

HEAD & NECK INSTITUTE INNOVATIONS

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NOVEL APPROACH ALLOWS
SURGEONS TO ACCESS SPHENOID
MENINGOENCEPHALOCELES WITH
MINIMAL DISSECTION AND
LESS MORBIDITY

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Dear Colleagues,

When I came to Cleveland Clinic last year, I announced that our department would be embarking on an ambitious reset. My vision for the Head & Neck Institute is one focused on innovation and growth. I am pleased and excited to announce that we are moving swiftly toward these goals. While we remain committed to providing world-class care to our patients, we also continue to ask ourselves, “How can we do this better?”

It's with this approach and premise that I am pleased to share with you some of our incredible accomplishments over the past year. Our cover article is just one of the many examples of our constant search for improvement. Raj Sindwani, MD, discusses how his novel approach to treating sphenoid meningoencephaloceles greatly reduces patient morbidity by accessing the lateral sphenoid sinus through the nasal cavity. Dane Genther, MD, Brandon Hopkins, MD, and I performed what we believe is the first ‘tri-vector’ reanimation surgery in a pediatric patient and gave a 9-year-old patient with congenital facial paralysis the ever-elusive “Duchenne smile.” Michelle Adessa, BM, MS, CCC-SLP, explains the importance of including a speech and language pathologist in the operating room (OR) to perform real-time voice assessments during medialization thyroplasty procedures. Erica Woodson, MD, and I also discuss how we determined the best path of care for a young patient who presented with a facial nerve tumor.

We have also been busy on the research side. Samantha Anne, MD, explains why early detection of hearing loss in pediatric patients is critical to their speech and language development, cognitive function and school performance. Robert Lorenz, MD, discusses innovations to improve the diagnosis and treatment of idiopathic subglottic stenosis, one of the more challenging conditions to manage. Sarah Sydlowski, MD, and Erika Woodson, MD, retrospectively reviewed patients with single-sided deafness or asymmetric hearing loss and the benefits of cochlear implants for this patient population. Joseph Scharpf, MD, discusses some of the advances in treating thyroid cancer and how our department is contributing to the future of care for these patients.

One of the projects I am incredibly excited about is our commitment to expanding our use of advanced practice providers, or APPs. We recognize that the dynamics in our field, as in much of healthcare, are changing. While many otolaryngologists choose to subspecialize, there remains a vital function for comprehensive otolaryngologists to fulfill. We recognize that most of our surgeons – specialists, as well as comprehensive otolaryngologists – want to practice at the top of their license. Patients want to see providers who are experts and passionate about the condition they present with. By expanding both the number of APPs as well as their scope of practice, we believe we can improve our patient access flow to help patients see the best provider faster. At the same time, we can help our surgeons do what they most love: operate and manage complex surgical conditions.

I hope you find this issue informative. Please do not hesitate to contact me or my colleagues with any feedback.

A handwritten signature in blue ink, appearing to be 'P. Byrne', with a long, sweeping horizontal line extending to the right.

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PEDIATRIC UNILATERAL HEARING LOSS CAN CAUSE SPEECH AND LANGUAGE DELAY EVEN IN MILD CASES

Research indicates higher rates of speech and language delay among children with mild-to-moderate unilateral hearing loss compared to the general population

Researchers from Cleveland Clinic's Head & Neck Institute have reported an increased rate of speech and language delay (SLD) in pediatric patients with mild-to-moderate unilateral sensorineural hearing loss (USNHL). Early detection of hearing loss is critical in pediatric patients since hearing loss can affect speech and language development, cognitive function and school performance. The research was recently published in *International Journal of Pediatric Otorhinolaryngology*.

The study's objective was to determine the prevalence of SLD in patients with mild-to-moderate USNHL and compare it to the prevalence in the general population and patients with more severe USNHL. "With mild-to-moderate USNHL, some studies show an impact on speech and language development and similar concerns that are seen with worse unilateral hearing loss," explains Samantha Anne, MD, Medical Director of Pediatric Ear and Hearing Disorders in Cleveland Clinic's Head & Neck Institute and one of the study's authors. "We wanted to add to the evidence on the impact of mild-to-moderate hearing loss on children in terms of speech and language development."

SLD prevalence among pediatric patients with hearing loss

A retrospective chart review was performed to identify patients with USNHL, diagnosed with an audiogram or auditory brainstem response test over the past 10 years. However, the study only included patients with formal speech, language and auditory function testing that included measures of auditory perception and language performance. Forty-nine patients with USNHL were identified, and 34 patients with formal speech, language and auditory function testing were included in the study. Twenty of these patients had mild-to-moderate USNHL, and 14 patients had severe-profound USNHL.

First, the frequency of SLD was evaluated in children with mild-to-moderate unilateral hearing loss compared to children with severe-to-profound unilateral hearing loss. The frequency of SLD in patients with mild-to-moderate and severe-to-profound USNHL was 25% (95% CI,

9%–49%) and 50% (95% CI, 23%–77%), respectively, and this difference was not statistically significant. "Next, we compared the rate of speech and language delay in the mild-to-moderate USNHL group versus what the general population reports," explains Dr. Anne. "We found that close to a quarter of the group with mild-to-moderate USNHL had SLD, which is much higher than the 6% incidence of SLD reported in the general population."

Limitations and next steps

One of the limitations identified by the research group was the small sample size of the study, which impacted the study's secondary objective. "We were exploring testing measures and how they relate to the severity of hearing loss," says Dr. Anne. "We wanted to know whether children with more severe and profound hearing loss perform poorer on these tests. We didn't find a correlation with that, but I anticipate that if we have a bigger volume of patients to look at, we may get more conclusive information."

Dr. Anne also notes that while these findings help clarify the relationship between USNHL and SLD, they don't necessarily change how Cleveland Clinic treats pediatric patients with USNHL. "We will put a hearing aid on a child for unilateral hearing loss if they are determined to be a candidate through audiologic evaluation," says Dr. Anne. "This study shows that children with even mild-to-moderate hearing loss may have increased speech language delay, and hearing aids can help minimize that risk."

In terms of future research, Dr. Anne and her team are focusing on the benefits of amplification and determining whether hearing aids over a long period help keep children from developing SLD. "The point of this review was to see whether there's an impact on speech and language delay on these children with milder hearing losses that are one-sided," says Dr. Anne. "The next step, which is currently underway as a multi-institutional study, is to see whether hearing aids help prevent these negative impacts on hearing loss and whether their use is beneficial for children."



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Reference

Mahomva C, Kim A, Lieu J, Goldberg D, Anne S. Speech and language outcomes in mild-moderate unilateral sensorineural hearing loss. *Int J Pediatr Otorhinolaryngol*. 2021;141:110558. doi:10.1016/j.ijporl.2020.110558

NOVEL APPROACH TO A FACIAL NERVE TUMOR

A skull-base surgeon explains why it's important to consider your options before pursuing the most aggressive route



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Case

A 17-year-old patient initially presented to her local otolaryngologist with hearing loss. The otolaryngologist believed fluid was causing the hearing loss. They placed an ear tube, but the patient's hearing did not improve. Subsequent scans at a medical center revealed that it was not fluid but a middle ear tumor affecting her hearing. The tumor was later determined to be a facial nerve schwannoma.

At this point, the patient did not have any visible facial symptoms such as facial weakness or droop. However, the first medical team she met with discussed radical resection right away with her.

The patient began exploring additional opinions and reached out to Cleveland Clinic. She chose to meet with the radiation oncology department after coming across emerging literature about radiosurgery, indicating that it can control the tumor and possibly help change the trajectory for facial nerve function. She also met with Erika Woodson, MD, Section Head of Neurotology/Otology/Lateral Skull Base Surgery in Cleveland Clinic's Head & Neck Institute and Gamma Knife Center.

Dr. Woodson met with the patient and noticed that the patient had begun to develop very subtle facial weakness. Patrick Byrne, MD, MBA, Chair of Cleveland Clinic's Head & Neck Institute, was brought in to consult with the patient.

