disclose

Following this session:



- You should be able to:
 - Identify lobes of the brain and their major functions
 - Describe several neurological syndromes associated with damage/dysfunction to each lobe
 - Demonstrate an understanding of the impact of damage/dysfunction on functional living skills
 - Identify interventions based on the specific location and presentation of neurologic damage/dysfunction

Frontal Lobe



Frontal Lobe: Major Functions

- ▶ Executive Functioning
- ▶ Voluntary Motor Control
- ▶ Working memory and Complex Attention
- ▶ Language processing and Comprehension
- ▶ Emotional Regulation



Frontal Lobe: Syndromes

- ▶ Executive Functioning Deficit
- ▶ Frontotemporal Dementia
 - Behavioral Variant Frontotemporal Dementia
 - Primary Progressive Aphasia
- ▶ Traumatic brain injury

Frontal Lobe: Symptoms

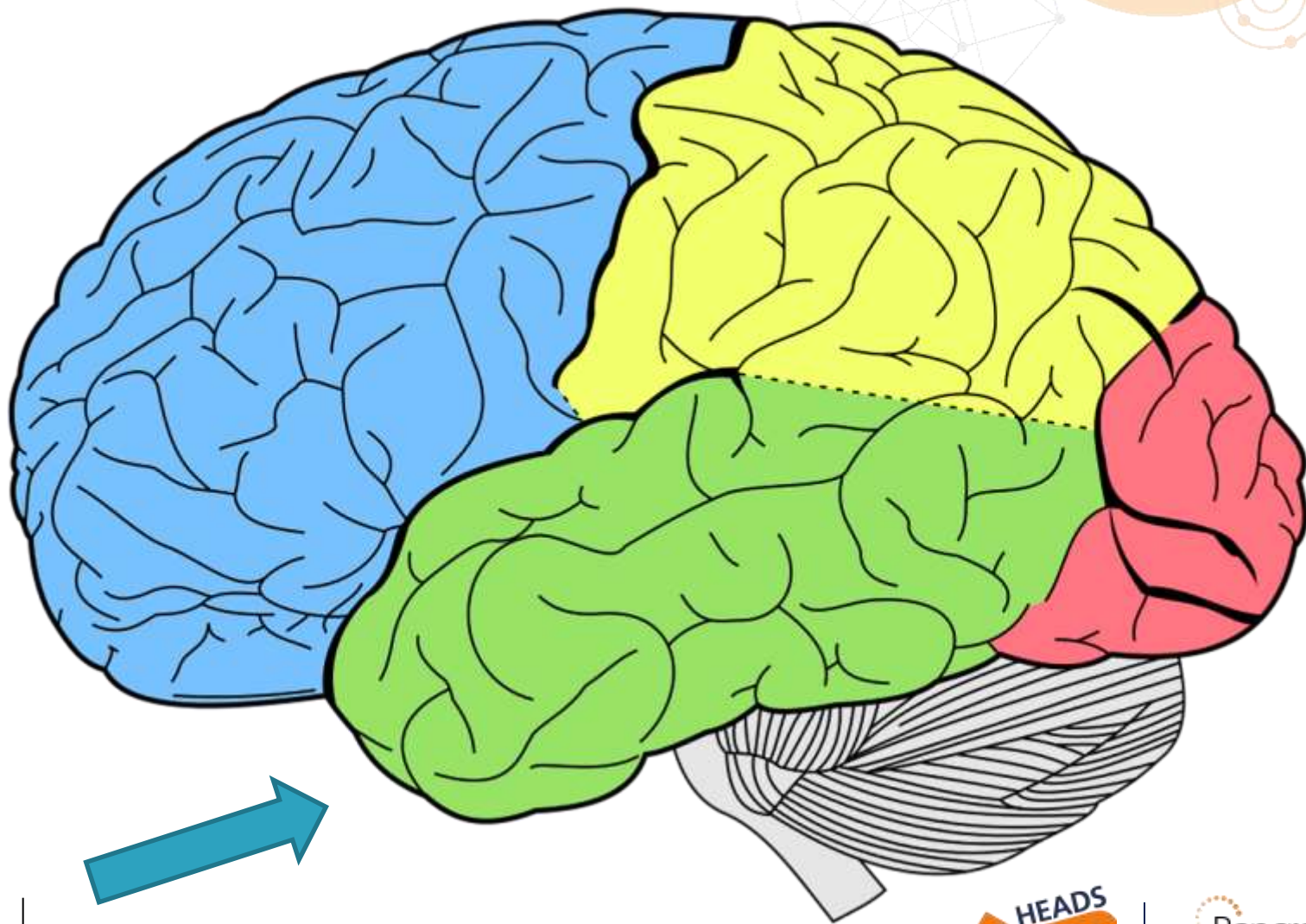


- ▶ Cognitive Symptoms
 - Changes in executive functioning
 - Changes in working memory
 - Changes in complex Attention
- ▶ Physical Symptoms
 - Changes in motor functioning
- ▶ Behavioral Symptoms
 - Changes in personality
 - Changes in mood

Frontal Lobe: Impact on Functioning and Recommendations

