NBASLH Praxis Review Course: Motor Speech Disorders

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- ***I have no financial or other disclosures***

Motor Speech Disorders: Essential Information
NBASLH Praxis Review
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I. FOUNDATION
(A) WHY STUDY MOTOR SPEECH DISORDERS
(B) DEFINITION OF MOTOR SPEECH DISORDERS
(C) CAUSES OF MOTOR SPEECH DISORDERS
(D) DEVELOPING A FRAMEWORK FOR UNDERSTANDING MOTOR SPEECH DISORDERS
(E) NEUROLOGICAL UNDERPINNINGS FOR MOTOR SPEECH DISORDERS

II. APRAXIA OF SPEECH
(A) ACQUIRED
(B) DEVELOPMENTAL

III. THE DYSARTHRIAS
(A) UNILATERAL UMN
(B) SPASTIC
(C)FLACCID
(D) ATAXIC
(E) HYPOKINETIC
(F) HYPERKINETIC
(G) MIXED

IV. MANAGEMENT
(A) ASSESSMENT
(B) EVIDENCE-BASED TREATMENT

VI. RESOURCES

VII. CASE TO PULL IT ALL TOGETHER

Why Study Motor Speech Disorders

Definition of Motor Speech Disorders (Apraxia of Speech and Dysarthria)

- Speech disorder resulting from neurologic impairments affecting:
- Planning
- Programming
- Control
- Execution of speech

- Includes the dysarthrias and apraxia of speech

Apraxia of Speech

- Neurologic disorder due to…

Impaired capacity to plan or program sensorimotor commands..

that are necessary to direct movements that result in phonetically or prosodically normal speech.

Dysarthria

- Collective name for group of neurologic speech disorders that reflect abnormalities in

-strength

-speed

-range

-steadiness

-tone or accuracy of movement..required for

Speech Production (articulation, phonation, resonance, prosody, breathing)

Causes of Motor Speech Disorders

- Stroke
- TBI

- Neurological disease (ex. M.S., ALS, Friedrich's ataxia, Marie's ataxia, Huntington's Chorea, Parkinson's disease)
- Tumors
- Infections
- Toxic conditions

Developing a Framework for Motor Speech Disorders QUESTIONS TO ASK YOURSELF

- 1. Do you understand the neurological underpinnings?
- 2. Are you able to associate features/characteristics with neurological underpinnings?
- 3. Do you recognize and remember which key characteristics are associated with each motor speech disorder? (*Refer to videotaped case presentations with key characteristics –provided in this Power Point)
- 4. Are you familiar with assessment practices designed to help detect key characteristics for differential diagnosis (*what to look for and how/what test procedures to use)?
- 5. Are you familiar with evidence-based treatments (that reflect (a) current literature, (b) case preferences, and (c) clinician savvy)?
- 6. What gets “measured gets managed.” How will you track performance to detail outcomes, and to detect when ongoing treatment changes/direction are needed?
- 7. Are you familiar with ASHA Practice Portal, ANCDS EBP resources (and other resources)? (Review of these materials will be helpful during your review for the Praxis Exam.)

Neurological Underpinnings for Motor Speech Disorders

(1) Cortex (unilateral or bilateral)

(2) Lower

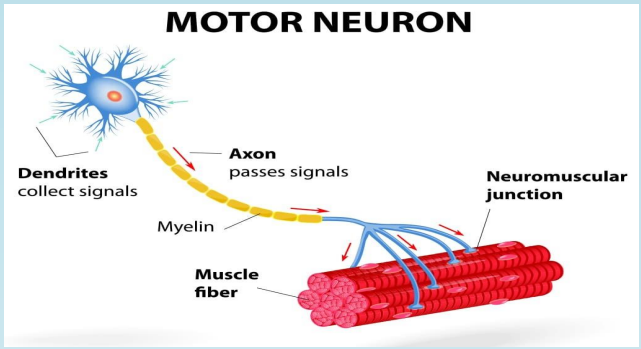
motor neuron

-Brain stem (cranial nerves)

-axon reaching to musculature

-myoneural junction

-muscle itself



(3) Cerebellum

Upper Motor Neuron vs. Lower Motor Neuron

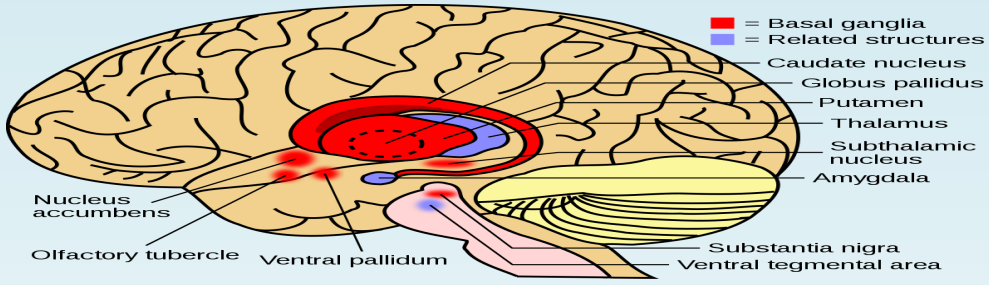
Sign	Upper Motor Neuron Lesions	Lower Motor Neuron Lesions
Weakness	Yes	Yes
Atrophy	No[a]	Yes
Fasciculations	No	Yes
Reflexes	Increased[b]	Decreased
Tone	Increased[b]	Decreased

