MASSACHUSETTS EYE AND EAR

Quality and Outcomes

Department of Otolaryngology

2018

Photo by John Earle.

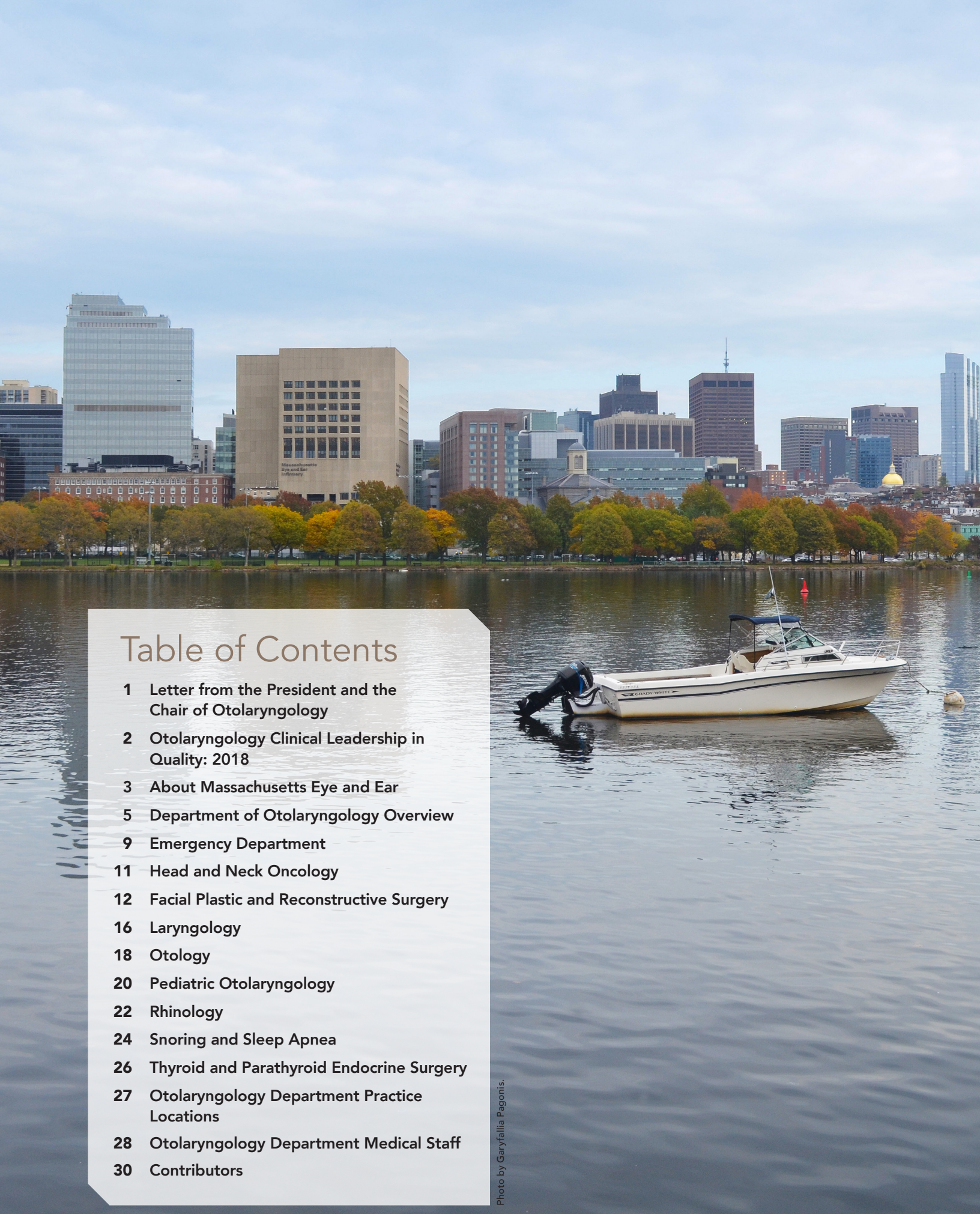

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Photo by Garyfallia Pagonis.

Leading the way in making outcomes data publicly available...

Dear Colleagues in Healthcare,

As a department driven by a mission to find better treatments and cures for otolaryngology conditions, including deafness and diseases of the head and neck, we are continuously evolving in order to best serve our patient population. Specializing in a field that focuses on the delicate and complex structures of the head and neck makes it imperative to always be at the forefront of science and setting high standards of care to improve the lives of our patients.

One way we accomplish this is by leading the way in the development of otolaryngology outcome measures. Since 2010, *Quality and Outcomes* has provided us with an avenue for transparency, accountability in our work and documenting our improvements. By sharing a variety of outcomes from our subspecialty divisions, we hope to help determine some of the universal standards that should be reported by our discipline and to provide patients with the insights they seek when turning to us for life-altering care.

As you read through the pages of our 2018 book, which shares data through 2017, we hope to encourage a dialogue among you and other colleagues in the field. Our goal is to not only provide benchmarks for our work but to also empower other institutions to report on their outcomes.

The Board of Quality Care Committee and the Steering Committee for Quality at Massachusetts Eye and Ear would like to thank the Vice Chair of Quality and Safety for Otolaryngology, Dr. Christopher Hartnick, for his leadership in this project. We also wish to thank the clinicians, technicians, nurses and other staff at Mass. Eye and Ear who work so hard to provide the highest quality care each day.

For more information about Mass. Eye and Ear's Quality Program initiatives, please visit our website at **MassEyeAndEar.org/Quality**.

John Fernandez
President
Massachusetts Eye and Ear

D. Bradley Welling, MD, PhD, FACS
Walter Augustus Lecompte Professor and Chair of Otolaryngology,
Harvard Medical School

Chief of Otolaryngology,
Massachusetts Eye and Ear,
Massachusetts General Hospital

Otolaryngology Clinical Leadership in Quality: 2018

D. Bradley Welling, MD, PhD, FACS
Walter Augustus Lecompte Professor and Chair of Otolaryngology,
Harvard Medical School
Chief of Otolaryngology, Massachusetts Eye and Ear,
Massachusetts General Hospital

Mark A. Varvares, MD, FACS
Associate Chair of Otolaryngology, Massachusetts Eye and Ear,
Harvard Medical School

Rachel Wasserstrom, MBA
Vice President for Otolaryngology, Massachusetts Eye and Ear

Christopher J. Hartnick, MD, MS
Professor of Otolaryngology, Harvard Medical School
Vice Chair of Quality and Safety, Department of Otolaryngology,
Massachusetts Eye and Ear
Director, Pediatric Otolaryngology, Massachusetts Eye and Ear

Eileen Lowell, MM, BSN, RN
Vice President of Patient Care Services, Chief Nursing Officer,
Massachusetts Eye and Ear

About Massachusetts Eye and Ear

Founded in 1824, Massachusetts Eye and Ear is a pre-eminent specialty, teaching and research hospital dedicated to caring for disorders of the eyes, ears, nose, throat, head and neck. Our dedicated staff provides primary and subspecialty care and serves as a referral center for inpatient and outpatient medical and surgical care.

Mass. Eye and Ear is the leading authority in its specialties throughout the Northeast and is a resource globally for advances in patient care, research and education. As the primary academic medical center for Harvard Otolaryngology, and the hub of its research and teaching facilities, Mass. Eye and Ear encourages multidisciplinary and interdisciplinary pursuits across patient care, research and education. Seminal contributions to these three mission-critical areas span nearly two hundred years and have shaped the hospital's reputation and success as a national and global center of excellence.

Pivotal to our clinical quality efforts is the use of Partners eCare, a highly integrated health information system. Partners eCare is utilized by a large segment of Harvard Medical School's network of hospitals and affiliates, facilitating quick and easy communication amongst referring physicians and Mass. Eye and Ear's consulting ophthalmologists, otolaryngologists and radiologists.

2017 Ophthalmology and Otolaryngology Hospital Statistics

(January 1 – December 31, 2017)

Patient Volume

All services at Mass. Eye and Ear locations by faculty and non-faculty physicians.

Outpatient Services*	491,704
Ambulatory Surgery Services	32,717
Inpatient Surgical Services	1,015
Emergency Department Services	20,172
Discharges	1,279
Beds	41
Overall Operating Revenue#	$454,538,656

*All clinic visits, ambulatory surgery services and Emergency Department services
#All sites, clinical and non-clinical

20 Locations

Mass. Eye and Ear Boston
Main Campus
Longwood

Mass. Eye and Ear North
Malden
Medford
Stoneham
1 Montvale Avenue
Stoneham
41 Montvale Avenue

Mass. Eye and Ear West
Concord
Newton
Waltham
Wellesley

Mass. Eye and Ear South
Braintree
Duxbury
East Bridgewater
Harwich
Mashpee
Milton
Plainville
Providence
Quincy
Weymouth

For more information, visit MassEyeAndEar.org/Locations.

Photos by Garyfallia Pagonis and John Earle.

Massachusetts Eye and Ear Otolaryngology Department

The Massachusetts Eye and Ear/Harvard Medical School Department of Otolaryngology is committed to delivering excellence in clinical care, research, teaching and service. We provide comprehensive medical and surgical care in a variety of subspecialties in the field of otolaryngology, including:

- Audiology
- Comprehensive Otolaryngology
- Dermatology
- Facial Nerve Disorders
- Facial Plastic and Reconstructive Surgery
- Head and Neck Oncology
- Laryngology
- Otology and Neurotology
- Otoneurology
- Pediatric Otolaryngology
- Rhinology
- Sleep Disorders
- Speech and Language Pathology
- Thyroid and Parathyroid Endocrine Surgery
- Vestibular Disorders

With a large and productive community of otolaryngology researchers, we are also a center of research in these areas. We have a long history of medical breakthroughs, including the discovery of stem cells in the adult inner ear and, more recently, elucidating synaptopathy related to noise damage in the inner ear. Our head and neck research team has also defined a subtype of cells most likely to metastasize in a groundbreaking study published in *Cell*.

Working alongside clinical and research fellows, residents and doctoral students, our investigators probe basic biology in order to develop leading-edge treatments for otolaryngoloic disorders.

For more information about the Mass. Eye and Ear Quality Program or the Department of Otolaryngology, please visit our website at MassEyeAndEar.org.

Department Highlights:

- A primary teaching hospital and coordinating center for Harvard Medical School's Residency Program in Otolaryngology – Head and Neck Surgery.
- Home to a large community of otolaryngology researchers, including those from the Eaton-Peabody Laboratories of Auditory Physiology; Lauer Tinnitus Research Center; Jenks Vestibular Physiology Laboratory; Jenks Vestibular Diagnostic Laboratory; Norman Knight Center for Hyperbaric Medicine; National Temporal Bone, Hearing and Balance Pathology Resource Registry; Otopathology Laboratory; Facial Nerve Regeneration Laboratory; Carolyn and Peter Lynch Center for Laser and Reconstructive Surgery; Tillotson Cell Biology Unit; Voice and Speech Laboratory; Dystonia and Speech Motor Control Laboratory and Berthiaume Surgical Photonics and Engineering Laboratory.

