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Canadian Hearing Report

Revue canadienne d'audition

CAA Canadian Academy of Audiology Heard. Understood.
ACA Academie canadienne d'audiologie Entendus. Compris.
www.canadianaudiology.ca

Vol. 6 No. 4

Hyperacusis: An Introduction

Online Web Study on Hyperacusis

The Hearing Foundation of Canada's Youth Listening Summit

Peer Reviewed

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Welcome back from one of the hottest summers that I can remember. The concept of "green grass" may be a thing of the past. Good thing that I like beige/neutral colours. Let's hope that this is not the type of 40+ degree weather we can expect in the future. I just returned from the Performing Arts Medical Association (www.artsmed.org) conference in Snowmass, Colorado, and I was the only audiologist there. Of the hundred or so people, there were physiotherapists, occupational therapists, orthopedic surgeons, rehab. medicine/physiatry specialists, family doctors, and quite a few musicians and musician educators. The conference underscored our duty to educate our colleagues in different fields about what we do, and what our training is. There was a case report about a drummer with strained wrists and elbows.

Occupational therapists, physiotherapists, physicians of every type, and drumming instructors, were involved in trying to get to the "diagnosis." I had actually seen many drummers in this situation over the years and have published on this issue in the distant past. The problem was that this drummer had read in (a magazine for drummers) that he should be wearing hearing protection. After using his father's industrial strength foam earplugs he started to notice wrist strain. It's pretty obvious that the foam earplugs removed so much of his cymbal and rim shot sounds that he started hitting harder. This wrist issue was actually a hearing/monitoring issue. And it's something that I have written about in the distant past. (I believe that my article was entitled "The Wrist Sings the Blues"). When the drummer is fit with the proper form of hearing protection – not so much as to lose the monitoring ability, but enough to still hear his music at a safe level (e.g., the ER-25) – the wrist and arm problems should cease. I am always amazed how our audiology training is half theory, half practical, and half common sense. The high point of the conference for me was the delightful task of having to remind our colleagues in other, seemingly unrelated fields, what an audiologist is. The beer at 10,000 feet was also pretty good.

In this issue of the *Canadian Hearing Report* we continue with our columns. These are all written so that they can be read quickly and usually are of the calibre of writing style, that they can be shared with our clients. I am especially impressed with Dr. Robert Harrison's "For the Consumer" column. This question was initially posed to me by Gael Hannan (one of our other columnists) and it was a question that she could not answer posed by a grade 6 student, "How many hair cells can we lose before we have a hearing loss." I pulled out all of my text books and more recent articles that I could find, and couldn't find anything that was clear. So, I asked Bob Harrison, PhD., of The Hospital for Sick Children. The result is a clear and concise overview of everything that we know, aimed at the level of a grade 6 student, which as far as I am concerned, is the perfect level for me.

We also have regular columns from Gael Hannan titled "From the Consumer"; Dr. Kim Tillery, "All Things Central"; and Calvin Staples with his selections from the blogs at hearinghealthmatters.org.

And if you don't like columns, we have a peer-reviewed article by Dr. David Baguley from over the pond in England entitled, "Hyperacusis: An Introduction", as well as the results of an online study on hyperacusis by Dr. Rich Tyler and his colleagues at the University of Iowa. We finish off with a most delightful paper by Kate Dekok on "The Rules of the Profession… Are They Enough?" This was an expansion of a talk that Kate had given for the last Seminars on Audition in Toronto in March, 2011.

Let's hope that climate change has not stolen my favourite season from us and we still have a beautiful fall.

Marshall Chasin, AuD, MSc, Reg. CASLPO, Aud(C),
Doctor of Audiology
Editor-in-Chief

Canadian Hearing Report 2011;6(4):3.

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PEOPLE FIRST

L'été passera sans doute dans les annales comme l'un des plus chauds à ce jour. L'époque dus gazon vert est peut-être révolue. Je n'y perds pas grand-chose, moi qui préfère les tonalités de beige. Par ailleurs, espérons que ce mercure à plus de 40 degrés ne soit pas ce qui nous attend à l'avenir. Je reviens tout juste du congrès de groupe *Performing Arts Medical Association* (www.artsmed.org) qui s'est tenu à Snowmass au Colorado; j'étais le seul audiologiste présent parmi les quelque cent physiothérapeutes, ergothérapeutes, chirurgiens orthopédistes, physiatres et autres spécialistes de la réadaptation, médecins de famille et musiciens et enseignants en musique rassemblés pour l'occasion. Une situation qui fait ressortir la nécessité, et notre devoir, d'instruire nos collègues des diverses disciplines quant à la nature de notre champ de pratique et de notre formation. Nous avons assisté à la présentation d'un exposé sur un batteur affligé d'élongation musculaire aux poignets et aux coudes. Les ergothérapeutes, les physiothérapeutes, les médecins toutes spécialités confondues et les professeurs de batterie se sont employés à cerner le « diagnostic » de ce cas. Au fil des ans, j'ai rencontré nombre de batteurs aux prises avec ce problème, j'ai même publié un article sur le sujet par le passé. Pour ce qui est de ce batteur, il a lu dans *Modern Drummer* (magazine de musique) qu'il était conseillé aux batteurs de porter des protecteurs auriculaires. Après s'être exercé un temps muni des bouchons d'oreille en mousse de calibre industriel de son père, il a commencé à ressentir les contrecoups d'une élongation musculaire au poignet. Il paraît évident que, puisque ces bouchons d'oreille l'ont empêché d'entendre les sons produits par ses instruments, il s'est mis à frapper plus fort. La blessure au poignet est en fait un problème d'audition et de surveillance (écoute). J'ai écrit à ce sujet il y a longtemps (je crois me souvenir que l'article s'intitule « The Wrist Sings the Blues »). Le poignet et le bras reviendront à leur état habituel dès que le batteur choisira la protection auriculaire appropriée, un dispositif lui permettant de conserver sa capacité d'écoute tout en entendant sa musique à un niveau sécuritaire (p. ex., ER-25). Voilà qui illustre une fois de plus à quel point notre formation en audiologie allie la théorie, la pratique et le simple bon sens. C'est ainsi que le point culminant du congrès a été pour moi de décrire, avec beaucoup de plaisir et de fierté, ce qu'est l'audiologiste au bénéfice des collègues d'autres disciplines éloignées de la nôtre en apparence. Sans compter que la bière à plus de 3 000 mètres d'altitude était également délicieuse!

Vous trouverez dans le présent numéro de la *Revue canadienne d'audition* les chroniques habituelles. De lecture facile, elles sont rédigées de telle sorte qu'elles peuvent être utiles à nos clients. Je suis particulièrement impressionné par la rubrique destinée au consommateur du docteur Robert Harrison. Gael Hannan (une des rédactrices de la Revue) m'a posé cette question, qui provient d'un élève de sixième année et à laquelle elle n'a pu répondre, celle de savoir combien de cellules auditives internes nous pouvons perdre avant de subir une perte auditive. J'ai consulté tous mes manuels et des articles récents, mais je n'ai rien repéré de précis sur le sujet. Je me suis donc adressé à Bob Harrison de *l'Hospital for Sick Children*. Il nous offre une vue d'ensemble claire et concise des connaissances sur la question, compréhensible pour un élève de sixième année, ce qui me convient tout à fait.

Vous aurez donc le loisir de parcourir la chronique de Gael Hannan sur le point de vue du consommateur, celle de Kim Tillery sur les questions centrales liées à l'audition, celle de Calvin Staples formée d'une sélection d'observations des blogueurs sur le site hearinghealthmatters.org.

Si vous en voulez plus, le numéro renferme également un article, révisé par des pairs, de David Baguley d'Angleterre sur l'hyperacousie ainsi que les résultats d'une étude en ligne sur l'hyperacousie de Roch Tyler et de ses collègues de l'Université d'Iowa. Le numéro se conclut par un exposé captivant de Kate Dekok qui se demande si les règles de la profession sont suffisantes. Il s'agit de la version longue de l'exposé que Kate a présenté au dernier séminaire sur l'audition à Toronto en mars 2011.

Il ne me reste qu'à espérer que le changement climatique ne me privera pas de ma saison préférée, que l'automne sera magnifique.

Marshall Chasin, docteur en audiologie
Rédacteur en chef

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contents

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Hi All,

I shared this with a patient today and thought I should share it with everyone. One of my cochlear implant patients uses an app called "ClearCaptions" to caption his phone calls on his iPhone. The app is also available on Android Market so it's not only limited to iPhone users. Patients can just search the iTunes Store or Android Market for "Clear Captions" or go to their website: http://www.clearcaptions.com. "

I think technology is just so awesome! I have some 90 year olds using all of the Bluetooth connections and loving the freedom it gives them. This week I had the opportunity to be interviewed by a local TV station during their morning news program. When I was chatting with the producer she already had it in her mind that my target audience was over 70. Well, yes, but I had a great opportunity to educate her on why I want to reach 40 and 50 year olds as well. This is the starting age group for most caretakers and so many in their 50s already suffer from hearing loss. This group loves technology!

If we incorporate what the Smart phones and tablets are capable of for those with hearing loss, whether it is purely for Bluetooth or the apps we can find, we should promote this as well to our patients. I had loaded an app for a patient that had, white, pink, and brown noise to help with his tinnitus. How cool is that?!

Judy L. Huch, AuD
Oro Valley, Arizona

Canadian Hearing Report 2011;6(4):9.

Coming to Canada: Intensive Seminar on Hearing Protection and Prevention of Hearing Loss

Please note that this is a free seminar but that pre-registration is required. Both Elliott Berger and Laurie Wells are world class speakers.

Sponsored by 3M Canada
Course Date and Location:
September 20, 2011
Hilton Garden Inn Toronto

In spite of decades of regulations, workers around the world continue to acquire hearing loss and tinnitus due to noise. Meanwhile, employers, employees, and professionals grapple with the best approach to preventing this disabling condition. Often, good intentions to protect hearing aren't enough to stop the gradual changes in hearing thresholds. If noise is an issue in your work life, you are invited to attend an all-day intensive seminar sponsored by 3M Canada: *Hearing Protection Devices and Hearing Conservation Programs*. Applying the content of this program can help you make a difference.

EXPERT PRESENTERS

Two recognized experts, Elliott Berger, division scientist for 3M Occupational Health and Environmental Safety Division and Laurie Wells, AuD, doctor of audiology, of Associates In Acoustics, Inc., bring theory and practical application together. An eloquent and engaging presenter, Elliott Berger has been teaching about hearing protection devices for over 30 years. He shares his unequaled command of technical knowledge about hearing protection devices and his contagious enthusiasm for helping others discover that all ears can be properly fit with hearing protection! Laurie Wells has devoted her audiology career to preventing hearing loss and has extensive experience as a consultant and educator. With an interactive presentation style, she elicits participation no matter how large the audience.

RELEVANT CONTENT AND COURSE MATERIALS

The 3M Canada: *Hearing Protection Device and Hearing Conservation Program* seminar is designed to help you understanding the science behind hearing protection devices and other elements of hearing conservation with *practical tips* that can be immediately implemented into your hearing conservation program. The morning session concentrates on hearing and hearing protection devices including the topics:

- Hearing Mechanics
- How Protectors Work
- Laboratory Attenuation Measurements
- Considerations Regarding the NRR
- Real-World Performance
- Dual Protection
- Selection, Use, and Care, and Fit Testing
- Communications
- Specialized Hearing Protectors

The afternoon session addresses the balance between compliance with regulations and applying a preventative approach to reducing the risk of hearing loss. Specific topics include:

- Best practices approach to hearing loss prevention programs
- Audiometric testing nuances
- Significant threshold shifts
- Steps in determining if hearing shifts are related to the workplace
- Essential records for hearing conservation programs
- Motivating employees to protect their hearing

Valuable time during the day can be spent with "ears-on" fitting of hearing protection devices. Specialists will be giving live demonstrations of the EARfit Validation system. This innovative technology quickly and objectively measures the attenuation a hearing protector achieves in your ear.

Seminar materials are provided: a professional binder of the lecture handouts, product information, and supplemental resource information. Because of the educational focus, the seminar is approved for continuing education points for the professions of nursing, audiology, industrial hygiene, and safety.

The 3M Canada H*earing Protection Device and Hearing Conservation Program* seminar is a popular and unique educational opportunity. Over 10,000 people have attended since its inception and testimonials from attendees are consistently over-whelmingly positive.

There is no fee to attend however pre-registration is required. For more information and registration instructions, please visit:

EDUCATION CREDITS SPECIFIC TO CANADA

This course is appproved for 0.5 CMP by the Board of Canadian Registered Safety Professionals.

This course has been awarded 1 Registration Maintenance (RM) point by the Canadian Registration Board of Occupational Hygienists.

For more information please visit:
http://www.e-a-r.com/hearingconservation/earseminars.cfm
Course Date and Location:
September 20, 2011 | Hilton Garden Inn Toronto | Vaughan & Homewood Suites by Hilton Vaughan
3201 Highway 7 West,Vaughan, ON L4K 5Z7 | 866-539-0036
Sponsored by 3M Canada

Unitron's Favourite Sound Program and Impact Video Recognizes Healthcare Professionals Around the Globe and Tells the World that 'Hearing Matters'

In recognition of the individuals who have dedicated their lives to helping people with hearing loss, Unitron has united hearing healthcare professionals from around the globe to put the spotlight on the issue of hearing loss, staging a rolling global program that asks the simple question, "what is your favourite sound?"