[a] Mild atrophy may develop due to disuse
[b] With acute upper motor neuron lesions; tone may be decreased

(4) Extrapyramidal system

Basal ganglia – underproduction of dopamine -Hypokinetic

Basal ganglia – overproduction of acetylcholine -Hyperkinetic



(*"kinetic"/muscle movement not to be confused with the term "tonic"/muscle tone)

(5) Mixed multi-system involvement

Fasciculation-LMN sign

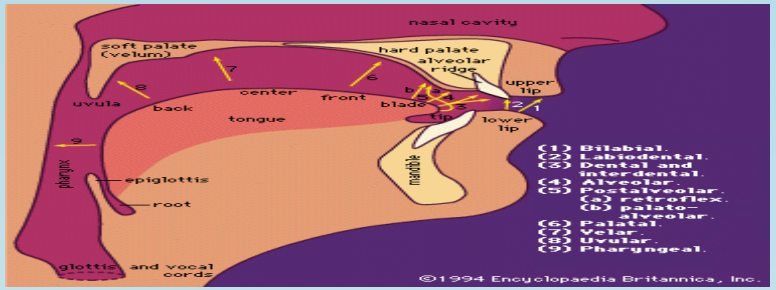
https://youtu.be/V8DoxyBseGo

Assessment: Key Areas to Observe
(preliminary mention)

- **1. Articulation**

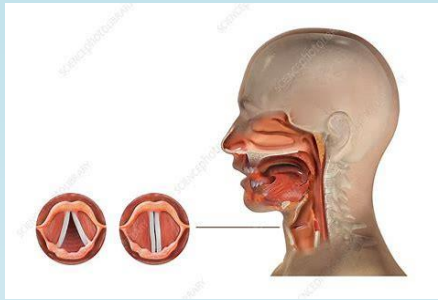
  (precision of consonants, distorted vowels,

  regularity of articulation –esp. for multisyllabic words)

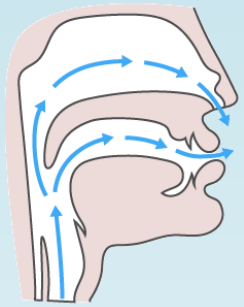


- **2. Phonation**

  (breathy, harsh, strained-strangled, vocal tremor)



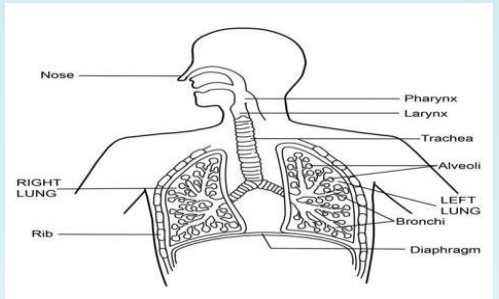
- **3. Resonance** (hypernasality, hyponasality or normal resonance)



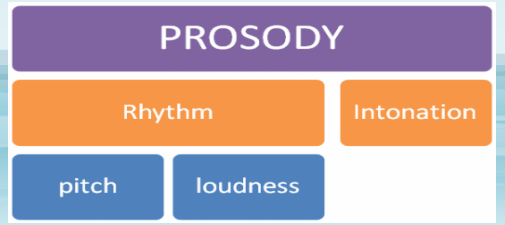
- **4. Respiration**

  (coordination of breathing,

  adequacy of abdominal support for speech, speaking on residual air)



- **5. Prosody** (rate, stress, intonation)



- Observe these things during…

-Conversational speech

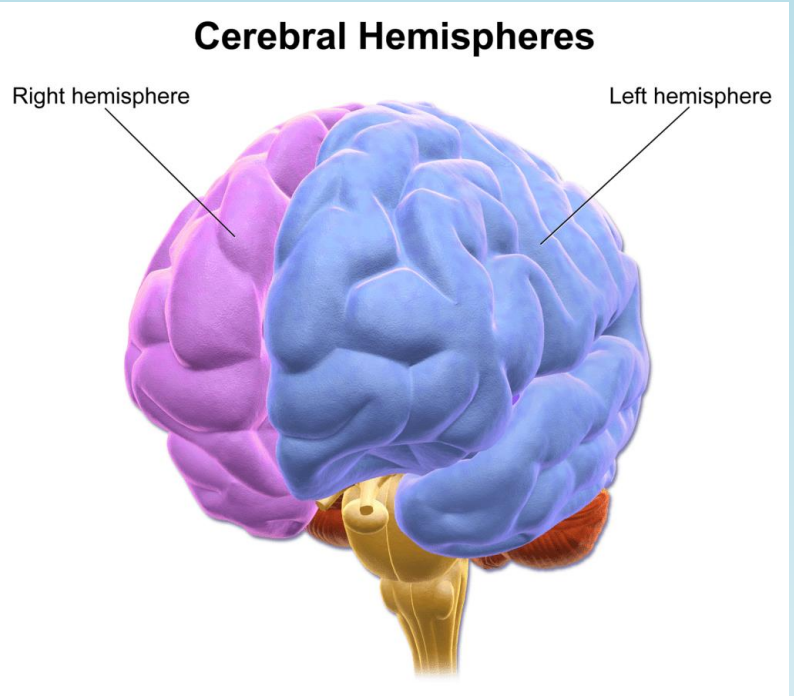
-Vowel prolongation

-Alternate motion rates (AMR)