Clinical Affiliations:

- Massachusetts General Hospital (MGH)
  - Mass. Eye and Ear physicians and audiologists provide comprehensive and subspecialty care to otolaryngology patients, including consultations and coordination of inpatient consultations for urgent patient care concerns and newborn infant auditory screenings.
- Mass. Eye and Ear Suburban Centers for Otolaryngology
  - Mass. Eye and Ear physicians and audiologists provide comprehensive community-based care throughout the Greater Boston area, with locations in the Longwood medical area, Braintree, Concord, Duxbury, East Bridgewater, Harwich, Mashpee, Medford, Milton, Newton, Quincy, Stoneham, Wellesley and Weymouth.
- Mass. Eye and Ear Balance and Vestibular Center at Braintree Rehabilitation Hospital
  - Mass. Eye and Ear specialists provide comprehensive vestibular diagnostic services in addition to otologic and neurologic assessment and care in a specialty clinic housed at the Braintree Rehabilitation Hospital.

Academic Affiliations:

- Massachusetts General Hospital
- Beth Israel Deaconess Medical Center
- Boston Children's Hospital
- Brigham and Women's Hospital

Otolaryngology Resources at Massachusetts Eye and Ear

24/7 Emergency Care

New England's only dedicated otolaryngology emergency service available for walk-ins with staff coverage 24 hours a day, seven days a week.

Audiology Services

Through the Department of Audiology, we offer a full range of diagnostic and treatment services for patients with hearing loss. This includes newborn screenings, hearing aid services, audiometry exams and cochlear implant and auditory rehabilitation services for adults and children.

Balance and Vestibular Testing

We offer clinical vestibular testing in the Jenks Vestibular Diagnostic Laboratory and at the Mass. Eye and Ear Balance and Vestibular Center in Braintree, which both have highly trained staff and the latest equipment to aid in the diagnosis of vestibular and balance disorders.

Facial Nerve Center

We provide full diagnostic, surgical and rehabilitative services for patients with facial paralysis and movement disorders.

Head and Neck Oncology Services

With the most up-to-date and effective evaluation and treatment modalities for patients with head and neck cancer, we offer advanced techniques in ablative and reconstructive surgery in collaboration with Massachusetts General Hospital's medical oncology, radiation oncology, robotic and proton beam facilities.

Laryngology Services

We provide care to patients suffering from all voice disorders, including neurolaryngology disorders, laryngeal cancer, vocal fold paralysis, recurrent respiratory papillomatosis, vocal fold keratosis and voice, swallowing and airway disorders.

Pediatric Airway, Voice and Swallowing Center

Through the Pediatric Airway, Voice and Swallowing Center, we perform assessments and treatments of a wide spectrum of such congenital, developmental and acquired disorders in children.

Sinus Center

We provide advanced clinical care to patients with diseases of the nose and sinuses, which includes olfactory evaluation (smell).

Skin Treatments

The Mohs Cutaneous Surgery Unit and the Carolyn and Peter Lynch Center for Laser and Reconstructive Surgery provide care for a wide array of dermatologic disorders and skin cancers.

Snoring and Sleep Apnea Services

We provide polysomnography sleep diagnostic studies for assessment of adults and children with sleep disturbances.

Thyroid and Parathyroid Diagnostic and Surgical Care

For patients with thyroid and parathyroid diseases, we offer diagnostic and surgical services with world-renowned expertise in nerve preservation and electrophysiological intraoperative monitoring.

Voice and Speech Laboratory

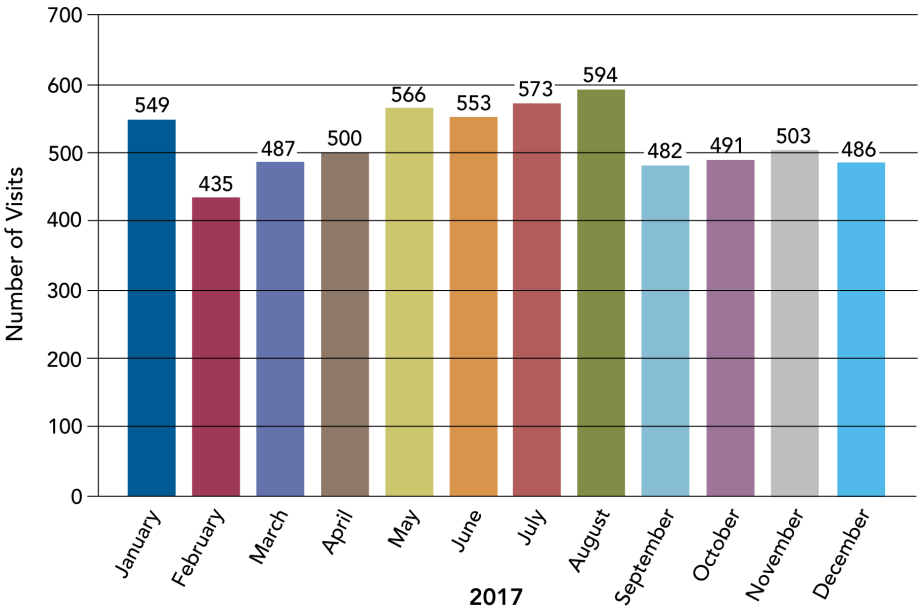
We have a dedicated center that provides state-of-the-art acoustic and video diagnostic facilities, technicians and therapists.

Complete Integration

Our patients have access to all hospital support services and infrastructure, including social work and discharge planning, the Howe Library, clinical and research IT, a medical unit, a radiology unit, child life specialists, a surgical pathology unit, international program and language translation support, dietary support and pharmacy services.

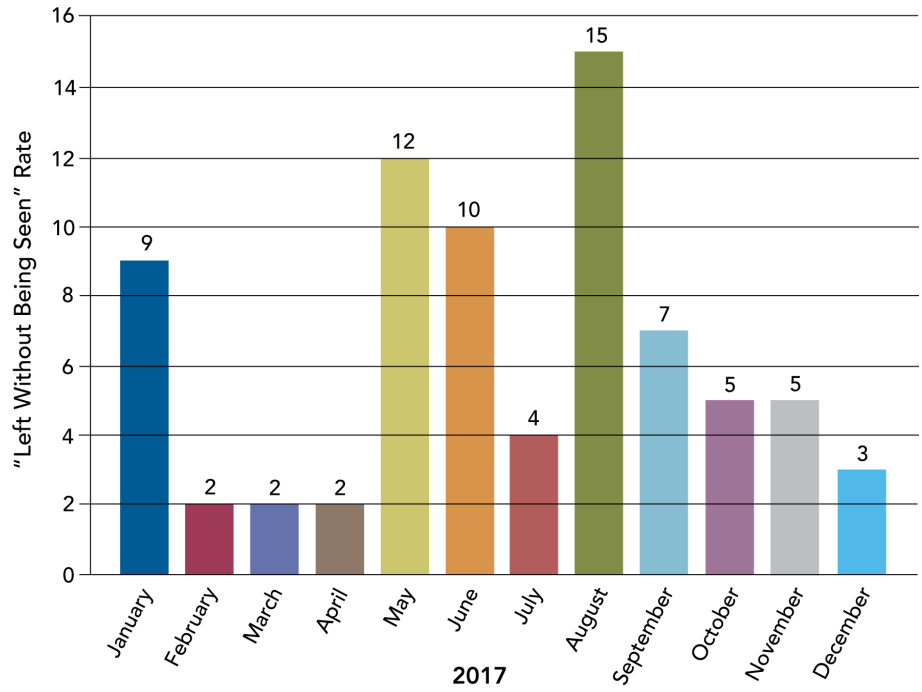
Otolaryngology Emergency Visits

The bar graph shows the number of otolaryngology initial encounters by the Mass. Eye and Ear Emergency Department during each month of calendar year 2017. Throughout this time, the Emergency Department maintained a high volume of otolaryngologic emergency visits, with an average of 518.25 encounters per month.



Otolaryngology "Left Without Being Seen" (LWBS) Rate

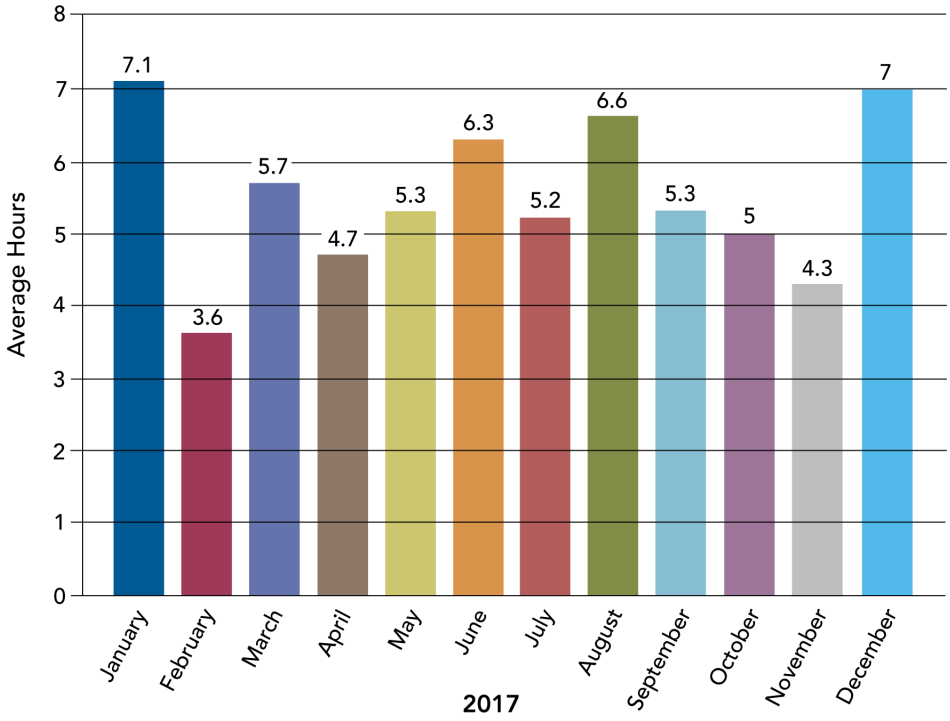
"Left without being seen" (LWBS) refers to patients who present to an emergency department but leave before being seen by a physician. The Mass. Eye and Ear Emergency Department reported a LWBS rate of 1.2 percent (76 patients for all 6,219 initial otolaryngologic emergency encounters) in calendar year 2017.



Mass. Eye and Ear provides the region's only dedicated otolaryngology emergency service with staff coverage 24 hours a day, 7 days a week. The department provides care for otolaryngology emergencies on a walk-in basis.