The first wave of the Unitron initiative, which reached out to US hearing healthcare professionals, concluded at the end of April, and has resulted in the production of an inspirational video that shares a message that 'Hearing matters.' The video, which will be made available on Unitron's website and YouTube and showcases sound contributions from hundreds of hearing healthcare professionals, including such favorites as baby's heartbeat, the roll of thunder, and milk steaming for a latte. Along with the video, a full gallery of all sound submissions can be viewed at www.unitron.com/mysound .

Favourite Sound campaigns are now underway or planned in other countries where Unitron operates, including Canada, France and Germany.

"We have been tremendously pleased by the response to this program as it rolls out to hearing healthcare professionals in the countries we serve. We believe this business is personal, and that belief defines everything we do as a company," says Unitron President and CEO, Michael Tease. "Clearly, our partners and customers are equally moved by the power of sound, and share in Unitron's passionate belief that 'hearing matters'. We look forward to seeing the contributions coming in from other countries around the globe."

For every submission of sound received, Unitron US donated a financial contribution to the NEADS, a nationally recognized non-profit organization established to provide guide dogs for deaf and disabled Americans. Similar philanthropy programs were initiated for other countries.

Aging and Speech Communication: 4th International and Interdisciplinary Research Conference

Indiana University, Bloomington October 10-12, 2011

The goal of the fourth conference on Aging and Speech Communication is to integrate auditory and cognitive approaches to understanding age-related declines in speech communication. The conference will bring together researchers working around the world in the areas of cognitive processing and sensory perceptual processing, especially hearing, to share their latest research findings with regard to aging and speech communication. Speech communication is an ability that involves both sensory encoding of acoustic information and the processing of that information by higher cognitive centers. Aging is known to impact both the peripheral sense of hearing and some cognitive functions that may be critical for processing the peripherally degraded auditory input. By bringing together scholars actively involved in research in these areas, it is hoped that further progress will be made in understanding and remedying the

speech-communication difficulties of older adults.

The conference program and information about registration, call for poster submissions, student scholar-ships, travel, and local arrangements are available at the conference website www.indiana.edu/~ascpost/index.htm.

Some important dates follow:
Registration and poster abstract submission opens **June 1, 2011**.
Poster abstract submission and student-scholarship application closes **July 15, 2011.**

Registration closes September 10, 2011. For this conference, a new initiative has been implemented and advertised in which stipends of up to $300 each will be provided to those wishing to attend the conference, but in need of family care while in attendance. These stipends may be used to cover the travel expenses of the attendee's childcare provider so that the childcare provider (baby sitter, spouse, grandparent, etc.) can accompany the attendee and the attendee's child to the conference. Special conference registrations will also be made available on the conference registration website to permit the childcare provider and child the opportunity to have conference meals with the attendee. Requests for such stipends and registrations will be made by the attendee during registration and will be limited to the first ten such requests received for the 2011 conference (on a first come-first served basis).

Conference Advisory Committee:
Larry E. Humes, Indiana University (Chair)
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Sandra Gordon-Salant, University of Maryland
Louise Hickson, University of Queensland, Australia
Kathleen Pichora-Fuller, University of Toronto-Mississauga, Canada
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Mitchell Sommers, Washington University

IRA HIRSH 1922-2010

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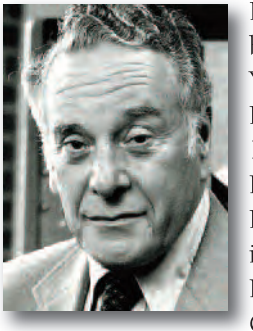

Ira Hirsh was born in New York City on February 22, 1922. He earned BA degrees in English and Math in 1942 from the New York State College for Teachers. A Year later he married fellow student Shirley Kyle, who became Ira's life-long companion, colleague, and collaborator. After earning an MA from Northwestern University's School of Speech Ira served as a lieutenant in the Army Air Force from 1944-46, first as an instructor in communications and later in aural rehabilitation. After the war, Ira joined the Psychoacoutic Lab at Harvard University whose director was S.S. (Smitty) Stevens. Stevens assembled a truly remarkable group of scientists, during and just after World War II. It included J.C.R. Licklider, Hallowell Davis, James Egan, George Miller, George von Bekesy, and other well-known members of the Acoustical Society of America (ASA). The benefits Ira gained through those associations were clear to all who knew him, as were the influences of Ray Carhart and pioneers in audiology at Northwestern where Ira first became interested in hearing and deafness. Ira completed his PhD in 1948, but stayed on at Harvard for several years, where he developed a friendship with B.F. Skinner. He and Skinner shared a deep interest in music. Plus they both had interests in applied psychology (Skinner had just published Walden II in 1948). When Ira left Harvard in 1951 Skinner gave him a copy of Helmholtz's "The Sensations of Tone" saying that it was good science but useless when the need was to tune a piano. "Take the damn thing with you" Skinner inscribed in the book. Ira did, and throughout his research career he devoted a portion of his efforts to applied questions, including auditory rehabilitation, noise abatement, and deaf education.

In 1951 Ira moved west to St. Louis to take a research position at the Central Institute for the Deaf (CID), along with an assistant professorship in the Department of Psychology at Washington University. Ira quickly rose through the ranks becoming Director of Research at CID (1965-1983), Professor of Psychology in 1961, Dean of the Faculty of Arts and Science (1969-1973), and Chair of the Psychology Department (1983-1987). Along the way Ira won numerous awards and honors, including election to the National Academy of Science, the Gold Medal of the ASA, and the Whetnall Medal from the Royal Society of Medicine. At the time of his death on January 12, 2010, Ira was the Edward Mallinckrodt Distinguished University

Professor Emeritus of Psychology and Audiology at Washington University.

A year after arriving at Washington University Ira published *The Measurement of Hearing* which quickly became the standard textbook in psychological acoustics courses as well as a basic reference for audiologists. In addition to this book, Ira published over 100 scholarly articles, many of which laid the groundwork for research that has revolutionized such fields as audiology, psychoacoustics, audiometry, and deaf education. For example, Ira was among the first scientists to push auditory research beyond the study of single tones, clicks, or noise bursts. His dissertation investigated the influence of inter-aural phase on the detection of tones masked by noise, a phenomenon known today as the masking-level difference, and around which a huge literature, both basic and applied, has developed. As another example, Ira and Carl Sherrick published a paper in 1959 on the perception of temporal order and the role this ability plays in recognizing sounds, both speech and nonspeech. His basic findings have been generalized to other sense modalities and have influenced such fields as sound localization and perceptual sequencing within a sensory stream. Ira's strongest research connections were to the Central Institute for the Deaf in St. Louis, and it was there that he enjoyed the excitement of his long research career.

Ira's was a person who had high standards for himself as well as others. As an academic leader and scientist he could be forceful and demanding, but his goal was always the betterment of the field. He had an unflagging devotion to psychology as a hard science. Those who shared his values and goals had a robust ally and colleague.

Ira also had a life full of outside interests. He enjoyed his left-hander advantage in tennis and in winters he could be found frequenting the ice-skating rinks around St. Louis where he was an accomplished figure skater, and he and Shirley performed ice dancing. His interest in music was a life-long avocation, and he regularly was part of a barbershop quartet that performed at the meeting of the Acoustical Society. He directed and sang in the First Unitarian Church of St. Louis choir as well as with the St. Louis Chamber Choir and the Bach Society of St. Louis. He traveled extensively, including sabbaticals spent in China, Japan, and France. He became a connoisseur of French wine and served as a wine consultant to the Washington University Faculty Club.

He was preceded in death by his wife of 61 years, Shirley who passed away in 2004.

- Charles S. Watson.

CAA Welcomes Dr. Gordon Hempton

as the Keynote Speaker of the 2011 Conference and Exhibition

Q&A

Dr. Gordon Hempton is an internationally renowned acoustic ecologist who travels the globe in pursuit of Earth's rarest natural sounds. His many accolades include an Emmy for the PBS television documentary Vanishing Dawn Chorus and awards from The National Endowment for the Arts and the Rolex Awards for Enterprise. Here, Dr. Hempton gives us a quick glimpse into his world.

What is an acoustic ecologist?

Acoustic ecology is the study of sound in living communities—how sound is produced, the obstacles of intelligible message sending, the synchronicity of species in wild environments, human noise impacts, and more. In short an acoustic ecologist listens to places and strives to understand how each place is as unique as a thumbprint.

How did you become interested in acoustic ecology?

Purely by accident. I discovered that despite my academic success I was a terrible listener. Whimsically I bought a microphone to hear what I could hear and in one instant a whole new world opened up to me. I've been hooked on listening to the world ever since—it has now been 30 years.

Can you give an example of one of your recent projects and its potential impact?

My latest project is for Parks Canada in collaboration with Canadian Geographic at Grasslands National Park in Saskatchewan. I am conducting a sound survey of Grasslands NP to determine species diversity, sonic value, and most importantly to determine if it is one of the last great quiet places in the world—meaning that human caused noise pollution is largely absent. I will include my findings as part of my keynote address.

What is your favourite destination in the world for listening, and why?

To date the Sinharaja forest of Sri Lanka (UNESCO World Heritage Site), is the place that I have most enjoyed because the rhythms of its music created by insects, frogs and birds are so complex, yet, linked. You must listen to the evening ambience for more than fifteen minutes before most of the patterns are recognized, and when the brain finishes its work, you listen clearly to one of nature's greatest symphonies.

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14th Annual CAA Conference and Exhibition
October 19-22, 2011
Victoria Conference Centre, Victoria BC

For registration, speaker list, and travel & hotel information go to:
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calendar of events

SEPTEMBER 8–10, 2011

19th Annual Conference on the Management of the Tinnitus Patient
The University of Iowa
Registration Website:
http://www.continuetolearn.uiowa.edu/conferences/conferences.htm

SEPTEMBER 20, 2011

E•A•R Hearing Conservation Seminar
Hilton Garden Inn Toronto | Vaughan & Homewood Suites by Hilton Vaughan | http://www.e-a-r.com/hearingconservation/toronto.cfm

OCTOBER 10–12, 2011

Aging and Speech Communication: 4th International and Interdisciplinary Research Conference
Indiana University, Bloomington
www.indiana.edu/~ascpost/index.htm.

OCTOBER 19–22, 2011

Building Bridges Conference
Canadian Academy of Audiology 2011 Conference and Exhibition
Victoria, BC | http://www.canadianaudiology.ca/

OCTOBER 20–21, 2011

Services that Promote Early Development for Deaf and Hard of Hearing Children 0–6 and their Families
Mississauga, ON | Info: 905: 803-6735

NOVEMBER 3–5, 2011

Academy of Doctors of Audiology Annual Convention (ADA 2011)
"Rock the Boat: How to Practice, Manage and Lead in Rough Waters" | Bonita Springs, FL
http://www.audiologist.org/events.html

NOVEMBER 17–19, 2011

2011 ASHA Convention
San Diego, CA
http://www.asha.org/events/convention/l

FROM THE BLOGS@HEARINGHEALTHMATTERS.ORG

By Calvin Staples, MSc

I hope everyone is checking out hearinghealthmatters.org on a regular basis. The website is pretty handy as a starting point for many topics you might want to explore in greater detail. This month I thought I would explore a variety of different blogs to submit to CHR. I rarely chomp on the topic of ethics as for the most part I think it is pretty simple; be a good person. However, I was reviewing Ray Katz's blog on ethics and I thought maybe we'll all have a little man in mirror session. I imagined with the changes in our industry many of us are presented with the issues Ray blogged about on a regular basis. It also appears Ray might be doing a bit of an informal survey so you can send your answers on to him via the website. Additionally, I included Marshall Chasin's Weber's Law awaking! It is quite interesting how we all continue to learn. Finally, I included two blogs on new technology. The technologically driven world we live in changes rapidly and without much notice. I am uncertain as to whether or not either of the tech blogs below will readily and successfully be part of our practices, but I thought we best check it out. Happy Reading!

ETHICS -BLACK, WHITE, OR GRAY

By K. Ray Katz

Every once in awhile my mind stumbles and an old subject rises to the top. Ethics can be a subject with more than a few grey areas, although there are some people who have a very black and white view of it. I believe that I always ran an ethical business (practice) but even so, I can't say that everyone would agree. Most of us believe we are ethical people, but we each were raised in a different environment and our experiences tend to provide us with slightly different interpretations of our professional rules of conduct. People who have never worked in a commercial business may have a different view of what is "proper" from those who have.

Do you remember when it was unethical to sell hearing instruments for a profit. People were kicked out of organizations for such conduct. Things have changed and will continue to just as we change. Our laws, rules, and professional standards all try to strip away our different ways of thinking regarding ethical conduct and have us think and act in a way that is clear, open, honest, and beneficial to our clients. I have no quarrel with this and have even done my small bit to help promote ethical conduct within our professions.

With this said, I have constructed a few scenarios, and would like you to rank them as:

Ethical = 1 Questionable = 2
Really questionable =3
Unethical = 4 I punt = 5

I would really like you to send me your results and you may rest assured that no one's name will be made public. You can even send them anonymously if you prefer. Your additional comments should you choose to undertake this assignment, will be greatly appreciated. The results will be tabulated and printed in next week's blog.