-Oral motor exam

(Pause Point)

Apraxia of Speech (AOS): Definition



- Neurologic speech disorder due to..

impaired capacity to plan or program sensorimotor commands ..

that are necessary to direct movements that result in phonetically or prosodically normal speech.

Developmental Apraxia of Speech

- **Neurological underpinnings**: known or unknown
- **Causes** : known or idiopathic (unknown)
- **Features**: Disorder of speech sound production; precision and consistency of speech movements and precision of speech movements is impaired IN THE ABSENCE OF Neuromuscular impairments (ex. no abnormal muscle tone and no abnormal reflexes)

- **Assessment**: speech production, and also language/cognition

*Look for impaired planning/spatiotemporal movement that results in errored speech production and prosody

Kaufman Speech Praxis Test for Children (KSPT; Nancy Kaufman)

Screening test for Developmental Apraxia of Speech (STDAS-Z; Robert Blakely)

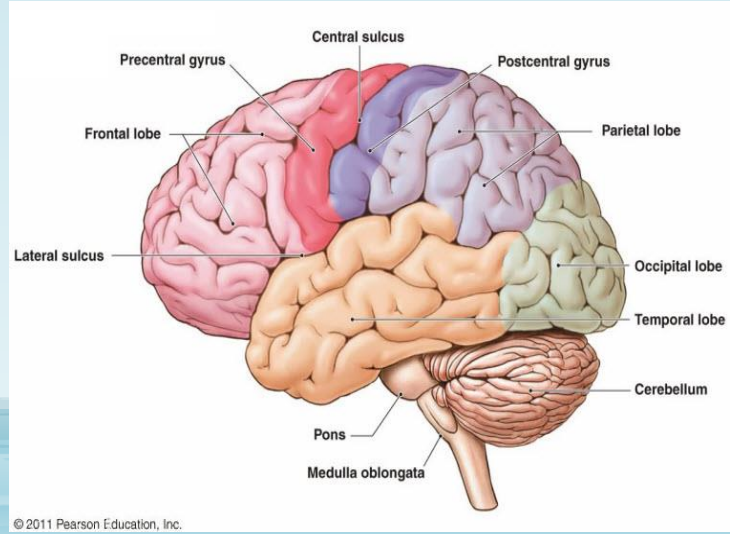
*JSHD 2021 articles to discuss diagnostic markers

- **Treatment**: Enhance speech production-intelligibility, prosody, and ease of production

-motor programming – integral stimulation/cueing (including Prompt= prompts for restructuring oral muscular phonetic targets using touch cues/tactile kinesthetic approach)

-Rhythmic (ex. M.I.T)

-AAC (to supplement/enhance communication-not replace oral)



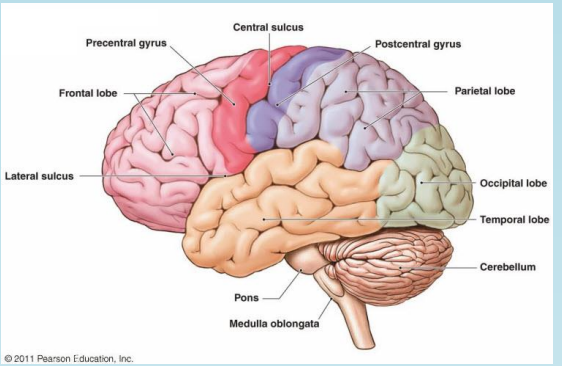
Case with Developmental Apraxia of Speech "Take a Listen"

Impairment in precision and consistency of speech movements

IN THE ABSENCE OF Neuromuscular impairments (ex. no abnormal muscle tone and no abnormal reflexes)

https://youtu.be/_5ph53B9UXY

Acquired Apraxia of Speech (pure = rare)



- **Neurological underpinnings** -2ndary motor area/Broca
- **Causes** – stroke, TBI, tumor, surgical tumor resection, neurodegenerative disease
- **Features**- (sometimes in association with UMN dysarthria; may co-exist with aphasia)
- **Assessment** – distortion, substitution, additions, sound inconsistencies/irregularities, articulatory groping, initiation difficulties, prosodic impairments, longer utterances more difficult, aware of difficulties, reduced rate of speech

-**Apraxia of Speech Battery** – Barbara Dubaul

- Treatment

-motor programming – integral stimulation/cueing (including Prompt)

-Rhythmic (ex. M.I.T)

-AAC (to supplement/enhance communication-not replace oral)