- ▶ Frontal lobe impairment can have an impact on:
 - Work/career
 - School
 - Interpersonal Relationships
 - Instrumental Activities of Daily Living
- ▶ Recommendations
 - Complex attention and working memory
 - Executive functioning
 - Seek referrals/advice from medical professional

Temporal Lobe



Temporal Lobe: Major Functions

- ▶ Primary function: Process sensory information that is used to create meaningful memories, language, and emotions
 - ▶ Learning and memory (hippocampus)
 - ▶ Memory: declarative, visual, verbal, spatial relationships
 - ▶ Memory processes
 - ▶ Language (primary auditory cortex)
 - ▶ Sound and language processing, semantic knowledge, language production
 - ▶ Emotions (amygdala)
 - ▶ Processing emotions

Temporal Lobe: Syndromes

- ▶ Alzheimer's disease
- ▶ Frontotemporal dementia
- ▶ Aphasia
- ▶ Prosopagnosia (faces)
- ▶ Temporal lobe epilepsy/seizures
- ▶ Klüver–Bucy Syndrome



Temporal Lobe: Symptoms

- ▶ Cognitive Symptoms
 - ▶ Memory impairment
 - ▶ Language problems (nonsense speech)
- ▶ Physical Symptoms
 - ▶ Seizures
 - ▶ Hearing loss
- ▶ Behavioral Symptoms
 - ▶ Depersonalization
 - ▶ Emotional instability
 - ▶ Psychosis
 - ▶ Mania

