

HeadWay

NEWS FOR PHYSICIANS FROM JOHNS HOPKINS
 OTOLARYNGOLOGY-HEAD AND NECK SURGERY

Sounding the alarm on hearing loss in the elderly

The elderly patients who make up about a third of **Frank Lin's** hearing loss practice are aware of their hearing deficits, and they're interested in doing something about it. However, says Lin, this group of patients is the heavy exception to the rule.

"I'm just seeing the tip of the iceberg," the otologist explains. "The vast majority of older people ignore their own hearing loss, and geriatricians don't push this issue with their patients. Why would they? It's mainly been seen as a minor quality-of-life issue, just a nuisance of old age."

But Lin and his colleagues are showing that hearing loss in the elderly could be far more than just an inconvenience. In a study published this February, they showed that seniors whose hearing had waned were significantly more likely to develop dementia over time than those who retained this sense.

The study, published in the *Archives of Neurology*, followed 639 people for up to 18 years, with all of them receiving periodic cognitive exams. Participants with hearing loss at the beginning of the study were significantly more likely to develop dementia by the end. Compared with volunteers with normal hearing, those with mild, moderate and severe hearing loss had twofold, threefold and fivefold, respectively, the risk of

developing the memory-robbing disease over time.

Even after the researchers took into account other factors associated with risk of dementia, including diabetes, high blood pressure, age, sex and race, hearing loss and dementia were still strongly associated.

In a second study also published in February in the *Journal of Gerontology: Medical Sciences*, Lin and his colleagues showed that nearly two-thirds of American adults over age 70 have hearing loss—and might be susceptible to the cognitive effects shown in their first study. "It's really a larger and more serious problem than we expected," he says.

Now that an impressive collection of clinical results are in, Lin is developing a solution. Through his joint work with the Johns Hopkins Department of Otolaryngology-Head and Neck Surgery and the Johns Hopkins Center on Aging and Health, he's come up with a multipronged plan of attack. First, he's studying which molecular and genetic factors might cause hearing loss in aging and whether intervening with these factors might lessen the risk of hearing loss or even improve hearing. He's also studying whether improving hearing now might lessen cognitive risk. Lin is launching a study this spring to follow patients who get hearing aids or cochlear implants to see if these devices improve their cognitive abilities.

Lin's research plan has more immediate effects. In the next few years, he wants to overhaul the way hearing aids are delivered. He explains that audiologists are often able to spend time fitting a patient with the correct hearing aid, but don't have the time or resources to provide patients with follow-up rehabilitative care.



With new research suggesting that hearing loss can lead to dementia, Frank Lin has plans to overhaul care for elderly patients who are hard of hearing.

"It's too often, here's your hearing aid—good luck," Lin says, "but that's the opposite of most other forms of sensory rehab." For low vision, he explains, patients might meet with an optometrist, an occupational therapist and a counselor, who all work together to develop a comprehensive plan for how patients and their families can accommodate vision deficits and use new vision technology. Lin is hoping to adopt a similar, more comprehensive strategy with aural rehab.

"Now that we know what's at stake for older patients with hearing loss," Lin says, "we know we can't ignore this problem any longer." ■

To refer a patient, call 443-287-6509.

"NOW THAT WE KNOW WHAT'S AT STAKE FOR OLDER PATIENTS WITH HEARING LOSS, WE KNOW WE CAN'T IGNORE THIS PROBLEM ANY LONGER."

Inside



2
 Putting sleep apnea, and depression, to rest



3
 Bringing falls down with a new clinic



4
 When reflux is more than reflux

Toward an artificial trachea

Tissue engineering is making great strides in many fields of medicine—and according to otolaryngology-head and neck surgery fellow

Alexander Hillel, his is no exception.

“There are few specialties,” he says, “where tissue engineering could be so versatile and make such a difference for our patients.”

For example, Hillel and his colleagues recently published research on combining synthetic and biologic materials into a composite that could eventually act as a handy filler for soft tissue restoration. Current fillers include materials like combinations of collagen and hyaluronic acid. Though these work well for filling small defects, such as those in common cosmetic procedures, their lifetime in vivo before resorption is too short to use for more extensive facial plastic surgery, such as repairing the much larger defects introduced by tumor resections.