Dr. Byrne met with the patient and her family and suggested performing a nerve transfer in order to restore that movement. The nerve transfer would also prevent further loss of function should the tumor cause more paralysis in the future. The outpatient procedure connects the masseter nerve to the buccal branch of the facial nerve that helps produce a smile. The patient did well following the surgery, and Dr. Byrne anticipates that the nerve will grow into the muscles over the next several months.

Dr. Woodson will monitor the patient's scans for growth of the tumor and keep an eye on any symptoms. As the tumor progresses, Drs. Woodson and Byrne will likely need to take a more aggressive approach. By having preemptive reconstructive surgery for the facial nerve downstream from the tumor, the patient will retain more function and have more time and flexibility to consider her options for the tumor itself.

Understanding options

With a facial nerve tumor, the patient will likely have increased facial weakness over time. This can happen either gradually or more abruptly, with noticeable changes occurring in steps. She may also experience twitches or spasms because this tumor is slowly damaging the normal nerve fibers. Traditional surgery can involve removing bone to allow the tumor room to grow (decompression) or removing the tumor completely.

"Taking bone away is an attractive option for patients when you know the tumor is fully encased in bone because it might buy them some time," says Dr. Woodson. "But this particular patient's tumor was right behind her eardrum, so there was no way to decompress this space. The medical team that she originally met with offered her radical resection. If you go in and take it out completely, the patient will wake up with permanent facial paralysis, unless more reconstructive surgery is done."

Dr. Byrne notes that a key factor in this case is that the patient's facial schwannoma is benign. Since the tumor had caused only minor hearing problems by that point, the patient faced a vexing dilemma. "There is no compelling necessity to treat it immediately," explains Dr. Byrne.

"Treating a tumor of this type aggressively may cause devastating facial paralysis, and each treatment option is imperfect. Surgical removal would almost assuredly result in facial paralysis. Gamma Knife® therapy is less likely to permanently arrest growth, but it is also less likely to cause facial paralysis."

Changing the mindset

At most institutions, deciding whether to treat and which treatment to pursue is usually where the conversation



Figure 1: Prior to the nerve transfer, the patient began to show signs of weakness.



Figure 2: After the cranial nerve transfer, the patient has enhanced function of her smile, and tone around her eye.

begins and ends. However, Dr. Byrne notes that it's important to view this dilemma a bit differently and consider another option: preemptive nerve transfer. "A cranial nerve transfer is when we provide motor nerve innervation to the paralyzed facial nerve by connecting a different cranial motor nerve into the facial nerve," explains Dr. Byrne. "So, for example, we can disconnect a nerve that controls chewing muscles and reroute it to the facial nerve. Remarkably, this can allow a patient to smile or blink by activating the nerve that used to cause chewing."

In addition to masseter nerve transfer, another preemptive option for these patients is cross-face nerve grafting. In this scenario, a nerve graft is harvested from the leg and connected to functioning facial nerve branches on the opposite side of the face. These nerve grafts are then channeled under the skin and across the face so that normal healthy functioning nerves grow from the normal side over to the abnormal side. This lays the groundwork to enable the team to support facial tone in the future.

Dr. Woodson believes that the approach to facial nerve tumors has historically been fairly passive, and this needs to change. "We now know that we can take a more proactive approach and get better outcomes," she says. "As that nerve is slowly changing and becoming impacted, the patient starts to lose the nerve fibers and some of the muscle bulk and tone over time. If we take a back-seat approach and just let weakness happen over a protracted period of time, then the reanimation schemes we have are already at a disadvantage because the muscles have atrophied so much. The more proactive approach used in this case treats the facial paralysis, but it also gives the patient time to consider their best option for treating the underlying cause: the tumor."

IDIOPATHIC SUBGLOTTIC STENOSIS: MISDIAGNOSIS OF ASTHMA IS COMMON

New innovations improve treatment of this rare disease



Robert Lorenz,
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Subglottic stenosis is a narrowing of the larynx below the vocal cords, essentially blocking a patient's airway. It can be caused by trauma (including from tracheotomy or intubation) or autoimmune disease (including granulomatosis with polyangiitis, sarcoidosis and systemic lupus erythematosus). However, in some cases, the condition is idiopathic.

"The standard delay in diagnosis for a patient with idiopathic subglottic stenosis (iSGS) is one to two years," says Robert Lorenz, MD, a surgeon in the Head & Neck Institute at Cleveland Clinic. "The condition is often misdiagnosed because the etiology is uncertain and the symptoms — including stridor, coughing and breathlessness — are nonspecific. Up to a third of patients are initially diagnosed with asthma."

Patients with iSGS commonly use bronchodilators for months or years with no improvement. When symptoms aren't successfully managed by asthma treatment, Dr. Lorenz says it's time to change course and consider this rare disease. When symptoms aren't successfully managed by asthma treatment, it's time to change course and consider this rare disease.

While diagnosing iSGS can be challenging, treatments for the condition have advanced in recent years, as reviewed in a *Journal of Thoracic Disease* article co-authored by Dr. Lorenz.¹

A challenging diagnosis

Incidence of iSGS is low, about 1 in 400,000 people, but 99% of those diagnosed are female, predominantly white women between ages 20 and 50.

"There are a number of ongoing studies, mostly coming out of the North American Airway Collaborative, on why the disease largely affects patients who are white, fertile and female," says Dr. Lorenz. "The cause likely will have a hormonal aspect, but that's yet to be defined."

Dr. Lorenz adds that for now, iSGS is a diagnosis of exclusion. Patients are evaluated for history of trauma to the larynx. If symptoms began within three to six months of having a breathing tube, for example, traumatic etiology may be suspected.

Diagnosing autoimmune etiology involves detecting other hallmarks of autoimmune disease, such as sinusitis and



Figure 1. Near-complete subglottic stenosis.

ear problems, as well as suggestive lab results. Treating this type of subglottic stenosis centers on treating the root autoimmune disorder.

Conservative first- and second-line treatments

For idiopathic (and some traumatic) subglottic stenosis, treatment often begins conservatively, with an endoscopic procedure.

"Our goal is to do as little intervention as possible, especially if the patient is only minimally stenotic and has no breathing problems," says Dr. Lorenz.

If patients are symptomatic, standard treatment consists of:

1. Steroid injection in the subglottis. Steroids inhibit the proliferation of fibroblasts and help reduce hypertrophic scarring, like dermal keloids.
2. Dilation procedure. Balloons dilate just the area of stenosis and cause less trauma than traditional dilators like bougies or bronchoscopes. Performing lysis before dilation allows greater widening of the airway and further minimizes trauma.

The procedure can be repeated as needed. For most patients, one treatment controls symptoms for one year or longer.

For refractory conditions or for patients who don't tolerate the endoscopic dilation well, the second line of treatment is serial steroid injections. For this procedure, the standard steroid injection, lysis and dilation are performed, followed by monthly steroid injections for three consecutive months. Injections can be done during an office visit or, if the patient prefers, under general anesthesia in an operating room.

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SPEECH PATHOLOGISTS CONDUCT REAL-TIME VOICE ASSESSMENTS IN THE OR

Personalized care enhances patient experience, optimizes voice quality

Patients with glottic insufficiency often present with a hoarse voice, vocal fatigue and difficulty projecting their voice. Whether it's caused by vocal fold paralysis or atrophy, glottic insufficiency makes it difficult for patients to communicate and can even cause them to withdraw from family and friends. The condition can greatly impact a patient's voice quality and overall quality of life.

To help these patients return to fully participating in their lives, laryngologists may perform medialization thyroplasty procedures to improve glottic closure and approximation of the vocal folds. These procedures are unique because patients are awake in the operating room (OR) to allow voice testing in real time.

Historically, only laryngologists would perform voice testing during these procedures. Cleveland Clinic's Head & Neck Institute takes a different approach and is one of a few hospitals in the country to include speech-language pathologists in the OR. These experts help perform intraoperative voice assessments and put patients at ease.