Temporal Lobe: Impact on Functioning and Recommendations

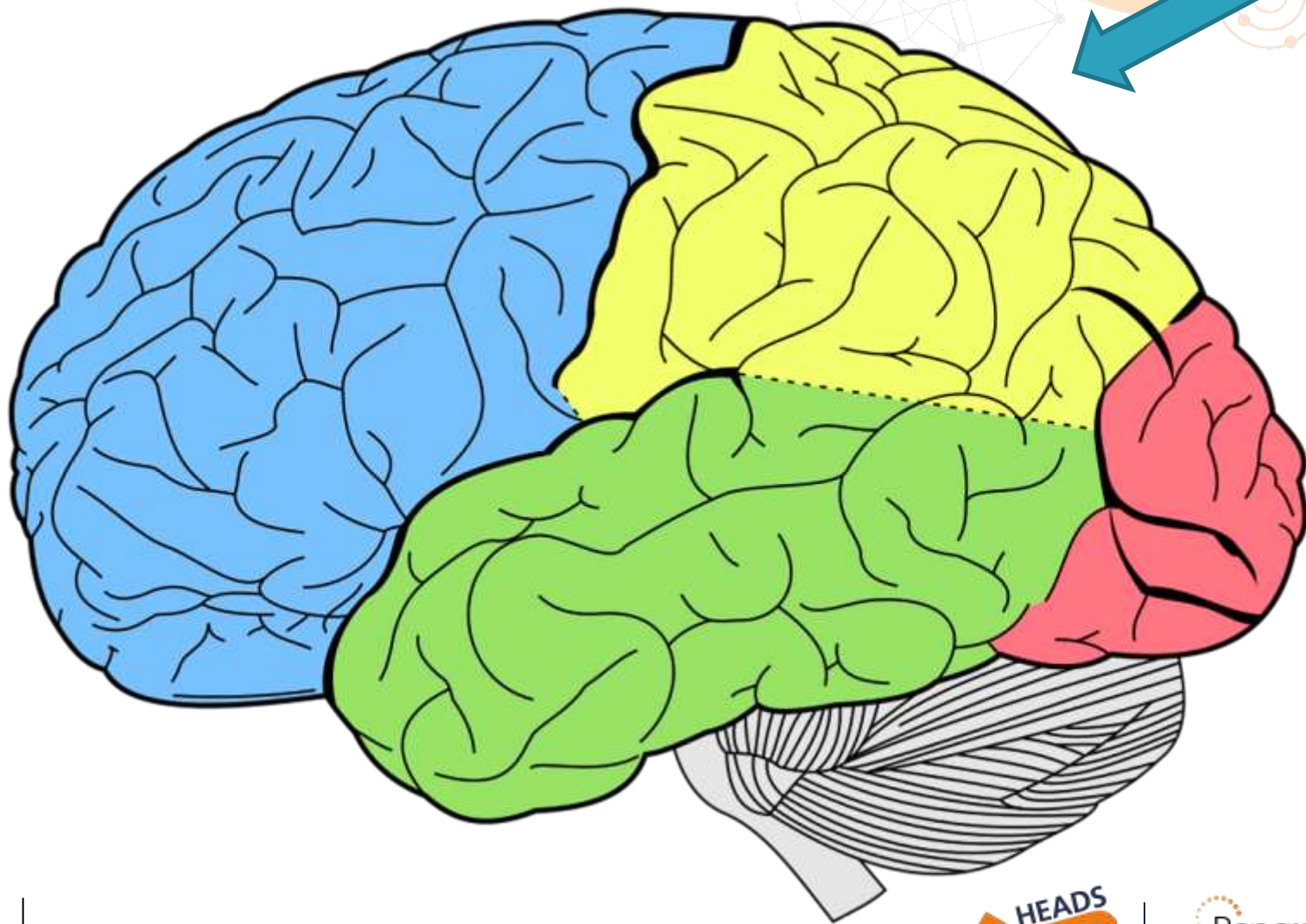
- ▶ Aphasia
 - ▶ Assessment is crucial
 - ▶ Speech fluency, speech comprehension, repetition
 - ▶ Tailor interventions to clients' strengths
 - ▶ Communicate in writing
 - ▶ Visual information
 - ▶ For the provider
 - ▶ Be patient
 - ▶ Referral to speech therapy

Temporal Lobe: Impact on Functioning and Recommendations

- ▶ Memory Impairment
 - ▶ Assessment: strengths and weaknesses, etiology
 - ▶ Tailor interventions to clients' strengths
 - ▶ Visual vs Auditory/Verbal
 - ▶ Reminders/Cues
 - ▶ Repetition
 - ▶ Memory book, calendar, notes
 - ▶ Provide written summaries of care
 - ▶ Family/Caregiver involvement in treatment
 - ▶ Caregiving resources
 - ▶ Alzheimer's Association www.alz.org
 - ▶ Referral to cognitive therapy, psychotherapy when appropriate



Parietal Lobe



Parietal Lobe: Major Functions

- ▶ Integration station (somatosensory cortex)
- ▶ Attention
- ▶ Visuospatial abilities
- ▶ Numerical processing
- ▶ Memory
- ▶ Language processing

