

12th Annual Otolaryngology Literature Update

Otology III

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Ted A. Meyer, M.D., Ph.D. joined the Department of Otolaryngology – Head and Neck Surgery at MUSC in 2004. He was named the director of the MUSC Cochlear Implant Program. Dr. Meyer grew up in St. Louis, MO, and graduated from Washington University where he majored in mathematics and was captain of the tennis team. In 1995, he graduated from the Medical Scholars Program with a medical degree and a doctorate degree from the University Of Illinois College Of Medicine.

His doctorate degree was from the Department of Speech & Hearing Science. Dr. Meyer then completed a residency in Otolaryngology – Head and Neck Surgery at Indiana University, followed by a fellowship in Otology-Neurotology at the University of Iowa. Dr. Meyer then joined the faculty at MUSC. Dr. Meyer has limited his practice to the evaluation and treatment of hearing and balance disorders in adults and children.

Examples of his specialty areas include hearing loss, cochlear implants, ear infections, tympanic membrane perforations, cholesteatoma, otosclerosis, vertigo, Meniere's disease, facial paralysis, congenital ear malformations, acoustic neuromas, glomus tumors and other skull base lesions. As director of the MUSC Cochlear Implant Program, Dr. Meyer oversees all clinical and research protocols involving patients with cochlear implants.

Dr. Meyer has published 100 manuscripts and eight book chapters. He has received three grants to study mechanisms of speech perception with cochlear implants, and he frequently presents his results at national and international research meetings. Dr. Meyer is a fellow in the American Academy of Otolaryngology – Head and Neck Surgery, and chairs the International Board of Directors for AG Bell.

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- Yesantharao LV, Joo H, Wei EX, Lin SY, Vohra V, Agrawal Y, Galaiya D. Factors related to wellness and burnout in academic otolaryngology: A pre- and Post-COVID-19 analysis. *Laryngoscope Investig Otolaryngol*. 2023 Feb 24;8(2):409-416. doi: 10.1002/lio2.1033. PMID: 37090875; PMCID: PMC10116971.



Otology & more

Ted A. Meyer, MD, PhD

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Changing What's Possible



Conflicts of Interest

Inspire – PI – OSA Registry

Liva Nova – PI – Osprey Trial – new HGNS for OSA

Sound Pharmaceuticals – Co-I – Meniere’s Disease

None related to today’s presentations

Changing What’s Possible



Patient-reported outcomes with hypoglossal nerve stimulation for treatment of OSA: A systematic review and meta-analysis.

Braun, Stoerzel, Wollny, Schobel, Sommer, Heiser

European Archives of Oto-Rhino-Laryngology – 2023

Germany – multiple institutions

Changing What’s Possible



Patient-reported outcomes with hypoglossal nerve stimulation for treatment of OSA: A systematic review and meta-analysis.

34 publications, 3785 patients – English language, >10 patients, followup > 3 months
 Mean followup – 12 months
 3701 patients – resp-synced HGNS
 84 patients – continuous HGNS
 Daytime sleepiness – significant improvement
 Daytime functioning – significant improvement
 Sleep quality – significant improvement

Changing What's Possible



Patient-reported outcomes with hypoglossal nerve stimulation for treatment of OSA: A systematic review and meta-analysis.

7 PROM instruments
 Epworth Sleepiness Scale *** sig
 Functional Outcomes of Sleep Questionnaire *** sig
 Calgary Sleep Apnea QOL Index *** sig
 Pittsburgh Sleep Quality Index ** sig (minimal diff NOT reached)
 Others – small numbers

Changing What's Possible



Patient-reported outcomes with hypoglossal nerve stimulation for treatment of OSA: A systematic review and meta-analysis.

So we have numerical improvement – AHI 35-5

And PROM improvement

Changing What's Possible



Portable sleep study device versus polysomnography: A meta-analysis.

Cagle, Young, Shih, Nguyen, Meyer, White, Clemmens

Otolaryngology – Head & Neck Surgery – 2023

MUSC

Changing What's Possible



Portable sleep study device versus polysomnography: A meta-analysis.