Implant fitting and voice testing

While the patient is under local anesthesia, the laryngologist creates an incision on the exterior of the neck over the thyroid cartilage. Then, a cartilage window is created to pass material through that is used like a doorstep to push the vocal fold over. The laryngologist creates a personalized implant for the patient that's made of a silicone block or a GORE-TEX® strip.

"The goal is to optimize the patient's voice, making it clear and strong," explains Michelle Adessa, BM, MS, CCC-SLP, voice-specialized speech-language pathologist at the Head & Neck Institute's Voice Center. "While the surgeon is making the personalized implant fit the patient, we need to test the patient's voice using various therapeutic techniques in order to optimize it."

That's when Adessa gets involved. "I use my ears in collaboration with the laryngologist to help guide the perceptual quality of the patient's voice," she says. During the perceptual voice assessment, Adessa has the patient

perform different tasks and then rates their voice. She performs these assessments before and after medialization thyroplasty procedures.

Adessa also helps operate the endoscope during the procedure, which allows the laryngologist more freedom of movement while fitting the implant. The surgical team uses videostroboscopy to see how the vocal folds behave during vibration. Adessa notes, "This gives the team video confirmation that the vocal folds are coming together and vibrating as well as possible."

Putting patients at ease

The top priority of the speech pathologist is putting the patient at ease. "It's important to remember what an unnatural experience it is to be awake in the OR," Adessa says. "I want to make sure that patients are as comfortable and relaxed as possible."

Adessa may do some speech therapy with the patient prior to the procedure to try to optimize their voice. "Doing therapy ahead



Michelle Adessa, BM, MS, CCC-SLP
Staff, Speech-Language Pathology,
Voice Center



Figure 1. Adessa performing an intraoperative voice assessment during a medialization thyroplasty procedure.

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ADVANCES IN THE TREATMENT OF AGGRESSIVE THYROID CANCER

How Cleveland Clinic is contributing to the future of care



Joseph Scharpf, MD, FACS
Staff, Section of Head and Neck Surgery

As the worldwide incidence of thyroid cancer has increased, it has generated much debate and study concerning the proper evidence-based management strategies. This increase in thyroid cancer, overall, has fortunately not resulted in an increase in mortality from thyroid cancer.¹ However, advanced, invasive thyroid cancers continue to represent the primary cause of thyroid cancer-specific death, and these aggressive thyroid cancer variants result in significant morbidity for patients. Morbidity from primary and recurrent treatment for these cancers is not inconsequential, and it is often not captured in outcomes studies. In addition to treating our patients suffering from thyroid cancer, we have dedicated considerable focus in the Head & Neck Institute to this subset of patients.

A collaborative approach and an emphasis on the surgical safety profile

A multidisciplinary endocrine clinic has been established with the support of Patrick Byrne, MD, MBA, Chair, along with Christian Nasr, MD, and Mario Skugor, MD. This affords us the opportunity to have direct interactions beyond both our standard head and neck tumor board and our separate multidisciplinary thyroid cancer tumor board to treat complex patients. Although guideline development can be difficult for these more uncommon tumors,² we have been instrumental in contributing to an American Head and Neck Society Consensus Statement.³ Our multidisciplinary approach has utilized advanced surgical techniques⁴⁻⁶ complemented when appropriate with radiation and targeted therapies to achieve locoregional control in the settings of airway invasion (Figure 1) and organ preservation threat (Figure 2).

Our surgical team within the Head and Neck Section is made up of expert, fellowship-trained head and neck surgeons and includes Brandon Prendes, MD; Eric Lamarre, MD; Jamie Ku, MD; our new addition of Natalie Silver, MD; and me. As a group, we have placed a particular emphasis on the safety profile of surgery by utilizing intraoperative nerve monitoring, and a couple of the society guidelines on neuromonitoring in the setting of thyroid surgery have been invaluable for our team. These include the International Neuromonitoring Study Group and its two-part guidelines.^{7,8} The Cranial Nerve Monitoring Task Force of the American Academy of Otolaryngology-Head and Neck Surgery, which I chaired, also released a position

statement from the AAO-HNS that culminated in the AAO-HNS Cranial Nerve Monitoring Task Force Report.^{9,10}

I am also finishing up what will be the first book of its kind dedicated solely to intraoperative cranial nerve monitoring in head and neck surgery.¹¹ My hope is that it will serve as a reference for contemporary advances in nerve monitoring and inspire further work in this very important area.

New developments

The Head & Neck Institute will be a leader for Cleveland Clinic as a participating site member for a multicenter anaplastic neoadjuvant clinical trial utilizing dabrafenib, trametinib and pembrolizumab before surgery in treating patients with *BRAF* V600E-mutated anaplastic thyroid cancer (NCT04675710). Recognizing the need for expedient care for this subset of patients, our multidisciplinary team offers same-day appointments for patients and for referring doctors. This is critical to evaluate the patient's airway stability, determine potential for surgical resection, and obtain tissue so that it may be interrogated for mutations that could be targeted for the aforementioned treatment potential.

Novel treatment strategies discovered through research will be critical to further advances. We are fortunate to be able to collaborate with Jeffrey A. Knauf, PhD, who was recently recruited to Cleveland Clinic Lerner Research Institute as a staff scientist. For the past 26 years, Dr. Knauf's research has focused on understanding the biology of thyroid cancer. Past research identified the cause of resistance to radioactive iodine therapy¹³⁻¹⁵ which led to improvements in the response of thyroid cancer patients to that therapy.¹⁶ His recent research includes mouse models of advanced thyroid cancer to investigate mechanisms of resistance to drugs targeting oncogenic *BRAF*¹⁷ and, more recently, to explore treatment of advanced thyroid cancers with immunotherapy alone or in combination with *BRAF* inhibitors. In addition to her clinical responsibilities, Dr. Silver will have a primary role in advancing care through her research efforts. Dr. Silver's lab is developing personalized RNA nanovaccines against thyroid cancer. Preliminary results are promising and demonstrate vaccine efficacy in murine models of metastatic thyroid cancer. The goal is to translate these findings into human clinical trials.

The future of care for patients afflicted with aggressive

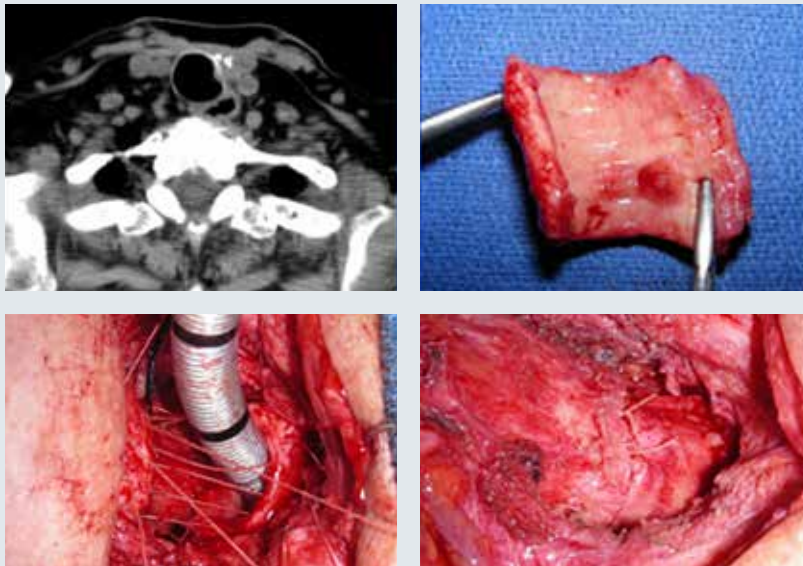


Figure 1. Airway invasion from recurrent thyroid cancer requiring tracheal resection for cure.