Otolaryngology Visit Times

The average otolaryngology visit time in the Mass. Eye and Ear Emergency Department for calendar year 2017 was 5.5 hours. The visit time is defined as the total time from when the patient walked in the door of the Mass. Eye and Ear Emergency Department to when the patient finished the visit with the otolaryngologist. It encompasses the registration process, any testing (e.g., audiograms, imaging), administration of IV fluids and medications and review of discharge instructions.



Distribution of Top Twenty Urgent Otolaryngology Diagnoses

During calendar year 2017, there were 6,219 otolaryngologic emergency initial encounters to the Mass. Eye and Ear Emergency Department. The top twenty urgent diagnoses represent a majority of those total encounters and are listed below.

- Impacted earwax
- Nosebleeds
- Ear pain
- Swimmer's ear
- Hearing loss
- Ear infection
- Respiratory symptoms
- Tinnitus
- Dizziness
- Tonsillitis
- Postprocedural hemorrhage
- Disorders of nose and nasal sinuses
- Foreign body in ear
- Peritonsillar abscess
- Sinusitis
- Neck mass/swelling
- Headache
- Sore throat
- Eustachian tube dysfunction
- Swallowing difficulties

Nodal Counts in Early Oral Cancer

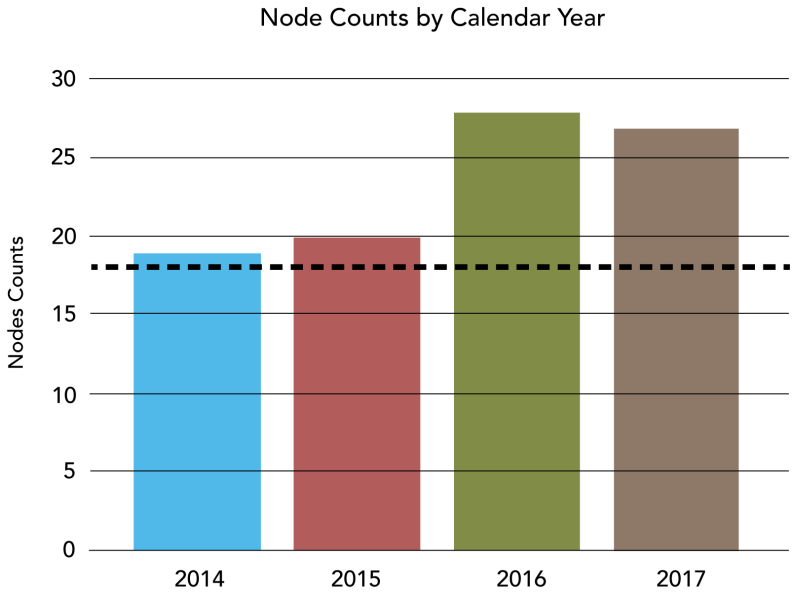
Oral cavity cancer is common with 32,670 cases reported annually in the United States.[1] This is a cancer associated primarily with tobacco and alcohol use and surgery remains the mainstay of treatment.

Surgery to manage oral cancer addresses not only the primary site (tongue, jaw, floor of mouth), but also the draining lymph nodes in the neck. Lymph nodes are removed when there is a clinically obvious spread (seen in the form of a lump in the neck) and, in patients without obvious disease, when the extent of disease at the primary site predicts a 20 percent or greater likelihood of microscopic neck disease being present. A recent study has shown better survival when patients that fit this latter category had their neck nodes removed rather than waiting until a lump shows up in the neck.[2] This is called an elective neck dissection.

The number of lymph nodes harvested in an elective neck dissection for oral cancer has been suggested as a quality metric in head and neck surgery. Recent studies have linked the number of lymph nodes harvested to outcomes, suggesting that a minimum of 18 lymph nodes should be removed in elective neck dissections.[3,4]

We have been tracking our nodal counts in elective neck dissections since 2010. Our average node count over the interval from 2010 to 2017 is 23. The year-by-year average for the last four years is shown in Figure 1.

Figure 1.



Mass. Eye and Ear is committed to providing the best care possible to head and neck cancer patients. We believe that our neck dissection node counts, which are above the suggested threshold for quality, are a reflection of that commitment.

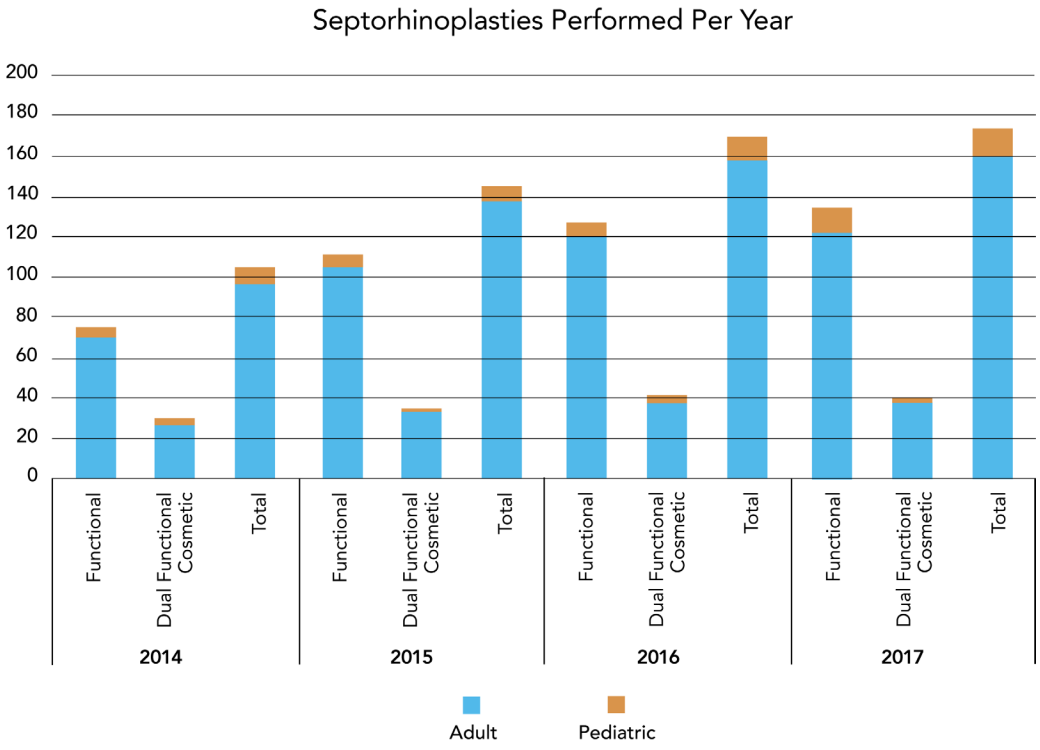
References

[1]Siegel RL, Miller KD, Jemal A. Cancer statistics, 2017. CA: A Cancer Journal for Clinicians. 2017;67(1):7–30. [2]D'Cruz AK, Vaish R, Kapre N, Dandekar M, Gupta S, Hawaldar R, Agarwal JP, Pantvaidya G, Chaukar D, Deshmukh A, Kane S, Arya S, Ghosh-Laskar S, Chaturvedi P, Pai P, Nair S, Nair D, Badwe R; Head and Neck Disease Management Group. Elective versus therapeutic neck dissection in node-negative oral cancer. N Engl J Med. 2015 Aug 6;373(6):521–9. [3]Ebrahimi A, Clark JR, Amit M, Yen TC, Liao CT, Kowalski LP, Kreppel M, Cernea CR, Bachar G, Villaret AB, Fliss D, Fridman E, Robbins KT, Shah JP, Patel SG, Gil Z. Minimum nodal yield in oral squamous cell carcinoma: Defining the standard of care in a multicenter international pooled validation study. Ann Surg Oncol. 2014 Sep;21(9):3049–55. [4]Schoppy DW, Rhoads KF, Ma Y, Chen MM, Nussenbaum B, Orosco RK, Rosenthal EL, Divi V. Measuring institutional quality in head and neck surgery using hospital-level data: Negative margin rates and neck dissection yield. JAMA Otolaryngol Head Neck Surg. 2017 Nov 1;143(11):1111–1116.

Functional and Dual Functional Cosmetic Septorhinoplasty

Some cases of nasal obstruction can be caused by septal deviation and nasal valve compromise. To ensure that the techniques used to alleviate symptoms of nasal obstruction in patients with both septal deviation and nasal valve compromise are resulting in significant functional improvement without negatively impacting nasal appearance, we use patient reported and objective outcome measures to evaluate the impact of functional septorhinoplasty on symptoms of nasal obstruction, global quality of life, cosmetic appearance and sleep quality and snoring.

The outcomes measures used are (1) the Nasal Obstruction Symptom Evaluation (NOSE) score, which is a validated disease-specific quality of life measure that measures a patient's symptoms of nasal obstruction, the (2) FACE-Q Nose scale, which is a validated patient reported measure that evaluates a patient's perception of their nasal appearance and (3) the Snoring Outcomes Survey, which is a validated patient reported outcome measure for snoring.



This and the following tables show the procedures performed by one member of the Facial Plastic and Reconstructive Surgery team at Mass. Eye and Ear annually.

Nasal valve compromise cannot be corrected by septoplasty alone and requires correction with a functional septorhinoplasty. This procedure will both straighten the septum, if needed, and open up the nasal passage.

A cosmetic septorhinoplasty aims to change the external appearance of the nose.

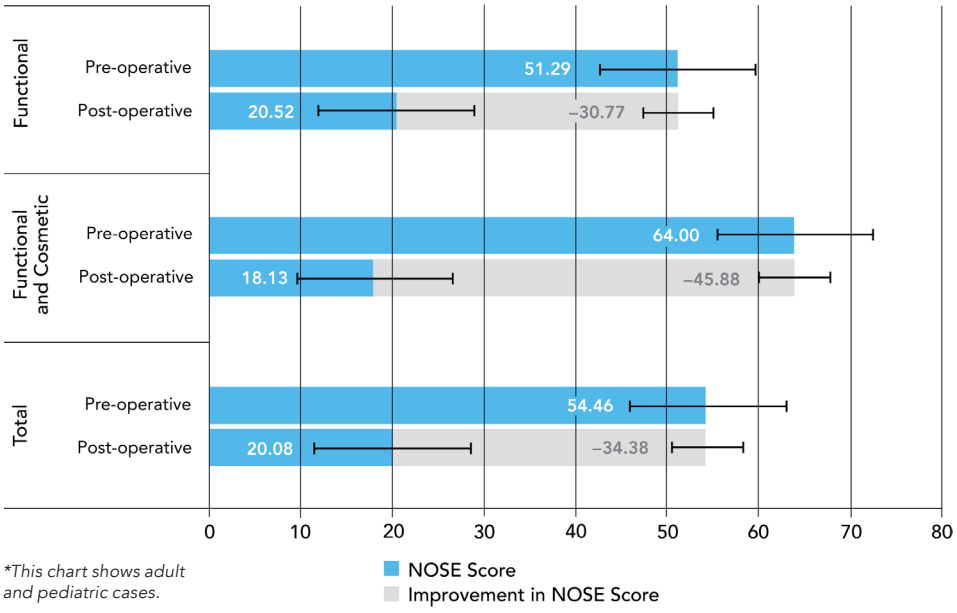
A dual functional cosmetic septorhinoplasty combines both of these procedures into one surgical event.