Comparison of common sleep study measures

Simultaneous measures of

Portable sleep study devices and polysomnography

AHI – apnea-hypopnea index

ODI – oxygen desaturation index

RDI – respiratory disturbance index

O2 sat

LSAT – lowest oxyhemoglobin sat

Changing What's Possible



Portable sleep study device versus polysomnography: A meta-analysis.

24 studies, 1644 patients

Mean age 50, mean BMI 30, 69% male

Meta correlations between portable and psg

AHI $r=.89$ ($p<.001$)

ODI $r=.94$ ($p<.001$)

RDI $r=.83$ ($p<.001$)

O2 sat $r=.86$ ($p<.001$)

LSAT $r=.93$ ($p<.001$)

Changing What's Possible



Portable sleep study device versus polysomnography: A meta-analysis.

24 studies, 1644 patients
Mean age 50, mean BMI 30, 69% male

Meta-regressions between portable and psg

AHI $r=.96$ ($p<.001$)

ODI $r=.75$ ($p<.031$)

RDI $r=.99$ ($p=.005$)

O2 sat $r=.31$ ($p=.692$)

LSAT $r=.85$ ($p=.030$)

Changing What's Possible



Portable sleep study device versus polysomnography: A meta-analysis.

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Changing What's Possible



Cochlear implantation outcomes in adults with single-sided deafness: A systematic review and meta-analysis.

Daher, Kocharyan, Dillon, Carlson

Otology & Neurotology, 2023

Mayo & UNC

Changing What's Possible



Cochlear implantation outcomes in adults with single-sided deafness: A systematic review and meta-analysis.

2008-2021

36 studies, 800 adults, mean age 51, duration deafness 6 years

Improved speech recognition in noise

Head Shadow - 2-6 dB S/N

Sound source localization error – 25deg $p < .001$

Reduced tinnitus severity – THI drop 30 points $p < .001$

Improved special hearing abilities $p < .001$

Changing What's Possible



Cochlear implantation outcomes in adults with single-sided deafness: A systematic review and meta-analysis.

2016 – prevalence of SSD 1.5% of adults
3.5 million in US
Significant tinnitus, some handicap from tinnitus

CROS, Bone-Conduction Devices

Yearly – 60,000 acquire SSD (a bunch) – would be around 900 in SC alone

2019 – FDA approved CI for SSD for adults and children over 5

Changing What's Possible



Cochlear implantation outcomes in adults with single-sided deafness: A systematic review and meta-analysis.

Insurance challenging
VA good – follows FDA guidelines

Study – unilateral severe-profound SNHL (PTA >70 dB), normal or near normal other ear

Changing What's Possible



Cochlear implantation outcomes in adults with single-sided deafness: A systematic review and meta-analysis.

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Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

Park, Dillon, Buss, Brown

Ear & Hearing – 2023

UNC

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

UNC study

18 children, SSD, Ages 3.5 to 6.5 at time of implantation

18 peers, bilateral normal hearing, age-matched - controls

SSD group – CI+NH better than NH alone, not as good as 2 ears with normal hearing

UNC

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

Children with unilateral SNHL – hearing aid helps

Children with unilateral deafness – SSD – hearing aid does NOT help

Child at risk for educational problems – including grade repetition, cognitive and communication delays – compared to NH

Could use CROS, BAHA (not recommended for young children)

Localization and other spatial hearing measures – significantly impaired in children with SSD

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

Children in UNC SSD program have been reported on over the years - 12-month data look promising

This is 24-month data

All children had receptive and expressive language scores in the normal range at the time of the CI

Medel cochlear implants

Mean age at CI – 5

Length of deafness 3.5 years

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

Children in UNC SSD program had therapy with LSL-certified SLP during the first year with CI

Normal ear remained normal over time period

Thresholds, speech, and localization measures

CNC – normal ear 86% (worse than bilateral NH group – 93%)

CNC – CI ear – minimal up to about 58% on average

NH+CI – big improvement in S/N for sentences – not as good as NH-NH

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

Localization

NH-NH – error < 10 degrees

SSD-NH alone – error about 60 degrees

SSD NH-CI together – error improves with age to about 20 degrees – long way from normal hearing – but big improvement