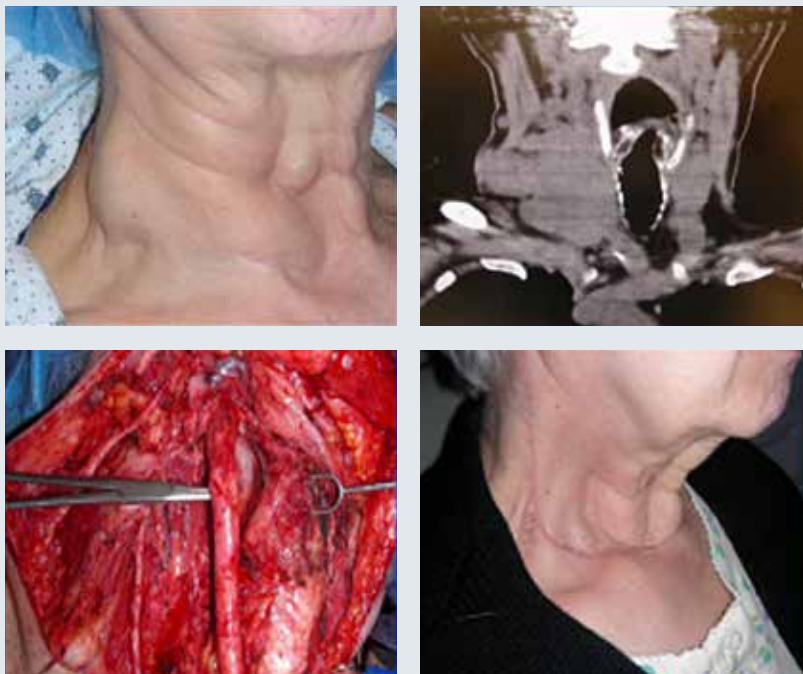


Figure 2. Organ preservation threat from invasive thyroid cancer eliminated with surgery.

thyroid cancer is certainly very promising, and our group is excited and honored to be contributing.

A full list of references is available at clevelandclinic.org/aggressivethyroidcancer.

IDIOPATHIC SUBGLOTTIC STENOSIS

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New innovations in endoscopic and surgical treatment

The third line of treatment is the Maddern procedure, developed over the past decade. Introduced in the U.K., this transoral procedure entails shaving away the fibrotic tissue in the larynx and relining the area with skin from the thigh. Dr. Lorenz, who has performed nearly 30 Maddern procedures — the most in the world — recently revised the procedure to use mucosal lining from the cheek rather than skin from the thigh.

“Cells from the cheek are optimal because they don’t contain keratin, which can slough off, collect in the airway and cause blockage or irritation,” says Dr. Lorenz.

The grafted lining adheres with the help of a silicone stent, which is removed after two weeks.

Patients with more complex lesions affecting cartilage require conventional surgical treatment, such as cricotracheal resection. This invasive procedure, while effective at treating iSGS, involves removing the muscle that allows vocal inflection.

Dr. Lorenz most recently introduced a modified procedure, extended tracheal resection, which entails removing the stenotic lining inside the voice box while preserving the muscle that attaches to the cartilage structure, thereby retaining the ability to modify vocal pitch. In an open procedure through the neck, the diseased uppermost portion of the trachea is removed along with the lining of the lower larynx. Healthy tracheal tissue is used to reline the subglottic area.

“As we unravel more about the pathophysiology of iSGS, we will continue to discover more advanced ways of treating it,” says Dr. Lorenz. “There are new discoveries and trends in treatment all the time, which makes it even more important to diagnose patients with iSGS as promptly as possible.”

1. Aravena C, Almeida FA, Mukhopadhyay S, Ghosh S, Lorenz RR, Murthy SC, Mehta AC. Idiopathic subglottic stenosis: A review. *J. Thorac. Dis.* 2020; 12(3):1100-1111.

NOVEL APPROACH ALLOWS SURGEONS TO ACCESS SPHENOID MENINGOENCEPHALOCELES WITH MINIMAL DISSECTION AND LESS MORBIDITY

Multi-institutional report indicates 100% success rate for treated patients



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For meningoencephaloceles originating in the lateral recess of the sphenoid sinus, access can be extremely difficult. These lesions have traditionally been treated with invasive approaches including the transpterygoid or transmaxillary and even craniotomy. These approaches are associated with serious drawbacks including poor visualization and greater patient morbidity.

To overcome these shortcomings, skull base surgeons in Cleveland Clinic's Head & Neck Institute have incorporated a different technique for treating patients with this rare condition. The simplified approach, referred to as the endoscopic modified transpterygoid approach (MTPA), allows the surgeon to access the lateral sphenoid sinus through the nasal cavity without having to dissect (and possibly injure) the complex anatomy of the pterygopalatine fossa.

Technology catches up

The original transpterygoid approach was described in 2005 and involved a technically challenging dissection of many important structures. "With the traditional approach, a surgeon has to go through the back wall of the maxillary sinus and through the pterygopalatine fossa in a straight line to get to the lateral sphenoid sinus" explains Raj Sindwani, MD, Head of Rhinology, Sinus and Skull Base Surgery and Vice Chair, Quality Improvement in the Head & Neck Institute. "The problem was in getting there — you had to move sensitive nerves out of the way and avoid injuring them, dissect fat, manipulate lymph nodes and arteries. Then, you finally arrived at where the problem was. The reason our modified technique would have been difficult to attempt back then is that all our instruments were straight and rigid, especially the tools we used to actually resect the meningoencephalocele and control bleeding. Now, some 15 years later, we operate around corners all the time using angled endoscopes and angled and malleable instrumentation. It was this angled instrumentation component that I think drove home to us that this approach was actually feasible and could offer significant advantages."

Published findings

Dr. Sindwani and his team have published two important studies detailing the success of this innovative approach.

The first article, "Simplifying Access to the Lateral Sphenoid Recess: A Modification of the Transpterygoid Approach," which was published in the *American Journal of Rhinology & Allergy*, describes the technical aspects of the endoscopic MTPA and why it should be considered for accessing benign lesions in this challenging location. The second article, published in *Laryngoscope* and titled "Modified Transpterygoid Approach to Sphenoid Meningoencephaloceles: A Shorter Run for a Longer Slide," reports a multi-institutional experience using this greatly simplified technique. One of the major findings from the second article is that of the 33 included patients treated with MTPA for meningoencephaloceles in the lateral sphenoid sinus, the authors had a 100% success rate and no recurrent cerebrospinal fluid leaks.

Dr. Sindwani says, "By simplifying this otherwise very complicated technique, my hope is that we can help surgeons assist their patients by offering excellent outcomes and fewer complications."

Benefits for both patient and surgeon

Cleveland Clinic performs this and other complex skull base surgery using a multidisciplinary skull base team approach, which includes a rhinologist and a neurosurgeon. Dr. Sindwani describes this approach as similar to a dance, where multiple instruments are going through the nose to remove the meningoencephalocele (or skull base tumor) and then patch the hole in the skull base.

"The patch can come from a number of different sites," explains Dr. Sindwani. "In our experience, we've had such a high success rate with our technique that we usually employ a postage-stamp-sized piece of nasal lining to patch the defect. Our results also demonstrate that, by and large, more-involved pedicled flaps, which we do sometimes use for more complex skull base reconstructions, are generally not needed for sphenoid meningoencephaloceles. Overall, between the simplified approach and the straight-forward repair with free mucosal grafts, we are trying to advocate that when done well, less is more in these cases."