A. _____ An office purchases all of its instruments at the wholesale, single unit list price and sells them at an amount deemed to be competitive with its competition.
B. _____ An office owner and its employees want to attend a seminar that involves registration and travel expenses and accepts a manufacturer's offer to pay for the trip.
C. _____ A manufacturer provides travel and attendance at one of its seminars to offices who purchase a set number of units.
D. _____ An office accepts a prepaid trip of their choosing from a manufacturer after purchasing a set number of units.
E. _____ An office uses points accumulated on its credit card for buying units at full wholesale, and uses the points to go to a professional seminar and gets a quantity discount rebate check from its supplier.
F. _____ An office gets a quantity discount from its supplier but does not reflect that discount in the price it charges its clients.
G. _____ An office sends each new client a check for their share of the office's quantity discount for that month.
H. _____ An office sells all of its units at its cost and charges a separate professional services fee.

Good luck to everyone and PLEASE send me your answers.
http://hearinghealthmatters.org/haveyouheard/

WEBER'S LAW ...WELL ALMOST, WELL ... MAYBE NOT...

By Marshall Chasin

I received this comment to an earlier blog on Weber's Law from Dr. Brian Moore in the UK…. *"Reducing the stereo volume from 60 dB to 55 dB may be quite noticeable, but barely noticeable if one were to reduce the stereo volume from 90 dB to 85 dB." … This is a mis-interpretation of Weber's law. A reduction in level of 5 dB corresponds to a fixed ratio of intensities. So, according to Weber's law, the change from 60–55 dB is equally detectable to the change from 90 to 85 dB. In fact, owing to the 'near-miss' to Weber's law, the change from 60 to 55 dB would be LESS noticeable than the change from 90 to 85 dB."*

Thanks for the clarification. I have been stating Weber's Law that way for over 30 years, but you're never too old to learn something new. I actually consulted with 10 of my friends (yes, I have 10 friends … I pay them very well) who are audiologists and they all also had the same misinterpretation!

The bottom line is not so much whether a just noticeable difference is greater or less at lower sound levels, but that the just noticeable difference is rather large at all levels in a loud band or orchestra. This is clearly not a Weber's Law issue as I had initially thought, but the result is similar- one can reduce the stage level by 5 dB and it is not really noticeable by, or even objectionable to, the performers.
This past week was spent with over 100 of the most talented up and coming classical musicians at the National Youth Orchestra of Canada. These are amazing musicians and some were as young as 15. Typically the string players are the younger ones because they start at age 3 and the brass and woodwinds are older. It takes longer to hit your stride for brass instruments. Among the many "experiments" I did with the musicians was to have them listen to a recording of a very intense piece by Shostakovich – Josef Stalin's favorite composer – that they had just performed. When asked to listen for any "changes" I was able to reduce the volume by about 6 dB before anyone noticed a change. Most, if not all, would happily play at a level that would result in only 1/4 of their damage (a 6 dB reduction) without much urging.

This was one of the results of the excellent study by Jeremy Federman and Todd Ricketts (Federman, J., and Ricketts, T. 2008. Preferred and minimum acceptable listening levels for musicians while using floor and in-ear monitors. *Journal of Speech Language Hearing Research,* 51(1), 147–160.). Namely that musicians, under certain circumstances, are willing to accept a lower listening level. In the Federman and Ricketts study, the musicians accepted this lower level (called the minimal acceptable listening level) when in ear monitors were used, rather than the stage "wedge" floor monitors.
So, … my apologies for attributing this to the Weber Law where it probably belongs under the more general heading of masking, and I am positive there are other headings but am too gun shy to travel much further.

http://hearinghealthmatters.org/hearthemusic/

IN-THE-MOUTH HEARING DEVICE APPROVED FOR CONDUCTIVE LOSS

By David Kirkwood

SAN MATEO, CA – The U.S. Food and Drug Administration (FDA) has cleared the SoundBite Hearing System for use in treating patients with conductive hearing loss. SoundBite, which is manufactured by Sonitus Medical, Inc., a San Mateo medical device company, is the first non-surgical and removable hearing system to transmit sound via the teeth.

Earlier this year, the FDA had cleared SoundBite for treatment of patients with single-sided deafness. Approval for use with conductive hearing loss further establishes SoundBite as a non-surgical and less expensive alternative to bone-anchored implants SoundBite imperceptibly transmits sound via the teeth to help people with single-sided deafness or conductive hearing loss who are not candidates for conventional air-conduction hearing aids. It uses bone conduction to deliver sound to the inner ear.

The system consists of an easily inserted in-the-mouth hearing device – custom made to fit around either the upper left or right back teeth – and a small microphone unit worn behind the ear. No modifications to the teeth are required.

The SoundBite hearing system will be available starting early this fall through physicians and audiologists in selected markets in the U.S. It will then be introduced to additional markets nationwide over the following several months. For information on availability, go to www.soundbitehearing.com/find/. Commenting on the FDA's action, Amir Abolfathi, CEO of Sonitus Medical, said, "We are pleased that the uses of the SoundBite system continue to expand. As we begin the roll out of our product in partnership with otologists, ENTs, and audiologists, we remain committed to increasing the number of patients who may benefit from our non-surgical treatment option."

http://hearinghealthmatters.org/hearingnewswatch/2011/in-the-mouth-hearing-device-approved-for-conductive-loss/

SURVEY FINDS CONSUMER DEMAND FOR WATER, DUST PROOF HEARING AIDS

By David Kirkwood

PISCATAWAY, NJ – A survey of 500 hearing aid wearers, conducted by Siemens Hearing Instruments, Inc., showed that many of them want more robust products that can better hold up during swimming and other activities that they want to enjoy without giving up their ability to communicate.

According to the study, hearing-impaired Americans want to lead a more vibrant daily life, but feel restricted by their hearing devices.
The Siemens survey, which was released last week, found that for fear of water damage to their hearing aids, wearers refrain from activities they would otherwise enjoy, such as swimming, lounging in the pool, or soaking in a hot tub. A third of respondents state that wearing their hearing device on a day with adverse weather conditions directly affects their routine.

Many hearing aid wearers avoid wearing hearing aids when doing activities, such as like woodworking, farming, and construction, that might expose them to dust or dirt.

About 53% of respondents expressed interest in sturdier hearing aids, better capable of handling a broader range of environmental situations. When asked about specific hearing aid attributes, more than 70% of respondents expressed interest in a waterproof device, with 63% and 60%, respectively, interested in shock-resistant and dustproof qualities.

Siemens released the survey results in conjunction with the introduction of Aquaris (www.usa.siemens.com/aquaris), which it describes as "the first truly waterproof, dustproof, and shock-resistant hearing aid."

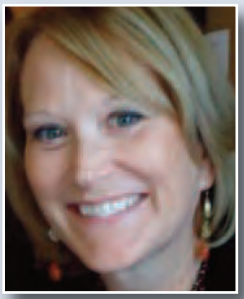
According to the company, the new hearing aid's housing is constructed from a single piece and features watertight seals and membranes. As a result, Siemens says, Aquaris can be submerged in water up to 3 feet for 30 minutes without damage to the instrument.

http://hearinghealthmatters.org/hearingnewswatch/2011/survey-finds-consumer-demand-for-water-dust-proof-hearing-aids/

Canadian Hearing Report 2011;6(4):15-17.

Types of CAPD

By Kim L. Tillery, PhD, CCC-A



About the Author

Dr. Kim L. Tillery, professor and chairperson of the Department of Communication Disorders and Sciences at the State University of New York at Fredonia, also has a private practice in diagnosing and treating individuals with (C)APD. She has been honoured to present 90 workshops or presentations at national, international, and regional conferences, and authored and co-authored several chapters and journal articles on (C)APD.

We have come a long way from writing a (C)APD evaluation report with general statements about the diagnosed auditory processing disorder. Audiologists today can define the type(s) of (C)APD a client exhibits based on three models that have more similarities than differences. In the 1980s Jack Katz and colleagues at SUNY at Buffalo developed the Buffalo Model and reported their findings in the early 1990s.[1,2] The Bellis / Ferre Model was first reported by Jeanne Ferre[3] known as the CAT files (indicating different CATegories of (C)APDs) that was later made into broader areas of (C)APD.[4] A third model, the Spoken-Language Processing (S-LP) Model, described in 2002, was provided by Larry Medwetsky and colleagues[5] at the Rochester Speech and Hearing Clinic in New York. Some audiologists use one model while others incorporate different aspects from more than one model to diagnose (C)APD.

All the models above recognize **Decoding** as a type of (C)APD when a client struggles in identifying, manipulating and remembering phonemes. In fact, Bellis[6] states that decoding may be the only true form of an auditory processing disorder. Decoding is diagnosed by obtaining (1) weaker right ear competing performance verses left ear competing performance on the Staggered Spondaic Word (SSW) test,[1,5] (2) weak right ear performance on the speech in noise tests,[7] or (3) weak right ear / both ears on the Dichotic Digit test.[8] Site of lesion studies suggest the probable dysfunction site is the primary auditory cortex of the left hemisphere[7] and the phonemic zone of the left temporal lobe[9] causing weak reading and spelling skills related to weak phonemic skills.[2] The inability to process words quickly and accurately is another classic sign.[5] Children and adults are referred usually due to consistently mishearing the auditory message even when they have normal peripheral hearing. Other noted problems are omissions of grammatical morphemes, difficulty in differentiating vowel sounds, inaccurately processing the message even when given extra time to process the message, and exhibiting a word-finding problem or a receptive language disorder.[10]

Integration is another generally accepted type of (C)APD. This type is the most severe due to an immature corpus callosum or other neural areas involved in transferring information across the hemispheres.[2,8] Difficulties seen in this (C)APD type are in drawing, dancing, receiving dictation, and performing multimodal tasks.[8] Some may display significant reading problems, respond to tonal tests as a malingerer does, and show difficulty in integrating auditory and visual information,[2] including suprasegmental processing difficulties.[5,11] Significant left ear dichotic test errors places the client in this category. Children are referred because of academic or behavioural problems related to sensory integration and language issues, severe reading problems, or they are receiving occupational therapy.

The **Organization** type of (C)APD is seen differently in all three models. This type is diagnosed when stimuli are repeated out of sequence (known as reversals) on the SSW or Phonemic Synthesis tests. (These are the only tests that have norms for reversals.) Originally, the Bellis/Ferre model had this category, but in time removed it to be a secondary profile, naming it the

Output-Organization deficit.[7] The other models include Organization as a type of processing disorder. The S-LP characterizes this type when one struggles in keeping speech sounds, words and directions in order. It should be noted that weak organization, planning and sequencing are associated with prefrontal dysfunction[12] common among individ-uals with attention disorders. When reversals are found during the (C)APD testing it may be related to attention or learning disorders rather than C(C)APD.[13,14]

Two other types of (C)APD are not seen in all the models: **Tolerance Fading Memory (TFM)) and Prosodic.** TFM or working memory (how information is maintained in the conscious memory) may give limitations in expressive language, motor programming and the ability to inhibit impulsivity.[2,5] Adults and children with attention deficits are at risk for this type of (C)APD possibly due to the close proximity of the frontal and anterior temporal lobes.1[3,15] A Prosodic type of (C)APD is characteristic of difficulty perceiving tonal information, mathematics, poor social communication, and weak visual perception problems.[8] These are problems also seen in individuals with a Nonverbal Learning Disorder (NVLD), so differential diagnosis is warranted.

Understanding the models and types of (C)APD allow audiologists to provide a more defined diagnosis and specific therapeutic measures to assist with the behaviours and difficulties seen in these clients. The models also give characteristics related to processing areas that overlap with other disorders. A child with a Decoding type of (C)APD is at risk for receptive language disorders while an Integration type places one at risk for receptive and expressive language disorders. The TFM and Organization types are seen in children and adults with attention or learning disorders. While the field of audiology has advanced in diagnosing the type(s) of (C)APD, there is more work ahead in improving reliable differential diagnosing.

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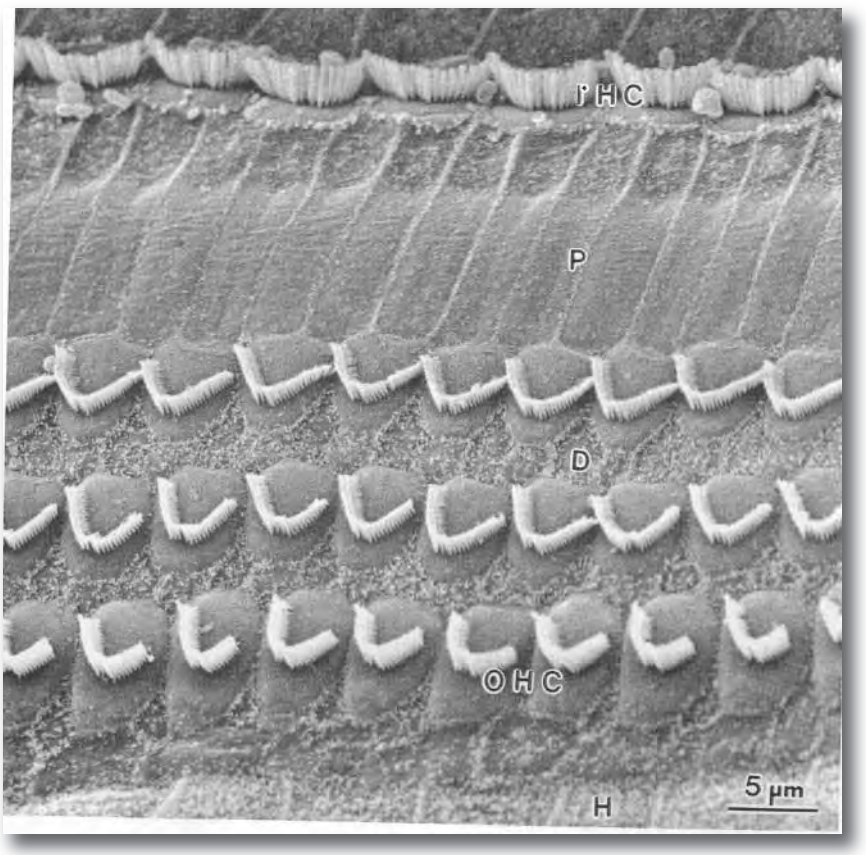
Canadian Hearing Report 2011;6(4):18-19.

