Motor Speech Disorders: Praxis Review

NBASLH

June 11, 2021

2

TRAVIS T. THREATS, PH.D., F-ASHA, F- NAP

Professor and Chair, Department of Communication Sciences and Disorders

Interim Chair, Department of Occupational Sciences and Occupational Therapy

Saint Louis University

St. Louis, Missouri

TOPICS COVERED

- Definitions of Motor Speech Disorders
- Neurology brief review
- Etiologies
- Types of Motor Speech Disorders
- Using the International Classification of Functioning, Disability, and Health as a framework for understanding Motor Speech Disorders
- Assessment principles
- Intervention principles

4 WHAT ARE MOTOR SPEECH DISORDERS?

- An acquired speech disorder caused by a known neurological impairment
- May or may not also have an accompanying cognitive or language disorder, but by itself does not affect comprehension, cognition, or language skills
- Wide range of impairments depending upon where the damage is
- Can involve:
  - Planning/Programming
  - Execution
  - Control

5 BRIEF NEUROLOGY REVIEW

- Necessary because need to know what is damaged and what is not, with some treatments indicated for some types and the same contraindicated for other types
- Regions/structures of brain which underpin speech production-
  - Motor cortex – Where signal begins, where motor fibers for voluntary movement emerge
  - Broca's area – Responsible for motor programming of speech
  - Basal ganglion- Important for muscle tone, starting, controlling and stopping movement
  - Cerebellum – Coordination of voluntary muscle movements
  - Upper motor neurons - Nerves that leave the motor cortex
  - Lower motor neurons (cranial nerves for speech)- Nerves that synapse with upper motor neurons to go to muscles need for speech
  - Motor end plates- Where synapses with actual muscles, to cause contraction
  - Muscles- The actual work of moving articulators

6 ETIOLOGIES

- Strokes
- Head trauma
- Side effects of medications
- Progressive neurological diseases like ALS or Parkinson's Disease
- Neuromuscular disorders such as cerebral palsy
- Brain tumors
- Dementia

7 APRAXIA OF SPEECH

- Disorder characterized by difficulty sequencing and voluntarily controlling muscle movements, often includes prosody difficulties as a result.
- It is a programming disorder
- Muscles are NOT weak or paralyzed and may be able to use them normally for facial expressions and eating
- Due to damage to Broca's area
- Characterized by effortful speech, slowed, distorted, false starts, and inconsistent errors, with the longest utterances causes the most difficulty due to their programming demands.
- Usually aware of errors
- Often accompanies Broca's aphasia but can exist on its own

8 DYSARTHRIA TYPES AND THEIR AREAS OF DAMAGE

- Ataxic- Cerebellum
- Flaccid – Lower motor neurons
- Hyperkinetic – Basal ganglia
- Hypokinetic – Basal ganglia
- Spastic – Upper motor neuron
- Mixed – damage to more than one of above systems
- Unilateral upper motor neuron – Unilateral upper motor neuron damage

9 DYSARTHRIA – SYSTEMS THAT CAN BE AFFECTED

- Respiration
- Phonation
- Articulation
- Prosody
- Resonance

10 DYSARTHRIA SYMPTOMATOLOGY

- Ataxic- Incoordination of speech, imprecise speech, distortion of vowels, uneven prosody and rate- like intoxicated
- Flaccid – Weakness and hypotonia, slurred indistinct and slowed, reduced movements, breathy, possible hypernasality, and poor respiration
- Hyperkinetic – Abnormal, extraneous movements, with distorted and slowed speech, prolongations, excess or reduced stress, monopitch and monoloudness. Examples- Tourette's syndrome, tardive dyskinesia
- Hypokinetic – Reduced range of movement, rigidity, reduced stress, very monotone, short rushes of speech, long pauses of speech. Example- Parkinson's disease
- Spastic (bilateral) – Weakness and spasticity, involves effortful slow speech to overcome excessive muscle tone, hyper adduction of vocal folds, strained voice quality, reduced stress in prosody
- Mixed – Any combination of above. Many etiologies hit more than one substrate of speech
- Unilateral upper motor neuron – Weakness and spasticity, can be combination of breathiness and harsh voice, hypernasality, reduced rate of speech

