advance
for Speech-Language Pathologists & Audiologists

Targeted Treatment
Cranial nerve-based assessments

Alyssa Banotai
Posted on: February 2, 2009

View Comments (0)

Vol. 19 • Issue 5 • Page 6

Cranial nerve-based assessment and treatment cannot only add depth to a typical bedside swallowing evaluation but can provide a valuable guide for treatment planning and patient outcomes, according to Jennifer Jones, PhD, CCC-SLP, BRS-S, chief clinical officer and founder of Dysphagia Mobile Imaging and owner of Therapeutic Interventions of Georgia, both in Augusta.

Extensive knowledge of the 12 cranial nerves often is overlooked in the speech-language pathology graduate school curriculum, much to the eventual detriment of practicing clinicians, she said. "In school we're all so scared of nerves and no one likes the cranial nerves, so no one really pushes doing a cranial nerve assessment."

Generally, curriculums include a basic overview of nerves before moving on to teaching a swallowing assessment, which are two separate topics that Dr. Jones believes should share common clinical ground. "We, as a profession, need to try and incorporate it into every assessment we do," she told ADVANCE. "It doesn't take long; you can do a cranial nerve assessment in 15 minutes. Once you've learned it and know what types of things to look for, you can whip right through it."

Instead of simply focusing on individual muscles during a swallowing assessment, Dr. Jones suggests taking into account the major role many of the cranial nerves play in swallowing as part of the overall swallowing assessment. The nerves often may indicate the best and most appropriate course of treatment for the patient.

"If we have a patient coming out of a surgery from having a cervical fusion or something that happens between CI and CV and there's a nerve that's been compressed, it's not going to just affect a specific muscle; it's going to affect everything that cranial nerve is responsible for," she said. "Unfortunately, we are led to learn in school that 'this is a muscle, and this is what it does, and this is what you fix.' But if you neglect learning what other things the cranial nerve is affecting, you could be missing something very important."

Cranial nerve XII, the hypoglossal nerve, innervates most lingual muscles and contributes to tongue movements, but muscles like the palatoglossus innervated by X, helps elevate tongue back. "For anything you need the tongue to do, it's extremely important to have an intact hypoglossal nerve," she stated.

Some clinicians may not know the extent of its effect on the pharyngeal phase of the swallow. "Most people don't think about it assisting the anterior movement of the geniohyoid muscle, which contributes in laryngeal closure as the muscles shorten and lengthen while creating tension," Dr. Jones explained. "Some patients who have hypoglossal tongue lesions actually end up having a trace aspiration as well."

Dr. Jones has nicknamed the vagus and glossopharyngeal nerves the "powerhouse nerves" because of their major contributions to the swallow.

The vagus nerve (cranial nerve X) is responsible for most of the pharyngeal phase of the swallow. "The superior laryngeal nerve comes off the vagus nerve, and it's 100 percent responsible for telling the patient, 'You're penetrating; something is going into your airway, and you need to cough and kick it out.' If it's not intact, the patient is going to have a silent penetration," she said.

The recurrent laryngeal nerve portion of the vagus nerve is often the nerve most likely to be damaged in surgical procedures, causing a silent aspiration due to a lack of sensation below the vocal folds, she noted. "The vagus nerve is also partially responsible for respiration, which is the primary thing we have to look at in the pediatric population-making sure their respiratory system is intact before we do anything with feeding."

The glossopharyngeal nerve (cranial nerve IX) is responsible for taste on the posterior third of the tongue, as well as sensation for the faucial pillars. The spinal accessory nerve (cranial nerve XI) controls the sternocleidomastoid muscle, which is used to turn the head to the side, and the trapezius muscle, which is required for shrugging the shoulders.

The facial nerve (cranial nerve VII) controls not only the facial muscles but provides taste to the anterior two-thirds of the tongue and saliva production. "A person who has a stroke could get a flaccid lip or cheek and end up having a lot of pooling in the buccal cavity because the cheek can't push back," she explained.

Cranial nerve V, the trigeminal nerve, is responsible for registering facial sensation and for biting and chewing, two processes that may not go hand in hand. "Just because a person can bite doesn't mean they can chew," Dr. Jones cautioned. The trigeminal nerve

"innervates the masseter, temporalis and pterygoid muscles; so the person may have a problem with just the pterygoid or with the masseter and temporalis separate from that."

The optic and oculomotor nerves (cranial nerves II and III) are largely visual nerves. As such, they can serve as helpful indicators during a cranial nerve assessment. "They are good nerves to tell us that there may be something wrong with the patient from a cranial nerve aspect. They would tell us to look further at other problems, but they are not pertinent for swallowing. However, they do play a role when it comes to seeing the food and self-feeding skills," Dr. Jones noted.