Case with Apraxia of Speech
“Take a listen”

- distortion, substitution, additions, sound inconsistencies/irregularities
- articulatory groping,
- initiation difficulties,
- prosodic impairments,
- reduced rate of speech
- longer utterances more difficult,
- aware of difficulties

https://youtu.be/bZ7pnmd9UHI

Dysarthria: Definition

- Collective name for group of neurologic speech disorders that reflect abnormalities in
- Strength
- Speed
- Range
- Steadiness
- Tone or accuracy of movement…required for..
- Speech production (breathing, phonation, resonance, articulation or prosody)

Dysarthria

(1) Unilateral UMN

(2) Spastic

(3) Flaccid

(4) Ataxic

(5) Hypokinetic

(6) Hyperkinetic

(7) Mixed

Unilateral UMN Dysarthria

- **Neurological Underpinnings** – one side of brain affected (either right or left primary motor area; only one side)
- **Causes** –stroke, TBI, tumor

Features

(1) **Artic** –tongue and lower face (95% have imprecise consonants)

(2) **Phonation** – harsh and dysphonia

(3) **Resonance** –hypernasal (only 11% are mildly hypernasal)

(4) **Prosody** –not impaired

(5) **Respiration** (rarely affected – cause of widely distributed innervation)

- **Assessment**

- Oral Motor
- Frenchay Dysarthria 2-Pam Enderby
- AIDS –Kathy Yorkston
- Other

- **Treatment**
- Determine impact on life participation. Relaxed onset, breath support, articulatory precision; minimal contrast, compensatory movements

Unilateral UMN Dysarthria Case

(1) **Artic** –tongue and lower face (95% have imprecise consonants)

(2) **Phonation** – harsh and dysphonia

(3) **Resonance** –hypernasal (only 11% are mildly hypernasal)

(4) **Prosody** –not impaired

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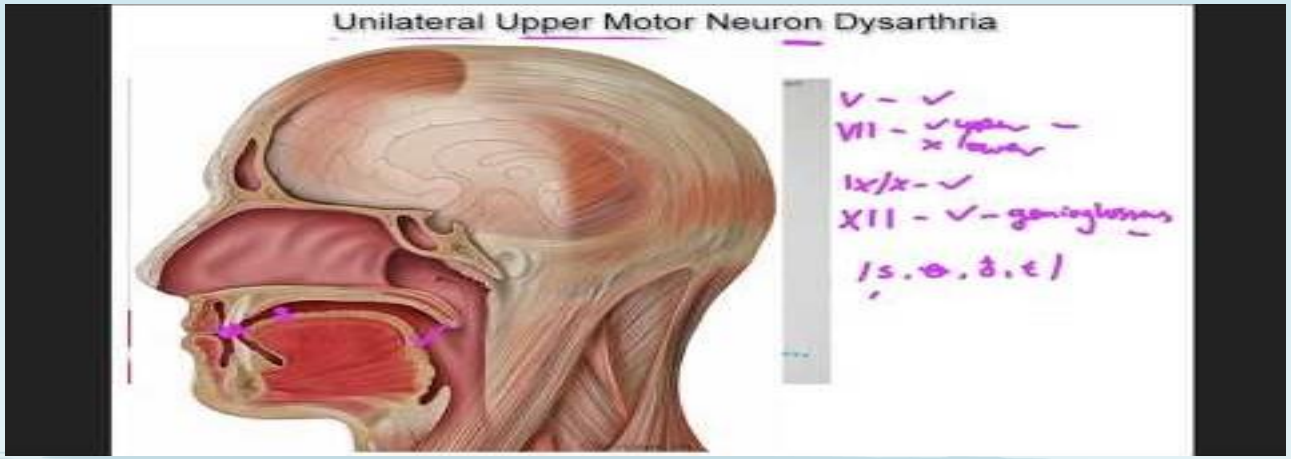

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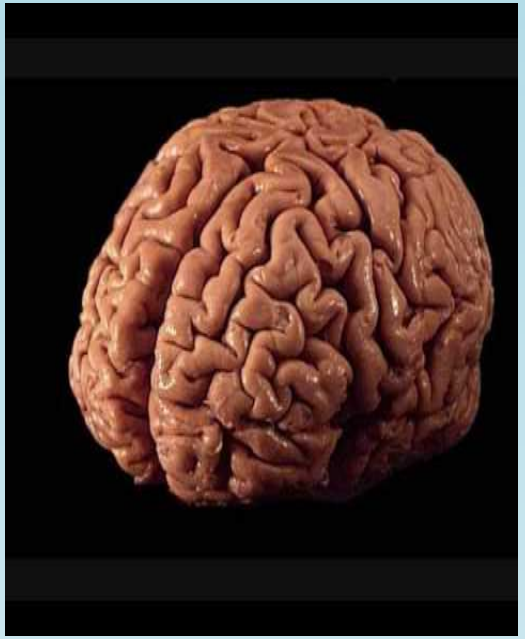
Spastic Dysarthria



- Neurological underpinnings –bilateral UMN lesions
- Causes –stroke, TBI, congenital (CP),tumor, anoxia, infectious (viral or bacterial)
- Features –general muscle weakness (esp. tongue)

  - slowness – esp. tongue and lips

  -spasticity – esp. in larynx; hyperadduction. Also, incomplete closure of velum during production of nasal phonemes resulting in hypernasality.