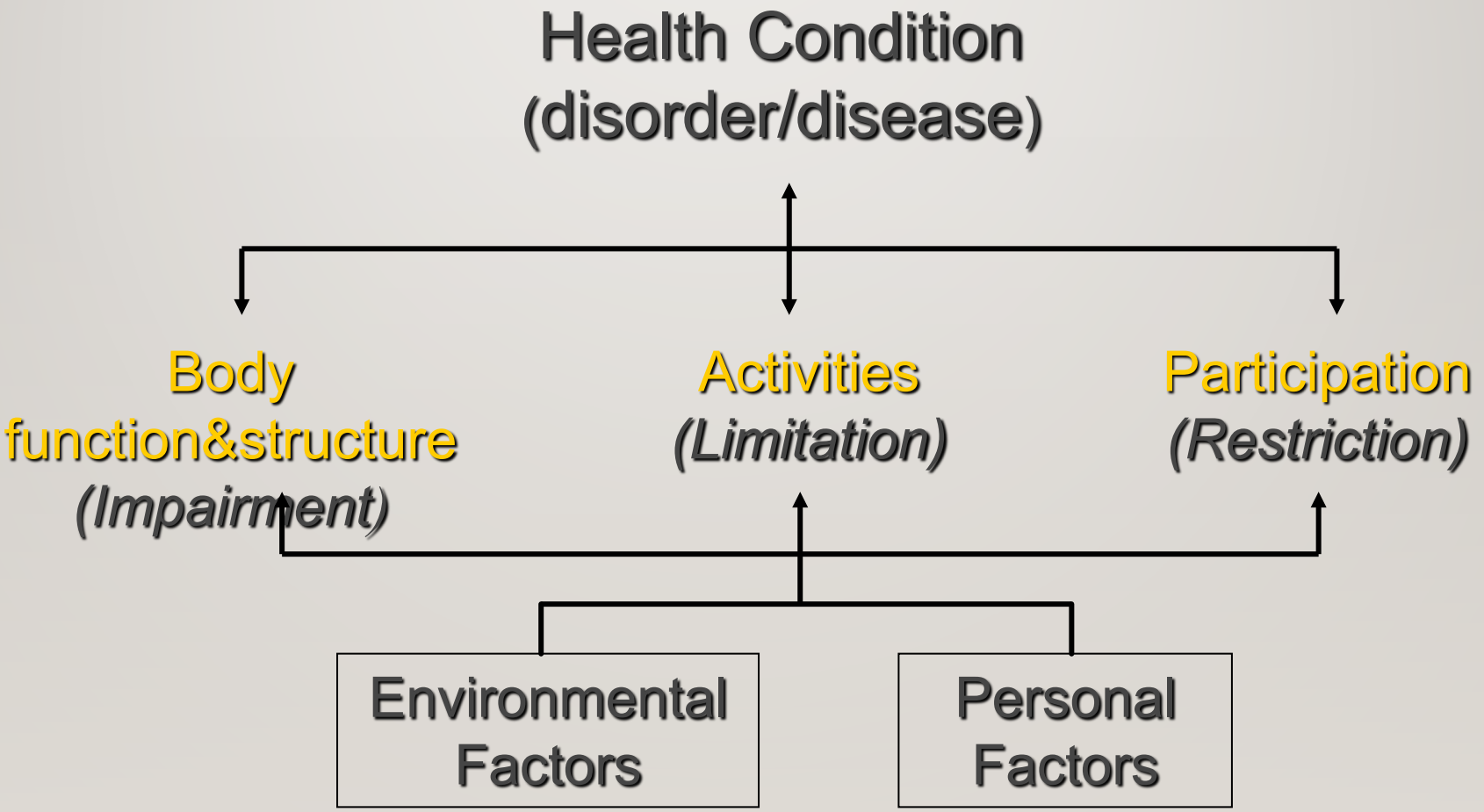
DEVELOPMENTAL APRAXIA OF SPEECH OR CHILDHOOD APRAXIA OF SPEECH

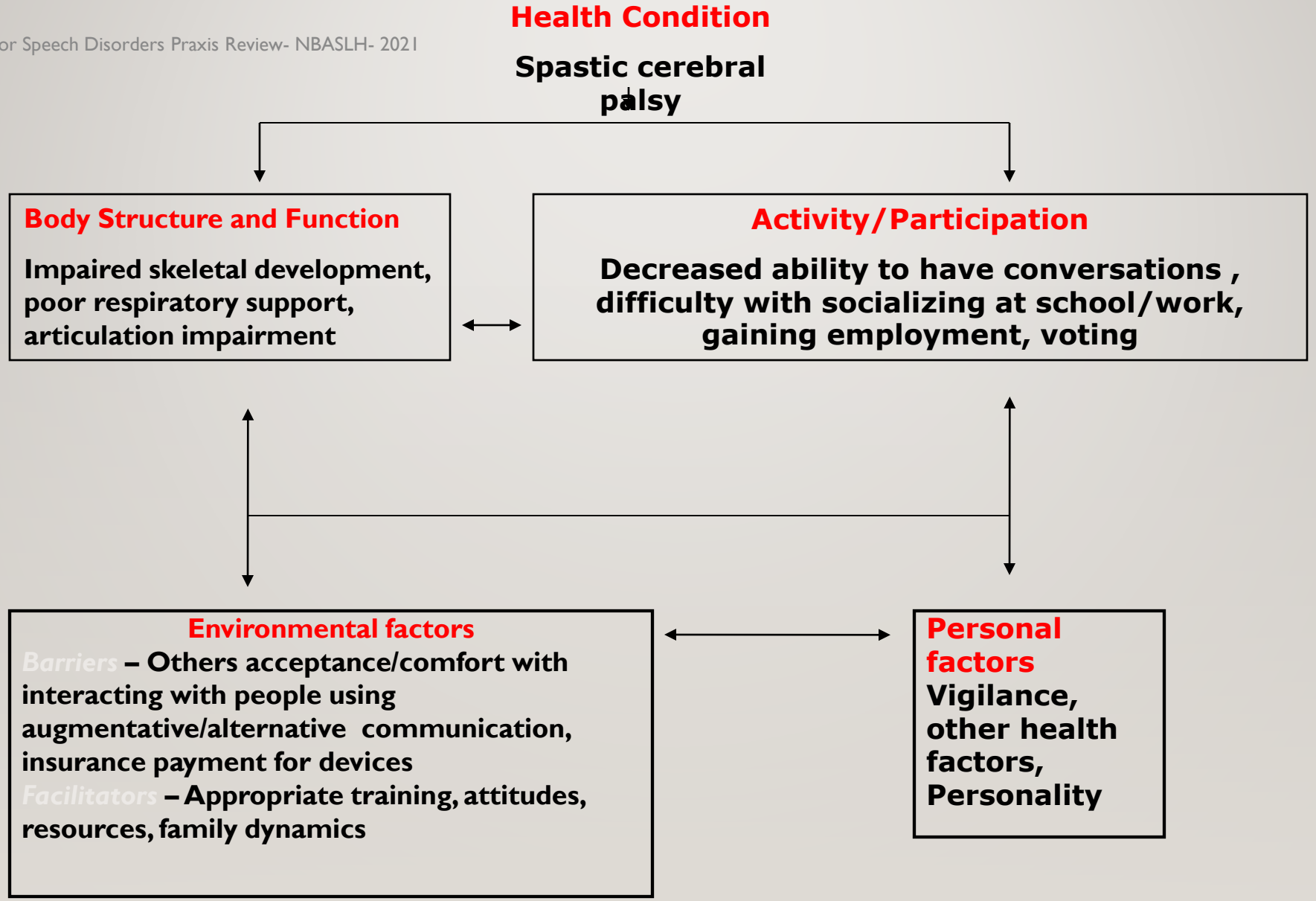
- Debated
- May be covered under childhood speech sound disorders lecture, as it is congenital not acquired like the classic definition of Motor Speech Disorders
- Difficulties with sensorimotor problems with controlling and sequencing movements for speech
- Do not have motor weakness
- Often accompanying history of feeding problems and phonological awareness difficulties
- There is often not any physical evidence of neurological damage, maybe just cannot detect it

12 UNDERSTANDING MOTOR SPEECH DISORDERS VIA THE LENS OF THE ICF

- The medical model is what has been presented so far – Diagnosis, Label, Symptoms
- Treatment follows whatever the diagnosis is, thus would say "Intervention strategies for Flaccid Dysarthria" - note not the person being treated but the disorder.
- Published by the World Health Organization (WHO) is 2001, it is the framework for the fields of speech-language pathology, occupational therapy, physical therapy, recreational therapy, rehabilitation nursing, and physical medicine and rehabilitation

ICF FRAMEWORK




Health Condition
Spastic cerebral palsy
Body Structure and Function
Impaired skeletal development, poor respiratory support, articulation impairment
Activity/Participation
Decreased ability to have conversations , difficulty with socializing at school/work, gaining employment, voting
Environmental factors
Barriers – Others acceptance/comfort with interacting with people using augmentative/alternative communication, insurance payment for devices
Facilitators – Appropriate training, attitudes, resources, family dynamics
Personal factors
Vigilance, other health factors, Personality

15 ASSESSMENT IN MOTOR SPEECH DISORDERS

- Structure
- Function
- Activity/Participation
- Environmental Factors
- Personal Factors

INTERVENTION FOR MOTOR SPEECH DISORDERS

- Structure
- Function
- Activity/Participation
- Environmental Factors
- Personal Factors