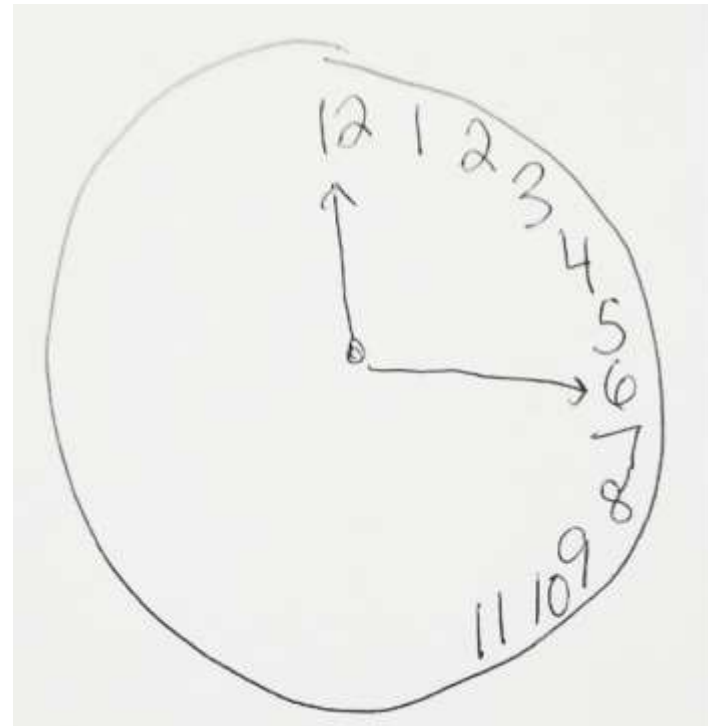


Parietal Lobe: Syndromes (The A's)

- ▶ Damage often related to stroke or brain injury
- ▶ Apraxia (movements on command)
 - Constructional apraxia (drawing, building objects)
 - Dressing apraxia (left inattention when dressing)
- ▶ Acalculia (calculations)
- ▶ Anosognosia (insight)
- ▶ Alexia with agraphia (reading and writing)
- ▶ Tactile agnosia (recognize objects through touch)
- ▶ Optic ataxia (reaching for objects)

Parietal Lobe: Other Syndromes

- ▶ Gerstmann syndrome
- ▶ Balint syndrome
- ▶ Hemispatial neglect



Parietal Lobe: Symptoms

- ▶ Cognitive, Physical, and Behavioral Symptoms
 - ▶ Difficulty drawing objects
 - ▶ Left – right confusion
 - ▶ Topographical disorientation (getting lost)
 - ▶ Problems with reading, writing, understanding symbols
 - ▶ Difficulty dressing
 - ▶ Problems with math
 - ▶ Difficulty with gestures
 - ▶ Inattention
 - ▶ Sensory problems (numbness, tingling, trouble feeling hot and cold)

Parietal Lobe: Impact on Functioning and Recommendations

- ▶ Interference with ADLs
 - Problems dressing, reaching for objects
- ▶ Interference with IADLs
 - Neglect!, navigation, visuospatial problems, inattention, reading, writing
- ▶ Comprehensive rehabilitation program including physical, occupational, and speech therapies
- ▶ Supportive psychotherapy
- ▶ Anosognosia (awareness of deficit)

Parietal Lobe: Impact on Functioning and Recommendations

- ▶ Treatment should be tailored to each person's unique strengths and weaknesses
- ▶ Comprehensive rehabilitation program including neurology, neuro-ophthalmology when appropriate, physical, occupational, and speech therapies
- ▶ Occupational therapy (ADLs, IADLs, assistive devices)
- ▶ Cognitive therapy
- ▶ Supportive psychotherapy when appropriate

