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Hearing Rehabilitation in Patients with Vestibular Schwannomas

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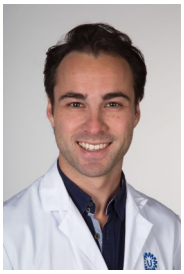


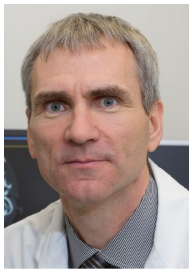

Vestibular schwannomas (a.k.a. acoustic neuromas) are slow-growing and benign tumours arising from the balance (vestibular) nerve. Most patients present with progressive symptoms of hearing loss, tinnitus, aural fullness, and imbalance. Over 90% of vestibular schwannomas are unilateral. Bilateral tumours almost exclusively occur in patients with Neurofibromatosis type 2 (NF2). Most patients with small and stable tumours can be observed. For larger, or growing tumours, surgical resection or radiation are both effective in achieving tumour control. With any treatment strategy, patients are confronted with hearing loss and hearing rehabilitation in every stage of the disease is therefore an essential part of our treatment.

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Hearing loss can be divided into two types: conductive hearing loss and sensorineural hearing loss. In a normal hearing ear sound waves travel through the ear canal towards the eardrum. The eardrum and the middle ear bones (ossicles) transduce the sound energy to the hearing organ, the cochlea. In conductive hearing loss sound waves are hindered to reach the cochlea by either obstruction in the ear canal or conditions affecting the middle ear or ossicles. Hearing loss caused by conditions in the cochlea or the vestibulocochlear nerve result in sensorineural hearing loss.

With pure tone audiometry (hearing testing) we can differentiate between these two types of hearing loss. Auditory thresholds are assessed by presenting stimuli via headphones and bone oscillators. With the headphones the entire auditory pathway is assessed, while with the bone oscillators the sound energy is transmitted through vibration of the skull directly to the cochlea, bypassing the middle ear and the ossicles. Combining these two thresholds gives us an impression of the degree and type of hearing loss, i.e. conductive, sensorineural or a combination of both. Besides the pure tone audiogram, we routinely also perform tests of speech discrimination or speech understanding.

In someone with a unilateral vestibular schwannoma, we typically see a sensorineural hearing loss in the affected ear and normal hearing thresholds in the other ear. An asymmetric sensorineural hearing loss on the audiogram is therefore one of the reasons to perform additional imaging or additional hearing testing (auditory brainstem response or ABR) to identify or exclude a vestibular schwannoma. In patients with sensorineural hearing loss due to conditions in the cochlea, like excessive noise exposure, the patient's speech discrimination ability is usually retained. In the typical patient with a vestibular schwannoma, the speech discrimination is poorer than what is expected based on the hearing loss measured with the pure tone audiogram. The presence of the tumour on the vestibulocochlear nerve leads to a distortion of speech.

Expected Natural History of Hearing

The best hearing outcomes occur in patients who are able to have their tumours simply followed with serial MRI scans. In these people, the hearing will remain the best the longest. Unfortunately, over time the hearing can deteriorate, even if the tumour does not change in appearance on subsequent MRI scans. In whom the hearing will deteriorate and in whom it will not is not possible to predict at this time.

Radiation therapy can sometimes stop a tumour from growing and preserve residual hearing. This is particularly possible if the radiation can be directed at the tumour while avoiding the cochlea. Similarly, it is sometimes possible to surgically remove the tumour and preserve the residual hearing. This is somewhat dependent on the size and the location of the tumour, but predictable preservation of hearing even in small, ideally situated tumours is not possible. In no instance is the hearing improved with treatment of the tumour.

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Hearing Rehabilitation

Rehabilitation of the patient's hearing loss is important at every stage. Patients with a mild-to-moderately severe hearing loss in one ear might benefit from a hearing aid. This hearing aid will amplify the sound enhancing their hearing ability. However, patients with severe-to-profound hearing loss may expect little benefit from a hearing aid on their affected side. For these patients a contralateral routing of signals (CROS) hearing aid might be a better option.

The CROS device consists of two hearing aids. On the affected side, the hearing device consists primarily of a microphone that picks up the sound and transmits the signal wirelessly to the receiver of a hearing aid placed on the better hearing ear. With this setup the CROS hearing aid can pick up sound from the impaired ear and transmit it to the better hearing ear. This enables patients to hear sounds from their impaired side with their better hearing ear. A CROS hearing aid can improve hearing ability especially in a quiet environment, but not all users experience these benefits, and some have difficulties integrating the sounds from both sides. As this process takes time and is different for every individual user, a thorough trial period with a CROS device is therefore advised before committing to purchase.