The new material is a mix of hyaluronic

acid and polyethylene glycol (PEG), a synthetic material so biologically friendly that it’s already being used in other biomedical applications, such as drug delivery. The bio-synthetic material cross-links following light exposure, Hillel explains, so that physicians who use this filler could have the chance to mold it before it polymerizes. He adds that altering the proportion of PEG changes the firmness of the material, giving it versatility for a variety of uses, from filling nasolabial folds to larger defects in the skull.

Hillel’s other recent successes have involved creating a variety of three-dimensional constructs combining cells and scaffolding materials. For example, he and his colleagues recently published work showing the potential of growing engineered adipose tissue using embryonic germ cells and a PEG-based scaffold. They have also created engineered musculoskeletal tissues from embryonic germ cells seeded onto similar synthetic scaffolds.



These advances could eventually provide adipose or cartilage tissue to implant in patients.

Because his clinical interests focus more on the voice and airway, Hillel plans to combine what he’s learning through these experiments to construct a viable engineered trachea, work



Christine Gourin and Stacey Ishman have conducted research showing that sleep apnea can lead to depression—and treating apnea can lessen depression.

SLEEP APNEA

Putting sleep apnea, and depression

Seeing depressive symptoms in their obstructive sleep apnea patients comes as no surprise to head and neck surgeons **Stacey Ishman** and **Christine Gourin**. The poor nighttime sleep quality and daytime sleepiness that accompany obstructive sleep apnea (OSA) combined with spiraling neurocognitive deficits and a long-term increased risk of heart attack and stroke would be a depressing diagnosis for anyone. But Ishman and Gourin wondered whether there might be more to the story.

“Anecdotally, we’ve often noticed that if you’re tired, you’re more likely to feel depressed,” says Gourin. “But which comes first? We wanted to find out whether our patients’ OSA was causing their depression, or whether daytime sleepiness was the real culprit.”

To sort out the cause, the researchers conducted an initial study of 53 OSA patients. Scores on a depression inventory suggested that 35 percent of these patients were depressed. However, these scores didn’t correlate well with their sleep study results—the patients’ depression severity didn’t rise in step with their respiratory disturbance indices.

Instead, the researchers found that patients’ depression scores were more directly connected to their measurements on a scale that assesses sleepiness. “It’s not a function of how bad their apnea was,” says Gourin, “but a function of how sleepy they were.”

That led the researchers to another theory: Once OSA is treated surgically, does the depression also go away?

This time, Ishman, Gourin and their colleagues looked at a different cohort of 19 OSA patients. More than half of these patients reported excessive daytime sleepiness, and about a third were depressed. After surgery, the researchers found that daytime sleepiness resolved for most of the patients, and depression lifted for each of the depressed patients.

“We’ve seen that OSA patients are often much happier after surgery,” Ishman says. “Now we know that as they’re able to get more sleep, their depression wanes. The effect of the surgery was substantial—these patients weren’t treated directly for depression at all.”

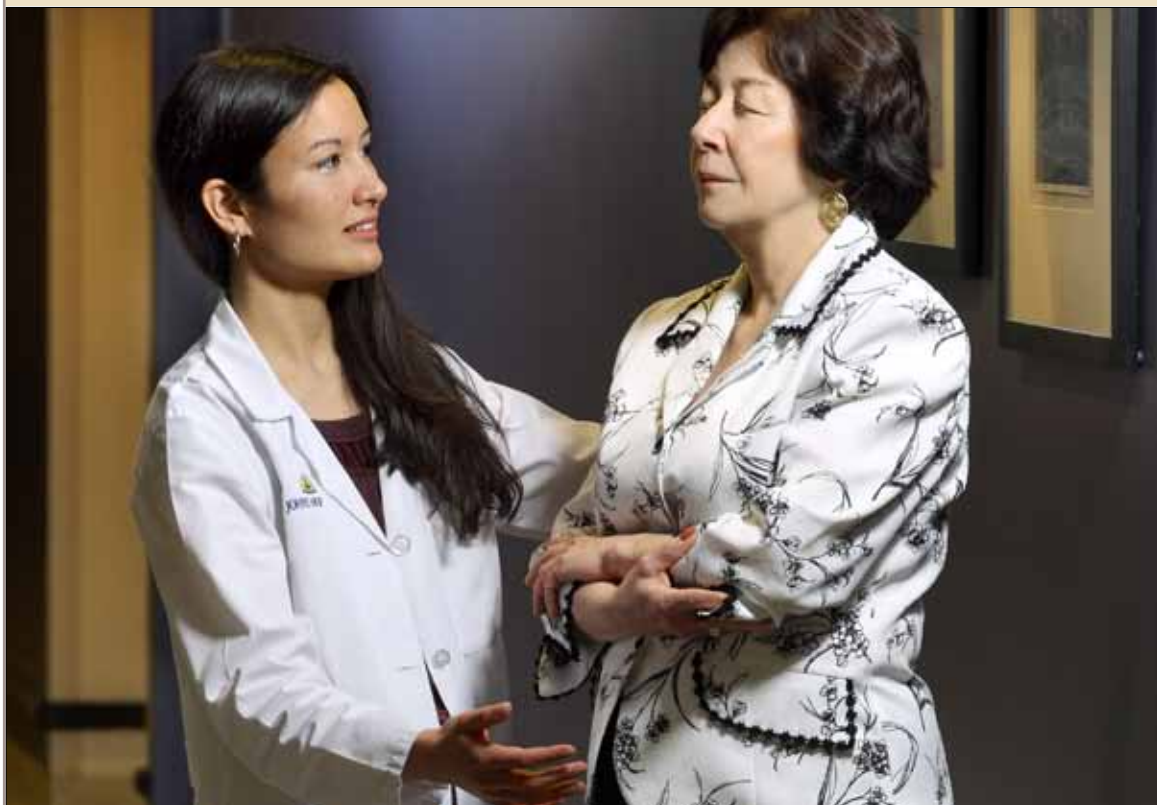
“Although the typical first line of treatment for OSA—continuous positive airway pressure (CPAP)—is 95 percent effective in resolving OSA,” says Ishman, who is also board certi-