Disease-Specific Quality of Life Assessment After Functional Septohinoplasty Using NOSE

All functional and dual functional cosmetic septorhinoplasty patients are asked to complete the NOSE Score before and after treatment. It is scored from 0 to 100, with 0 representing no obstruction and 100 representing severe disease. A change in NOSE score of 30 after surgical intervention is clinically significant based upon previous research.[1]

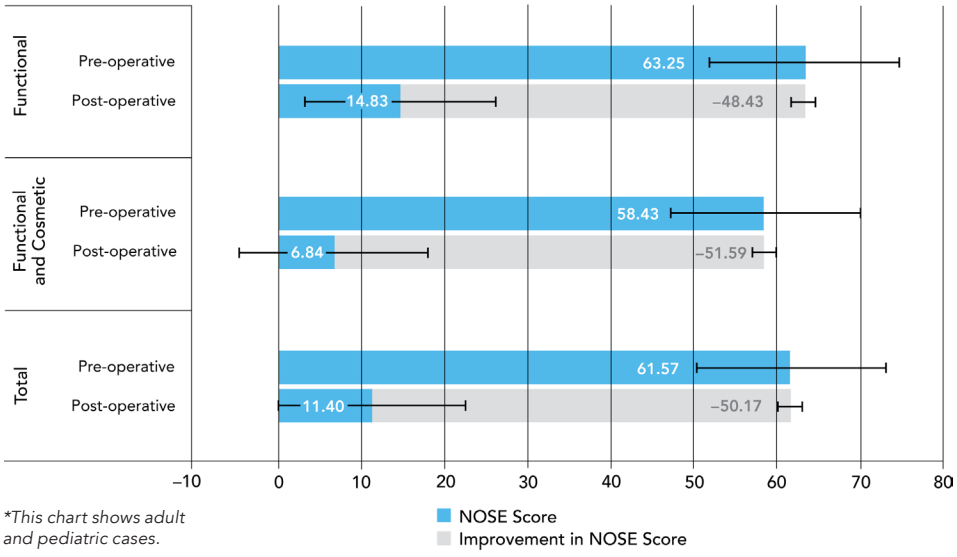
The following data illustrates the change in symptoms of nasal obstruction by year of treatment in patients who underwent functional or dual functional cosmetic septorhinoplasty and completed pre- and post-operative surveys.

2015 Adult and Pedi NOSE Scores



*This chart shows adult and pediatric cases.

2016 Adult and Pedi NOSE Scores



*This chart shows adult and pediatric cases.

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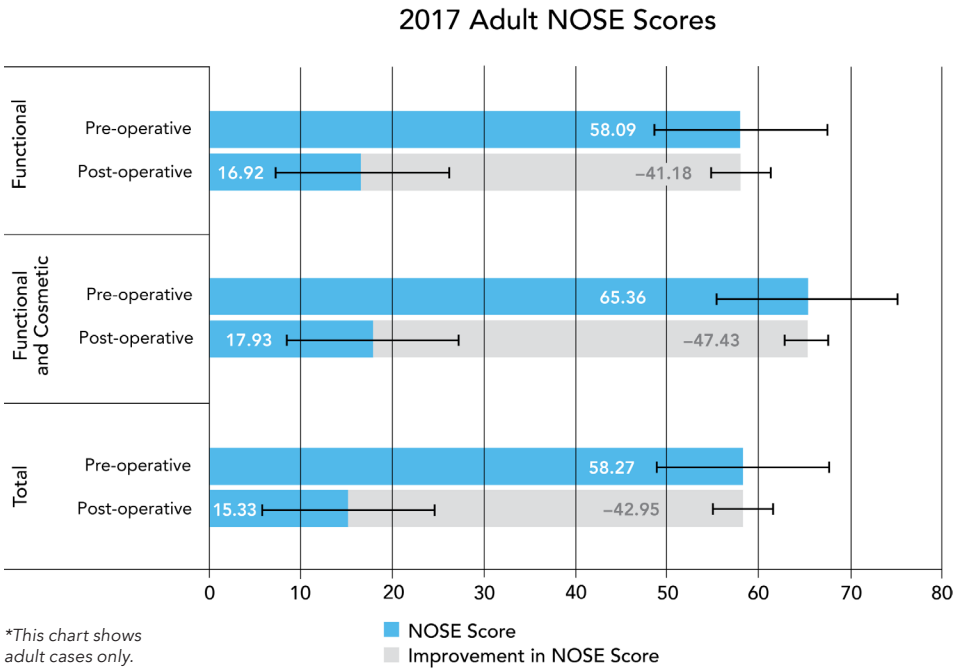
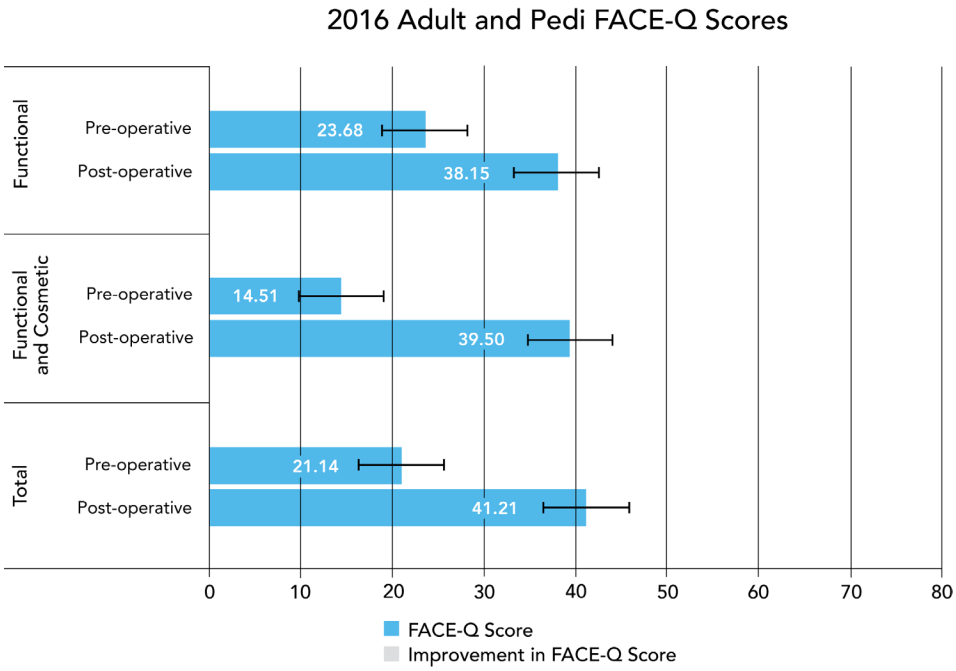
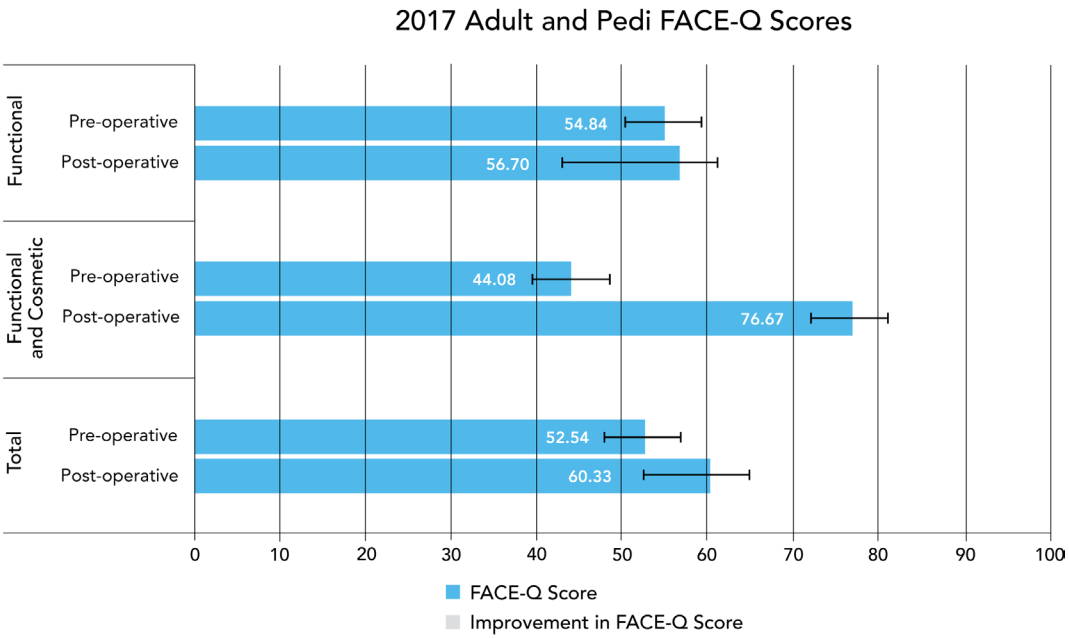


**This chart shows adult cases only.*

Patient Perceived Cosmetic Outcomes After Functional and Dual Functional Cosmetic Septorhinoplasty Using FACE-Q

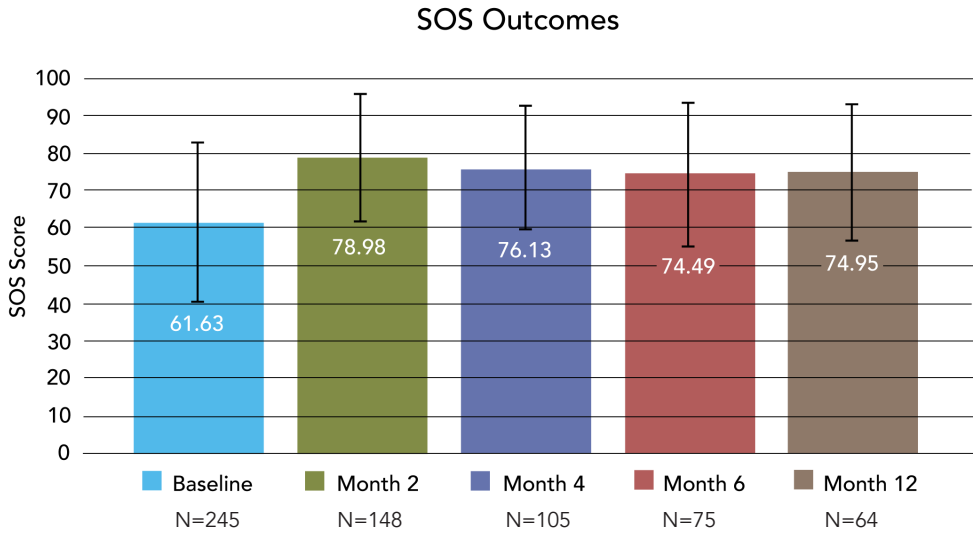
The FACE-Q score first published in 2016[2] is used to ensure that changes made to the nasal structure to improve breathing do not negatively impact the nasal appearance. The following data demonstrate that patients undergoing functional surgery typically feel that their nose appears the same or better after surgery, and patients undergoing both functional and cosmetic septorhinoplasty feel they've had a significant improvement in nasal appearance. With this tool, a higher score than baseline shows improvement.