A different, but more expensive option for patients with unilateral severe-to-profound hearing loss (single-sided deafness) is a bone conduction device (BCD) or bone anchored hearing aid (BAHA). This system consists of a titanium screw which is surgically fixated in the bone behind the ear, and an external bone oscillator which can be attached to the screw. The microphone, integrated in the bone oscillator, receives the sound signal. The sound processor converts this signal to an oscillation which is transmitted via the screw to the skull. The vibrating skull will activate the cochleae on both sides as they are embedded in the bone of the skull. In a patient with a unilateral severe hearing impairment due to a vestibular schwannoma, the impaired side is unable to adequately process these signals, but the vibrations are also registered by the cochlea on the normal hearing side resulting in activation of this cochlea. As with a CROS hearing aid, the BCD enables patients with unilateral hearing loss to hear sounds from their impaired side with their better hearing ear. The main difference is that the BCD uses vibration of the bone to activate the cochlea on the better hearing side, whereas the CROS hearing aid uses air conduction.

The CROS hearing aids and BCDs are only viable options for patients with a properly functioning contralateral ear. In patients with bilateral severe-to-profound sensorineural hearing loss caused by either a unilateral vestibular schwannoma and contralateral impaired cochlear functioning, or bilateral vestibular schwannomas, cochlear implants (CIs) and auditory brainstem implants (ABIs) are indicated.

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A cochlear implant consists of an external sound processor and a surgically implanted device with an electrode array which is placed in the cochlea on the impaired side. The sound received by the sound processor is converted to an electrical signal which is directed through the electrode array. In the cochlea, the electric current activates nearby nerves resulting in activation of the nerve fibers which propagate this signal up to the brain. Although with vestibular schwannomas the problem is located behind the cochlea, in the vestibulocochlear nerve, cochlear implants are able to activate enough neural tissue to produce a signal, which can still be propagated through the nerve and past the tumour. Cochlear implantation in an ear with a vestibular schwannoma is mainly indicated for patients with bilateral tumours due to NF2. Because the tumour properties and extent are different in each patient, the hearing result of cochlear implantation in patients with a vestibular schwannoma is more variable than in traditional cochlear implant patients with hearing loss not due to a vestibular schwannoma.

If, despite cochlear implantation patients do not fare well, or if the tumor is growing and requires surgical resection, an ABI might be indicated. Just like a CI, an ABI consists of an external sound processor and an internal device with an electrode array. However, this electrode array is not placed within the cochlea but instead is placed on the cochlear nucleus in the brainstem. The ABI enables patients to perceive sounds, even after surgical removal of the tumour and the vestibulocochlear nerve. However, the hearing result is in general poorer and more variable compared to cochlear implant users. Most ABI users are able to detect sounds and obtain measurable assistance with lip reading, but a minority are able to gain significant speech understanding. Vancouver has recently been approved for an ABI program.

Conclusion

Hearing rehabilitation is an integral part of vestibular schwannoma treatment. Given the variation in hearing impairment among patients and the progressive nature of the hearing loss, an individually tailored approach is required in every stage of the disease. We advise patients to talk with their audiologists and ENT surgeons about all different rehabilitation options to aid them in their current situation and in their future.

Dr. Brian Westerberg, specializing in Otology and Neurotology is based at the B.C. Rotary Hearing and Balance Centre in Vancouver. He completed a Fellowship at Stanford University and a Masters in Health Care and Epidemiology at the University of British Columbia (UBC). Dr. Westerberg has served the Royal College of Physicians and Surgeons as Program Director, and member of the Examination Committee and Chair of the Specialty Committee in OHNS at UBC. His interest in global health is apparent in his involvement in Zimbabwe and Uganda Hearing Health Care Programs. He is a clinical professor in the Department of Surgery and Director of the Branch for International Surgical Care at UBC.

How Can Tinnitus Retraining Therapy Facilitate Habituation to a Problematic Tinnitus

By: Dany Pineault, Audiologist, Reg. CASLPO, Aud.D.
Canadian Hearing Society

Tinnitus is defined as the perception of sound(s) in the ears or head when no external sound is present. While it is often referred to as "ringing in the ears," tinnitus can present as different sounds, including buzzing, hissing, whistling, swooshing, and clicking. Tinnitus is also described as a "phantom sound" or "phantom auditory sensation" that shares many similarities with chronic pain disorders.