While endoscopic MTPA has several benefits for the surgeon because of its less invasive approach and shorter dissection time, there are also a number of benefits for

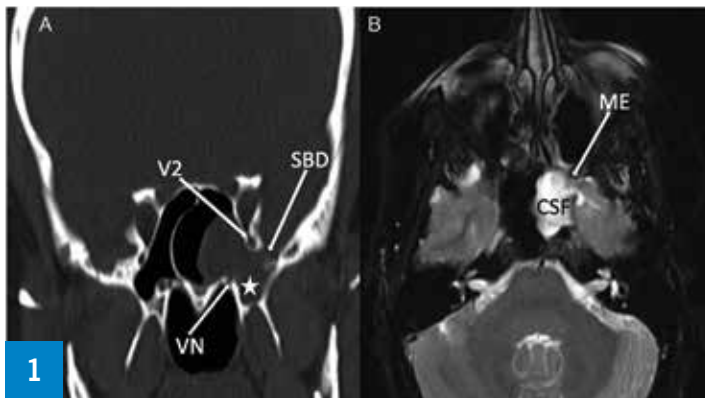


Figure 1. Imaging showing a left lateral sphenoid recess meningoencephalocele and relevant anatomy. (A) CT scan demonstrating the skull base defect and (B) skull base magnetic resonance imaging of the associated meningoencephalocele coming through the defect. CSF = cerebrospinal fluid; ME = meningoencephalocele; SBD = skull base defect; star = lateral recess of the sphenoid sinus; V2 = maxillary division of the trigeminal nerve; VN = vidian nerve. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

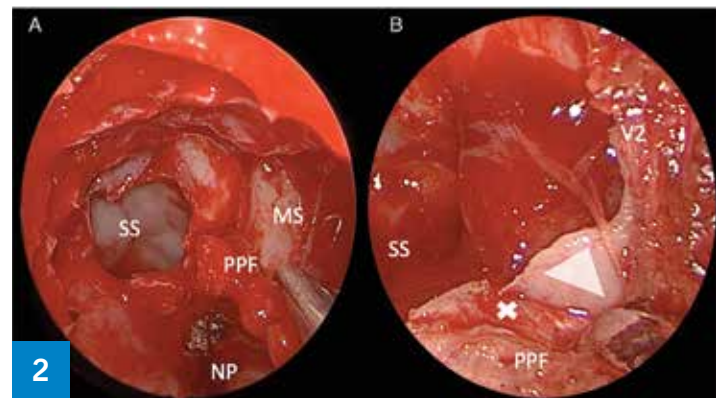


Figure 2. The initial approach to the lateral sphenoid. (A) Endoscopic endonasal approach to the lateral sphenoid recess and exposure of the PPF. (B) Wide exposure of the sphenoid sinus, pterygoid wedge and retracted PPF contents with visualization of the vidian nerve and the maxillary division of the trigeminal nerve (V2) at foramen rotundum. Triangle indicates pterygoid wedge to be removed. MS = maxillary sinus; NP = nasopharynx; PPF = pterygopalatine fossa; SS = sphenoid sinus; V2 = maxillary division of the trigeminal nerve; X = vidian nerve.

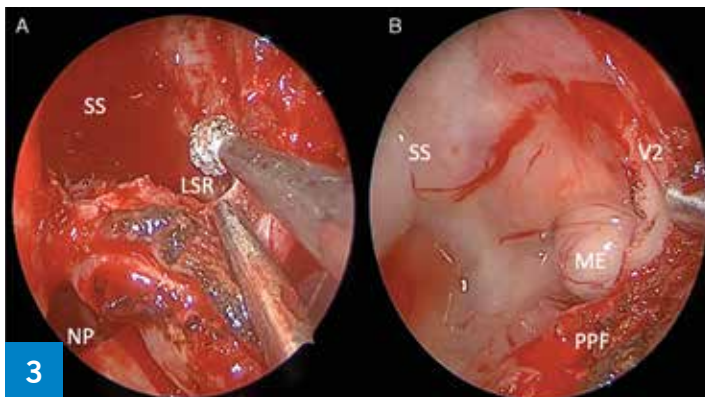


Figure 3. Technique with angled approach and instrumentation: (A) Demonstration of the three-handed endoscopic technique through a single-nostril corridor while removing the bony pterygoid wedge. (B) Exposure of the meningoencephalocele in the lateral sphenoid recess using a 30 endoscope. LSR = lateral sphenoid recess; ME = meningoencephalocele; NP = nasopharynx; PPF = pterygopalatine fossa; SS = sphenoid sinus; V2 = maxillary division of the trigeminal nerve.

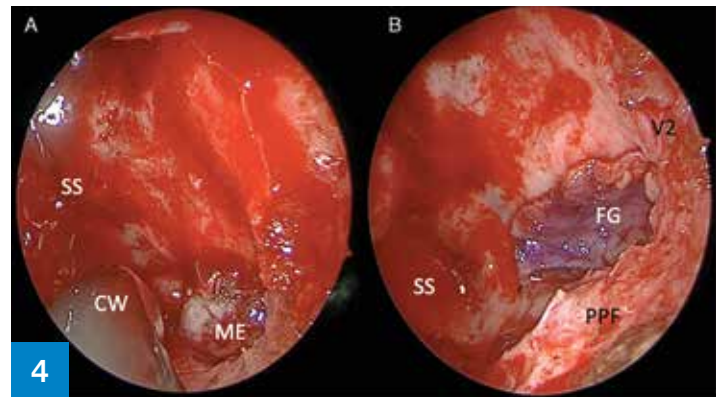


Figure 4. Endoscopic resection of the meningoencephalocele and skull base reconstruction. (A) Bipolar cauterization and ablation of the meningoencephalocele using a malleable, endoscopic coblator through an angled approach. (B) Completed skull base reconstruction with a free mucosal graft in the lateral sphenoid recess. CW = endoscopic coblator wand; FG = colored free mucosal graft; ME = meningoencephalocele; PPF = pterygopalatine fossa; SS = sphenoid sinus; V2 = maxillary division of the trigeminal nerve.

the patient. Most important, there should be far less risk of significant bleeding or injury to nerves that can cause temporary or even permanent dry eye, dry nose and facial numbness. In addition, when a patient undergoes this surgery, there are no cuts or bruises on their face because everything is done through the nasal passages. Dr. Sindwani also doesn't use any nasal packing that has to be removed but instead uses only tissue glues and materials that are completely absorbed to support his repair. He notes that most of his patients are discharged home after just a few days, with follow-up a week after the surgery and again around four to six weeks later.

"Surgeons have been excited to hear that there is an easier way to get to the lateral sphenoid sinus and effectively manage these lesions without the complicated and risky dissection associated with older approaches," Dr. Sindwani explains. "If you're a patient, hearing of the excellent success rate and that this approach offers the promise of fewer complications and a better and a quicker recovery, that sounds pretty compelling," he says.

SURGEONS PERFORM BREAKTHROUGH REANIMATION SURGERY IN PEDIATRIC PATIENT

Their innovative 'tri-vector' procedure achieves the elusive 'Duchenne smile' long sought by reanimation surgeons



Patrick J. Byrne, MD, MBA
Chair, Head & Neck Institute



Dane J. Genther, MD, FACS
Staff, Facial Plastic and Microvascular Surgery

Case

In 2019, a 7-year-old patient presented to Patrick Byrne, MD, MBA, Chair of Cleveland Clinic's Head & Neck Institute, with congenital facial paralysis. She was unable to move the right side of her face, which impaired her ability to express emotion, smile or close her right eye. Two years later, she followed up in clinic with Dr. Byrne and also Dane Genther, MD, a facial plastic and reconstructive surgeon in the Head & Neck Institute who specializes in the treatment of facial paralysis. Her inability to smile and her weak lower eyelid made her a good candidate for facial reanimation with the use of a gracilis free muscle transfer. This microvascular surgical procedure has become the gold standard for the management of long-standing facial paralysis. Historically, it has been performed using a single muscle belly, which is placed in a manner that allows elevation of the corner of the mouth. Dr. Byrne and others have in recent years developed innovations in an effort to more accurately recreate natural facial expression. This includes the use of multiple motor nerves and multiple muscle slips. Most recently, Dr. Byrne has developed "tri-vector" flaps through which not only multiple smile vectors are achieved, but also emotional movement around the eyes. To their knowledge, this is a unique approach worldwide, not only in adults, but now in children.