Snoring Improvement After Functional Septorhinoplasty

Patients are asked to complete the Snoring Outcomes Scale (SOS) survey before and after surgery to determine the impact of functional rhinoplasty on snoring. An increase in the SOS score of 10.57 is considered to be clinically significant. The SOS scores below, which represent data collected from 2014 to 2017, demonstrate an improvement in snoring after isolated functional septorhinoplasty among our patients.



Presented at the American Academy of Facial Plastic and Reconstructive Combined Sections Meeting National Harbor, MD, 2018. Short and Long-Term Improvement in Sleep-Disordered Breathing Outcomes after Functional Septorhinoplasty.

References

[1]*Rhee JS, Sullivan CD, Frank DO, Kimbell JS, Garcia GJ. A systematic review of patient-reported nasal obstruction scores: Defining normative and symptomatic ranges in surgical patients. JAMA Facial Plast Surg. 2014;16:219–25; quiz 32.* [2]*Klassen AF, Cano SJ, East CA, et al. Development and psychometric evaluation of the FACE-Q scales for patients undergoing rhinoplasty. JAMA Facial Plast Surg. 2016;18:27–35.*

Paradoxical Vocal Fold Motion

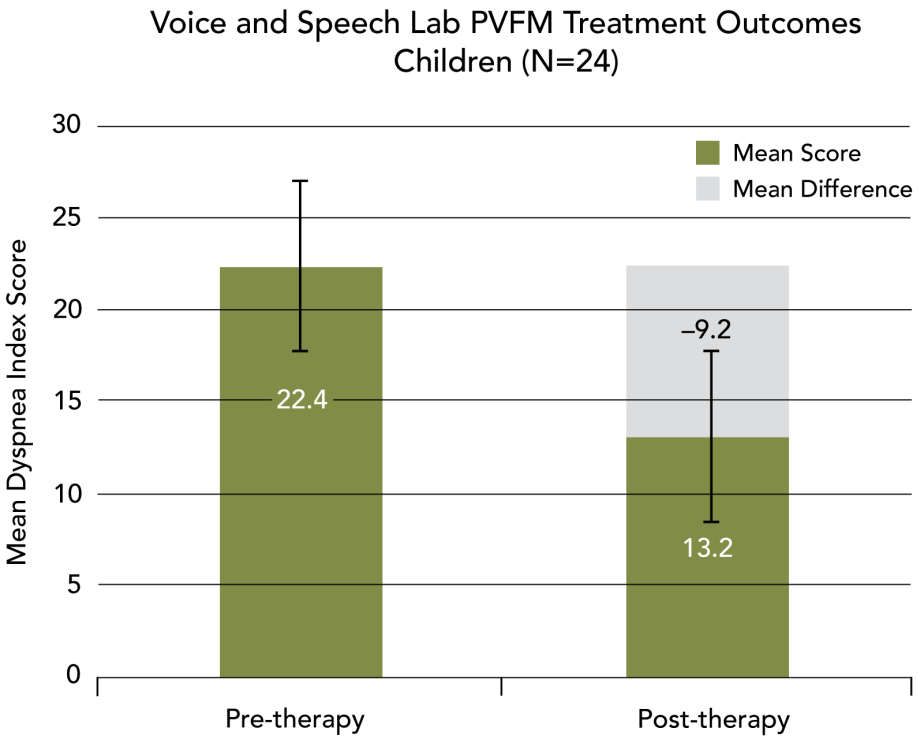
The Voice and Speech Laboratory treated 34 patients with paradoxical vocal fold motion (PVFM) between January 2016 and December 2017.

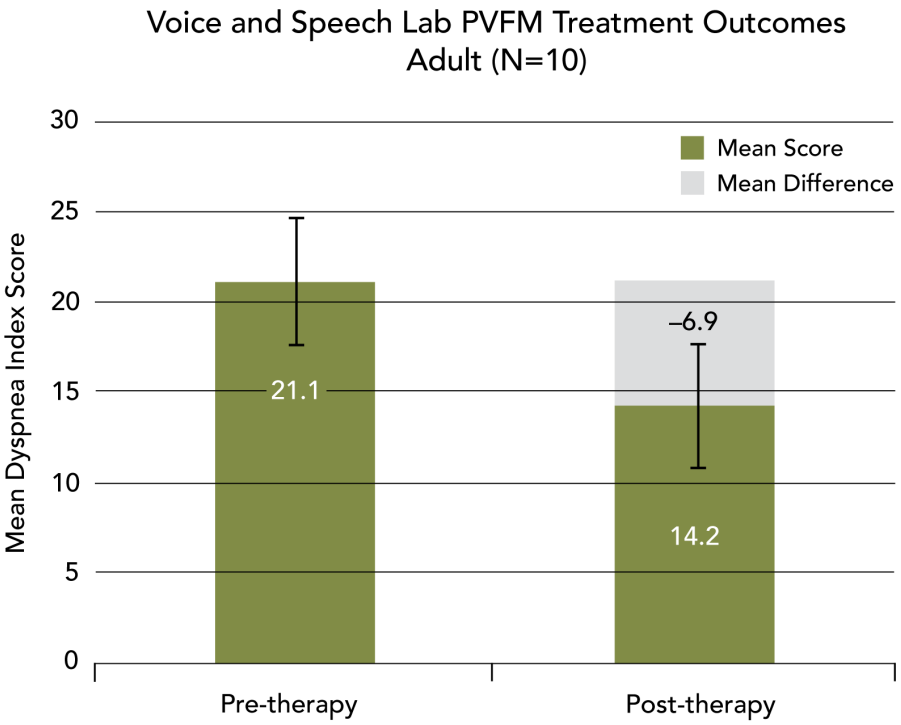
Paradoxical vocal fold motion (PVFM), inappropriate closure of the vocal folds with inspiration, is a medical problem that afflicts children and adults, which may result in partial to severe airway closure. These patients were treated with voice therapy, which focuses on behavioral intervention and teaching patients specific breathing exercises to help control and even eliminate airway closure. Patients usually attend one to six sessions of 30 to 60 minutes in duration, occurring every two to three weeks (or as needed).

The Dyspnea Index (DI), which helps to quantify the degree of difficulty breathing a patient may have, was administered to patients prior to voice therapy and again post-therapy as a means of objectively assessing changes in the severity of their dyspnea (difficult breathing) symptoms. The higher the DI score, the more severe the breathing impairment. A DI score above 10 indicates an abnormal DI score and, thus, a breathing problem.[1]

- Mean pre-therapy DI score: 22.4
- Mean post-therapy DI score dropped to 13.2, indicating a mean DI change of -9.2

A study looking at the validation of DI in adolescents revealed that a DI change score of 8 indicated a significant global improvement in symptoms.[2]





- Mean pre-therapy DI score: 21.1
- Mean post-therapy DI score dropped to 14.2, indicating a mean DI change of -6.9

The study revealed a significant decrease (improvement) in the severity of breathing difficulties in patients who received voice therapy for PVFM, which resulted in patients being able to return to work, exercising and other tasks that were previously restricted by PVFM.

Studies have shown that 10 to 40 percent of patients diagnosed with severe asthma may also have PVFM. Voice therapy is the mainstay of treatment.

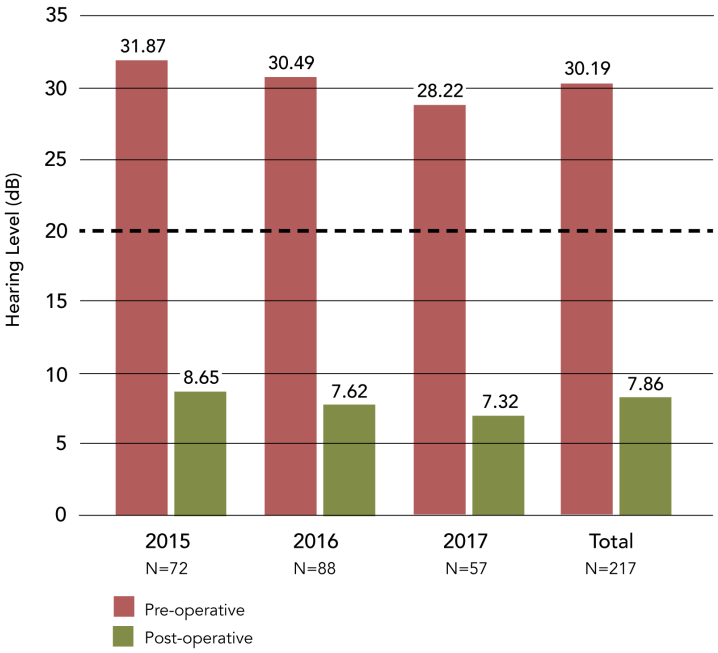
References
[1]Gartner-Schmidt JL, Shembel AC, Zullo TG, Rosen CA. Development and validation of the Dyspnea Index (DI): A severity index for upper airway-related dyspnea. J Voice. 2014;Nov 28(6):775–82. [2]De Guzman V, Ballif C, Maurfer R, Hartnick C, Roal N. Validation of the Dyspnea Index in adolescents with exercise-induced paradoxical vocal fold motion. JAMA Otolaryngol Head Neck Surg. 2014 Sep;140(9):823–8.

Stapedectomy and Revision Stapedectomy Review

Otosclerosis is a condition in which the stapes gradually becomes immobile from abnormal bone remodeling adjacent to the oval window. Normally, the stapes vibrates freely to allow the transmission of sound into the inner ear. When the stapes becomes fixed to the surrounding bone, the sound energy "conductive" mechanism is disrupted. This prevents sound waves from reaching the inner ear and results in hearing loss.

Review of Stapedectomy (2015 – 2017)

Stapedectomy surgery addresses this conductive hearing loss by replacing the immobile stapes with a prosthesis. When successful, it can result in improvement of the conductive hearing loss and restoration of normal hearing. Here, we show before and after conductive hearing loss scores from our stapedectomy cases annually.



