Dysarthria in the CVA Population

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What is Dysarthria

- It is a motor speech impairment that impacts verbal output. It results from an impairment in the motor neurons (upper and/or lower), the neuromuscular junction, the basal ganglia, the cerebellum, or the speech musculature

- Dysarthria can impact any or all areas of the speech mechanism including respiration, phonation, articulation, resonance and prosody

- It can vary from mildly to severely unintelligible speech output

How Aphasia, Dysarthria and Apraxia interact

Dysarthria

- It is one of the most common 1st signs of a stroke, but can also be associated with degenerative processes such as ALS, Parkinson's disease, or congenital impairments such as cerebral palsy or with an acquired impairment such as a Traumatic brain injury

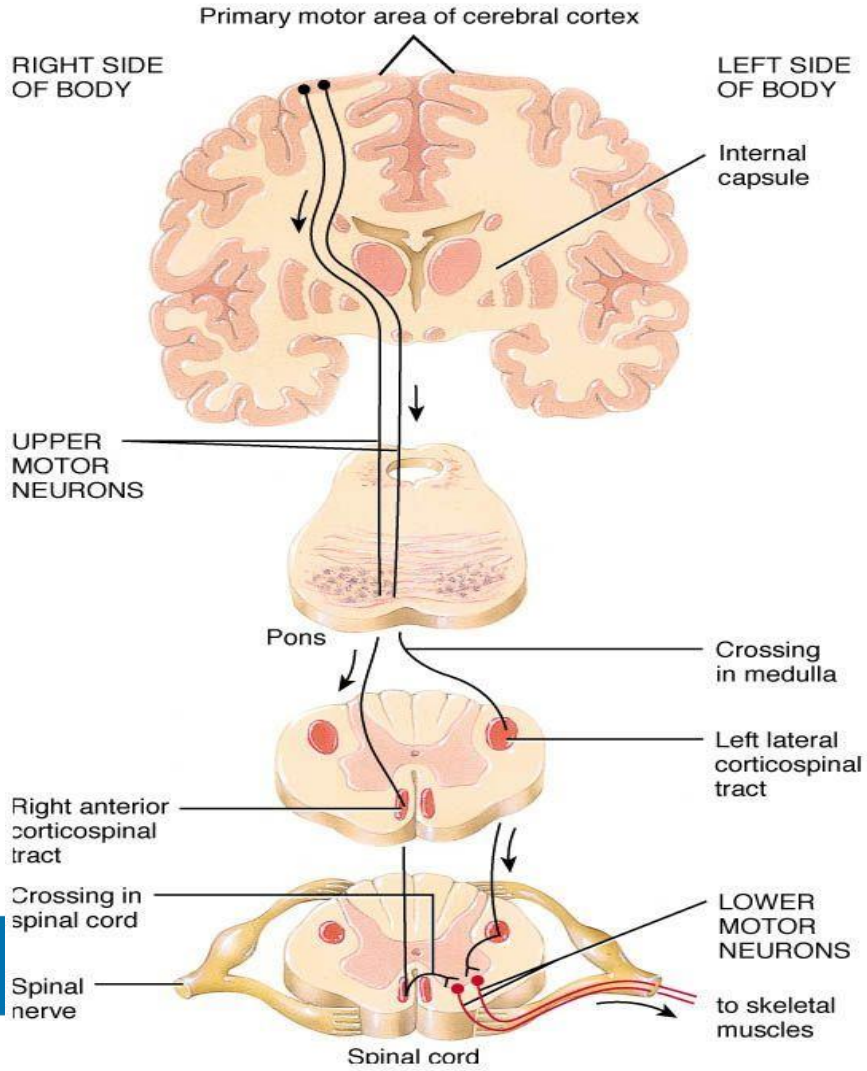
- Dysarthria as a result of a stroke is characterized as non-progressive

- 41% of patients who have a stroke also experience dysarthria

Upper Motor Neuron vs. Lower Motor Neuron

- UMN – originate in the cerebral cortex and travel down to the brain stem or spinal cord
- LMN – originates in the spinal cord and travels to innervate muscles throughout the body