Changing What's Possible



Two-year outcomes of cochlear implant use for children with unilateral hearing loss: Benefits and comparison to children with normal hearing

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Changing What's Possible



**Two-year outcomes of cochlear implant use
for children with unilateral hearing loss:
Benefits and comparison to children with
normal hearing**

Park, Dillon, Buss, Brown

Ear & Hearing – 2023

UNC

Changing What's Possible



**Patulous eustachian tube dysfunction
symptoms following balloon dilation.**

Hubbell, Toivonen, Kawai, Kim, Nieman, Ward, Poe

Laryngoscope – 2023

Multiple institutions – MEEI (Poe)

Changing What's Possible



Patulous eustachian tube dysfunction symptoms following balloon dilation.

3 academic centers
 295 consecutive BET (182 patients)
 6-year period
 Mean age 38 (7-78), 58% male
 20 Patulous ETD after
 Age <18 increases risk
 Repeat BETD increases
 Significant inflammation increases
 Most symptoms – mild or intermittent

What are you telling patients?

Changing What's Possible



Patulous eustachian tube dysfunction symptoms following balloon dilation.

Patient characteristics obtained – age, sex, preop LPR, allergies, rhinosinusitis, ET mucosal inflammation score, balloon diameter, duration of balloon inflation, laterality, repetition, adjunctive procedures – adenoidectomy & other ear procedures

6 x 16 mm balloon – majority (Acclarent), some other sizes
 5 x 16 or 3.5 x 12 balloon – most kids

Generally – inflation of 2 min

Changing What's Possible



Patulous eustachian tube dysfunction symptoms following balloon dilation.

Male 58%
 Allergy 55%
 LPR 16%
 Rhinosinusitis – 34%
 Most at MEEI
 Bilateral 54%
 Duration – 2 min (70%), 20% - less, 10% more
 Other procedures – adenoid,
 adenoid/tube/myringotomy/tplasty, tubes, myringotomy,
 tplasty, others
 Repetition – 5%

Changing What's Possible



Patulous eustachian tube dysfunction symptoms following balloon dilation.

PET overall – 7%
 Age 7-18 13%
 19-49 6%
 50+ 2%
 First 6% Repeat 20% $p < .001$
 Duration 3 minutes – 12%. NS
 Bad inflammation 19% $p = .007$
 Other procedure yes 8%, no 5%. $p = .02$

 Most with PET symptoms – within first month, one 5 months
 (but better with pregnancy), one 14 months (weight loss)

Changing What's Possible



Patulous eustachian tube dysfunction symptoms following balloon dilation.

Most brief – couple short bouts
Couple with exercise
Two – lasted 6 months
Seven > 6 months
One – better after stopping caffeine
Couple considered surgery
One had surgery – helped

Changing What's Possible



Ergonomics in otolaryngologic surgery: A state of the art review.

Walters, Chang, Cervenka, Collar, Hsieh
Otolaryngology – Head & Neck Surgery – 2022
University of Cincinnati

Changing What's Possible



Ergonomics in otolaryngologic surgery: A state of the art review.

ENT Literature review – prevalence, severity, interventions to reduce problems

Chronic musculoskeletal pain is common
Many procedures produce high ergonomic risk

Pain begins in training, paucity of information related to ergonomic risk in ENT residency curricula

Concern for diminished longevity as surgeon and burnout

Changing What's Possible



Ergonomics in otolaryngologic surgery: A state of the art review.

Discussion

Changing What's Possible



Ergonomics in otolaryngologic surgery: A state of the art review.

Discussion

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Shah, Salehi, Ihnat, Kim, Salehi, Judson, Azizzadeh, Lee

Otolaryngology – Head & Neck Surgery – 2023

Multiple institutions – Yale (Shah, Lee)

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Literature review (past 5 years)– burnout prevalence, factors, solutions, OTO and other residents

OTO residents - moderate to high burnout in 35-86%

Plastics residents – 58-66%

NSG residents – 11-67%

Urology residents – 38-68%

Ortho residents – 31-56%

OMFS residents – likely similar – don't have good data

Highest in PGY2 residents

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Highest in PGY2

Hours worked (>80/week) - ?