How Many Haircells Need To Be Damaged Before We Experience Hearing Loss?

By Robert V. Harrison, PhD, DSc

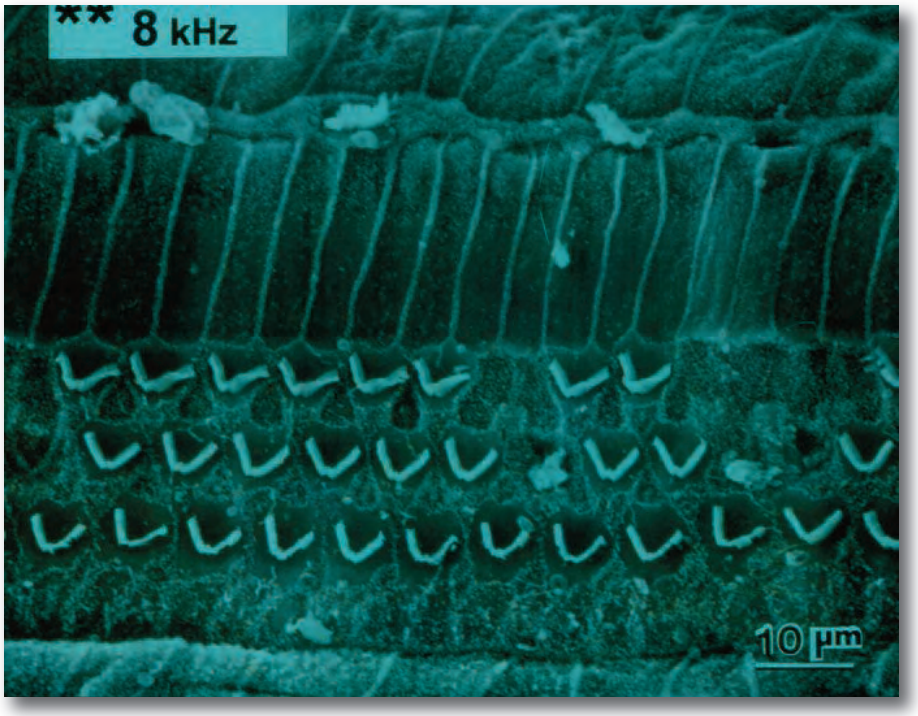
About the Author

Bob Harrison is professor and director of research in the Department of Otolaryngology – Head and Neck Surgery at the University of Toronto. He is also a senior scientist in neuroscience and mental health at The Hospital for Sick Children. Bob has basic training in biological sciences, with doctoral degrees in auditory neuroscience from universities in the U.K. He worked with scientists in England, France, and the Netherlands before moving to Canada. His research ranges from basic laboratory science to clinically applied projects in the area of hearing loss and communication disorders. His research philosophy is to take new basic science findings and apply them to promote wellness and improved health care.



More than you would probably think is my first response. A young person with "normal" hearing will have many more haircells than are actually needed. This redundancy may exist because it provides a buffer such that we can have some cell loss but with little functional consequence.

Remember that the haircells (in the mammalian cochlea) do not regenerate; we are born with about 20,000 of them and they have to last a lifetime. We can actually loose lots and lots of cells and still have relatively normal hearing. As we get older, we tend to loose haircells for our very high frequency hearing, but because we do not use these frequencies for speech understanding, we can often not notice the loss. This progressive high frequency loss with age probable starts very early on. As a rule of thumb, imagine we start with hearing up to 20,000 Hz. For each day of our life, starting at puberty, we lose about one Hertz per day from this top



range. That means about 1000 Hz every three years. Nobody really notices this gradual high frequency loss, until after many years we start to lose hearing in the range that we use for speech communication. This gradual hearing loss with age involves haircell loss that we are not even aware of at all.

Let's now consider haircell loss in the lower frequency regions that we really need for communication. Well, even at low frequencies we can lose more than 50% of haircells and still not see a difference in threshold sensitivity. We can lose many outer haircells and still have enough to perform the cochlear amplification role. Again there is built in redundancy. I would estimate that for outer haircells, when we get down to last 30–40% of our total, then we will notice a problem. At this point the hearing deterioration may be clinically measurable and show as a mild audiometric loss.

For the inner haircells, we can probably lose even more cells before there is noticeable threshold deterioration. I would estimate (based on some of my own experimental work, that we can have just 10–20% of inner haircells, but still not measure, clinically, an audiometric loss. There may be some other problems with hearing, such as difficulty in speech understanding, but not threshold sensitivity. This condition exists in many types of auditory neuropathy spectrum disorder.

So overall, here is the simple answer to the initial question. If we have 20,000 haircells to start with, we can lose all of the haircells in frequency regions from about 4,000 Hz to 20,000 Hz and not notice much. That's about 2.5 octaves worth of cells so we are down to about 12,000. Of these, let's say there are 3,000 inner and 9,000 outer hair cells. We can lose half of the outer haircells (4,500 left) and need only 20% of inner haircells (600 remaining). So overall we can lose 75% of our haircells, and just get by. The real problem comes, of course, when our stock is expended, and there is no more redundancy in the system. That point can come early on if we have been abusive to our ears through noise exposure, and the situation will come naturally to us as we age.

Canadian Hearing Report 2011;6(4):20-21.

An Ounce of Prevention, Five Grams of Protection: A Collective "Shout Out" Against NIHL

By Gael Hannan

You're standing in a Tim Horton's line-up, irked by the music leaking from the earbuds of the teenager behind you. It's not just the noise; you are exasperated at the universal poor listening behaviour that, according to the 2005-06 NHANES survey, has contributed to a 30% increase in teen hearing loss over the previous decade.

Should you say something to help him? As an audiologist, your professional scope of practice includes the prevention of hearing loss. But respectful of the right to personal choice, you probably just shake your head and wait for your coffee.

But, just this once, wouldn't you love to say, "Excuse me, could you turn it down a bit? But if you insist on giving us an ear concert, could you play something we all like?"

(You take the plunge.) By the way, are you trying to destroy your hearing? Keep it up, young man, and you'll be swapping those earbuds for hearing aids by the time you hit the big 3-0!
(And finally, the professional push.) "And, don't give me that look because I am an audiologist – an AWDEE-OLLA-GIST – so I know what I'm talking about! Here's my card, share it with your friends, you'll need it. Thanks for listening!" Wouldn't that feel wonderful?
If I'm in the line-up, the hard of hearing person, I don't hear the music but I see the earbuds, the slightly bobbing head – and I'm really ticked off. I did nothing to cause my hearing loss, and I've had to work long and hard to get past the "why me?" whinge, to accept my reality and to move on. But I live with its challenges every day, and here's a kid willing to throw away his good hearing for cheap volume thrills!

To be fair, he may not realize the damage he's incurring – has anyone explained the consequences to him, in his language? And can we blame him for using technology that is available, affordable, and sexy, and which comes with no visible "user beware"?

Noise-Induced Hearing Loss (NIHL) prevention is not taught in schools, or discussed by the average family doctor. In survey after survey of teen listening habits, youth say that they have never received the prevention message but would wear earplugs if they were advised to.

Let's shout out about NIHL! Most hearing-related organizations – consumer groups, manufacturers, service providers, hearing health professionals – include some information about noise and prevention on their websites. But unless a person is motivated to click on these sites, our messages will go unread, a spit in the wind.

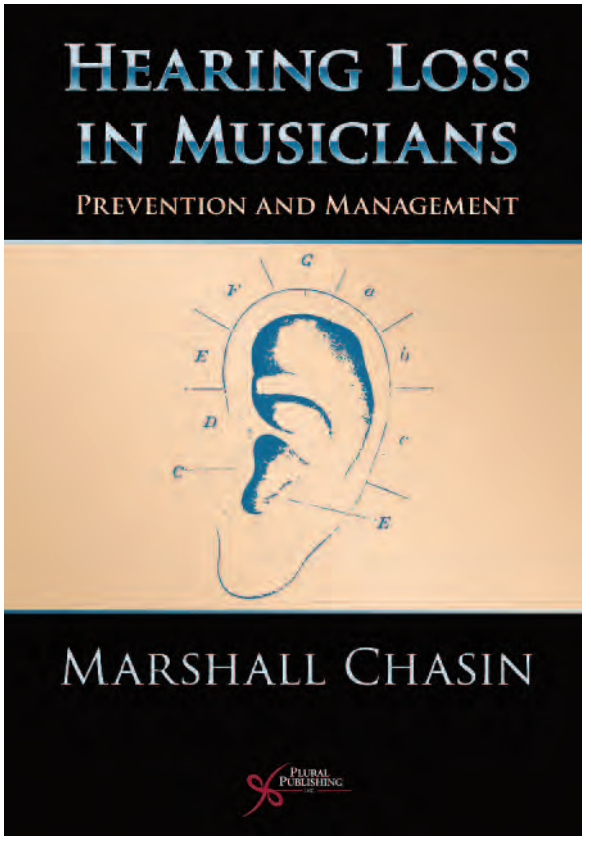
It's time for Canadian consumers and professional hearing-related organizations to brainstorm a comprehensive NIHL-prevention strategy, to develop the partnerships and resources to make it a reality. School-based programs are crucial, such as The Hearing Foundation of Canada's *Sound Sense* elementary program. But, for real impact and long-term behavioural shifts, effective health promotions need many message iterations that resonate with the intended audience. Young people learning about NIHL for the first time at a Youth Listening Summit held by the Hearing Foundation said, "OMG, what we're doing is self-mutilation! In order to get through to us, you need to scare us, freak us out!" Let's discuss how we, as individuals and as members of hearing health organizations, can help stem the tide of NIHL and keep our hearing healthy for as long as we can.

I do not want my 16-year old son and his friends to live, unnecessarily, with the hearing challenges that are my daily reality. And, if they are armed with an ounce of knowledge and five grams of earplugs, they won't have to.

Canadian Hearing Report 2011;6(4):22.

Hearing Loss in Musicians

By Marshall Chasin (Ed). San Diego: Plural Publishing (2009). 186 pp., $65.00.
Orders: www.pluralpublishing.com. ISBN13: 978-1-59756-181-5, ISBN10: 1-59756-191-9.



Reviewed by Maris S. Appelbaum, Department of Communication Sciences and Disorders, Montclair State University, Montclair NJ

Hearing loss in Musicians by Chasin is a practical guide book for audiologists working with professionals in the music industry, as well as for patients who suffer from hearing loss but enjoy listening to music. According to the editor, the main focus of the book is that music may be considered as a form of occupational noise exposure for musicians, The book is divided into three sections. The first section (chapters 1 to 5) addresses the problem of music-induced hearing loss, the second section (chapters 6 to 11) suggests some solutions to the problem, and the third section (chapters 12 to 14) is about future forms of assessment.

In the first section, the topic is introduced and music-induced hearing loss is differentiated from classic noise-induced hearing loss. A detailed review of the anatomy and physiology of the peripheral auditory system is found in chapter 2. The biomechanics and biochemistry of noise-induced hearing loss are covered detail. The next chapter examines the medical disorders associated with noise-induced hearing loss and specifically how they relate to musicians. These two chapters are excellent reviews for those who have already studied these topics. The discussion of tinnitus, including its causes and prevention, is covered in more depth in the next chapter. The final chapter of the first section is about the risk of hearing loss that faces the music consumer. This is a useful resource for counseling patients who are concerned about safe listening levels for portable music players.

Section 2 covers various solutions to the problems associated with exposure to damaging levels of music and chapter 6, in particular, is a discussion of hearing protection specifically for musicians. The text offers a quick review of the current methods of establishing damage risk criteria, which are based on industrial noise. Music represents a different sound spectrum, but these criteria are the best guidelines we have at this point in time. The author covers the limits of conventional earplugs and suggests strategies for choosing appropriate custom and noncustom versions of earplugs for musicians. The next chapter is an overview of the problem musicians face in trying to monitor their music and the music of other performers with whom they are playing, while at the same time not

damaging their hearing. This provides the introduction for personal monitor earphones. This section has specific information regarding in-the-ear monitors. This information is invaluable to audiologists working with musicians and counseling them about preserving their hearing. Chapter 8 provides an interesting look at the acoustics, such as reverberation and background noise, of performance and teaching halls. These are performance spaces that can be designed with consideration of the hearing health and safety of the music professional while at the same time enhancing the performance. This chapter is also an excellent resource and review for educational audiologists who are concerned about classroom acoustics. The next chapter is a brief look at inexpensive environmental modifications to reduce exposure to damaging levels of music. This chapter is, once again, a wonderful counseling tool. Chapters 10 and 11 cover the topics of hearing aids and cochlear implants and the processing of music. These chapters are informative in counseling patients regarding realistic expectations and in particular in the suggestions made for audiologists to program hearing aids for maximum listening pleasure.