There are two types of tinnitus: subjective and objective tinnitus. Subjective tinnitus is the most common form and is defined as the perception of sound(s) generated by the brain (auditory cortex) in response to disturbances within the auditory system. Subjective tinnitus is only audible to the patient. Objective tinnitus is rare and is defined as the perception of sound(s) generated by sound sources in the body that are transmitted to the ear such as a blood vessel adjacent to the middle ear (pulsatile tinnitus). Objective tinnitus can be audible to others such as in the case of rapid muscle spasms of the soft palate (myoclonus).

Tinnitus is not considered a disease but rather a condition resulting from a wide range of health issues. Tinnitus is most commonly caused by noise exposure, age-related changes, whiplash and head injury, acoustic neuroma, side-effect of some prescription medications (e.g., high dose of aspirin, some antibiotics, antidepressants and chemotherapy agents), Ménière's disease, otosclerosis, ear infection, severe cold and flu, Eustachian tube dysfunction and aerotitis, temporomandibular joint dysfunction, diabetes, high blood pressure, hyperthyroidism, arthritis, stress, anxiety and depression.

Tinnitus is almost always accompanied by hearing loss. It is estimated that 90% of tinnitus patients present with some degree of hearing loss. Patients with tinnitus may also experience decreased sound tolerance. The most common form of decreased sound tolerance is hyperacusis which is characterized by the experience of discomfort and sometimes ear pain with everyday sounds such as dishes clanking, babies crying, dogs barking, cars honking and sirens of emergency vehicles. It is estimated that 40% of tinnitus patients present with hyperacusis.

Tinnitus is a prevalent condition. It is estimated that 15% to 20% of the general population experiences tinnitus at some point in their lives. The condition interferes with daily activity in about 3% to 5% of the affected population.

Tinnitus becomes a problem when it affects quality of life. The impact of a problematic tinnitus ranges from a mild annoyance to a completely debilitating condition with significant social and

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economic consequences. The most common tinnitus-related complaints are:

- difficulty understanding speech and television, poor appreciation of music, and trouble using the phone;
- interference with work duties, social activities, and family responsibilities;
- effects on general health including sleep disturbances, fatigue, headaches and ear pain;
- emotional and cognitive problems including annoyance, irritation, inability to relax, anxiety, depression, suicide ideation and difficulty concentrating.

A problematic tinnitus has both auditory and non-auditory (emotional) components. The auditory component involves the perception of the sound of tinnitus generated by the brain (auditory cortex) in response to disturbances within the auditory system. When hearing loss is present, the brain receives reduced information from the ears. The brain adapts to this change by compensating for the lack of information. In an effort to fill in the blanks, the auditory cortex augments its processing activity. The tinnitus or phantom sound heard is essentially the perception of this increased activity.

Even with normal hearing ears, the brain can receive incomplete information. Scientists have observed abnormalities with the delicate structures of the cochlea (inner ear) such as the outer hair cells and auditory nerve fibers that don't always show up on a clinical audiogram. This phenomenon is referred to as hidden hearing loss or cochlear synaptopathy.

The non-auditory component involves the emotional reaction to the sound of tinnitus. The annoyance experienced with tinnitus is the result of negative thoughts, fears, and worries associated with the experience of tinnitus. Is my tinnitus going to get worse? Will I be able to go back to work? Will I be able to enjoy silence again? What if I lose all hearing in my good ear? An emotional response is triggered when the brain starts focusing significant amount of attention onto the tinnitus. The negative thoughts associated with tinnitus lead to distress, which increases attention and monitoring of tinnitus resulting ultimately in a more noticeable and intrusive tinnitus. This is what is referred to as the vicious cycle of a problematic tinnitus. The brain temporarily loses its ability to filter out the harmless sound of tinnitus before it reaches consciousness. Tinnitus becomes problematic when natural habituation mechanisms are held back by the negative experience and fears associated with tinnitus.

Habituation is a simple form of learning in which we progressively stop paying attention to annoying sensory information. Habituation happens all the time. For example, the loud ticking of a grandfather clock in a quiet room doesn't seem as resounding after a while and starts fading in the background. We forget about the humming noise coming from the ventilation system until it stops working. Habituation is also why some people can live near a train station, the highway or

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an airport. In time, the brain ceases to respond to these sounds as they are perceived as non-threatening, familiar and meaningless.

The good news is that there are evidence-based treatments designed to assist habituation of a problematic tinnitus. It is possible to retrain the brain to no longer react to tinnitus and bothersome environmental sounds.