Mean values for pre- and post-stapedectomy outcomes were calculated from patient results evaluated by Mass. Eye and Ear audiograms. These values therefore represent a subset of the total number of procedures. ***Lower values correspond with better hearing.***

These results show that our stapedectomy procedures are highly successful on average in reversing a moderate level of hearing loss (30 dB of hearing loss in the affected ear — in which patients would be expected to have significant difficulty hearing in noise and localizing sound) and bringing hearing essentially back into the normal range.

- Prior to surgery, a patient with a hearing threshold of 25dB or greater often has trouble hearing conversational speech (for example, friends and family in social environments such as parties or gatherings). *(See **red** bars)*
- Post-operative average air bone gap (a measure of a conductive hearing loss) where < 20dB (dotted line) is defined as a success. A patient with a hearing threshold of < 20dB experiences no such difficulties. *(See **green** bars)*

Review of Revision Stapedectomy (2007 – 2017)

In most cases (95 percent), stapedectomy results offer a lifetime of improved hearing. However, scarring, bony erosion and prosthesis displacement can cause a recurrent conductive hearing loss, in which case revision stapedectomy is indicated. Revision stapedectomy is a more complex procedure than primary stapedectomy, with generally poorer rates of hearing improvement.

Post-op air bone gap	Number of patients
< 20 dB	116 (76%)
> 20 dB	36 (24%)

These results show that our revision stapedectomy procedures are successful in most cases in bringing hearing essentially back into the normal range. Patients with < 20 dB average air bone gap after surgery experience little to no deficits in hearing conversational speech.

Photo by Garyfallia Pagonis.

Dr. Alicia Quesnel examining a patient.

The Hypoglossal Nerve Stimulation for Sleep Apnea in Children with Down Syndrome

Down syndrome (DS) is one of the most common genetic anomalies in children. Children with DS often have large tongues that may obstruct their airway at night, putting them at high risk of significant snoring and obstructive sleep apnea (OSA). As we learn more about OSA, we are beginning to understand just how important sleep is to our daily lives. Given the special needs of children with DS, issues with attention and memory might become accentuated from a lack of sleep.

Over the past two years, we have been conducting an FDA-regulated clinical trial implanting the Hypoglossal Nerve Stimulator (HGNS) device in DS children who meet a set of strict criteria. The device works by sending an electric signal when it "senses" that the sleeping child is attempting to take a breath. This electric signal stimulates the hypoglossal nerve, causing the tongue muscles to push the tongue forward and unobstruct the airway (Figure 1).

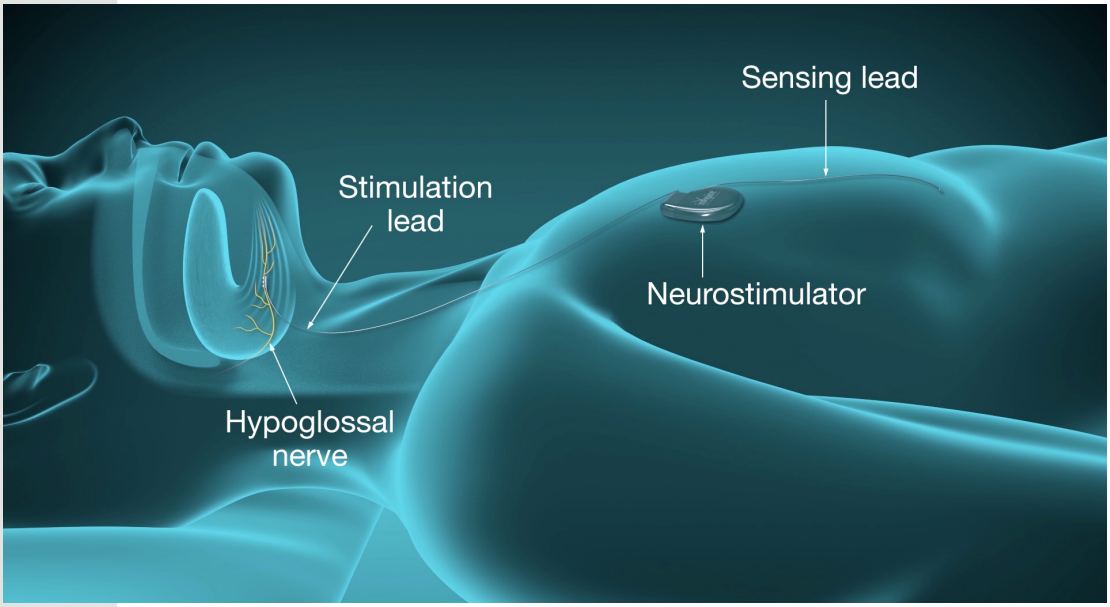


Figure 1. Pictoral example of the HGNS device and where it sits within a patient.[1–2]

Measurement Criteria

The severity of OSA is measured by calculating the Apnea Hyponea Index (AHI). For children:

0 – 1	Normal
1 – 5	Mild OSA
5 – 10	Moderate OSA
> 10	Severe OSA

We also measure the parents' perception of their child's quality of life due to OSA, using a previously validated questionnaire known as the OSA18. Finally, we measure how long the children use the device at night.

Results

- Since 2016, we have safely implanted 18 children with DS, ages 10 to 21, who have severe OSA.
- An 87 percent reduction was seen in AHI scores (Figure 2).
- The children averaged using the device 8.2 hours a night.
- Parents reported a change score on the OSA18 of 2.2, where a change score of greater than 1.5 signifies a large change in quality of life.

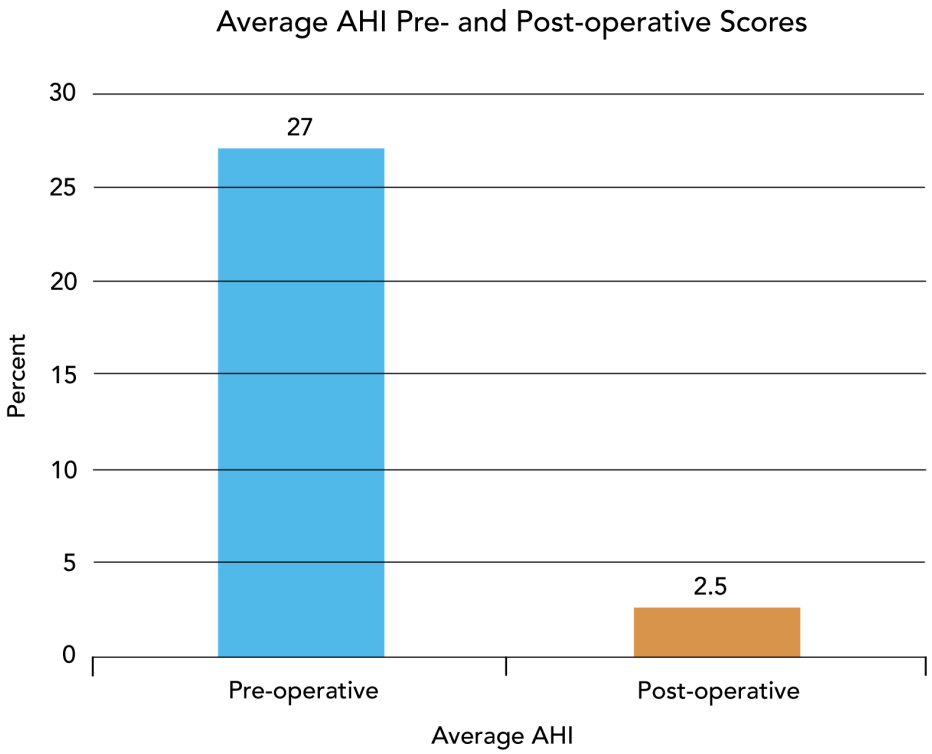


Figure 2. Average AHI pre- and post-operative scores.

References
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Maintenance of Nasal Function After Endoscopic Medial Orbital Decompression

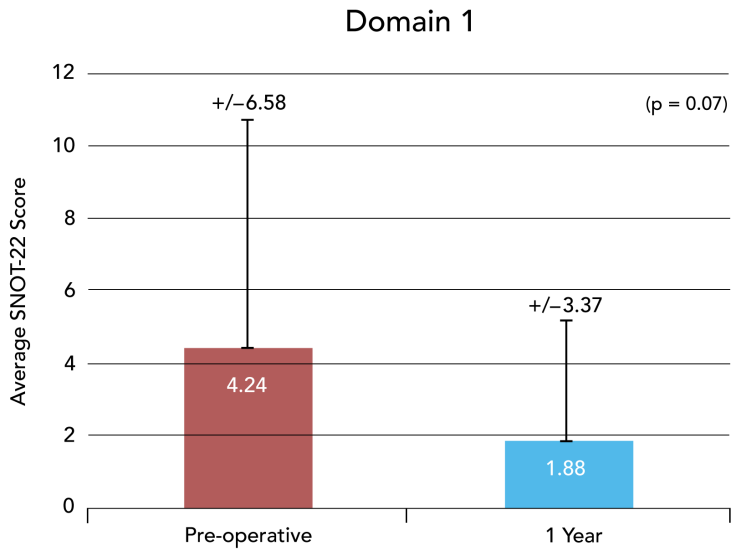
Occurring in approximately .5 percent of males and 3 percent of females, Graves' disease is an autoimmune disorder that causes an overactive thyroid gland. Of these patients, 25 to 80 percent will also develop a condition known as Graves' ophthalmopathy, which is bulging of the eye that's related to the enlargement of the eye muscles and expansion of orbital fat.

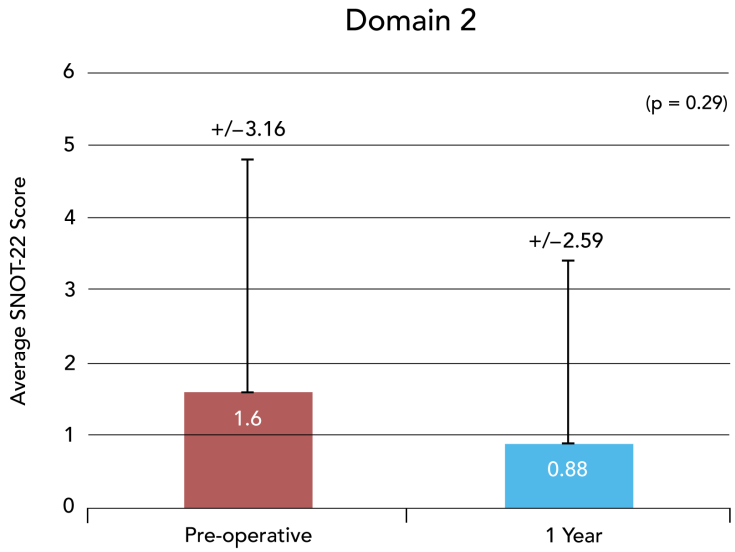
Surgery to remove the bone between the eye and the sinuses allows the enlarged tissue of the eye to expand into the nose and sinuses, reducing the pressure and correcting the appearance of protruding eyes. This can be performed through endoscopic surgery through the nasal cavity and sinuses with minimal recovery time. However, by performing this surgery, there is a potential to induce nasal symptoms such as obstructed airflow, sinus pressure and pain, smell loss or recurrent sinus infections.