Alexander Hillel is combining what he's learning from other tissue engineering work toward his ultimate goal of constructing an engineered trachea.

that could provide new options for patients with airway narrowing from frequent intubations, Wegener's disease, or idiopathic causes. Starting with decellularized tracheas, he's currently working on finding the right stem cell types to populate these natural scaffolds to create something long sought in medicine—a substitute for the damaged tracheal airway that enables full and effective breathing.

"We have some obstacles to overcome before we can translate this therapy," Hillel says. However, he adds that he has no doubt it will eventually help a select group of patients with no alternative. "This field is progressing so quickly. For tissue engineering, the future is now." ■

For more information, call 410-955-1686.



Vestibular specialist Yuri Agrawal hopes her new clinic, opening soon, will help prevent future problems in patients with a history of falling.

Bringing falls down with a new clinic

In concept, falls are a relatively simple medical problem. "There's a loss of resistance to gravity, and the patient ends up on the floor," says **Yuri Agrawal**. But, adds the neurotology fellow, managing a patient to prevent falls can be extremely complex.

According to the Centers for Disease Control and Prevention, more than a third of people 65 and older fall each year, and those who fall are two to three times more likely than those who don't to experience repeated falls. Among older adults, falls can be devastating, with one in 10 resulting in a serious injury, such as hip fracture.

Patients might fall for numerous reasons, ranging from problems with the vestibular system to vision deficits to a poorly laid-out home with cluttered furniture and loose area rugs. Scouting out exactly why a patient has fallen is a tough challenge for most individual physicians.

"There are so many systems that interact to help a person stay upright and maintain balance and locomotion," Agrawal says, "and most physicians don't feel like they have the resources to study all these systems in a comprehensive way. The only way to treat this multifactorial problem is with a multidisciplinary solution."

That's what Agrawal had in mind in establishing a falls clinic. Every Wednesday afternoon, she and other care providers from multiple specialties plan to see patients who

have been referred to the clinic after a history of falls or movement and balance problems that might predispose them to falling. Patients will see an otologist, a vestibular specialist, an ophthalmologist, a geriatrician who evaluates medications, and an occupational therapist who specializes in home modification. Then these providers collaborate to develop a unique plan of attack to stem each patient's risk of falling.

The idea, Agrawal explains, is for patients to leave that day with strategies they can use right away. "If we recommend physical therapy," she says, "exercises are demonstrated to the patient right then and there. If they need more therapies or surgeries, we make appointments that same day." Patients also leave with a printed assessment they can take to their primary care physician to keep track.

After they leave the initial appointment, the care doesn't end there, Agrawal says. A clinic member will follow up with patients, making appointments to be sure they're seen again every three to six months. Agrawal and her colleagues also plan to study which interventions provide the best insurance against future falls.