  -abnormal reflexes
- Assessment –look for deficits in areas primarily articulation, resonance and voice
- Treatment –relaxation focus

-Phonetic placement

Key Features: spasticity, slowness, weakness

- Articulation-imprecise C, vowel distortion
- Resonance - hypernasal
- Phonation- harsh, stained-strangled, low pitch
- Respiration- reduced breath support. Generally not affected. May be incoordinated. May be reduced vital capacity. Airflow management at level of larynx may mask true reduction in functioning of the respiratory system
- Prosody –monopitch, monoloud, short phrases, slow rate of speech

Things to observe during conversational speech

- Hypernasality
- Imprecise consonants
- Prosodic disturbances

Things to observe during vowel prolongation

- Phonatory deficits – tense and partially abducted (air escaping) vocal folds – resulting in “harsh” voice quality – or may sound “strained strangled” with perhaps low pitch

Things to Observe during AMR

- Slow rate of phoneme production

Additional things to observe during the oral motor exam

- **Pseudobulbar affect:** uncontrollable laughing/crying (strained strangled sound; may be accompanied with drooling)

- **Drooling:** due to:

  1. impaired oral control of saliva

- May be due to less frequent swallowing (may feel as though are producing more saliva because of the neurological difficulty)

  ___

- Treatment for drooling problem =

  1. swallow more frequently (cue case to do so)

  2. meds to reduce saliva production

Treatment

*Phonation

-Head and neck relaxation, including “Progressive Relaxation,” massage

-easy onset of phonation

-respiratory support

*Articulation; traditional artic treatments, including:

-intelligibility drills,

-phonetic placement,

-exaggerating consonants)

Treatment

*Resonance

1. surgical and prosthetic treatments.

-Palatal lift is common choice with this population..BUT hyperactive gag and/or increased tone can make surgery prohibitive. Imp. to decrease velar hypertonicity

2. Exercise-based treatments

A. visual feedback (ex. using sound level meter or vocalite)

B. increased loudness

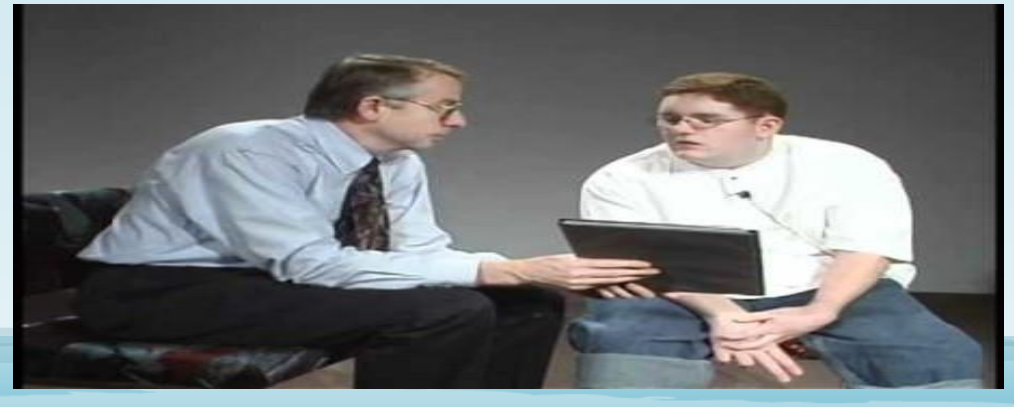
Treatment

*Prosody

1. Pitch range exercises (discrimination, then production of /ah/, low pitch high pitch, then up and down the scale (8 graded steps), then try practicing structured “pitch marked” phrases
2. Intonation profile – following cuing about intonation changes in written sentence as marked by the clinician
3. Contrastive stress drills
4. Chunking utterances into syntactic units