Dr. Byrne and Dr. Genther performed her facial reanimation procedure as a closely coordinated team. Dr. Byrne prepared the face and elevated tissue to get access to the nerves. He also elevated the skin and the fat all the way to the corner of the mouth to allow for placement of the flap. While Dr. Byrne focused on the patient's face, Dr. Genther harvested the sural nerve from the patient's lower leg for the cross-facial nerve graft and harvested the gracilis free flap from her thigh. The rest of the surgery was performed in collaboration to carefully position and secure the flap,

using microsurgical techniques to reconstruct the blood vessels and nerves. Brandon Hopkins, MD, a Cleveland Clinic pediatric head and neck surgeon, consulted during the surgery.

The surgery took 12 hours to complete, and the patient responded well. She spent four days in the hospital for careful monitoring before being released home. Swelling in the face remained for a few weeks as expected. "At her last visit, approximately four months after her surgery, she had excellence movement of the corner of her mouth in addition to lower eyelid contraction, leading to the elusive "Duchenne smile." The addition of the third vector to the lower eyelid is the key to this procedure and to achieving a natural appearing smile (Figure 1).

Technique gives patients a more natural-looking smile

While Dr. Byrne and his team have employed and described the tri-vector gracilis technique in adult patients, to the team's knowledge, this is the first instance of the tri-vector reanimation technique being used on a pediatric patient.

The gracilis free flap is the most complex procedure in facial reanimation, and it offers the greatest benefit to patients with severe facial paralysis. For patients who have no functioning facial muscles and/or nerves, the technique can restore movement by replacing the muscles and providing signaling from alternative nerves. For decades, a key



Figure 1. Left: Prior to surgery, the patient was unable to move the right side of her face. Right: Only three months after the procedure, the patient is already able to smile, show teeth and squint around the eyes.

challenge has been in the ability to create the “Duchenne smile.” “The gracilis microneurovascular free flap operation initially started out as just a single vector where a single slip of muscle would pull the lip up and out, but it didn’t do things like show the upper teeth, adequately elevate the upper lip or provide any movement around the eyes,” explains Dr. Genther. “It made your lip move like you were smiling, but it didn’t look natural, and it didn’t look natural or confer a Duchenne smile. To get more of a natural appearance, you need more vectors of movement. Normally, there are six different muscles that move the lip up and out, and trying to achieve all of that with one vector just doesn’t result in as natural of an appearance. In addition, when we naturally smile, our eyes squint a bit. No previous technique has addressed this.”

In both pediatric and adult patients, the surgery is optimally performed with a two-surgeon approach. One surgeon, in this case Dr. Byrne, prepares the face and provides access to all necessary structures, including nerves, blood vessels and locations where the flap will be secured. The incisions used to provide this access are carefully placed to allow them to fade and become camouflaged once they heal. The other surgeon, Dr. Genther for this particular case, harvests the sural nerve for nerve grafting and the gracilis free flap, which is harvested with its associated nerves and blood vessels so blood flow and nerve signal can be restored once placed in the face. Together, they then prepare the gracilis free flap by separating the muscle fibers into different vectors to restore different aspects of the smile. Once prepared, the flap is positioned to provide ideal facial movement. A microscope is then used to meticulously connect all nerves and blood vessels using suture that is thinner than a human hair.

Dr. Genther explains that each vector in this technique has a specific role. One vector is used to move the lip up and out, a shorter one provides additional upper lip elevation and the third vector creates movement around the eye to create the appearance of a genuine smile. Dr. Genther points to Dr. Byrne as one of the people who helped pioneer the tri-vector technique and increase the complexity of the procedure. “As far as we know, this has been the only tri-vector gracilis flap performed in a child,” says Dr. Genther. “This technique has been around for about five years, and it’s been done in adults. But in general, most surgeons aren’t doing it; it’s just Dr. Byrne and maybe a few other people across the country.”

Advantages of multivector reanimation over single-vector

The best candidates for this procedure are those with complete facial paralysis on one side. It is also an option for patients who have incomplete paralysis but don’t have an adequate smile and don’t seem to have recoverable facial muscles. Dr. Genther notes that while all facial paralysis patients are potential candidates for the dual- and tri-vector, a surgeon would not do a tri-vector if the patient had good eye movement. “The purpose of the third vector is to provide lower eyelid movement that is characteristic of a natural spontaneous smile,” says Dr. Genther. “With a Duchenne smile, your lower eyelids will wrinkle a bit.

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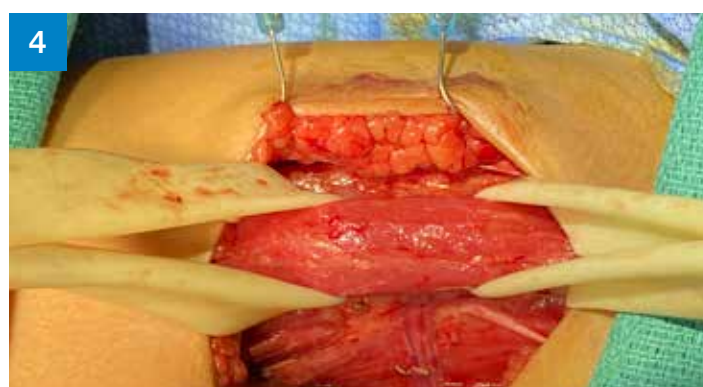


Figure 2. Five sutures are placed to ensure proper placement around the mouth.

Figure 3. The three separate muscle bellies — two for smiling, one for “smiling with the eyes” — are designed.

Figure 4. The segment of gracilis muscle in the leg, prior to separation into three slips.

Figure 5. The donor motor nerves are carefully dissected free.

EXPANDING ACCESS TO CI FOR PATIENTS WITH SINGLE-SIDED DEAFNESS

New research shows significant improvement for individuals who exceeded the FDA-labeled 5% word recognition ability.



Sarah A. Sydlowski,
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Hearing loss has meaningful and quantifiable consequences for the listener, even when only one ear is affected. This is particularly true for patients with single-sided deafness (SSD) or asymmetric hearing loss (AHL), which is when the poorer hearing ear receives limited or no benefit from a hearing aid.

Individuals with one unaidable ear commonly report perceived hearing handicap at severe levels.¹ Individuals listening to the world with one ear have difficulty localizing sound, hearing sounds from the deafened side and understanding speech in background noise. These problems arise even when their stronger ear has normal hearing. Additionally, the hearing loss in the poorer ear may be accompanied by disabling tinnitus. Many patients report social consequences that include feelings of embarrassment and isolation resulting from the inability to accurately follow conversations in a noisy environment.² The challenges are perhaps intensified by the fact that hearing loss is a nearly invisible disorder, with many communication partners unaware of the disability.³

Using cochlear implantation to improve hearing and quality of life

Cochlear implantation (CI) in cases of AHL and SSD improves speech recognition in both quiet and noisy environments and has been shown to effectively suppress tinnitus and improve localization and quality of life.^{4,5,6} Patients who preoperatively demonstrate elevated levels of stress, depressive symptoms and anxiety show improvement post-CI, and cortical reorganization can be halted and reversed.^{6,7,8,9}

Although CI is a very effective treatment for patients with SSD and AHL, the more traditional approach to determining CI candidacy relies on testing both ears together (i.e., bilateral or “best-aided” hearing). This approach, therefore, overlooks patients with AHL or SSD who could greatly benefit. Additionally, the criteria approved by the Food and Drug Administration (FDA) in July 2019 extends candidacy to patients with AHL or SSD but limits aided word recognition ability to 5% in the ear to be implanted. Conversely, for patients with bilateral hearing



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loss, the poorer hearing ear could achieve up to 60% aided word recognition and still meet candidacy criteria for CI with a short electrode array. Thus, current guidelines for SSD and AHL fail to recognize the candidacy of patients with significantly asymmetric hearing loss, who demonstrate very little functional hearing ability but are still below the threshold for traditional CI in the ear to be implanted. These patients all receive limited benefit from a hearing aid in the poorer ear.