- NCBI https://www.ncbi.nlm.nih.gov/books/NBK554616/



Dysarthria Types Most Associated with Stroke

- Spastic – seen in bilateral upper motor neuron impairment
- Unilateral upper motor neuron – unilateral infarcts
- Flaccid – lower motor neurons, speech musculature
- Ataxic – cerebellum and associated pathways

Spastic Dysarthria

- Bilateral upper motor neurons are impacted
- Usually is associated with cerebellar strokes
- It is characterized by strangled, strained vocal quality with slow AMR (alternating motor rates)/SMR (sequential motor rates)
- ***https://www.youtube.com/watch?v=xB9NgPZSQFA***

Unilateral Upper Motor Neuron Dysarthria

- Typically occurs in unilateral strokes
- Affects lingual protrusion and the lower ½ of the face
- Respiration, phonation, resonance are impacted
- ***https://www.youtube.com/watch?v=SUzqLeC6XTQ***

Flaccid Dysarthria

- Flaccid – lower motor neurons, speech musculature
- **Signs of Flaccid Dysarthria**
  - Hypernasal speech
  - Breathy, hoarse, wet voice
  - Monotone
  - Imprecise consonants
  - Short Phrases
  - Drooling
  - Slow, slurred AMR (alternating motor rates)/SMR (sequential motor rates)
- https://www.youtube.com/watch?v=dy8WvykiLto

Ataxic Dysarthria

- Associated with slurred speech, irregular articulation and harsh voice
- Typically caused by cerebellar stroke/injury and/or atrophy of cerebellum
- https://www.youtube.com/watch?v=7BnGxeMAM_s

Dysarthria Assessment tools

- Case history
  - Medical history
  - Education level
  - social history
  - Patient/family reports

Dysarthria Assessment includes:

- 5 areas of motor speech production in conversation samples and AMR/SMR tasks
  - Resonance and respiration – breath control and respiratory support
  - Phonation – voicing/vocal control
  - Prosody- pacing and phrasing
  - articulation – speech related oral motor movements

Assessment of alternating motion rates/sequential motion rates (diadochokinesis rates)

- Alternating motion rates – in isolation
  - /pa/
  - /ta/
  - /ka/
- Sequential motion rates – in combination
  - /pa/, /ta/, /ka/
  - ven though they are not direct speech related tasks, they provide information to help assess the strength, coordination and function of oral motor movements in speech tasks.

Speech production assessment

- Gathering a speech sample in conversation, as able, or by reading phonemic balanced paragraph such as
  - The “Rainbow passage”
  - The “Grandfather passage”

Oral motor assessment – including full cranial nerve evaluation

- Face – upper and lower facial movement, sensation and coordination
- Lips – opening and closing, protrusion and retraction, bilateral and unilateral weakness, sensation
- Tongue – retraction, lateralization, superior and inferior movements
- Palate/Velum – unilateral/bilateral elevation

Frenchay Dysarthria Assessment – 2nd edition

- This updated edition remains a well-established test for the measurement, differential description, and diagnosis of dysarthria. Norms are provided for ages 12 to 97.FDA-2 is quick and simple to administer, accurate, reliable, and cost-efficient. The client is rated on a number of simple performance tasks related to speech function. It is divided into eight sections:
  1. **Reflexes** - Ratings for cough, swallow, and dribble/drool
  2. **Respiration** - Ratings at rest and in speech
  3. **Lips** - Ratings for at rest, spread, seal, alternate, and in speech
  4. **Palate** - Ratings for fluids, maintenance, and in speech
  5. **Laryngeal** - Ratings for time, pitch, volume, and in speech
  6. **Tongue** - Ratings for at rest, protrusion, elevation, lateral, alternate, an in speech
  7. **Intelligibility** - Ratings for words, sentences, and conversation
  8. **Influencing Factors** - Includes hearing, sight, teeth, language, mood, posture, rate (words per minute), and sensation
- The Rating Form also allows the clinician to compare the patient's performance across all the items. Separate tables enable speech therapists to compare individual results with those of known dysarthric groups.