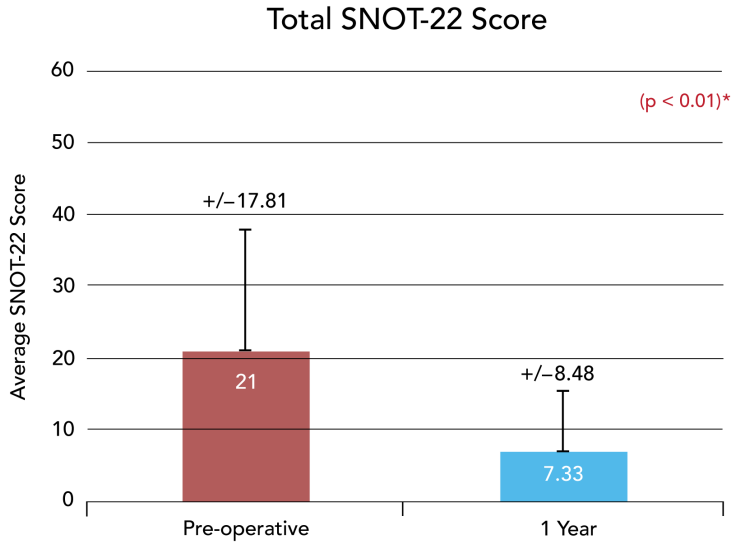
To determine whether medial orbital decompression surgery induces sinus symptoms, a validated 22-item questionnaire, SNOT-22, was given to 27 patients before and after orbital decompression surgery. This questionnaire asked patients to rate the severity of 22 symptoms, including nasal/sinus symptoms and general symptoms (fatigue, sleep, sadness), from a scale of zero (no symptoms) to five (most severe). **A change in total score of seven is considered significant.**

Photo by Garyfallia Pagonis.

Dr. Benjamin Bleier in surgery.







References: *Long-term impact of endoscopic orbital decompression on sinonasal-specific quality of life. Mueller SK, Miyake MM, Lefebvre DR, Freitag SK, Bleier BS. Laryngoscope. 2018 Apr;128(4):785–788.*

Results show that a method of endoscopic orbital decompression surgery performed through the nose does not increase total nasal symptoms or increase scores on specific nasal symptom subsets of the SNOT-22 relating specifically to nasal function (Domain 1 and Domain 2). In fact, there is an improvement in overall SNOT-22 scores after one year from the time of surgery (Total SNOT-22 score).

Therefore, through this complex orbital procedure, we are able to provide symptomatic improvement in eye symptoms without risk of compromising nasal function or nasal-specific quality of life.

Obstructive Sleep Apnea Therapy: Continuous Positive Airway Pressure

Obstructive sleep apnea (OSA) is a common worldwide condition that's characterized by upper airway collapse and causes sleep disruptions, arousals and oxygen desaturation.

Moderate to severe OSA is estimated to affect approximately 15 percent of men and 5 percent of women in the United States, which represents 12 percent of the population.[1] Only 20 percent of these patients have been diagnosed, leaving 80 percent of people suffering from OSA undiagnosed.[1] In 2015 alone, the American Academy of Sleep Medicine estimated that these undiagnosed cases cost the United States nearly $150 billion from workplace and traffic accidents, lost productivity and comorbid disease.[1]

In addition to the economic burden of OSA, long-term health outcomes from untreated OSA can include increased risk of cardiovascular disease, disturbed metabolism, neurocognitive impairment, all-cause mortality and decreased quality of life.[1–3] Unfortunately, the prevalence of OSA continues to climb and parallel the nation's upward trend towards obesity.[1,4–6]

Treatment for Obstructive Sleep Apnea

Obstructive sleep apnea severity is graded by the Apnea Hypopnea Index (AHI). It represents the number of apnea and hypopnea events per hour of sleep.

The gold standard for adult OSA therapy is CPAP (continuous positive airway pressure), which works by delivering pressured air to the upper airway to help maintain patency. It is the most effective and least invasive therapeutic option, and provides verifiable daily data collection of sleeping respiratory patterns. For those who are treated with CPAP, the Snoring and Sleep Apnea Center at Mass. Eye and Ear measures their outcomes through three domains:

1. Are all appropriate patients seen in a timely manner?

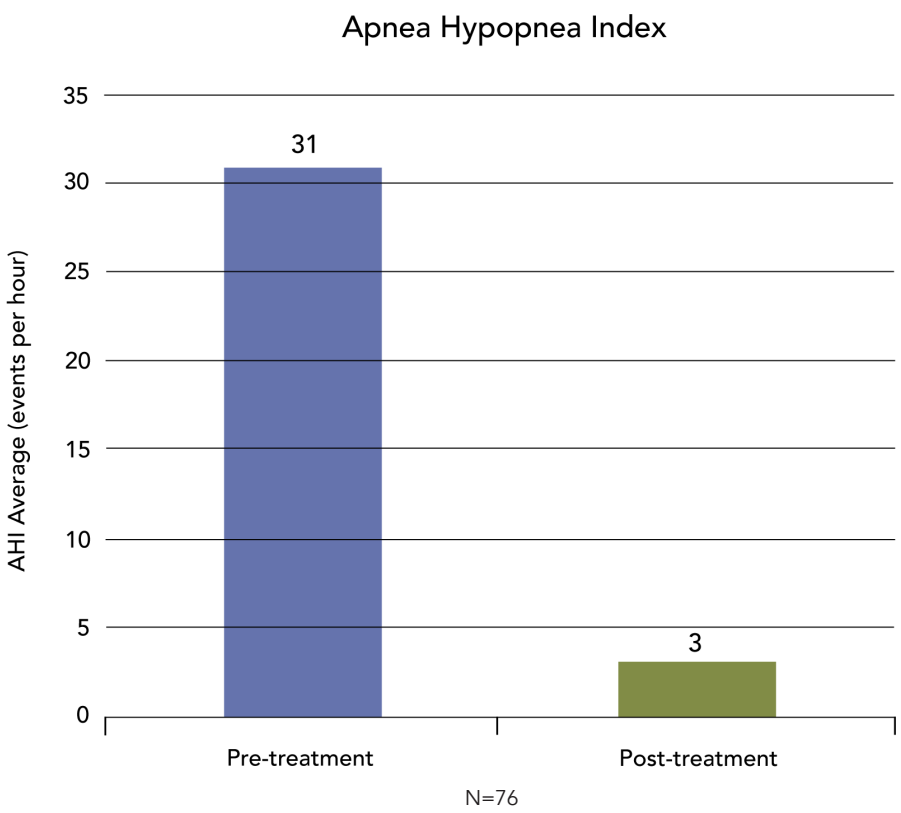
For all 2017 cases of patients deemed necessary to have their sleep patterns evaluated, they were seen within six-weeks of their ordered sleep study for in-lab or home sleep testing. **(N=190)**

2. Is there appropriate follow-up provided to OSA patients after CPAP has been initiated ensuring compliance?

Within four weeks of CPAP set up and initiation, all patients were seen in follow-ups to evaluate mask fit and CPAP compliance along with efficacy of treatment. Once compliant, patients are followed at three to six month intervals. **(N=79)**

3. Was there significant improvement on AHI in patients treated with CPAP?

There was ten-fold reduction in the AHI.



For compliant patients being treated with CPAP or Bi-Level therapy, post-treatment AHI fell from a pre-treatment level average of 31 events per hour (range of 5.2–91) to post-treatment average of three events per hour (range .3–10). Other treatment options are being developed for those who are not tolerant of CPAP.

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Voice and Laryngeal Guideline: Development and Adherence

We utilize intraoperative nerve monitoring technology in all of our thyroid and parathyroid surgeries to effectively minimize risks to the laryngeal nerves. A study involving an analysis of 27 articles reviewing more than 25,000 patients undergoing thyroidectomy reported an average postoperative vocal cord paralysis (VCP) rate of nearly 10 percent.[1] Using intraoperative nerve monitoring (IONM) techniques help the surgeon identify the recurrent laryngeal nerve (RLN) and prevent injury to it to optimize surgical outcomes.

Divisional Research and Thyroid Guideline Development

Through several research publications, we have demonstrated the association of pre-operative VCP with invasive disease and the overall importance of voice and laryngeal assessment in patients undergoing thyroid surgery.

National guidelines[2–3] now recommend that for all patients undergoing thyroid surgery, the surgeon must:

1) Document pre-operative voice assessment,
2) Perform pre-operative laryngoscopy in all patients with impaired voice, normal voice with suspected extrathyroidal extension and/or have had prior neck surgery,
3) Document post-operative voice abnormality within two weeks to two months and
4) Perform post-operative laryngoscopy if there is a voice change post-operatively.[2]

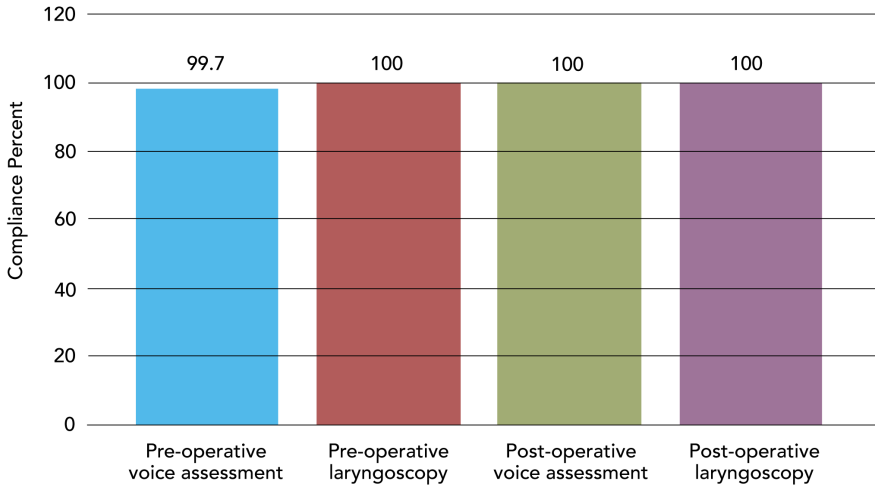
Voice and Laryngeal Guideline Adherence and Outcomes

We identified 296 monitored thyroid and parathyroid surgeries performed between April 2016 and December 2017 by the Thyroid and Parathyroid Endocrine Surgery Division. We report on voice and laryngeal guideline adherence in this group (Figure 1). Voice was assessed by the physician during otolaryngology history and physical exam, and the laryngeal exam was recorded as part of the office exam.