Parietal Lobe: Impact on Functioning and Recommendations

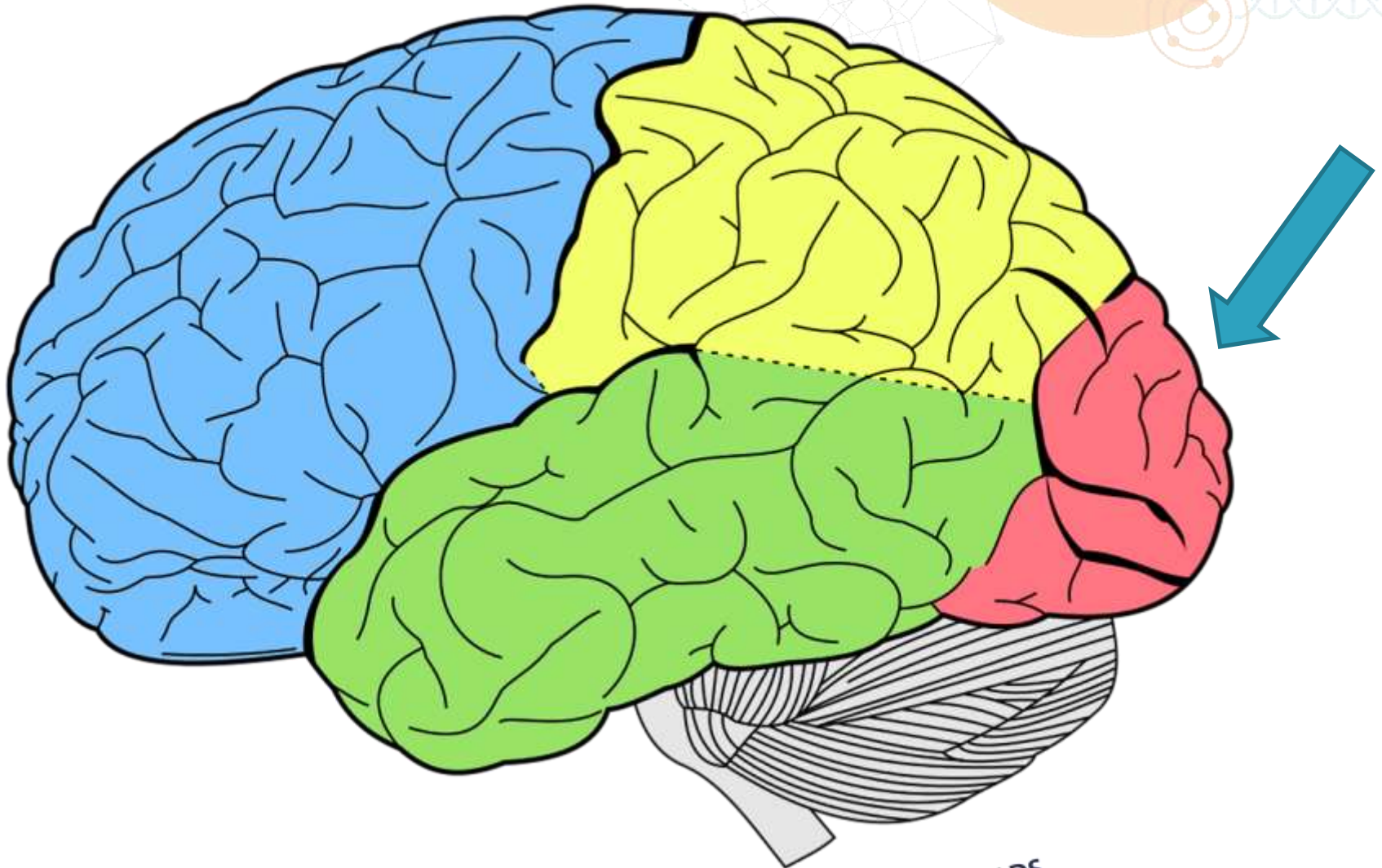
► Anosognosia

- May interfere with rehabilitation and recovery
- Safety concerns
- Conflict with caregiver and treatment team