The final section of the book is an audiologically friendly introduction to music and the similarities between the two professions. As an example of this, the author makes comparisons between musicians' loudness judgments and the equivalent decibel level. This is a wonderful introduction for nonmusical audiologists! Chapter 13 is a gentle reminder that the musician depends on his hearing for his livelihood and that damage may have occurred since childhood. This chapter suggests a multidisciplinary model in which we would counsel the musician to "choose a comprehensive health evaluation for musculoskeletal problems, performance anxiety, and hearing assessment" (p. 139). The need to develop new audiological tests to assess the functional hearing in musicians is discussed in chapter 14, with an example of one such tool.

Finally, the appendices are extremely helpful handouts for patients. In particular, Appendix B contains fact sheets with information on how to play and listen to music safely for many types of musicians. These should be available in every audiology office.

This is an excellent source of information covering a wide range of topics from prevention through management of music-induced hearing loss and its symptoms. There are many pages of practical advice that can easily be incorporated into any audiology practice. The text is a welcome addition to any medical audiology course curriculum or to a practicing audiologist's library. Chasin's many years of working with musicians gives him special insight into their specific needs.

Canadian Hearing Report 2011;6(4):23-24.

The "Rules" of the Profession … Are They Enough?

By Kate DeKok, AuD

About the Author

Kate DeKok is Chief Audiologist with ListenUP! Canada

I am a hockey mom. I can tell you all the rules of the game, where the players should be on the ice and I can dress a child with all the equipment in record time. I have laced up countless skates, carried hockey bags bigger than me, and have spent countless hours watching the game. I should make a great hockey player then, right? Well, not so much – I can't skate. Just because I know all the rules of the game, does not make me a great hockey player. I know all the rules but I do not have the skill to apply those rules to the game. While I have no intention of taking up hockey any time soon, I have spent considerable time over the past 6 years trying to improve my "skills" as an audiologist. I learned all the "rules" at school and through CEUs in the years following. I always knew intuitively that I needed more than those rules to deliver the level of care and service to my clients that they deserved.

As an industry, we spend time learning the rules of our profession. How many manufacturer seminars do you attend each year? Five, six, or more? We do a good job at keeping up with the latest technology and amplification options for our clients. Many of us can recite the latest names that manufacturers give to the latest hearing aid available and perhaps the names that they give their noise reduction system. We know the rules. We know that verification is the cornerstone to a hearing aid fitting. We know that we have options for prescriptive targets: DSL? NAL? Proprietary? We know how to connect the hearing aid to the Noak link. I like to think that for the most part, this is solid information in our consciousness and that we have a working knowledge of these rules to maximize the potential success of our hearing aid selections and fittings. Are these "rules" important? Of course and we cannot do our job without them, but the selection and fitting of hearing aids goes well above and beyond the "rules" of our profession. If we were to fit hearing aids on Kemar (the mannequin used in acoustic research), we would not need skill in what we do. We would apply the rules we know and we would have 100% success 100% of the time. The reality is we fit aids on ears that are attached to people – people who come to us with different life experiences, expectations on what hearing aids can and cannot do, socioeconomic status and cultural backgrounds. We spend considerable time on the "rules" of our profession, yet we often leave the development of our "skills" to experience, rather than taking an active role in it's development. The questions then become, *what are the necessary skills needed* to apply these rules to our client experience with us in the office, and *what exactly does that look like?*

Clients come to us for a variety of reasons and as a clinician, you may have a solution or recommendation for the very reason the client came to see you. We need to remember that simply because a client comes to your office for a hearing test, does not mean they will

follow and comply with your recommendations. For the purpose of this article, we will look at the recommendation of a hearing aid. For a client whose hearing is at a level where they can benefit from hearing aids, it takes more than giving them an accurate test for them to decide to go ahead not only with your recommendation to get a hearing aid, but also future recommendations during the fitting process of settings, programs, size of aid, etc. We need to gain client compliance and this takes a skill set that involves a number of things:

1. Meet our client where they are in their journey with hearing loss.
2. Ask good questions and listen to the answers.
3. Relay clinical knowledge in a meaningful way to client.
4. Enter into the client's world by understanding what the client is experiencing.
5. Walk with the client through the appointment.
6. If the client needs aids, give the client the info and guide them through the decision-making process.

Let's take a quick glance at what each of these "look like" in clinic:

MEET YOUR CLIENT WHERE THEY ARE IN THEIR JOURNEY WITH HEARING LOSS

We all know that there is a span of approximately seven years between when a client first has a sense they may have a hearing loss to when they decide to accept treatment of amplification. Each client comes into your office at different points in this process. Some may not even realize there is a problem yet. It is our job, as hearing health care professionals, to figure out where each client is in this process. We also need to truly understanding why the client came for a hearing test, what brought them in and how hearing loss affects their life and the lives of their loved ones.

The biggest argument I hear for not getting this information is that there is "no time" in the appointment. My response to that is "How can you possibly provide treatment for hearing loss, if you do not know what information you need to give to your client or understand their perceptions about hearing loss and hearing aids?"

Clients will rarely offer up all of this information so it is our responsibility to ask the right questions:

- How are you finding your ability to hear?
- How do your spouse/children/ friends find your ability to hear?
- What has prompted you to come in for a hearing test today?
- Tell me about a time when you did not hear as well as you would like.
- Tell me about a situation(s) where you would like to hear better.
- Tell me what you know about hearing aids.
- Do you know anyone who wears hearing aids? If so, how do they find them?

These questions give you a sense of what could be asked and I am certain that you may have your own questions as well that guide your discussion with your client in a way where you can gain important information that digs a little deeper than our standard case history questions. Clients often come to us with little knowledge about the hearing health care field, so by spending a few moments asking some probing questions it will help you, as a professional, to gain a better under-standing of where your client is at in their hearing loss journey.

ASK GOOD QUESTIONS AND LISTEN TO THE ANSWERS

I think we can all agree that this is paramount in what we do, yet I think this is one of the most underdeveloped skills in our profession. I am not talking about asking the case history questions – your receptionist could ask those! I am talking about the questions that are "customized" for each person that walks through your door. I am talking about the questions that are directed at your client for you to gain insight into their personal journey with hearing loss. I am talking about intuitive and thoughtful questions which arise based on your client's answers and those which will leave your client feeling like they have been heard and they have been understood. Restating back to the client what they have just shared with you will provide assurance and comfort to the client as well. This will solidify in the client's mind that you have both heard and understood what they have said.

RELAY CLINICAL KNOWLEDGE IN A MEANINGFUL WAY TO THE CLIENT

It is not what you say, but how you say it.

We require skill in applying our clinical knowledge to the client in a way that the client will not only understand, but will also be able to apply to their own life in a meaningful way. For example, when we tell a client he has a moderate sensorineural hearing loss, what does that mean to the client? It means they have some hearing loss and it sounds perhaps not too bad … after all, it is only "moderate." This is important information to give a client, but we should not stop there. Let's make that statement of a moderate sensorineural,

meaningful to the client by saying "You have a moderate hearing loss and this tells me that in quiet if someone is looking at you, you may be able to follow most of the conversation. If there is background noise, you will know the person is talking but you may not be able to make out all the words. Does that sound familiar?" By adding how the moderate loss may present itself in a client's life, the information moves from a statement with little meaning to the client, to a statement that puts into words what the client is experiencing.

If the client needs hearing aids, you could say "Your hearing is at a level where you could benefit from hearing aids." But, don't stop there! Continue on with pertinent examples showing how a hearing aid can impact your client's life. By now in the appointment you should know some personal details, so bring the conversation full circle by adding: "Your hearing is at a level where you could benefit from hearing aids. If you decided to try hearing aids Mrs. Jones, I would expect that you will be able to hear the bids more clearly when you play bridge on Wednesdays and I would also expect that you will be able to hear your grandchildren more clearly when you babysit them on Mondays." Bring the "concept" of a hearing aid into the "reality" of your client's life.

ENTER INTO THE CLIENT'S WORLD BY UNDERSTANDING WHAT THE CLIENT IS EXPERIENCING

A client asked me once, "Kate, do I have a hearing loss?" I was taken by the question and responded, "No, I don't. May I ask you why you asked?" and the response was "You just put into words what I have been experiencing and you seem to really understand what I am going through." I consider that to be the best compliment I have received from a client and reinforced for me the importance of spending a few extra minutes with clients to "enter into their world."

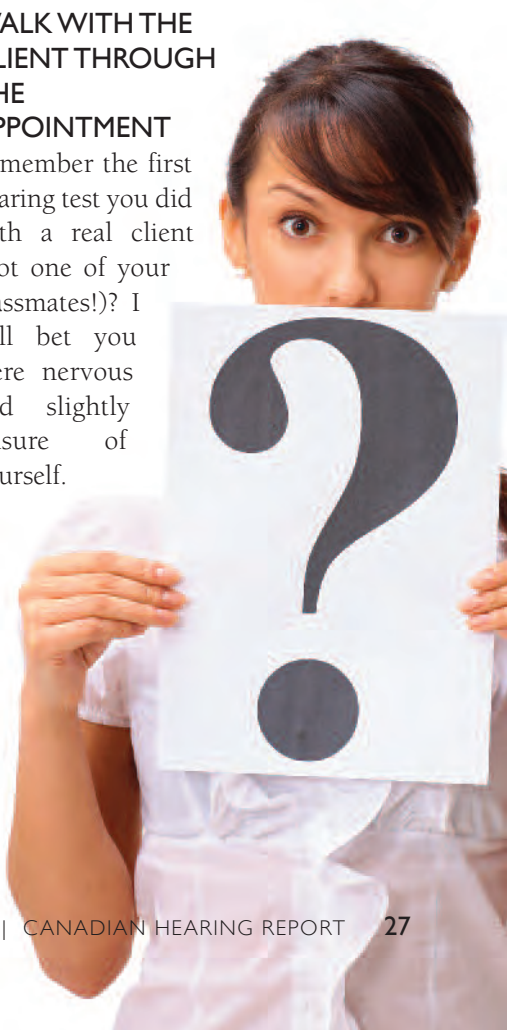
This is also a great way to build trust with a client. Enter into their world by asking questions, listen to the answers, and make sure you don't do all the talking – listen up! This is not easy. It is easier often to set a hearing aid to approximate target, than to sit for a few minutes with a client listening to what they are telling us and asking good questions based on that conversation. I get that the days are busy. Between clients you are getting your charting done, talking with clients on the phone, responding to e-mails, not to mention any personal issues weighing on your shoulders. You have done thousands of hearing tests in your career and this is just one more. By developing this skill, you will find your relationships will be more meaningful with your clients and in turn your client may be more willing to comply with and accept your recommendations.

Your client should come to you with a variety of questions. Some you may answer several times per day. Regardless of the question, every single one of the clients concerns, apprehension, and questions must be addressed thoughtfully and answered fully. It takes a skilled clinician to do this as the client may not come right out and ask directly, rather it may be more subtle. For example, you may recommend hearing aids for your client. They tell you that their neighbor got hearing aids, they whistle all of the time and she never wears them. A skilled clinician will pick up on this and address it by explaining that different people have different experiences with hearing aids and that constant feedback is not normal and should that happen with the client's hearing aids, it would be fixed.

What happens if you don't address the client comment? After all, they didn't ask a question, they were simply making a comment. Remember that the comment is very likely the client's perception and we know that a client's perception is their reality, even if the information is not correct. In this case the information was correct (their friend had a hearing aid that whistled) but her perception is likely that all hearing aids whistle and are in the drawer (not correct!). It is our job to give clients valid and relevant information on which to base their decisions. Addressing all a client's concerns will go a long way to putting their "mind at ease" about this new journey with a hearing aid.

WALK WITH THE CLIENT THROUGH THE APPOINTMENT

Remember the first hearing test you did with a real client (not one of your classmates!)? I will bet you were nervous and slightly unsure of yourself.



Your mind may have been racing with all the "What ifs." What if I put the inserts in the wrong ear? What if I have to mask something? What if I forget to adjust the VU meter? What if they try to fake a hearing loss? For many of your clients, this is their first hearing test and they may be experiencing some of the same concerns you had during your first hearing test.

First time clients are often nervous. They may not know what to expect. They have never met you before and you are leading them into a small room with a big door and a small window. You are putting foam in their ears and they are hooked up with wires. You are asking them to respond to beeps that they can barely hear, and they may worry about whether they are doing a good job or not. They will wonder how long they will be locked in the sound booth and have no idea how long the test takes. And who knows, maybe their neighbour was just in to see you and she left with a $3,000 pair of hearing aids. After all, they don't really want to spend $3,000, they just came in for a hearing test.