Reports of >80 hours/week for OTO

2005 8%

2019 26% - supposed to have policies in place to avoid this

Implications – decreased empathy, moral distress and injury, poor health, decreased QOL, increased attrition, decreased interest in fellowship, increased medical errors

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Lower rates
Structured mentorship programs
Wellness initiatives
Increased ancillary support

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Burnout – defined

A maladaptive response to job-related stressors - can lead to lower productivity, person dysfunction, attrition, reduced quality of patient care

Adaptive response – exercise, hobbies, time with family – promote well-being

Burnout higher in surgical residencies than others

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

OB and ophthalmology not reviewed as do not mandate Gen Surgery training

Gen Surgery not reviewed – rotations, fellowships, ...

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Burnout – emotional exhaustion, depersonalization, decreased sense of personal accomplishment

EE – overload, emotional resource depletion

DP – callousness, dehumanization of others

Low PA – decreased feeling of competence and meaning in work

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

OTO resident burnout – first looked at in 2007 (Golub) – 514 residents – 86% experienced moderate-high burnout

Relatively high in OTO faculty as well (up to 70%), but higher in residents.

EE – higher in female residents

DP, PA – no difference in male - female

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

BURNOUT consequences – substance abuse, depression, suicidality, patient harm, medical errors,

Strategies for change – many programs regularly survey resident emotional health – anonymous?

Formal mentorship – beneficial – more frequent meetings - beneficial

Wellness initiatives – mindfulness, meditation, healthy food, team building events, physical wellness activities

Changing What's Possible



Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change.

Some papers report positive benefit

Departmental support – financial and time

Institutional support – less administrative burden, nursing, clerical, coordinators, clerical, scribes, protected non-clinical time – couple hours a week

Culture of wellness, psychological safety

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

Yesantharao, Joo, Wei, Lin, Vohra, Agrawal, Galaiya

Laryngoscope – 2023

Johns Hopkins University

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

2018 and 2020

Cross-sectional Survey

Single Institution – JHU

Otolaryngology Faculty

Low & High burnout groups

2018 High, n=8, 19%

2020 High, n=11, 37%

3 semi-structured interviews to faculty reporting no burnout

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

2018 – Nov-Dec

42/71 participants (59%) completed survey – 9 questions

Full and Assoc Prof – significantly LOWER odds of HIGH burnout

Female – significantly HIGHER odds of HIGH burnout

2020 – Jul-Aug

30/49 (62%) completed survey – 14 questions

Rank/gender did NOT predict HIGH burnout

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

2018 – myriad of work-related stressors

2020 – patient care and family obligation stressors

No burnout factors – focus on helping others, happiness over compensation as currency, gratitude for ability to have impact

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

Why are you not burned out?

What do you do to prevent burnout?

How do you balance personal and professional life?

What personal wellness strategies do you practice on a regular basis?

How do you deal with professional stressors?

How do you maintain interest and enthusiasm for work?

What activities contribute most to your sense of personal accomplishment?

Which of your personal attributes do you think help you avoid burnout?

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

	2018	2020	
Any Burnout	62%	73%	
High Burnout	19%	37%	.094
Perc Prot Time		less	.002

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

Source of Burnout	2018	2020	
EPIC	57%	27%	.010 ****
Work act outside BH	64%	27%	.002 **** EPIC fixed ?
Society Work	38%	10%	.013 – doing less?
Academic Work	59%	30%	.013 – doing less?
Research	47%	10%	.001 - doing less?

EPIC fixed?, EPIC not needed as workload decreased?

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

Reducing Burnout 2018

- Increase access to scribes
- Minimize required lectures activities after hours
- Reduce administrative and bureaucratic overhead
- Hire additional APP
- Improve support staff training for patient questions
- Automate EMR features

Changing What's Possible



Factors related to wellness and burnout in academic otolaryngology: A pre- and post-COVID-19 analysis.

Reducing Burnout 2020 (couple months into COVID)

- Reduce Zoom fatigue
- Improve consistency in OR with COVID
- Automate EMR features
- Fitness – important coping mechanism – high percentage of departmental exercise support – virtual fitness

Changing What's Possible