Improving CI access

The Cleveland Clinic Hearing Implant Program is committed to optimizing access to cochlear implantation and closing the vast gap between those who could benefit from this life-changing technology and those who receive it. We consider the capability of each ear independently and recommend CI anytime we

expect improved outcomes for that side, independent of the capability of the contralateral ear (except in cases where we are limited by payer restrictions, e.g., Medicare Part B). We aim to determine CI candidacy as soon as limited benefit from a hearing aid can be confirmed. To this end, we rely heavily on low-context stimuli, such as Consonant-Nucleus-Consonant word lists, to isolate the capabilities of the ear in question rather than allowing the patient's ability to use higher-level processing to decode incomplete information to cloud our clinical decision-making.

It has been estimated that only 3%-5% of potential CI candidates receive an implant, leaving nearly 1 million candidates nationally who hear poorly and could benefit from this technology.

We retrospectively reviewed the charts of 63 adults with AHL (N = 48) or SSD (N = 15) approved for implantation using this ear-specific, word recognition-based approach. Both word and sentence ability in the implanted ear improved in cases of SSD and AHL, often after one month of listening experience. For both groups, the majority of individuals demonstrated improvement. Most important, significant improvement was noted for individuals who exceeded the FDA-labeled 5% word recognition ability.

It is important to note that we strongly encourage streamed auditory training for 30-60 minutes per day at least five days per week in the three to six months after activation. In our experience, isolating the implanted ear to allow for focused practice with the CI is critical to success; thus motivation to restore binaural hearing and a willingness to undergo a

rehabilitative therapy program are essential to our candidate selection process.

Looking ahead, our focus is on removing barriers to CI for our patients. It has been estimated that only 3%-5% of potential CI candidates receive an implant, leaving nearly 1 million candidates nationally who hear poorly and could benefit from this technology.¹⁰ By focusing on maximizing hearing for everyone in every ear, our program will successfully do its part to close the gap.

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EXPANDING THE ROLE OF APPS HELPS BOTH PATIENTS AND PHYSICIANS

By changing the patient access flow, patients are able to see the right provider faster, and surgeons are able to spend more time in the OR and less time in clinic



**Patrick J. Byrne,
MD, MBA**
*Chair, Head & Neck
Institute*

Cleveland Clinic's Otolaryngology/Head and Neck surgery department has historically focused on tertiary and quaternary care. This focus on highly subspecialized, complex surgical care is, and will always remain, a key distinguishing feature of Cleveland Clinic. Most residents who graduate from Cleveland Clinic and similar top-tier academic training programs pursue subspecialty training. Advanced cancer care, complex head and neck reconstructive surgery, and both anterior and lateral skull base surgery fall within these domains.

At the same time, Cleveland Clinic's Head & Neck Institute aspires to provide the entire spectrum of care for all conditions related to the head and neck. Much of this care across the nation is provided by otolaryngologists who choose not to specialize, and these "comprehensive otolaryngologists" serve a vital function in society. This practice model has been challenged in recent years by a variety of factors. In addition to the popularity of subspecialization, many private practices have undergone consolidation. In Northeast Ohio, very few private otolaryngology practices exist, with most having been incorporated into academic systems. Payment reform, along with the increased burden of regulation, has led to pressures on nonspecialist surgeons to see a higher number of patients. In otolaryngology, this means that a reasonable percentage of one's practice may end up focusing on nonsurgical or "medical" otolaryngology.

Patrick Byrne, MD, MBA, the Chair of the Head & Neck Institute, views these dynamics as concerning. He believes that the institute can use its resources more effectively and efficiently by rethinking how to provide the entire spectrum of care for otolaryngology/head and neck surgery. One of these solutions is the expanded use of advanced practice providers (APPs).

"Most surgeons really like to operate. Many conditions that fall within the scope of practice for comprehensive otolaryngology are nonsurgical in nature. We believe that investing in top-of-license activity is smart for a lot of reasons," says Dr. Byrne. "We're doing so in a number of ways. One way is that we're dramatically expanding the number of APPs we have. We have more than tripled the number of nurse practitioners and physician assistants who

work within the Head and Neck Institute over this past year. I have been blown away by the quality and professionalism of the APPs at the institute."

Dr. Byrne says that the institute intends to keep growing this cadre of providers and is training them across the spectrum of otolaryngology/head and neck surgery. A certain percentage of these APPs will function as comprehensive APPs, but there will also be APPs who will function as highly specialized providers across the subspecialties, including in facial plastic surgery, head and neck cancer, rhinology, laryngology, otology and pediatrics.

Improving access for patients, freeing up time for surgeons

The increased number of APPs and their incorporation into the care path will allow the institute to rework its patient access flow and make sure that patients are seeing the right provider quickly. "As our comprehensive APPs develop their capacity and skill set, they will become the way for many patients to initially encounter our institute," says Dr. Byrne. "This is not a novel concept, although it is certainly being leveraged to a greater degree in other fields than ours, but we are confident this is the right way to go. Instead of patients waiting a long time to see a surgical subspecialist who really doesn't focus on their problem, we'll have an experienced and highly trained provider who really focuses on the problem they're presenting with, and who can meet the patient more quickly and spend more time with them. In a sense, we're clarifying medical otolaryngology versus surgical otolaryngology."

Dr. Byrne sees a great number of benefits for both patient and provider by turning to this model of care. He believes that as the institute develops its ability to manage care this way, it will see the percentage of surgical patients in the clinics of comprehensive otolaryngologists progressively increase over time. Patients will get to see the right type of provider, who cares passionately about the condition because they have devoted their life to treating these conditions, and providers will get to practice the kind of medicine that really motivates them. The average cost of care will also go down as the institute transfers this care into the hands of APPs. Surgeons benefit because as the APP's take on more responsibility managing medical conditions, chronic disease and even seeing some postops,

surgeons can increase the amount of time they spend in the operating room, while decreasing the amount time they spend in clinic. Dr. Byrne believes this will help Cleveland Clinic not only recruit the most talented people but also retain them.

To better illustrate why the Head & Neck Institute is taking this approach, Dr. Byrne points to back pain as an example of how other specialties have streamlined care this way. Many centers around the country have learned intelligent ways to quickly triage incoming patient calls and, based on a fairly concise number of questions, direct the patient to either a medical provider or a surgical provider. This approach speeds up access, increases the quality of care, improves the quality of the experience, improves provider job satisfaction and lowers the overall cost of care.

“We envision a future in which APPs are integrated within a team throughout virtually all aspects of care. One example is the management of urgent consults,” says Dr. Byrne. “Oftentimes, patients present in emergency departments with peritonsillar abscesses or significant nosebleeds, and they can’t access a specialist. Their care is delayed, which often necessitates transfer to another facility. Our surgeons and APPs believe that by using experienced and highly trained APPs with oversight, we can achieve at least an equivalent level of quality and safety for epistaxis management and peritonsillar abscess drainage as we do with our current model. Many of our APP applicants are excited that they can be proceduralists as well. So while I do frame

it in part as medical versus surgical, which is APPs versus surgeons, there is this hybrid set of diagnoses, which really are procedural, and we envision APPs expertly managing these moving forward.”