In these 296 patients, compliance with published guidelines for pre-operative voice assessment, pre-operative laryngoscopy, post-operative voice assessment and post-operative laryngoscopy were excellent.

The recurrent laryngeal nerve is closely related to the thyroid gland, and injury to it during thyroid and parathyroid surgery can lead to vocal cord paralysis.

Figure 1. Compliance of our voice and laryngeal exam practice with current AAO-HNS and ATA guidelines



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Otolaryngology Department Practice Locations

Mass. Eye and Ear, Main Campus
243 Charles Street
Boston, MA 02114
Tel: 617-573-3954

Mass. Eye and Ear Balance and Vestibular Center at Braintree Rehabilitation Hospital
250 Pond Street
Braintree, MA 02184
Tel: 617-573-6700
Medical Director: Steven D. Rauch, MD

Mass. Eye and Ear, Concord
54 Baker Avenue Extension, Suite 303
Concord, MA 01742
Tel: 978-369-8780
Site Liaisons: Michael H. Fattal, MD, and Jennifer Setlur, MD

Mass. Eye and Ear, Duxbury
20 Tremont Street (Rte 3A)
Building 9, Suite 20
Duxbury, MA 02332
Tel: 781-337-3424
Medical Director:
Peter N. Friedensohn, MD

Mass. Eye and Ear, East Bridgewater
400 N. Bedford Street
E. Bridgewater, MA 02333
Tel: 508-378-2059
Medical Director:
Peter N. Friedensohn, MD

Mass. Eye and Ear, Longwood
800 Huntington Avenue
Boston, MA 02115
Tel: 617-936-6160
Medical Director: Noah S. Siegel, MD

Mass. Eye and Ear, Harwich
527 Long Pond Drive, Suite C
Harwich, MA 02645
Tel: 508-539-2444
Medical Director: Craig A. Jones, MD

Mass. Eye and Ear, Medford
101 Main Street, Suite 211
Medford, MA 02155
Tel: 781-874-1965
Medical Director:
David M. Bowling, MD

Mass. Eye and Ear, Mashpee
5 Industrial Drive, Suite 202
Mashpee, MA 02649
Tel: 508-539-2444
Medical Director: Craig A. Jones, MD

Mass. Eye and Ear, Milton
100 Highland Street
Lintz Medical Building
Milton, MA 02186
Tel: 617-774-1717
Medical Director:
Peter N. Friedensohn, MD

Mass. Eye and Ear, Newton-Wellesley
2000 Washington Street
Newton-Wellesley Campus,
Green Building Suite 668
Newton, MA 02462
Tel: 617-630-1699
Medical Director: Samir M. Bhatt, MD

Mass. Eye and Ear, Quincy
500 Congress Street, Suites 2B & 1C
Quincy, MA 02169
Tel: 617-774-1717
Medical Director:
Peter N. Friedensohn, MD

Mass. Eye and Ear, Stoneham
41 Montvale Avenue
Stoneham, MA 02180
Tel: 781-279-0971
Medical Director:
Michael B. Rho, MD

Mass. Eye and Ear, Wellesley
65 Walnut Street
Wellesley, MA 02481
Tel: 617-630-1699
Medical Director: Samir M. Bhatt, MD

Mass. Eye and Ear, Weymouth
825 Main Street
Weymouth, MA 02190
Tel: 781-337-3424
Medical Director:
Peter N. Friedensohn, MD

Otolaryngology Department Medical Staff

Emergency Otolaryngology
H. Gregory Ota, MD*
Kathryn A. Ryan, MD
Mark G. Shrime, MD, MPH, PhD

General Otolaryngology
Gregory W. Randolph, MD*
Jean M. Bruch, DMD, MD
John M. Dobrowski, MD
Allan J. Goldstein, MD

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Robin W. Lindsay, MD
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Molly Yancovitz, MD

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Head and Neck Surgical Oncology
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Daniel L. Faden, MD
Kevin S. Emerick, MD
Hani Z. Ibraham, MD
Brian J. Park, MD, MPH
Jeremy D. Richmon, MD
Mark A. Varvares, MD

Laryngology
Phillip C. Song, MD*
Ramon A. Franco, Jr., MD
Jean M. Bruch, DMD, MD
Matthew Naunheim, MD, MBA

Otology and Neurotology
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D. Bradley Welling, MD, PhD**
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Ronald K. de Venecia, MD, PhD
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Daniel J. Lee, MD
Michael J. McKenna, MD
Alicia M. Quesnel, MD
Steven D. Rauch, MD
Felipe Santos, MD

Vestibular
Steven D. Rauch, MD*
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Rhinology
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Stacey T. Gray, MD
Ahmad R. Sedaghat, MD, PhD

Thyroid and Parathyroid Endocrine Surgery
Gregory W. Randolph, MD*
Daniel G. Deschler, MD
Paul M. Konowitz, MD
Derrick T. Lin, MD
Jeremy D. Richmon, MD
Mark A. Varvares, MD

Otolaryngology Department Medical Staff (continued)

Suburban Centers

Mass. Eye and Ear Balance and Vestibular Center at Braintree Rehabilitation Hospital
Steven D. Rauch, MD*

Mass. Eye and Ear, Concord
Michael H. Fattal, MD
Terry J. Garfinkle, MD, MBA
Jennifer Setlur, MD

Mass. Eye and Ear, Duxbury
Cathy D. Chong, MD
Amee K. Dharia, MD
Hani Z. Ibraham, MD
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Mass. Eye and Ear, Harwich
Craig A. Jones, MD

Mass. Eye and Ear, Longwood
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Caroline A. Banks, MD
Kenneth M. Grundfast, MD
Allen C. Lam, MD
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Adrian Priesol, MD

Mass. Eye and Ear, Mashpee
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Mass. Eye and Ear, Milton
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Mass. Eye and Ear, Newton
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Gillian R. Diercks, MD, MPH
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Brian J. Park, MD, MPH
Mark F. Rounds, MD

Mass. Eye and Ear, Quincy
Peter N. Friedensohn, MD*
Alex Grilli, MD
Paul M. Konowitz, MD
Yuna C. Larrabee, MD
Mandana R. Namiranian, MD

Mass. Eye and Ear, Stoneham
Michael B. Rho, MD*
Dukhee Rhee, MD

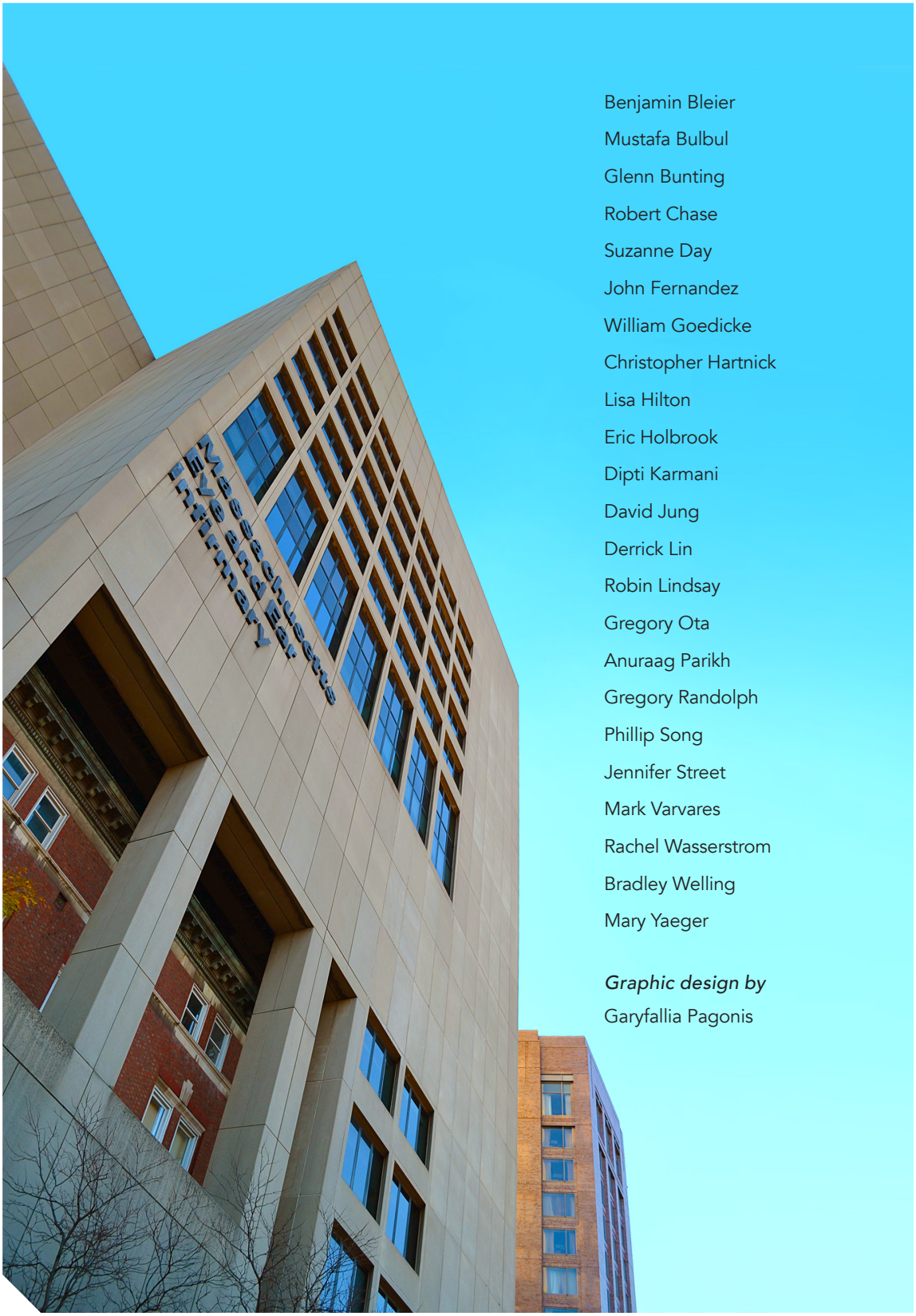
Mass. Eye and Ear, Wellesley
Samir M. Bhatt, MD*
Dunia E. Abdul-Aziz, MD
Gillian R. Diercks, MD, MPH
Brian J. Park, MD, MPH
Mark F. Rounds, MD

Mass. Eye and Ear, Weymouth
Cathy D. Chong, MD
Amee K. Dharia, MD
Hani Z. Ibraham, MD
David S. Kam, DMD, MD
Monica S. Lee, MD

Otolaryngology Referral Line
617-573-3954

**denotes division leadership*
***denotes chair of the department*

Contributors



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Rachel Wasserstrom
Bradley Welling
Mary Yaeger

Graphic design by
Garyfallia Pagonis

MASSACHUSETTS
EYE AND EAR

243 Charles Street, Boston, MA 02114-3096
617-523-7900 | 617-523-5498 (T.D.D.)
MassEyeAndEar.org