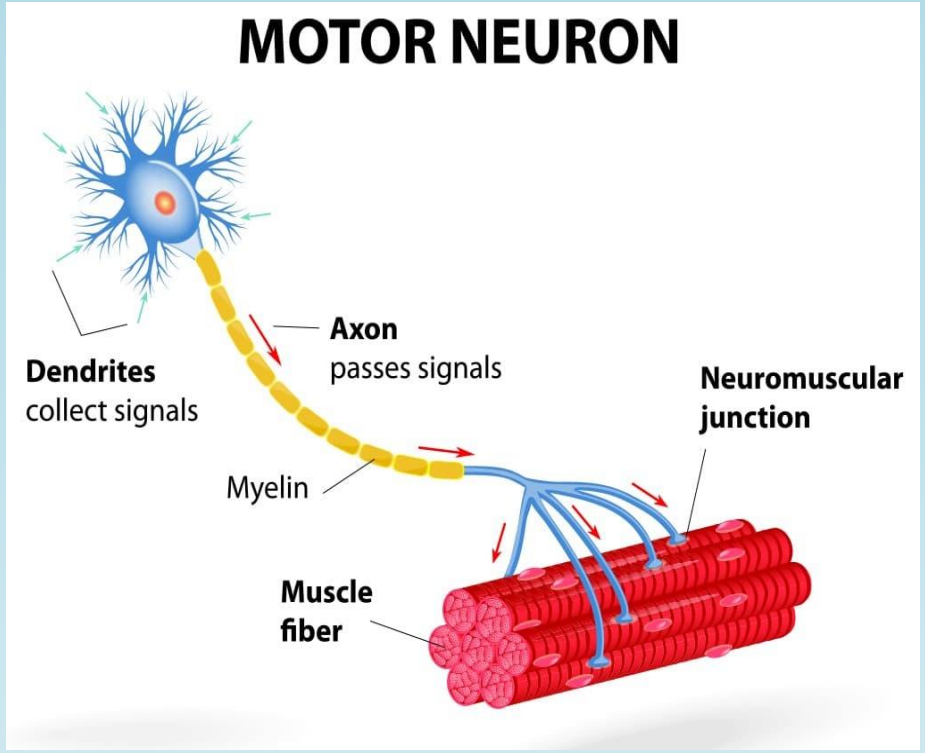
Case with Spastic Dysarthria

- Articulation-imprecise C, vowel distortion
- Resonance - hypernasal
- Phonation- harsh, stained-strangled, low pitch
- Respiration- reduced breath support. Generally not affected. May be incoordinated. May be reduced vital capacity. Airflow management at level of larynx may mask true reduction in functioning of the respiratory system
- Prosody –monopitch, monoloud, short phrases, slow rate of speech



https://youtu.be/IXxruuFwue8

Flaccid Dysarthria



- Neurological Underpinnings
- Causes
- Features – (respiratory-phonatory, resonance, artic, prosody)

-**Trigeminal (5)** *if bilateral = artic & prosodic difficulties

-**Facial (7)** *unilat = mild artic distortions; bilateral = significant artic difficulty and slow rate in an effort to compensate

-

-**Glossopharyngeal (9)** *negligible or unclear effects on speech when disrupted.

-**Vagus (10)** *complicated nerve **features depend on where disruption occurs; above pharyngeal branch (hypernasality), below pharyngeal branch, superior branch only, recurrent branch only)

-**Accessory (11)** *negligible or unclear effects on speech when disrupted

-**Hypoglossal (12**) *unilateral and bilateral = artic impairments and slow rate due to compensation efforts

-**Spinal nerve lesions** *bilateral results in = reduced loudness & strained voice, slow rate and short phrases (as person attempts to compensate)

-**Multiple cranial nerve lesions**

- Assessment
- Treatment

Case with Flaccid Dysarthria

- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment

https://youtu.be/jPFepAOQgoM

Ataxic Dysarthria

Neurological underpinnings

Causes –degenerative, vascular, demylenating

(ex. M.S.), tumor, toxic metabolic causes/endocrine related ex. hypothyroidism,

other

Features –imprecise consonants, irregular artic breakdowns, distorted vowels. Prosodic exess (equal and excess stress). Harsh, monopitch and monoloud.

Assessment

Treatment

Case with Ataxic Dysarthria

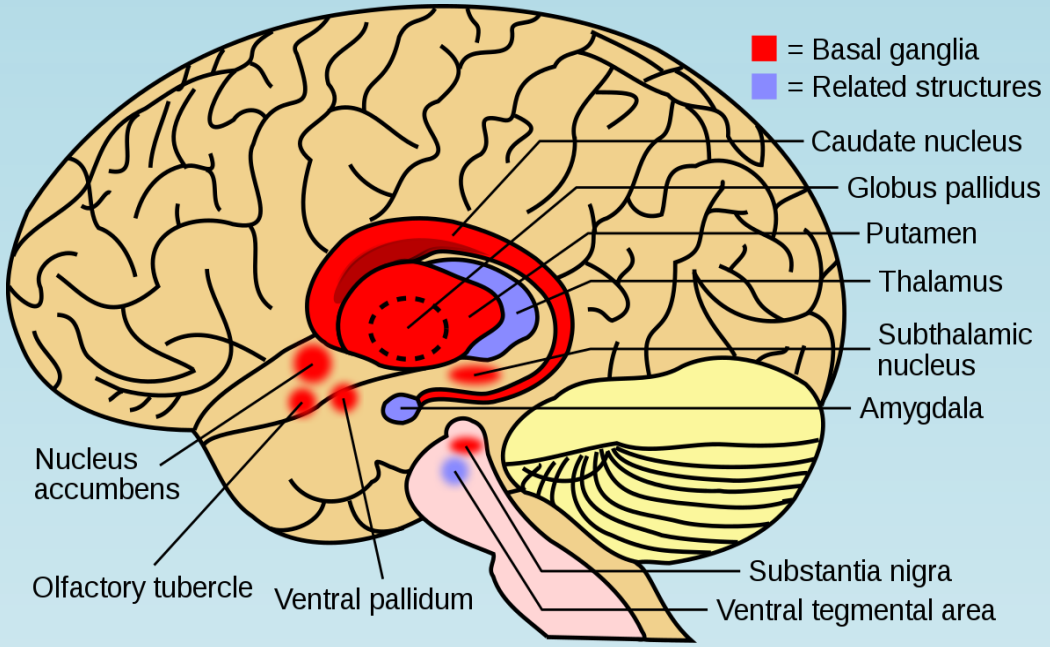
- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment

https://youtu.be/7BnGxeMAM_s

Hypokinetic Dysarthria

- Neurological underpinnings
- Causes
- Features – reduced loudness, monopitch, monoloudness, short rushes of speech, *masked faces, pill rolling, Head tremor