"A fall can really alter a person's life trajectory," Agrawal says. "We're hoping to turn that around." ■

To refer a patient or learn more, call 410-955-1686.

tion, to rest

fied in sleep medicine, "it's zero percent effective if patients don't use it." About half of OSA patients can't tolerate wearing the CPAP mask, she explains, so she, Gourin and their colleagues turn to surgical treatments next.

Depending on the source of their obstructions, patients have a range of surgical options. Ishman says she's had the most success with a combination of surgical techniques that suspend and lift the tissues of the throat and base of the tongue. The team also often works with colleagues who have expertise in opening up nasal valves or maxillomandibular advancement to pull the midface forward, opening up the airway.

The end result, says Gourin, is the potential for patients to wake up refreshed and depression-free.

"Our OSA success stories," she says, "are some of our most grateful patients." ■

To refer a patient or learn more, call 410-502-3225.

When reflux is more than reflux

Soon after Sarah Kilareski was born in October 2006, she began to gag and spit up excessively. Her pediatrician wasn't too concerned, says her mother, Carrie Kilareski, because Sarah was gaining weight. But at her 12-month well-baby check, she'd dropped from the 60th percentile on the weight growth chart at 6 months to zero percent.

Over the next three months, Sarah underwent a series of tests and procedures, including endoscopy, at a gastroenterology clinic near her home. The results showed she had reflux. But Kilareski believed the problem was far more complicated.

"It was heartbreaking to watch your 1-year-old daughter become skin and bones," she says, "when you knew you were doing everything you could to feed her. The doctors started using words like malnourished and failure to thrive."

More answers came after a barium swallowing test revealed that Sarah was aspirating thin liquids. A brain MRI ruled out a neurological cause, and Sarah was referred to an ear, nose and throat specialist who concluded, without a bronchoscopy to evaluate her lungs and airways, that Sarah's swallowing problem was related to a developmental delay.

"I knew in my heart something was not right," says Kilareski. "It was frustrating. Sarah would often get sick with fevers and the doctors didn't know how to incorporate her aspiration issues into a diagnosis and treatment."



Treating patients like Sarah Kilareski requires a team approach, says pediatric otolaryngologist Margaret Skinner.

Seeking a second opinion, mother and daughter headed to a new clinic that Hopkins Children's Center had recently opened to treat aerodigestive diseases, conditions involving the airways and upper digestive tract. There, Sarah would be evaluated and treated by a team of pediatric gastroenterologists, otolaryngologists, pulmonologists and speech-language pathologists who would bring collective insights to bear in the case.

"We're all in the same clinic at the same time so we can see and talk about the patient together, and then send a full note to the pediatrician saying what we collectively think needs to happen," says pediatric otolaryngologist **Margaret Skinner**.

To get to the bottom of Sarah's aspiration reflux problem, pediatric gastroenterolo-

gist **Karla Au Yeung** used an endoscope to examine her esophagus, and Skinner used a bronchoscope to look at her airway around the larynx and voice box. They both saw a small laryngotracheoesophageal cleft (LTEC), a rare and often easy-to-miss mid-line opening between the larynx, the trachea and the esophagus.

Within two weeks of diagnosis, Skinner operated to repair the cleft, and last year Sarah, for the first time, passed a swallowing study. Skinner emphasizes that both the detection and optimal treatment of the complex disorder would likely not have happened without the team of specialists focusing on it together.

"I need the gastroenterologist's guidance in finding the best strategy of fixing the cleft," Skinner explains, "and the pulmonologist needs my help before he can improve airway problems. It really is a collaborative effort that can produce remarkable results." ■

To refer a patient, call 410-955-1686.

"IT REALLY IS A COLLABORATIVE EFFORT THAT CAN PRODUCE REMARKABLE RESULTS."

HeadWay

Department of Otolaryngology–Head and Neck Surgery
901 S. Bond Street, Suite 550
Baltimore, Maryland 21231

This newsletter is published for the Department of Otolaryngology–Head and Neck Surgery by Johns Hopkins Medicine Marketing and Communications.

Department of Otolaryngology–Head and Neck Surgery
John K. Niparko, M.D., Interim Director

Marketing and Communications
Dalal Haldeman, Ph.D., M.B.A., vice president
Christen Brownlee, editor/writer
David Dilworth, designer
Keith Weller, photographer

For questions or comments, contact:
mayd@jhmi.edu or 410-955-2902

© 2011 The Johns Hopkins University and
The Johns Hopkins Health System Corporation.

CHANGE SERVICE REQUESTED

Non-Profit Org
U.S. Postage
PAID
Permit No. 5415
Baltimore, MD