Most tinnitus patients seen in today's audiology clinic present with a subjective tinnitus, some form of decreased sound tolerance and hearing loss. There are comprehensive management programs currently dispensed by audiologists specialized in these hearing-related disorders that facilitate tinnitus habituation and desensitization of the auditory system to bothersome environmental sound(s). The most commonly used are Tinnitus Retraining Therapy, Progressive Tinnitus Management, and Cognitive Behavioral Therapy.

As an audiologist at the Canadian Hearing Society providing services to patients with tinnitus and decreased sound tolerance, I am often asked what methods of treatment I use in my practice. I am a firm believer in the Tinnitus Retraining Therapy (TRT) approach. Most of the counseling material and assessment and management protocols I use come from TRT. More specifically, TRT is based upon the idea that structures in the brain other than the auditory system are involved in the development of a problematic tinnitus. The limbic and autonomic nervous systems are believed to be the primary and dominant non-auditory brain systems responsible for tinnitus annoyance and distress while the auditory system plays a secondary role.

TRT was developed by Dr. Pawel Jastreboff (Research Neuroscientist), Dr. Jonathan Hazell (ENT Specialist) and Jacqui Sheldrake (Clinical Audiologist) in the 1990s. TRT combines the use of directive counseling sessions and fitting of sound therapy devices such as ear-level sound generators and hearing aids. The counselling component aims at demystifying tinnitus/ hyperacusis and creating a new frame of reference for thinking about the troublesome condition. The sound therapy component is designed to provide enrichment of the auditory background noise, reduce the audibility of tinnitus and improved audibility of sounds difficult to hear for patients with hearing loss.

A comprehensive audiological assessment is essential for the success of TRT. The assessment includes a detailed case history designed to investigate causes, characteristics and progression of tinnitus and general physical and emotional health. A thorough hearing examination is also performed to assess patient's hearing health and associated hearing loss and decreased sound tolerance. It is crucial to consider the entire person as many internal and external factors can not only cause tinnitus but also aggravate its perception and experience.

How Can Tinnitus Retraining Therapy Facilitate Habituation to a Problematic Tinnitus

If you are struggling with a problematic tinnitus, inquire about comprehensive management programs offered by your community Audiology and Psychology clinics. Let a professional help you live a life free of tinnitus burden.

Dany Pineault who completed his Doctor of Audiology (Au.D.) at A.T. Still University. has been an audiologist for 25 years and has extensive clinical experience in the assessment and management of problematic tinnitus and decreased sound tolerance. He currently practices as a clinical audiologist at the Canadian Hearing Society, the largest non-profit hearing healthcare organization of its kind in North America and is also a research advisor for Statistics Canada. He recently co-authored the Tinnitus in Canada paper (Ramage-Morin P, Banks R, Pineault D and Atrach M, 2019).

Also, Dany is an assistant adjunct professor at A.T. Still University. He teaches the Tinnitus and Hyperacusis course to students enrolled in the Post-Professional Doctor of Audiology program and is an off-campus preceptor supporting Canadian University Audiology Programs (e.g.: University of British Columbia, Western University, Dalhousie University and l'Université d'Ottawa).

Trekking to the 2018 Symposium: Elizabeth's Pathway to Managing her AN

By: Elizabeth Ewashkiw, Belleville, Ontario

As an active, 74-year-old retired kindergarten teacher, I consider myself an engaged member of the community. Medically, I have keratoconus which is a progressive eye disease in which the normally round cornea thins and begins to bulge into a cone-like shape. This cone shape deflects light as it enters the eye on its way to the light-sensitive retina causing distorted vision, for which I have had three corneal transplants over the past 40-plus years culminating in an unsuccessful trabeculectomy for glaucoma. This has left me with no vision in one eye and a scleral lens in the other.

Having gradually adjusted to the lack of depth perception and minor balance issues, I was therefore not surprised when I seemed to develop vertigo a few years ago. I was careful getting into boats (we cottage on an island, so this is significant), started holding hand rails when possible, and got on with life.

In January 2018 after my flight home from BC, I experienced sudden onset deafness in one ear and secured an appointment with our ENT in Belleville. Also, after the flight to Europe in May 2018, I had balance issues and needed to take my husband's arm for the whole trip. The vertigo gradually settled down somewhat after we were home again.

Trekking to the 2018 Symposium: Elizabeth's Pathway to Managing her AN

After waiting for an appointment, waiting for an audiogram, waiting to have my ear cleaned out, taking time to cottage in the summer, and having an MRI, I was eventually diagnosed at the end of August 2018 with a small acoustic neuroma. It was not until November, when I had a second audiogram, that I was referred to Dr. Joseph Chen at Sunnybrook Health Sciences in Toronto.