- Assessment
- Treatment



Case with Hypokinetic Dysarthria

- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment

https://youtu.be/KKmHKzh2t2c

Hyperkinetic Dysarthria

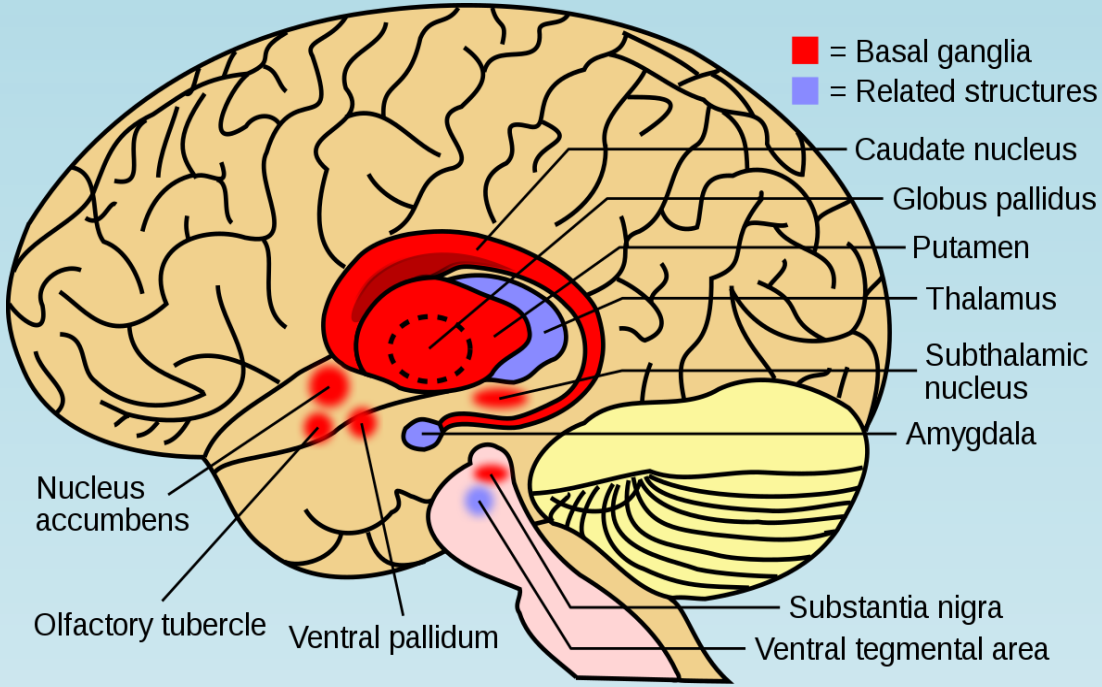
- Neurological underpinnings
- Causes -degenerative (ex Huntington's),

infectious (ex. lupus, rubella, AIDS)

- Features–dyskinesias, myoclonus, tics, chorea,

Ballismus, athetosis, dystonia, spasm, tremor,

- Assessment
- Treatment



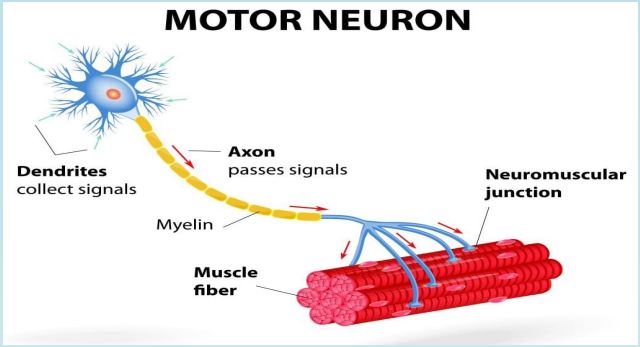
Case with Hyperkinetic Dysarthria

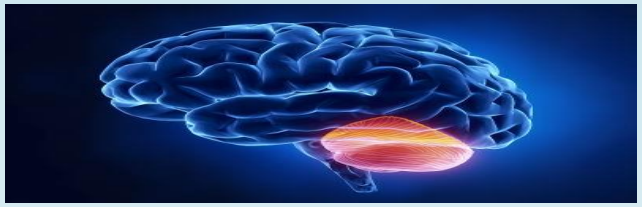
- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment

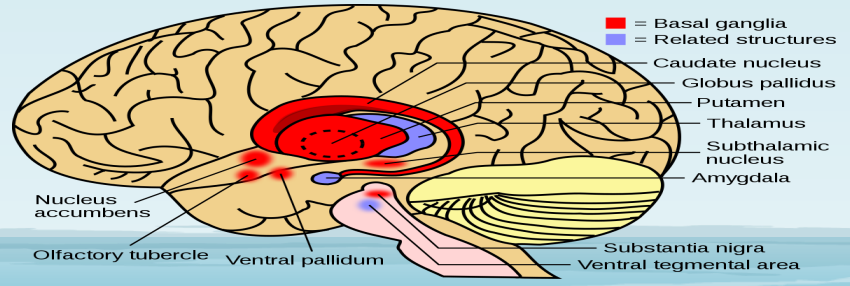
https://youtu.be/U4BSZ4FlGRg

Mixed Dysarthria

- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment







Example of Case with Mixed Dysarthria (ALS)

- Neurological underpinnings
- Causes
- Features
- Assessment
- Treatment

https://youtu.be/GAaMS_ecWyU

(Pause)

Comments about Management

I. Assessment of Motor Speech Disorders: Key Features to observe during Perceptual Assessment

- (*perceptual, instrumental, acoustic, physiologic, visual imaging methods)

Key Clinical Features

- Resonance
- Articulation
- Phonation
- Respiration
- Prosody

- Things to observe during *conversational speech (word, sentence, repetition –when AOS suspected)

  *vowel prolongation

  *Alternate motion rates (AMR)

  *Oral motor exam (and other important points)

II. Assessment Mindset/What Will You Look For? ICF MODEL-B A P + personal and environmental

- #1 Case-Centered ethnographic interview (to gain info about the important Participation + personal + environmental factors, then move on to obtain info about Body level and Activity level).
- Conversational speech (overall intelligibility and self generated strategies compensation)
- Performance with word and sentence of increasing length
- Repetition if suspect apraxia
- Vowel and consonant production
- Vowel prolongation
- Alternate motion rates
- Performance over time (*is there a fatigue factor?)

- Related difficulties in extremities

III. Assessment

- Listen/conversational speech
- Oral motor exam
- Frenchay Dysarthria Assessment
- AIDS
- Apraxia Battery
- Other assessments as necessary (some cases may have additional difficulties with language, cognition and swallowing/eating)

I. “**Treatment --as Research**”

Important to design treatment in a manner that

-enables assessment of outcomes, and
-helps to determine when ongoing adaptations are needed along the way

II. Treatment Principles and Foci for Motor Speech Disorders

- Foci will vary by motor speech disorder
- Ex. Apraxia
- Ex. Developmental Apraxia

-sound production, initiation, sequencing, fluency, prosody

- Ex. Unilateral UMN
- Ex. spastic –relax
- Ex. Flaccid - strengthen
- Ex. Ataxic –improve coordination
- Ex. Hypokinetic- improve intelligibility, prosody, and loudness
- Ex. Hyperkinetic – efforts to reduce effects of involuntary movements that interfere with speech production and intelligibility
- Ex. mixed ALS – support sustenance of intelligible speech for as long as possible, and prepare for augmentative communication early..the “Staging” concept.

The Concept of “Staging” …as applied to management of people who have motor speech disorders due to degenerative disease

- Identify early
- Help them to compensate in the least taxing way possible
- Prepare early for use of augmentative communication at first sign that might be needed so prepared.

STAGING (Kathryn Yorkston)

- Stage 1: No detectable speech disorder
- Stage 2: obvious speech disorder with intelligible speech
- Stage 3: reduction of speech intelligibility
- Stage 4: residual natural speech and augmentative communication
- Stage 5: loss of useful speech

III. Evidence-based Practice (3 prongs)

(1) using evidence to select treatment,

(2) using personal information about the case to select treatment and/or adapt treatment, and

(3) clinician judgement based on experience, clinical preference, and clinical intuition

Pause

The Importance of Interprofessional Collaboration (IPC) for Management of Cases with Motor Speech Disorders

Pulling It All Together: Practice With A Case

Pulling It All Together: Practice With A Case

1. Type of motor speech problem
2. Underlying neurological problem
3. Key characteristics and observations
4. KEY DISTINGUISHING CHARACTERISTIC/s
5. 2 standardized tests you might consider administering to explore motor speech
6. One EBP technique/approach you might consider using with this case
7. ICF factors to consider
8. Person centered factors to consider
9. EBP factors to consider
10. Life participation factors to consider

Pause

Selected References and Resources

- ASHA Practice Portal
- ANCDS EBP Resources

- Baylor, C. and Darling-White, M. 2020. Achieving participation-focused intervention through shared decision making: proposal of an age-and disorder-generic framework. *AJSLHP*, Vol. 29, 1335-1360.
- Duffy, Joseph R. 2020. (4th Edition) Motor Speech Disorders: Substrates, Differential Diagnosis, and Management. Elsevier Mosby: St. Louis, MO.

Final thoughts..

Wishing you the very best on the Praxis Exam and always!

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