I have calculated that, during my years as an audiologist, I have completed 21,000 hearing tests. I can recite the word lists in my sleep and complete a hearing test with my eyes closed (well, not quite!). I can look at an audio and within seconds get a picture of what is going on or any additional tests that need to be done. Just because we are now comfortable and familiar with the process of hearing testing, does not mean your client is comfortable with the process. Consider individually customizing the appointment, results, recommendations and follow up for the client and not simply following the routines we become accustomed to. Remembering that what your client may be thinking/feeling puts a new perspective on how we interact with them throughout the process of the hearing assessments and counseling.

IF THE CLIENT NEEDS AIDS, GIVE THEM THE INFORMATION AND GUIDE THEM THROUGH THE DECISION

At the end of the day, the decision to purchase a set of hearing aids along with the style and price of the aids is not ours to make, it is the client's. It is our job as clinicians to give our clients the information they need to make an informed decision. Sure, we may have specific ideas on what the client needs based on the audiogram and our assessment of their lifestyle, dexterity, and preferences, but it really is the client's decision.

WHERE DO WE GO FROM HERE?

Just as we should ask our clients "good" questions, we too must ask ourselves some hard questions in our quest to develop our skill in relating to clients in a more meaningful way.

1. Do I treat each of my clients as individuals – each being equally deserving of my full time and attention during their appointment time?
2. What new or different questions can I ask clients to determine why they have come for an assessment? For example: what are the implications of potential hearing loss on their life and on the lives of their loved ones; what are their views and knowledge about hearing aids and amplification?
3. How can I relay my clinical findings to a client in a non-technical and relevant way that both makes sense to the client and translates effectively into what the client is experiencing?
4. Am I giving my client all the appropriate and relevant information they need to make an informed decision on amplification? Am I showing them all the pertinent styles and price points of the solutions available?
5. What can I do to ensure that the entire client experience in the office, from the moment they call the office, is a comfortable and easy process that anticipates what they truly need and is customized for that client?

The skill set required to effectively apply the rules to our client's time with us in the office is not one that is learned instantly or in a classroom. It is not one that is graded by a professor or clinical supervisor or boss. It is a skill set that must be continually evaluated, monitored and fine tuned by each hearing health care professional for themselves. It is a skill set that is truly never mastered – sure, some clinicians exhibit exceptional skill in this area, but it is never mastered. It is a skill that deserves as much time developing as our knowledge of the rules does. To become an exceptional hearing health care professional requires an understanding of the rules and continual development of the skills required to apply those rules to your client care and experience, as you walk alongside your client in their journey with hearing loss.

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Hyperacusis: An Introduction

By David Baguley PhD

About the Author

David Baguley is a consultant clinical scientist (Audiology) at Addenbrooke's Hospital, Cambridge, UK., a fellow of Wolfson College, Cambridge University, and holds an honorary chair at Anglia Ruskin University.

The experience of becoming troubled by decreased sound tolerance can be catastrophic for a patient and their family, and represents a real challenge for the audiologist. Whilst the symptom has been described for many years, it is only in the past decade that protocols for diagnosis and treatment have been formulated, and that an evidence base for treatment efficacy has begun to build.

In this piece I seek to introduce the reader to modern understandings of hyperacusis, and present treatment strategies. Whilst I acknowledge that there are major shortcomings in both these areas, I will indicate that it is possible to diagnose and treat hyperacusis in a clinical audiology setting in a way that can set the patient (and their family) on the road to recovery.

DEFINITIONS

There are many words in current use to indicate a decrease in the ability to tolerate sound.[1] The word hyperacusis seems first to have been used by Perlman,[2] and a suggested later modification to hyperacusis dolorosa[3] was not widely adopted. A definition of hyperacusis is "an abnormal, lowered tolerance to sound."[4,5] In practice this refers to individuals who have developed a sense of discomfort when exposed to external sound of an intensity that would not trouble most others. For some the discomfort depends on whether they make the sound, or some external source – in such circumstances it is usually the case that self made sound is tolerated better. For others, however, the source may be irrelevant. Similarly, for some it is specific sound that is bothersome, such as that of an unruly child, whereas for others it is all sound that evokes discomfort.

The term phonophobia has been applied to these situations, especially when it is a specific sound that is bothersome, but there are two issues with that. The first is the implication that as a "phobia" this is essentially a psychological phenomenon, and optimally treatable by psychological therapy – but whilst there may be psychological features to a case, this may not be true. Second, phonophobia is used very specifically by neurologists to describe the sound intolerance symptoms experienced by some migraine sufferers, and it is far from clear that hyperacusis in general is similar to that.

Proponents of tinnitus retraining therapy (TRT) have introduced a new word to describe hyperacusis: misophonia[6] This derives from the Greek for "dislike of sound," and so resonates with the aversion experienced by patients. It is yet to be seen whether this term is adopted outside the TRT community.

It is interesting to note that patients develop their own terms to describe their situation. The Hyperacusis Network (www.hyperacusis.net) patient community uses the phrases reduced or collapsed sound tolerance to describe

their experiences and these words are very meaningful for patients in indicating that the clinician understands their problem.

PREVALENCE

At the present time firm evidence about the prevalence of hyperacusis is sparse. A study in Sweden[7] combined internet and postal survey techniques and identified a figure of 8% of the adult population who reported loudness tolerance issues, but this probably does not represent the number of people for whom that is clinically significant. A more realistic estimate is of 2% of the adult population.[1]

Even less is known about the prevalence of hyperacusis in childhood. There is some evidence regarding an association between sound tolerance issues and children identified with autism spectrum disorders (ASD), but there is much work to be done in this area. There are indications that hyperacusis in ASD may be a form of auditory hyper-vigilance, and as such phenomenologically different from general adult hyperacusis experiences.[8]

PATHOPHYSIOLOGY

Whilst hyperacusis may be idiopathic, in some individuals there are indications that it is associated with other symptoms or conditions. The link with migraine was mentioned above, and both depression and post-traumatic stress disorder have been linked with hyperacusis. Interestingly these three conditions may share a serotonergic basis, and this has been proposed as a mechanism underlying hyperacusis.[9]

A number of specific medical conditions can also give rise to sound tolerance symptoms.[10] An absent stapedial reflex, such as seen in some patients with facial palsy, may result in an apparent increase in the perceived intensity of sound. Some patients report hyperacusis post head injury. Reduced tolerance to sound is a recognised feature of lyme disease, and has also been reported in Addison's disease, multiple sclerosis, and fibromyalgia. As such, the clinician who assesses a patient with hyperacusis needs to be mindful of these (and other) differential diagnoses.

The relationship between hyperacusis and tinnitus is complex. Many persons with troublesome tinnitus report hyperacusis (perhaps as many as 40%), and it does seem that the overwhelming majority of hyperacusis patients report tinnitus. For some people sound tolerance was reduced first, and then tinnitus developed: for others this was the other way around. This is an area where more research is needed.

What then is the mechanism(s) of idiopathic hyperacusis? There are several theories, and whilst none of them is entirely satisfactory, they all propose that hyperacusis is a manifestation of increased central auditory gain. Some have proposed medial auditory efferent system dysfunction as underlying this, but evidence regarding the lack of impact upon loudness tolerance when efferent modulation of hearing is ablated (in surgical vestibular nerve section for example[4]) argues against this. The possibility of disturbance of serotonin function has been mentioned above, but this is a very broad proposal, not linking hyperacusis with the disruption of a particular form of serotonin or concentration thereof. Sahley and colleagues considered that glutamate function in the primary auditory synapses may be potentiated by opiod peptides released during stress, leading to the over-representation of the intensity of sound. It is difficult to see how this proposal might be empirically tested, and in any case the relationship between hyperacusis and stress is more complex than this implies. In a sense we are starting from the wrong place in making these and other suggestions: the fact is that how loudness is encoded and perceived in the human auditory brain is as yet poorly understood and so it should not be a surprise that the mechanisms of loudness perception disorders remain obscure.

Work by Craig Formby and colleagues[11] provides emergent evidence that loudness perception can change, and that it is influenced by the presence/absence of sound stimulation. Experiments where volunteers consistently wore earplugs, or wideband sound generators (at a stable intensity) have respectively demonstrated reduction or increase in the ability to tolerate intense sound. Work by Munro and Blount[12] corroborates these findings by indicating that stapedial reflex thresholds can reduce when earplugs are consistently worn. The idea that the human auditory brain is plastic, and can adapt on the basis of learning, injury and sound stimulation is now widespread. Hyperacusis may well be a consequence of a set of circumstances that influence loudness perception.

AUDIOLOGICAL ASSESSMENT

Some aspects of the audiological assessment of a patient with hyperacusis are straightforward, but others require some careful thought. Pure tone audiometry is essential, though a modified technique where initial presentation is at a lower intensity than usual protocols dictate is preferable. The stimulus intensity required for stapedial reflex testing, and a neurological auditory brainstem response assessment, may be problematic, and these tests should be withheld unless there is a specific value.

Table 1. Self report instruments for hyperacusis

Authors (date)	Type	Items	Validation set	Comments
Khalfa et al. (2002)[13]	Questionnaire	14	201 individuals from general population	
Nelting et al. (2002)[14]	Questionnaire	27	226 hyperacusis patients	Validated by Blasing et al. (2010)[16]
Dauman and Bousau-Faure (2005)[15]	Rating scale for difficulty of activities		249 tinnitus patients	

The issue of whether or not to use loudness discomfort testing is more contentious. In support of the use of such a procedure is the need to quantify the extent of the patient's difficulties, and the possible utility of results pre and post treatment as an outcome measure. Against is the distress this may cause a patient, possibly corroding trust in the clinician. Further, there are indications that the data elicited from such tests is marked by large test-retest variability, and influenced significantly by the instructions given to the patient. There are differing opinions about these procedures in specialist centres: it is the author's current practice not to use loudness discomfort tests routinely, but only when specific circumstances indicate – this might be a patient request or medico-legal aspects.

A number of validated self report instruments now exist for the assessment of hyperacusis (Table 1). Unlike loudness discomfort testing these are not stressful for the patient, and do allow staging and outcome assessment.

A additional tool of potential value is the Hospital Anxiety and Depression Scale[17] which enables low impact screening for these symptoms with a well validated instrument.

TREATMENTS

Self-help has great potential value for people with hyperacusis. The recently published book "Living with tinnitus and hyperacusis" (available on www.amazon.ca).[18] contains practical material for patients and their partners to work through, and is based upon a cognitive behaviour therapy program, though advice on sound therapy is also provided. Another useful self help resource is the Hyperacusis Network community based at www.hyperacusis.net. The information provided is clear and positive, and the message boards characterised by sharing of practical and positive information.

Regarding therapy delivered by an audiologist, evidence is sparse about what is optimally effective. There are three elements which have been suggested: (1) counselling; (2) sound therapy; (3) relaxation therapy.

The first two elements are brought together when a tinnitus retraining therapy approach is utilized. In that protocol some directive counselling is used to help the patient understand their hearing system, and how a dysfunctional central gain system may be involved in their symptoms. The distinction is made between decreased sound tolerance, and misophonia (aversion to sound). In hyperacusis, a desensitisation sound therapy strategy is used, starting with very low intensity wide band sound, which over time is increased in intensity as the patient's tolerance increases. In misophonia, a strategy of presenting pleasant sound to the listener is described. For details the interested reader is directed to Jastreboff and Hazell[6] and Jastreboff.[19]

An alternative sound therapy approach is to use wide band sound stimulation, but at a comfortable and consistent intensity. The underpinning argument is that this may allow the dysfunctional central auditory gain to be recalibrated, and hence the hyperacusis may be ameliorated.[1]

Patients with hyperacusis are often stressed and anxious, and for some, relaxation therapy may be of substantial benefit. There are many forms of relaxation therapy, but as progressive muscle relaxation therapy has a proven role in tinnitus management, porting the technique across to hyperacusis seems sensible. Andersson and Kaldo[20] give a script for relaxation that can be used with hyperacusis patients.

It has been mentioned above that McKenna et al.[18] have provided a cognitive behaviour therapy (CBT) approach for patients to use in a self help context. Baguley and Andersson[21] proposed that CBT techniques have a role in treating hyperacusis in the clinic, and that this approach may be particularly effective in treating the fear and anxiety components that may be debilitating for some patients. The chronic shortage of psychotherapists

with a working understanding of hyperacusis may be a barrier to patients receiving such treatment.

The evidence base regarding the efficacy of these various components of hyperacusis therapy is vanishingly small, and this is an area where well designed clinical outcome studies are keenly awaited. The heterogeneity and complexity of hyperacusis experiences are a challenge to getting such data however. Such data that does exist is largely in the form of conference reports,[1] and positive about the prospects of success in treating hyperacusis, but not of a standard that meets the needs of evidence-based practice.

REFLECTIONS

In this piece I hope to have whetted the reader's curiosity about hyperacusis, and encouraged those with an emergent interest to seek out more information, and clinical experience. The experiences of people with hyperacusis are a rich field for research, and the multitude of questions yet to be answered will occupy audiology clinicians and researchers for decades to come.

CONFLICTS

None declared.