My way of coping with the unknown is to learn all I can, so I turned to the search engines on the Internet looking for recognized national sites about acoustic neuromas. I soon learned that there was an acoustic neuroma association in Canada and, lo and behold, they would be holding a national symposium in Toronto at the end of September.

Living two hours away, I registered for the live webcast of the 2018 Symposium and sent a note. I immediately received a phone call from Carole Humphries, whose knowledgeable, warm and supportive manner, was exactly what I needed. Carole encouraged me to come to Toronto to experience the conference in person. The networking around our table, the fourteen pages of notes I took, the fact that the room was full of people with my symptoms, including some who had had surgery, plus the presenters making themselves available for brief chats during our refreshment breaks made this an invaluable day. I was able to introduce myself to Dr. Chen as a probable new patient and he immediately told me to discard the cane, use walking poles, and start walking, looking left and right continuously.

I gathered later that this was to help my brain adapt to receiving balance information from my one set of circular canals, rather than the usual two.

The conference also gave me the opportunity to speak to a vestibular therapist whose expertise I realized I needed.

Arriving home in full-blown overload, I emailed my physiotherapist and the manager/friend of the clinic I had used in the past. I learned that my present therapist was also qualified in vestibular therapy. I started immediately, as I continued the twice-a-week free VON seniors' exercise classes, which contain a balance component. Homework for the therapy became mandatory as I practised walking a straight line, gradually moving my arms, and eventually I expect to be able to change elevation and focus (by bending knees, raising heels, rotating shoulders, etc.). This is only one of the multitude of exercises I have learned in recent months. If I neglect to maintain them, my balance is compromised. The rewards are built in. If I work at it, I experience success. If not, . . .? I get right back to practising!

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By mid November 2018, I had an appointment with Dr. Chen, who reassured me that my small (0.6 x 1.5 cm) neuroma only needs monitoring every couple of years with an MRI, which I can have done in my home town of Belleville.

I have "graduated" from vestibular therapy but am most welcome to return when I deem it necessary and will continue to participate in two VON one-hour classes per week.

I had also learned about the CROS hearing aids when at the ANAC conference. Messages from the deaf ear are transmitted wirelessly to the functioning ear, from which the info is sent to the brain. When home, I went to learn about hearing aids. After another audiogram I asked what would be appropriate for me. The answer was the CROS. These I received on December 4. I certainly hear more with them (they look just like any other hearing aids, i.e. inconspicuous), but I do get caught out by the lack of directionality. If in a crowded room I hear a voice calling my name, I must rotate, checking people's facial expressions, to tell who has spoken to me! Similarly, around a table of unfamiliar people at a meeting, I don't automatically know who spoke. It all just adds another layer to "paying attention" to make it all work.

Presently I don't have to explain to people that I have balance issues or hearing in one ear only because I've learned how to compensate as much as possible. This is my new normal and it's working for me. **eewashkiw@sympatico.ca**

Redefining a Smile: John's Marathon Journey towards Reanimation

By: John Gerritsen, Toronto

My journey began in May 2017 with a call from my doctor's office saying my MRI results were in. As I was enjoying an amazing family vacation in a Florida theme park, I waited until my return to see the doctor and enjoyed the rest of my vacation.

The MRI revealed a large Acoustic Neuroma (AN). I had been to see an ENT specialist years earlier for a hearing assessment. As it turns out, the explanation that my hearing loss was a result of occupational hazards proved to be wrong. I cursed my stupidity for not having insisted on further diagnostic testing. In the meantime, an AN had grown without any nasty symptoms. Now, with the MRI results, I began moving into a new phase.

Following the AN diagnosis, I learned to manage the pain from pressure in my head, and also my new unsteadiness while I waited for surgery. Daily Advil and elevators were my friends. Finally,

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on December 18, 2017, a tumour the size of a golf ball was removed during a 12-hour surgery at Toronto Western Hospital.

My mantra – you must always look forward and make the best of what you've got. Be patient, let your body heal and pursue opportunities to make it better…

The Good News

The surgery went well: the pain was gone and most of the tumor was gone. My brain stem that had been as tight as a drum was back to its old fluffy self with no apparent adverse effects. After a few days, I was up walking with a walker, and I was home before Christmas.

