The Cranial Nerve Exam: Integrating Assessment and Treatment

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Putting It All Together: Dysphagia Basics Across A Continuum Of Care

Top cranial nerves involved in swallowing

*TRIGEMINAL CNV
- Sensory: Sensation to face and mouth
- Motor: Muscles of mastication biting/chewing

*FACIAL CNVII
- Sensory: Taste to anterior 2/3 of tongue
- Motor: Movement of facial muscles
- Parasympathetic: Salivation (submandibular and sublingual glands)

*GLOSSOPHARYNGEAL CNIX
- Sensor: Senses arrival of the bolus at the palate, taste (posterior 1/3 tongue and oral pharynx), Gag Reflex
- Motor: Pharyngeal constriction and shortening (stylopharyngeus), Elevation of palate
- Parasympathetic: Parotid gland

*VAGUS CNX
- Sensory (90%): General sensation in oropharynx, Sensation of residue in pharynx, larynx, esophagus
- Motor: Velopharyngeal Closure, Vocal Fold Approximation
- Middle/inferior pharyngeal constriction, Pharyngoesophageal Segment Relaxation, Esophageal Peristalsis, Gag Reflex

*HYPOGLOSSAL CNXII
- Motor ONLY
- Power source for the tongue muscles
- Hyoid-Thyroid Approximation
- Hyoid Anterior Movement
- Only nerve with contralateral innervation
**SKILL**

1. Creation of new “specialized neural groups”, enabling efficient and precise execution of skilled motor behavior, without muscle strength.

2. Acquisition of a skill through functional repetition and refinement of movement patterns.

**STRENGTH**

1. The exercise stimulus must be sufficient enough to elicit a change in muscle function. (stimulus intensity)

2. The frequency of the exercise stimulus, (how often it is performed) is crucial.

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**The FACTS**

**About Adjunct Modalities**

*PENS (Patterned Neuromuscular Stimulation)*

Uses electrical stimulation of sensory and motor nerves to achieve a muscle contraction using an EMG derived functional pattern.

*S*(Surface Electromyography): Record of electrical activity of a muscle or group of muscles (myoelectric activity)

*NMES (Neuromuscular Electrical Stimulation)*

The use of electrical impulses that are modified and manipulated to excite peripheral nerves evoking an action potential through a transcutaneous medium.
Important Lab Values

Blood/Urea Nitrogen (BUN), Creatine(Creat), Sodium(NA)

*Hydration and electrolyte status
*Critical lab value to check

*Patients may develop dysphagia due to the cognitive and neurological changes that may occur if these lab values are not within normal limits

Albumin and PreAlbumin

*Hydration status and malnutrition
*Describes protein status of both internal organs and blood

Red Blood Cell, Hematocrit, Hemoglobin

*Malnutrition and other nutrient deficiencies, anemia

White Blood Cells Neutrophils

*Indicative of the body's reaction to inflammatory response
*Neutrophils are first responders to acute infection and are highly present in the oral cavity
*Neutrophils are DIRECTLY related to immune systems response to bacteria

Peripheral Oxygen Saturation (SpO₂)

*Does NOT appear to be a clinically relevant marker of aspiration status (Leder 2000)
*Theoretical clinical significance because aspirators tend to have lower levels in general due to compromised respiratory systems

3 Medications that can impact swallowing

Anticholinergics
Antihistamines

Barbituates
Diuretics

Antidepressants
Antipsychotics


Beger D, Neuhuber W. Neural circuits and mediators regulating swallowing in the brainstem. GI Motility Online, 16 May 2006.


Jean A. Brain stem control of swallowing: neuronal network and cellular mechanisms. Physiol Rev. 2001;91:939–69

Jean A, Dallaporta M. Electrophysiologic characterization of the swallowing generator in the brainstem. GI Motility Online, 16 May 2006.