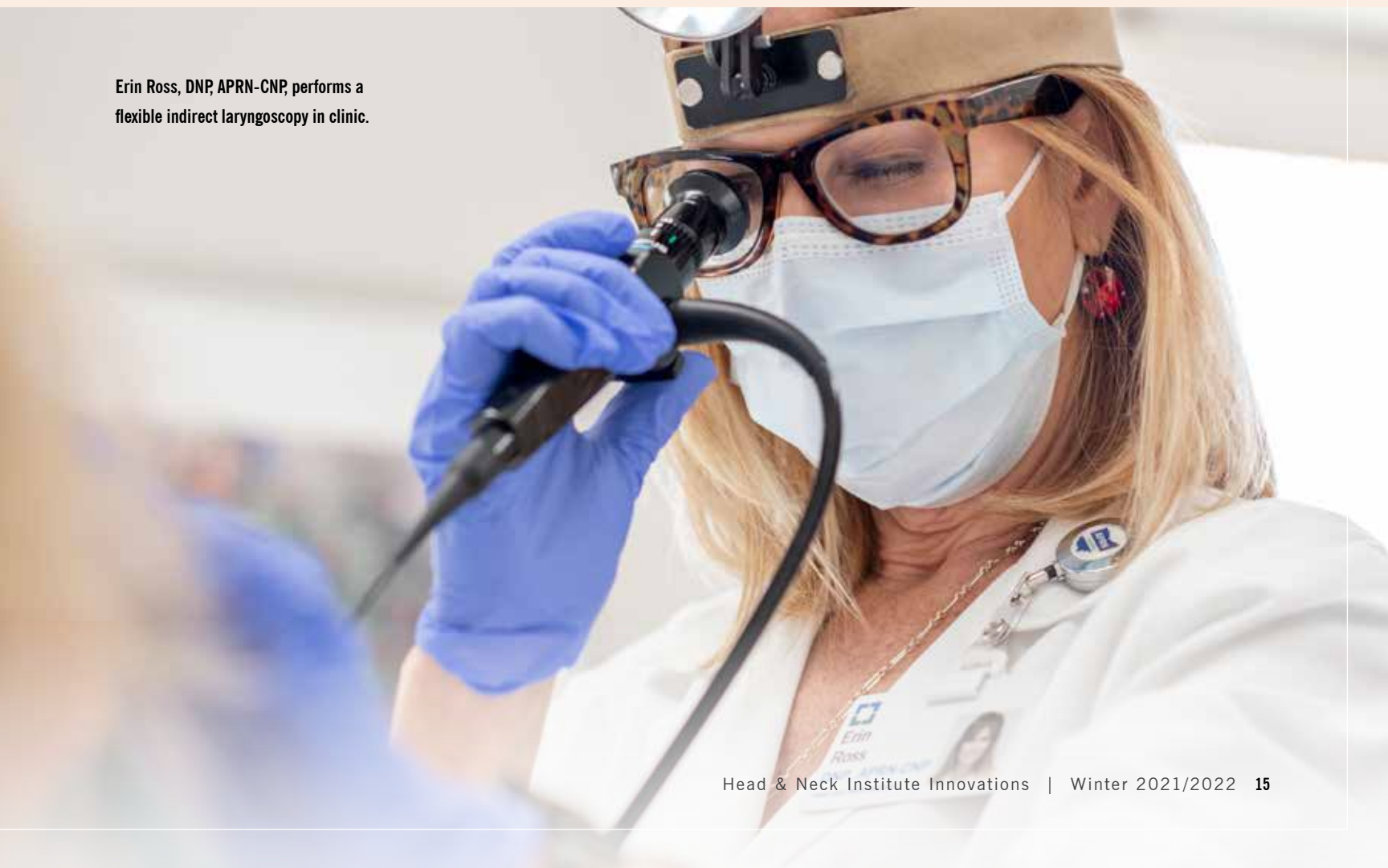
Where the program is presently

Marilyn Davies, a nurse practitioner in the Head & Neck Institute, is Director of the institute’s APP program and has spearheaded its expansion. “When I had my first meeting with Dr. Byrne and Trish Hirkala, PA-C, who was our APP director at the time, we discussed the roles of our APPs and this expansion plan he envisioned. After planning and meeting with staff, we put the wheels in motion to hire and onboard these new providers.”

“The APPs have spent five months just in training,” says Davies. “They have been rotating through, shadowing physicians and working side by side with them in clinic. There’s also a very big educational component to the program involving readings and lectures. Then, the transition into a fully functioning clinic is very gradual.”

Davies explains that the APPs in the program are all currently stationed, and while they are only seeing a few patients per clinic day, they will soon see 15 or more patients per day. “They’re also colocated with a surgeon,” she says. “So any single APP can go over to that surgeon and ask a question. In fact, the surgeon can also pop in at this stage, if it’s necessary. The feedback I’ve gotten from the physicians and the APPs is very positive. We’re approaching this in a really smart way that we feel will really pay off for our patients.”

Erin Ross, DNP, APRN-CNP, performs a flexible indirect laryngoscopy in clinic.



SURGEONS PERFORM TRI-VECTOR REANIMATION IN PEDIATRIC PATIENT

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When your eyes don't wrinkle, observers notice that movement is missing, and your smile can appear inauthentic."

Dr. Genther points out some additional advantages of the multivector reanimation beyond improving a patient's smile. Because a gracilis muscle adds a variable amount of bulk to the face, using just one vector can lead to too much bulk in one area. However, a multivector approach spreads the bulk out. Patients who have had previous surgery or congenital paralysis, tend to have atrophy of those areas, so the bulk from the gracilis can improve the symmetry of their face.

One of the primary reasons that the technique is not used more frequently is the level of comfort that is required, explains Dr. Genther. "The surgeon must be comfortable with actually separating the different gracilis muscle slips and keeping them viable," he says. "For most surgeons, doing the single vector is tough enough, and there's a sense that they don't want to mess with a good thing. But we have been doing this tri-vector technique frequently. We've been developing it and perfecting it, so we have a comfort level that allows us to provide improved outcomes with these more complex techniques."

Head & Neck Institute Innovations | WINTER 2021/2022

Head & Neck Institute Innovations offers information from Cleveland Clinic otolaryngologists, speech pathologists, audiologists and dentists about new and emerging medical, surgical and rehabilitative techniques. It is written for physicians and should be relied on for medical education purposes only. It does not provide a complete overview of topics covered and should not replace the independent judgment of a physician about the appropriateness or risks of a procedure for a given patient.

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SPEECH PATHOLOGISTS CONDUCT REAL-TIME VOICE ASSESSMENTS IN THE OR

continued from p. 5

of time allows the patient and me to get to know each other," she reveals. "So when I go to test them in the OR, I already know their vocal behavior, how their voice sounds and some tools that have worked in the clinic prior to the procedure. Plus, knowing I'll be in the OR with them helps calm their nerves."

"Speech pathologists are skilled at getting patients to release vocal tension," Adessa explains. "If they have compression in their throat muscles, this can make it challenging to get an accurate picture of what's going on. Fortunately, I have tools and therapy tasks that can help prevent the patient from squeezing their throat during the procedure."

Since joining the OR team six months ago, Adessa has noticed that her speech pathology skills have had a positive impact on her patients. "They seem to feel cared for and respond well to the therapy," she says. "We hope this will lead to happier patients and better long-term outcomes."

Interdisciplinary team of experts

Patients at the Voice Center benefit from the expertise of a collaborative, interdisciplinary team, which includes voice-specialized speech-language pathologists, laryngologists, otolaryngology residents and a laryngology fellow.

"We all understand our individual roles and work together to assess patients and optimize their voices," explains Adessa. "As speech pathologists, we concentrate on patient behavior and voice quality. This allows the laryngologists to focus on the procedures while we focus on the patient experience."

Follow-up care

Adessa may see the patient for a few follow-up sessions after the laryngologist fits the patient for the new implant. "Since the surgeon is essentially giving them new vocal folds, their body needs to adapt," she explains. "Or we may need to tweak the patient's vocal technique to ensure they're using their voice efficiently. It's very rewarding to help patients improve their communication and quality of life."

NEW STAFF



Natalie Silver, MD
Director, Head and Neck Cancer
Research



Ksenia Aaron, MD
Staff, Otology; Director of Diversity,
Equity and Inclusion



Mingsi Li, MD
Staff, Comprehensive Otolaryngology



Jeffery Wells, MD
Staff, Comprehensive Otolaryngology



Rebecca Chota Nelson, MD
Staff, Laryngology

NEW POSITIONS



Troy Woodard, MD
Surgical Director, Beachwood
Ambulatory Surgical Center



Mohamad Chaaban, MD
Director, Head & Neck Institute
Research



Raj Sindwani, MD, FACS, FRCS (C)
Vice Chair, Quality Improvement



Brandon Hopkins, MD
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