- According to Duffy [20], the FDA is the only standardized published test for the diagnosis of dysarthria.
- Published by Pro-ed

Assessment, continued…

Clinical perceptual assessment continues to be the golden standard practice for speech-language pathologists when assessing patients with dysarthria. These perceptual judgments are subjective. The accuracy of the assessment finding truly depends on the clinician's skill and experience in active listening and analysis of speech output.

Thus, while doing research of various informal assessments, it appears that there is lack of standardization.

The true assessment of a dysarthria is limited by the experience of the clinician's ear.

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Dysarthria Treatment strategies

- Should not include non-speech oral motor exercises
  - little research supports effectiveness of this strategy
- Studies report brain imaging active during non-speech oral motor tasks only partially overlap those that are active during speech tasks
  - This negates any neuroplasticity changes that could increase improvement of motor speech skills
  - In addition, patients often find these non-speech motor tasks inappropriate, frustrating, unmotivating, and not useful to their overall progress in connected speech

Treatment strategies with dysarthria and stroke

1. Education – to patient, family and caregivers regarding dysarthria's impact on communication
2. Communication strategies for patients and partners
3. Impairment focus
   a. Respiratory support – diaphragmatic breathing, postural adjustments
   b. Phonation
   c. Articulation and prosody

Dysarthria Treatment

- Be Clear Treatment program - By Sarah Barr
  - Personalized – personally relevant
  - Evidence Based
  - Functional phrases
  - Conversational

  - www.honeycombspeechtherapy.com

Be Clear method

- Focuses on Functional Phrase
  - 5 repetitions of 10 phrases
    - “Did anyone feed the dog?”
    - “What are we doing tomorrow?”

- Focuses on Service Request Phrase
  - 5 repetitions of 10 requests
    - “Where is the ….”
    - “How much is??...”

Be Clear Method, continued

- Functional Speech Tasks Phrase
  - Alternate between reading, picture description and conversational speech tasks
  - Provide 3 attempts to produce a stimulus item before moving on to the next item

- Homework tasks
  - Functional phrases, service requests, functional speech tasks
    - Transfer tasks – making a phone call

Be Clear treatment continued

- Results
  - 8 patients recruited to the study
  - 64 ratings
    - 72% had an increase in ability to be understood

Treatment Strategies

- Improving Respiratory Support – diaphragmatic breathing techniques, postural adjustments, training of inhalation/exhalation coordination during speech, phrasing
  - Expiratory muscle strength trainers could be incorporated into therapy
- Using of a prosthetic device to provide support for resonance impairment
- Implementing LSVT loudness training strategies, vocal function exercises are helpful
- Training “over-articulation” to help with intelligibility
- Using pacing/phrasing strategies to target prosody
- Biofeedback is also useful, by recording speech production samples

Treatment strategies

- Training “over-articulation” to help with intelligibility
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More Treatment strategies

- Making environmental/external changes such as
  - Reducing background noise
  - Teaching communication partner feedback strategies
  - Incorporating Augmentative and /or Alternative Communication systems

To Review

- Assessment is
  - Informal including case history, speech sample and diadochokinetic rate measurements
  - Formal, Frenchay Dysarthria Assessment

- Treatment
  - Focuses on respiration, resonance, phonation, articulation, prosody
  - Environmental Adjustments – listener support, AAC, lighting, noise

Real life implications

Considering patient's dysarthria and its impact on psychosocial skills, loss of self and relationship to others

Patients with dysarthria struggle with:

- changes to their daily activities
- A sense of loss relating to changes in their personal identity
- altered relationships
- experience social/emotional stressors
- Feeling stigmatized in their community secondary to their speech changes.

Our goal

- To ensure that our patients are able to communicate either verbally or with alternative methods during daily family, community and work interactions

- To educate family members to best help, support and encourage their family members with motor speech impairments

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