The final nerve to mention in a cranial nerve swallowing assessment is the olfactory nerve (cranial nerve I). "The sense of smell has a huge impact on whether or not the patient is going to want to eat," she said. "A lot of our elderly patients have a decrease in smell and taste. Because they need those things heightened, we may try to stimulate the olfactory nerve or the facial nerve or the glossopharyngeal nerve for taste."

She has found that burning food-scented candles prior to eating or during therapy will heighten a patient's sensory system through the olfactory nerve and may lead to the person experiencing some hunger sensations.

Though a standardized cranial nerve-based swallowing assessment is not available for speech-language pathologists, Dr. Jones suggests using a protocol that employs a patient-based approach rather than one based on a specific area, such as the mouth. A detailed modified study report is helpful in structuring a treatment plan, she said. "We need to know why the patient aspirated and when they aspirated. Was it before the swallow, during the swallow, or after the swallow? When there was an aspiration, were you able to do any compensatory strategies that eliminated the aspiration?"

The more information therapists have, the bigger the bag of tricks that they can go to, she said. "If you just know the oral aspects of what's going on, it's not going to tell you anything abouthow to treat your patient."

A cranial nerve assessment moves beyond the oral aspects and allows the clinician to form a hypothesis related to the pharyngeal phase of the swallow. "When you see a patient whose tongue is deviated to the right, you automatically think that something is going on with the hypoglossal nerve and you need to do treatment for everything that has to do with the tongue and the functional impact on the swallow," Dr. Jones said. "If a patient's swallow study shows they have a trace aspiration, we also need to work on an effortful swallow. We can exercise the geniohyoid muscle and get better anterior movement of the hyoid bone and better closure to the laryngeal vestibule."

Assessment reports should refer to and cite causes of the original symptoms for which the patient was referred for assessment, she said. "I try to give a reason for the problem. If there was pooling in the vallecula, I know the patient doesn't have any tongue-base retraction. If I just say there was spill-over from the vallecula into the airway and the patient aspirated, they're not going to understand when that occurred, before, during or after the swallow." Different treatment strategies are available depending on the time and reason for aspiration.

A growing body of research demonstrates the effectiveness of compensatory strategies and maneuvers to increase strength and skill. "Our patients have a huge resilience to getting better," she said. "These patients often are put on diets and given a strategy to do a chin tuck, and no one does the rehab for them. They can get better."

A therapist working on the trigeminal nerve should look at increasing strength in the masseter and temporalis muscles by focusing on the patient's bite. "I would also work with the pterygoid muscles and lateral movement," she said. "To do that we have to make sure the tongue muscles are also intact and the patient has appropriate lateral tongue movement. If you're working on chewing and don't have appropriate lateral tongue movement, you're putting the person at risk for a choking hazard."

When working on the vagus nerve to treat a delayed pharyngeal swallow, clinicians can use a laryngeal mirror for tactile stimulation. "Research shows it increases the timing of the pharyngeal swallow," noted Dr. Jones.

Treatment strategies are effective for other cranial nerve issues as well. "With the hypoglossal nerve you can do all the fun tongue exercises, moving forward and back and up and down, doing tongue pops, and sticking the tongue to the palate and popping it down," she said. Dr. Jones also uses the Iowa Oral Performance Instrument (IOPI), which has been shown to increase lingual strength, function and overall oral intake.

Treatment for facial nerve issues can be fun for patients. "I use the Dworkin exercises with a tongue depressor," Dr. Jones said. "You put pennies on both sides to make a tongue depressor 'barbell' for them to purse their lips and hold between the lips. It's a lot of

fun because they get to add a penny each week, and it makes it a little heavier."

Throughout cranial nerve-based treatment and assessment, particularly when consulting with other team members, clinicians should use more proper muscle and nerve terminology to increase familiarity and professionalism.

"The more we use cranial nerve terms, the more they are on the tip of our tongue. The doctors are going to appreciate it more because we're using their vernacular," she said. "When you talk in more of a medical sense and are confident about your knowledge of those things, they're going to come to you for advice. But if they feel like you don't know why you're having the patients do these exercises, they're not going to call us or make the referrals that they need to. We need to focus more on the medical aspect of treatment when we're looking at our patients so we can get that appreciation from the doctors."

Increased familiarity with medical speech-language pathology, particularly with the use of a cranial nerve-based swallowing assessment, not only has yielded professional benefits for Dr. Jones but better outcomes for her patients. "It has helped me guide my therapy, and my patients are getting better," she said. "My referrals have increased, and doctors call me personally to discuss their patients."

For More Information

• Jennifer Jones, PhD, online: www.tiofga.com, www.dysphagiamobileimaging.com

Alyssa Banotai is a Senior Associate Editor at ADVANCE. She can be reached at abanotai@advanceweb.com.

Cranial Nerves

I Olfactory

II Optic

III Oculomotor

IV Trochlear

V Trigeminal

VI Abducens

VII Facial

VIII Vestibulocochlear

IX Glossopharyngeal

X Vagus

XI Spinal Accessory

XII Hypoglossal