► Recommendations

- Comprehensive safety evaluation (safety first)
- Ensure medication adherence
- Vestibular therapy, Cognitive therapy
- Implement a structured environment
- Simplify tasks
- Stay positive; Use empathy and show concern
- Caregiver education and support

Occipital Lobe



Occipital Lobe: Major Functions and Syndromes



- ▶ Occipital Lobe
 - Visual Processing
- ▶ Associated Damage
 - Cortical Blindness
 - Anton Syndrome
 - Simultanagnosia

Occipital Lobe: Symptoms

Damage to the occipital lobe may cause:

- Hallucinations
- Blindness
- Inability to see color, motion, or orientation

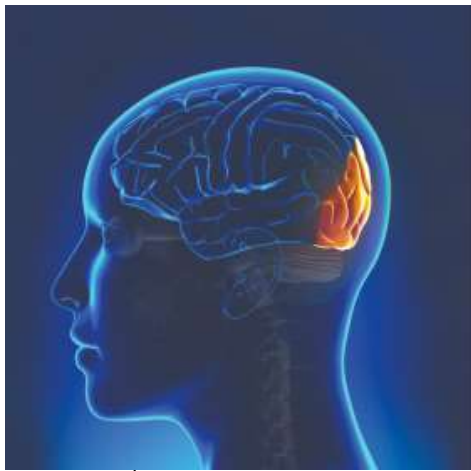


Occipital Lobe: Impact on Functioning and Recommendations

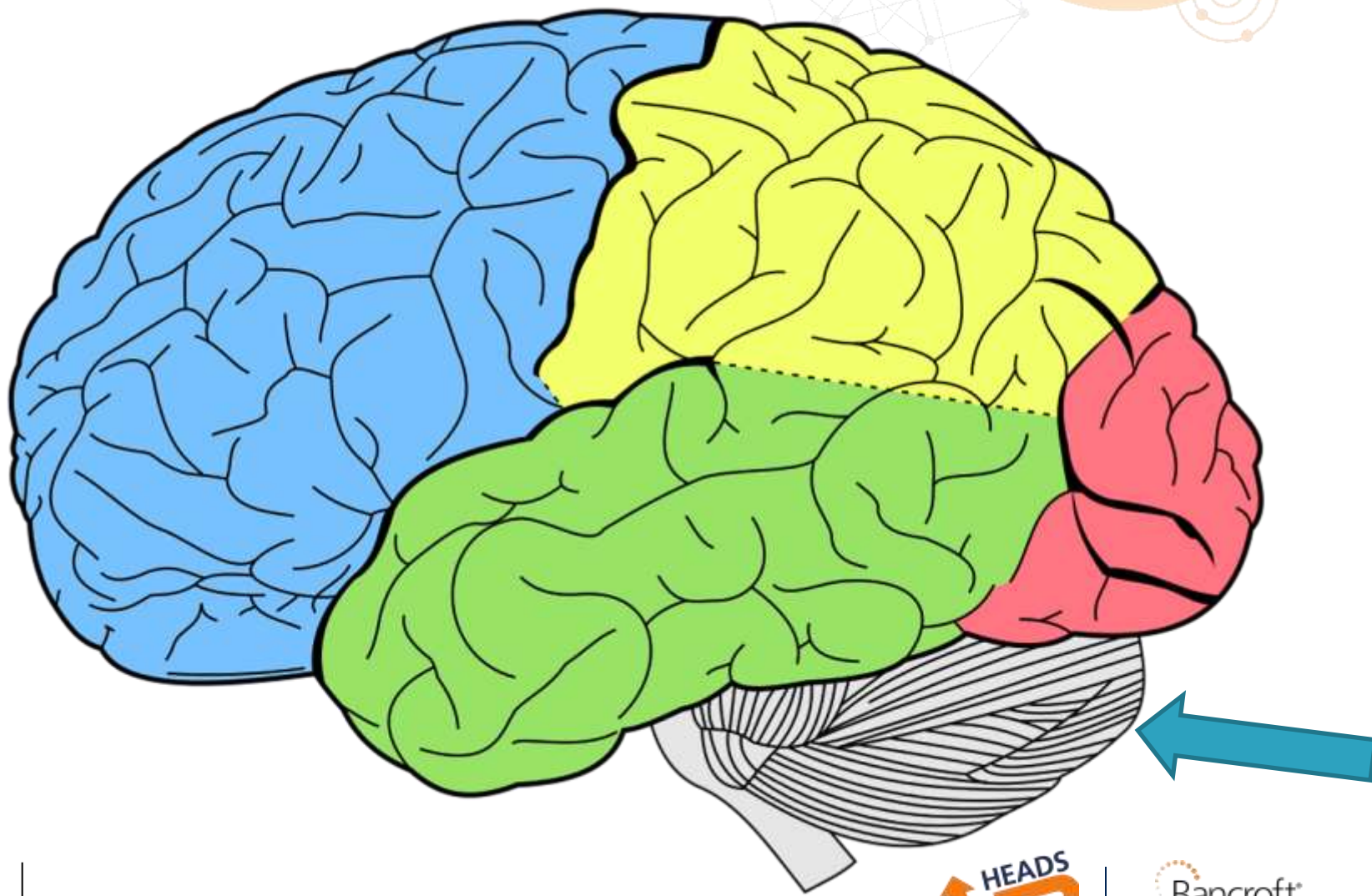
Occipital lobe impairment can have an impact on:

- ▶ Work/career
- ▶ School
- ▶ Instrumental Activities of Daily Living

Recommendations



Cerebellum



Cerebellum: Major Functions

- ▶ Maintenance of balance and posture
- ▶ Coordination of voluntary movements
- ▶ Motor learning
- ▶ Other cognitive functions (e.g. language)



Cerebellum: Syndromes

► Cerebellar Ataxia

- Etiology
 - ☐ Acquired: stroke, infection, toxin, nutritional deficiency
 - ☐ Genetic: spinocerebellar ataxias, mitochondrial ataxia
 - ☐ Idiopathic: multiple systems atrophy
- Presentation
 - ☐ Problems with posture or gait
 - ☐ Decomposition of movement
- Course
 - ☐ Progressive/degenerative vs stable

Cerebellum: Syndromes (Ataxia)

- ▶ Motor learning deficits
- ▶ Dysmetria (accuracy)
- ▶ Dysdiadochokinesia (alternating movements)
- ▶ Dysphagia (swallowing)
- ▶ Speech irregularities
 - Scanning speech (staccato speech)
 - Dysarthria (articulation of phonemes)
- ▶ Intention tremor (action)
- ▶ Nystagmus (eyes)

Cerebellum: Syndromes

- ▶ Cerebellar cognitive affective syndrome (CCAS)
 - Executive function
 - Linguistic processing
 - Spatial cognition
 - Affect regulation



Cerebellum: Symptoms

- ▶ Balance problems
- ▶ Falling
- ▶ Speech
- ▶ Swallowing
- ▶ Cognitive deficits may be more subtle



Cerebellum: Recommendations

- ▶ Individualized approach
 - Symptom management
 - Staying active
- ▶ Don't overlook cognitive and affective deficits
 - Executive functioning, social cognition, mood, etc.
- ▶ Comprehensive rehabilitation approach
 - Work closely with a neurologist/treatment team
 - Speech, occupational, physical , vestibular therapy
 - Safety interventions (falling, balance, swallowing, etc.)
 - Individual psychotherapy
- ▶ Caregiver support
 - National Ataxia Foundation (ataxia.org)



Take Home Messages



- ▶ A general understanding of the impact of dysfunction/damage to specific brain regions can guide management
- ▶ Even subtle cognitive and affective deficits can have a major impact on quality of life
- ▶ Assess strengths and weaknesses
- ▶ Tailor management strategies to the individual



Questions?





Thank you!



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