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Online Web Study on Hyperacusis

By Andrew J. Keiner, Richard Tyler, and Shelley A. Witt

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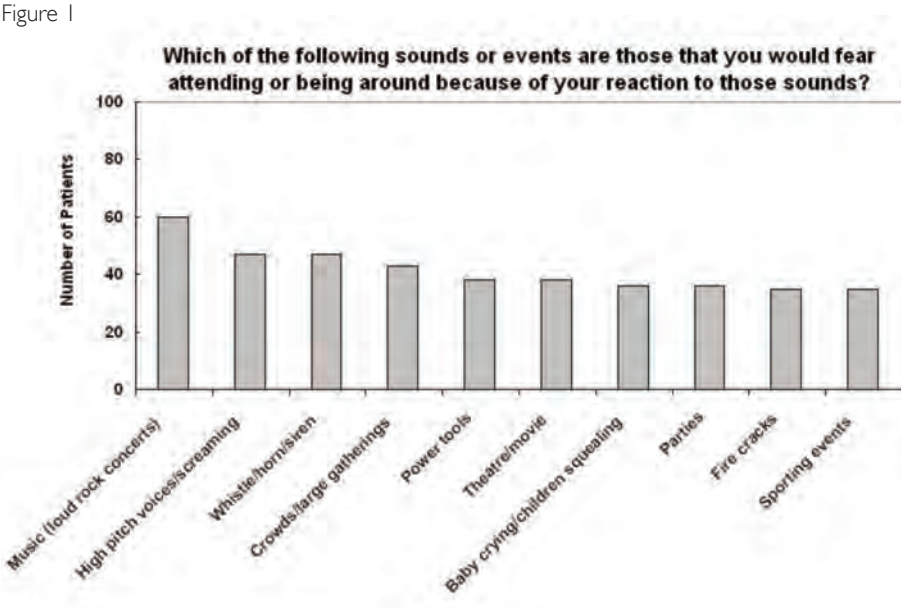
Hyperacusis can be devastating for many of our patients. We know so little about its mechanisms but often see the negative impact on our client's lives. There are many unanswered questions about hyperacusis. What causes hyperacusis to develop? Is there a link between hyperacusis and migraine headaches? Can risk factors, such as hearing loss, predispose an individual to hyperacusis? Our early work uncovered an association between hyperacusis and tinnitus.[2] Further work is necessary to understand why these associations exist.

We define hyperacusis in three ways [3]

- loudness-hyperacusis,
- annoyance-hyperacusis
- fear-hyperacusis.

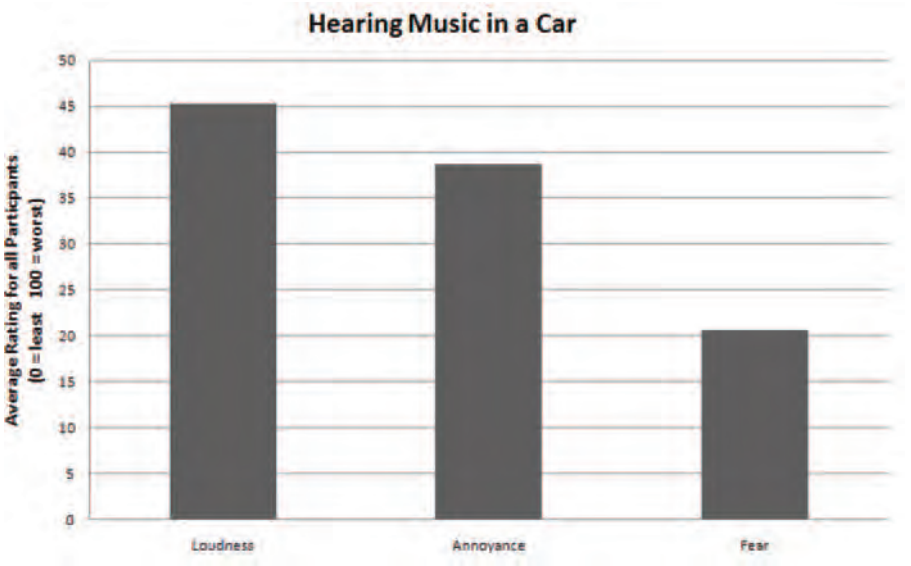
Patients experience loudness-hyperacusis when moderate sounds are perceived as very loud. Individuals with annoyance-hyperacusis experience varying levels of annoyance by sounds, often independent of loudness. Some individuals develop a fear of being in places where they are concerned about certain sounds; this is known as fear-hyperacusis or phonophobia. Patients can experience these symptoms independently or in combinations.

Figure 1



At our website, patients can take a survey which asks questions about their perceptions and experiences of hyperacusis. Preliminary results are displayed in Figures 1 and 2.

Figure 2



All subjects were given a list of noisy situations and asked which of them were feared most based on their reaction to those sounds. Figure 1 shows the 10 most-feared situations based on participant responses.

In Figure 2, subjects were asked to rate the severity of sounds on a scale of 0 (least) to 100 (worst) for the three subgroups of hyperacusis. The graph shows the averaged responses of all subjects for hearing music in a car.

There is no established cure for hyperacusis, yet; Formby[2] shows great promise at least for some. Many patients with hyperacusis choose to wear earplugs to make everyday noises manageable. People should use hearing protection whenever they are exposed to potentially damaging noise. However, for less intense noise this technique is not recommended as the reduction of sound level for long durations could change the way the brain reacts to sound, particularly when the earplugs are removed.[2] Patients who decrease the level of ambient sound may actually increase their loudness hyperacusis. Instead, we recommend using sound therapy to desensitize and treat the hyperacusis.

One form of sound therapy involves playing continuous low-level background noise throughout the day. In another technique, sound is initially presented at comfortable levels and is gradually increased over time until moderately-loud sound is tolerable for the patient. This technique is called successive approximation of sounds. A third approach is to record difficult sounds and listen to them at lower levels, gradually increasing the levels over time.[3] Counseling can be helpful for many patients. The extent of counseling necessary varies by patient and is determined by the patient's level of distress.

Although there are effective treatment methods, much remains to be studied about hyperacusis and its mechanisms. It is our hope that through continued research and greater understanding, more effective diagnosis and management methods will become available for patients. Please help our research efforts by directing your patients to our online web study on hyperacusis at the following link.

http://survey.uiowa.edu/wsb.dll/127/iowahyperacusis.htm

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The Value of Earplug Fit Testing

By Renee S. Bessette, COHC

About the Author

Renee S. Bessette, COHC, is the Global Brand Manager, Howard Leight / Honeywell Safety Products

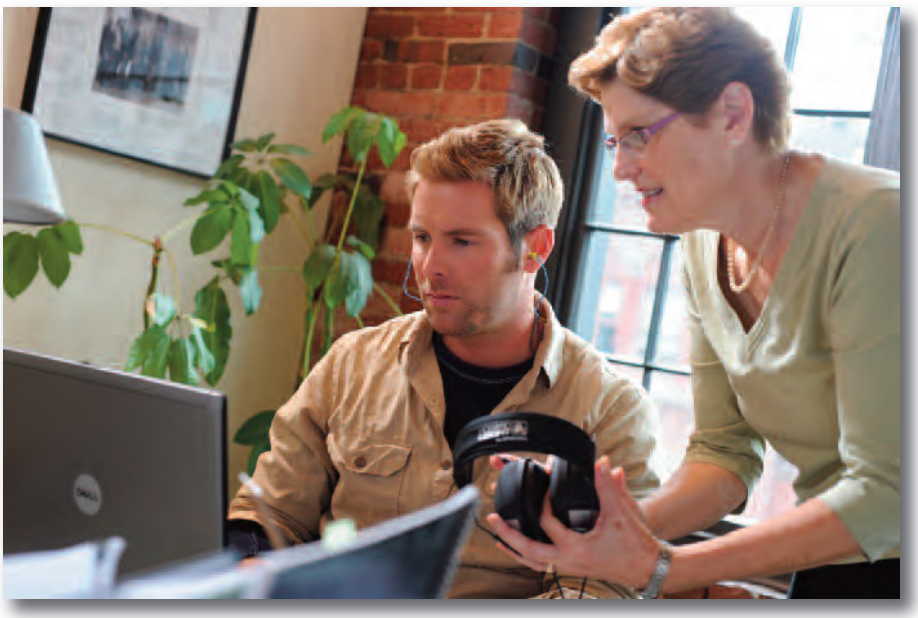
Although prevention has been the mantra in occupational hearing conservation programs over the years, the hoped-for results have not been realized. Despite years of regulation, hours of training, and billions of dispensed earplugs, the incidence of noise-induced hearing loss (NIHL) in the workplace continues to rise worldwide. In the United States, over 22 million workers are exposed to hazardous noise on a daily basis, and 8 million suffer from NIHL.[1] In some noise-intense industries, the rates of hearing loss are tremendous. For example, 50% of carpenters and plumbers, and 90% of retiring coal mine industry workers have NIHL.[1]

Safety professionals have a universal challenge in protecting the hearing of their noise-exposed employees: how much protection do their employees actually achieve with their earplugs?

As rating methods are based upon idealized laboratory conditions, designed to test the capability of the hearing protector, published attenuation ratings like the Noise Reduction Rating (NRR) have been criticized for being too generous in their estimation of noise blocking (attenuation). Studies indicate that while some workers in real-world worksites achieve the published attenuation on the package, many workers do not. This has led to a variety of inappropriate de-rating methods applied to hearing protection around the world, and has contributed to much confusion in knowing how to accurately estimate a hearing protector's attenuation in real-world use. Thus, determining if workers have optimal real-world attenuation for their noise environment is critical to the success of an occupational hearing conservation program.

EAR PLUG FIT TESTING TECHNOLOGY

Through new earplug fit testing technologies, safety managers and workers now have an accurate, real-world picture of hearing protector effectiveness, providing a starting



benchmark on which to build their Hearing Conservation practices. First and perhaps foremost, fit testing provides a formal metric from which one can determine whether employees are receiving optimal protection for their noise environment, require additional training on how to fit their earplugs, or need to try a different model.

Earplug fit testing benefits both safety managers and employees alike. For the safety manager, it fulfills regulatory requirements for training with documented results. For employees, it demonstrates the importance of proper protection in the workplace, and helps them select and compare protectors to find the best choice for their ears and specific applications.

In a recent evaluation, a UK laboratory that performs technical studies and certifications on personal protective equipment for the European Community identified that an earplug fit testing system "appeared to have the potential to aid correct fitting and selection of earplugs." Further, it validated that earplug fit testing "data demonstrated that it would be a useful tool for ensuring Hearing Conservation within the workplace."[2]

FIELD ATTENUATION STUDY

The value of fit testing was evident in a field attenuation study conducted by the Howard Leight Acoustical Laboratory on the performance of hearing protection devices. Conducted on over 100 workers at eight different facilities, the study showed that one-third of workers achieved attenuation higher than the published attenuation for their earplugs, and that another third achieved attenuation within 5 dB of the published rating. But the lowest one-third of workers had attenuation that was more than 5 dB below published attenuation.[3]

The study then interviewed the workers who obtained high attenuation values to determine the common factors that contribute to good earplug fit, and hence, good attenuation in use. Only one factor was found to be a consistent predictor of good fit: one-on-one training. That is, the more often a worker had received individual training in the proper use of hearing protectors, the higher the probability of a good fit. The same was not true for group training, such as watching annual training videos or passing out brochures.

The importance of fit testing as a critical element of one-on-one employee training cannot be overstated. No generalized rating scheme for hearing protectors can be effective without

knowing how much attenuation individual workers actually attain. If a safety manager were to supply earplugs based on the assumption that all earplugs only achieve half of their published attenuation in the field, then clearly two-thirds of the 100 workers in the study would be seriously overprotected, since they are achieving much higher protection than 50%. Fit testing of hearing protectors bridges the gap between the laboratory estimates of attenuation and the real-world attenuation achieved by workers as they normally wear their protectors.

Additionally, fit testing can be an invaluable tool in reducing compensation claims for noise-induced hearing loss at the workplace. Fit testing records can help document that effective steps were taken to select appropriate hearing protectors, train workers in their proper use, and to document a proper fit with a particular protector. This level of powerful documentation has been unavailable to hearing conservation programs in the past.

THE FUTURE OF HEARING LOSS PREVENTION

Earplug fit testing is gaining greater adoption by hearing conservation experts and by industry as a key tool in hearing loss prevention.

In a Best Practice Bulletin issued by an alliance between the National Hearing Conservation Association (NHCA) and Occupational Safety and Health Administration (OSHA), earplug fit testing was endorsed as a recommended best practice in reducing occupational hearing loss as well as a metric to assess a hearing conservation program's overall effectiveness.[4] The bulletin also cited fit testing as a way to "match the employee's hearing protector attenuation to his/her noise exposure level. This may be particularly useful in hearing critical jobs or for those with hearing impairment."

At the 2011 NHCA conference, a full-day workshop spotlighted the available earplug fit testing technologies, and allowed attendees to try each system. Several platform presentations throughout the conference also identified the benefits of earplug fit testing, emphasizing the benefits of selection of an appropriate hearing protector and one-on-one training for workers. Plus, the Safe-In-Sound Award, presented by NIOSH / NHCA for excellence in hearing loss prevention, was presented to Shaw Industries. In presenting the award, the award recognized Shaw's implementation of earplug fit testing as a critical success factor in its hearing conservation program.[5]

In addition, an ANSI working group has been assembled to evaluate and create a new standard for the performance criteria of hearing protector fit testing systems.[6]

CONCLUSION

While many occupational hearing conservation programs have the best intentions to ensure that workers are using hearing protectors, the ultimate goal is to ensure that workers wear them *properly 100% of the time when exposed to hazardous noise.* Earplug fit testing technology better enables and empowers workers to achieve this goal – and facilitate a life of healthy hearing.

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The Hearing Foundation of Canada's Youth Listening Summit

In November 2010, the Canadian Institutes of Health Research brought together participants in the Hearing Foundation of Canada's Youth Listening Summit to talk about the state of research on noise-induced hearing loss and the development of a program to address it among adolescents. (Transcript reprinted with kind permission from the Canadian Institutes of Health Research.)

NOW LISTEN UP!

Researchers and health advocates are expressing increasing concern about the link between overexposure to noise – largely from listening to music at unsafe levels – and the development of early hearing loss in youth.

The Hearing Foundation of Canada has developed an award-winning elementary hearing-health program, Sound Sense/Oui à l'ouie. It wanted to develop a program to reach teenagers. In 2008, the Foundation held the CIHR-funded Youth Listening Summit, with the goal of developing a program to reach this important age group. The summit brought together 30 youth participants, 10 of whom had hearing loss, and 30 professionals from a variety of relevant fields. Prior to the summit, the youth participants tested the MP3 listening levels of 150 of their peers; the results showed that 30% of teenagers were listening at decibel levels considered dangerous.

The summit led to the development of iHearYa!, a program featuring a live assembly, interactive website and social media site. "The power of iHearYa!," says Gael Hannan of The Hearing Foundation, "lies with the fact that young people are delivering the message in the way that they know their peers will listen." The program was delivered with positive feedback in three pilot project presentations and the Hearing Foundation is now seeking funding to extend the program's reach.

Three participants in the Youth Listening Summit came together recently to discuss the problem of noise-induced hearing loss and this innovative approach to addressing it.

PARTICIPANTS

Marshall Chasin is an audiologist and the director of auditory research at the Musicians' Clinics of Canada in Toronto, the coordinator of research at the Canadian Hearing Society, and the director of research at ListenUp Canada. Dr. Chasin presented a workshop at the Youth Listening Summit about the impact of noise-induced hearing loss on musicians and other people.

Robert Harrison is a senior scientist at The Hospital for Sick Children in Toronto, in the Neuroscience and Mental Health Program and a professor in the Department of Otolaryngology – Head and Neck Surgery, and Department of Physiology at the University of Toronto. Dr. Harrison was an advisor on the development of the summit, gave a lecture on biological and clinical aspects of noise-induced hearing loss, and participated in all group discussions.

Marwa Nather was a youth participant in the Youth Listening Summit. Herself hearing impaired, she followed up her participation in the summit by helping to deliver one of the pilot presentations of I Hear Ya! to students at her high school, Dante Alighieri Academy Catholic Secondary School. Ms. Nather is now studying psychology at Trent University.

Moderator: Thank you all for being here today. I'd like to start by asking, what is the research telling us about noise-induced hearing loss among youth?

Bob Harrison (BH): There is now plenty of research going on which relates to the basic mechanisms which cause hearing impairments as a result of noise exposure. So in relation to youth and the use of MP3 players, we know a lot about what happens when the ear is stimulated with very high

levels of sounds. I could talk for hours on this subject but just to say that we know what sound levels can cause damage to hearing and we know what sort of hearing deficits result from this damage. From this experimental data, we can extrapolate and confidently suppose that the levels (and duration) of sound exposures from misused MP3 players CAN cause damage to the cochlea. We know from much more applied or clinical research that young children and adolescents and adults are at risk for hearing loss because we know that the levels of sound that they are listening to on MP3 players is high enough to cause damage to the hearing.

So we have a wealth of basic and clinical research which tells us there is a potential for hearing loss in youth. More directly, there are a large number of case studies and epidemiological surveys which show that young people who have a history of using MP3 players unwisely are at risk for developing a significant hearing loss.

Marshall Chasin (MC): I do some research but I'm primarily a clinician. It's the expected norm for a 19-year-old person to have measurable hearing loss already. We know from large epidemiological studies that music does cause hearing loss. In other words, music is at the same level that you'd expect noise to be from a factory. If we subject someone to prolonged exposure to 85 dB, which can cause permanent hearing loss, people would say: That's not loud. It's astounding how quiet 85 dB is. It's maybe a dial tone on a telephone. It may be people clapping loud in an audience. It's the sound of the toilet flushing when you're very close to it. These are all 85 dB. It's your MP3 player on half volume, depending on the earphone. And humans, as a rule, are not very good creatures at discerning differences of loudness. And so people will say: "Well, that doesn't sound that loud." And they're absolutely right, it doesn't sound all that loud but it is damaging, it is intense. We don't really see music in the same way that we see noise. We don't have a good gut feeling of the relationship between intensity that is causing damage, and the loudness which is where we set the volume control. Also we don't have good measuring tools that can give us good sensitive information about the problems of the inner ear.

Moderator: So we have the knowledge, we have the research – how do we get the message out?

BH: There is a need for public awareness, for educational programs to inform at-risk individuals. Marshall Chasin does it for musicians, for example, and we want to do it for young people who are, if you like, ignorant of what they're doing to their hearing. We want to take what we know and we want to prevent the hearing loss. So the Hearing Foundation of Canada organized this "I Hear Ya" Youth Summit. One of the main reasons for it was to try and work out what would be the best way of getting the message across to adolescents.

Moderator: So Marwa, this is where you came in. How did you get involved in the summit?

Marwa Nather (MN): When I took the device that is used to measure the sound of MP3s to my school, to find the loudness that people were hearing. I found that most were using sounds over 85 dB. And I remember I had a sheet saying the normal decibels hearing and the loudness that would cause hearing loss and when I showed it to the students, they were actually very shocked. I didn't see that they would change the loudness that they are listening at, but after the presentation that I did at my school after the Hearing Summit, I noticed many people who were actually trying to lower the volumes.

Moderator: So why do you think they were ready to change just then but not before when you first did this experiment with the measuring device? What made the difference?

MN: I believe that it was because I spoke of a personal experience and maybe they're afraid that it would happen to them too.

Moderator: Tell me more about your participation in this summit. What was it like?

MN: Well, it was my first time meeting other people with hearing loss and it made me realize that it wasn't an easy thing and that other people really do need to be aware of the loudness that they're hearing in order to prevent hearing loss.

Moderator: Part of the summit was trying to figure out how this program for teenagers should look. So what things did the youth think would be important for the "I Hear Ya" program for it to work?

MN: Some of the things were to put a ban on high-powered MP3 player or saying the maximum loudness that it should be. And maybe that could give people a warning. And another thing was educational programs at school. Make special classes or, for example, in sciences, maybe provide a unit about hearing loss and about the ear.

Moderator: Bob, what do you think? This is a bit of a different approach to knowledge translation, I think, involving the youth so strongly. Do you think it makes a difference?

BH: Well, I think Marwa was an important participant; as she mentioned, she represented one who has a hearing loss. And a lot of young people don't have that contact or, even if they do, they don't actually understand what it can mean to have a hearing loss. So there was that shock and awe factor. We thought that getting youth involved in the development of "I Hear Ya" would actually tell us – and it actually did tell us – more about the way young people communicate and influence each other. For example, this notion that they're using social media to send messages, we felt that this was important to understand and how better to do this than by involving the young people themselves?

Moderator: What do you think changed as a result of their involvement?

BH: Well, I think there are a few things that I got from this. First of all was that youth are going to be more influenced by their own peer group perhaps than by some old professor like Marshall Chasin coming in and giving them a lecture. And so, getting the message spread among themselves is likely more influential. The other thing I found was that you need – and I use the words "shock and awe" – you need to sort of exaggerate things a bit and make it a very strong message, as opposed to, "You might get a hearing loss if you do this." You've really got to hit these young people with a very strong message. Subtlety is out of the window, I think, when you're trying to influence kids.

MC: I agree totally with Bob. Even though I'm a really dynamic speaker, nobody is going to listen to a mid-50s guy who represents their dad or mom or whatever; they're going to listen to Marwa, people her age, peers. We've seen this in the musical field for years. In 1990, less than a third of those that I tried to bully into getting earplugs actually got them. By 1999, however, the last time we did the review, about 96% of those same people did get them and it wasn't that the old fogies were becoming better salespeople but other people have stepped up to the plate, such as Pete Townsend of the Who, other rock-and-rollers, the Tragically Hip, who are really cool and groovy – and it's these people who have turned something around from being not so cool to, now it's cool to protect your hearing.

MN: People are very ignorant of hearing loss, of the idea of getting hearing loss. I remember when I was back in high school, every time I'd mention to someone: "Your music's so loud and you might get a hearing loss," the response was usually: "Oh, I'm so young, I'm not going to get a hearing loss."

Moderator: So how do you tell them that, no, it's what they're doing now that will harm their hearing?

MN: Honestly, the only way that I can get to them is by showing them what I'm going through, especially if I'm at class and have to use an FM system or I have to raise my hand a couple of times to ask for the teacher to repeat something, then they actually get it and say: Okay, well, we don't really want to go through that.

BH: Young people feel immortal, so the idea of hearing loss, as Marwa has said, is something that they associate with older people. But it's not something that's in their experience, which is why Marwa and others like her are very important: to show people that you can have a hearing loss as a young person.

MC: There's no way that we're going to change the view of a teenager, as Bob and Marwa pointed out. I think a multi-factorial approach may be able to work. Getting someone who's cool and groovy out there, Justin Bieber, or someone like him, would do infinitely more than anyone else but even with him, there's only so much that Justin Bieber can do. You'd have to have a multi-factorial approach, statistics with examples and signs of hearing loss, coupled maybe with some manufacturers designing MP3 players with lights going off or a vibration going on if a level exceeded a certain preset level.

BH: One of the things that I have often advised clinicians or parents to do, which is a little bit along the lines of "direct advice from adults isn't going to work," is go to the fancy package your new MP3 player came in and you will find in the box a warning from the manufacturers and, in many cases, they are very extensive and well-written warnings. That sort of direct information from manufacturers in the devices probably does influence to a certain extent young kids.

Moderator: Bob, you've mentioned that you wanted to do some research to the effect of "I Hear Ya" and see how effective it is. So have you been able to do that?

BH: We actually haven't got the "I Hear Ya" programs really up and running yet. You know, we're still at that pilot stage. And once we do have things moving

ahead then, certainly, we will want to gain evidence that it's working, by which I mean that the important messages about the risks of hearing loss are effective.

Moderator: Marwa, you made one of the program's pilot presentations at your school. So what do you think? Raising awareness is one thing, getting people to actually change something, a whole other thing. What's the necessary step to get to that changing behaviour?

MN: Students, you have to scare them, show them that this is going to happen. They still won't really understand it. They have this idea that it's not going to happen to them. Or they also say "We're going to enjoy our youth now and then we're going to worry about the future later." But they don't know that the present, actually what happens now, is going to affect their future.

MC: Another approach one could take is that there's nothing inherently wrong with MP3 players or portable music as long as it's done correctly. There's nothing inherently wrong with listening through earphones as long as it's done in moderation. The one thing that I found has been very useful is to say to them: "There's nothing wrong with listening to music. Enjoy it thoroughly. Your favourite song comes on, turn up the volume and enjoy it – just turn it back down to a more reasonable level afterwards." I talk about the 80/90 rule – 80% volume for 90 minutes a day will give you one half of your daily dose of music exposure.

BH: One of the things that Marwa mentioned was that there may not be an immediate perceived hearing loss in youth that are using MP3 players dangerously. And this is one problem because, in many cases, the hearing loss don't become evident to an individual until much later on in their life. So you can have damage to the inner ear that is not revealed by a clinical test or is not evident to the individuals themselves. However, the damage is occurring and it will become evident to them much later on in life. Many studies are now indicating that people in their 30s are now having hearing loss that is not age-related. They have a hearing loss that you would normally expect to get at age 60 or 70. It is a premature type of age-related hearing loss that is almost certainly due to noise exposure. But this is one of the problems: the immediate effects of noise-induced hearing loss are very often not immediately apparent in young people.

Moderator: Before we go, I'd just like to ask each of you for a statement wrapping up the value of things like the summit when you're targeting youth.

MN: I would say that it's better to pay now than wait until later to see the results because, later, it's going to be too late and you don't want to have the experience in hearing loss for the rest of your life, especially at a young age.

MC: Prevention is the cornerstone, coupled with early intervention, good education, a multi-factorial approach, and more family physicians involved and aware of the problems when they see the kids.

BH: As Marshall mentioned, a multi-pronged approach to this issue is required. We need to have education of health care professionals, parents, courses in schools. The peer-to-peer influence is what we were probing at the Youth Listening Summit and it told us that kids talk to each other in very influential ways. They have social media, you know, Twitter, Facebook, all these ways of communicating and, in order to get a message out to youth in general, we wanted to capitalize on this information transmission mode. That, for me, was quite a very important aspect of the Youth Listening Summit. It told us more about how youth might influence each other in sending this important message about being careful about noise exposure levels.

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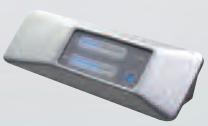

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