However, there were New Challenges

I had some temporary nerve damage that froze the left side of my face and caused me to speak in a whisper. Once again, I adapted: straws and soft foods were my new friends, and I wore a patch to protect my eye in extreme cold. My patient wife became expert at adding gel to my eye, helping the new me with daily tasks, and buying time for my body to heal . . . and it did! Gradually, I gave up the straws and my voice got stronger. With physiotherapy and exercise my balance improved. After three months I was ready to battle the crowds in downtown Toronto to commute to work again.

But … my face was still not normal. I could not smile or completely close my left eye. Regular application of gel or drops protected my eye from damage but kept it blurry. Care was needed to keep my mouth clean.

By August 2018, it became apparent that my face would not fully recover. The area around my left cheek was still frozen, with my eyebrow sliding towards my eye.

Opportunity and Help Comes My Way

Opportunity appeared in the form of Dr. Baltzer, a skilled plastic surgeon who years earlier was a resident at SickKids working with Dr. Zuker. Dr. Zuker is a pioneer of "smile surgery", who had honed his skills over decades of helping kids around the world. Dr. Baltzer, now with the University Health Network and Toronto Western Hospital, works with Dr. Zuker to offer this expertise to adults with facial palsy.

When I first met Dr. Baltzer and Dr. Zuker in September 2018, I was caught a little off-guard, having anticipated more traditional plastic surgery options. Instead, I was presented with a facial reanimation surgery option, whereby a nerve graft is used to restore natural facial movement! It was a unique and unexpected opportunity, but I had to decide quickly as the unused muscles in my face would soon start to atrophy.

Honestly, I was a little gun shy. I had just started feeling strong again and more like my old self after the last surgery. Did I really want more surgery? Dr. Baltzer was patient with me. She gave me time to consider the option while filling out the needed forms in case I decided to go ahead. I asked her if she would be doing the surgery herself. Her answer was, "Definitely!"

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A quick google search showed that facial nerve grafts were being used at top medical centres with some amazing results. Of course, there are no guarantees -- life is full of risks – but the surgery appeared to offer the potential for excellent results, with little downside risks beyond that of normal surgery. One cost: a sensory nerve would be taken from my leg, and I would be left with numbness around my heel.

On November 26, 2018, I underwent facial reanimation surgery. Although it was a five-hour delicate surgery, I recovered quickly. Dr. Baltzer and Dr. Zuker removed a sensory nerve from my left leg and weaved it from the moving side of my face to the paralyzed side, across my upper lip and across my eyebrow. They also lifted my left eyebrow to give my eye a normal shape. The surgery went well, and I was back to work after a two-week recovery period. My face and leg were still tender, so I avoided any pressure on my face and any heavy lifting.

The Journey is a Marathon Not a Sprint

It is now three months later. The surgical team had done an excellent job. The most immediate improvement was the brow lift, with the left brow now aligning perfectly with the right. More important still, my eye resumed a more normal shape, which helped it to close. The facial incisions along my ears, eye brow and the inside my mouth healed quickly, while the brow lift incision was deeper and took a little longer to heal. Facial scars are now either non-existent or invisible to the casual observer.

My leg works great. I can move normally, walk and run. A small area on the left side of my left foot around my heel is numb, feeling something like when your arm goes to "sleep" from a lack of circulation. I notice it sometimes, but I'm used to it.

Is there new facial movement? Nerves can take a frustratingly long time to heal and the grafted nerve needs to grow in. My wife and I have noticed slight improvements to the definition of my face and there is some new movement. We won't know the full story for another six months or so. Next is facial physiotherapy and exercise in front of a mirror to help wake up sleeping muscles and teach them to work in concert with the right side of my face again.

More good news, my recent MRI showed my brain is stable with no change to the small remnant of tumor by my left ear. My wife teases me that she wants it in writing that I'm mentally stable!!

My journey is a marathon not a sprint. I'm feeling good and I'm optimistic for the future. As I plan another family vacation to Florida, I ask myself if I would agree to facial reanimation surgery again? Was it worth it? Definitely!

https://www.uhn.ca/corporate/News/Pages/Not_just_reason_but_ability_to_smile_again.aspx

Acoustic Neuroma Research Abstracts

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A Comprehensive Analysis of Hearing Preservation after Radiosurgery for Vestibular Schwannoma

Yang I, Sughrue ME, Han SJ, Aranda D, Pitts LH, Cheung SW, Parsa AT.

Objective:
Gamma Knife surgery (GKS) has evolved into a practical alternative to open microsurgical resection in the treatment of patients with vestibular schwannoma (VS). Hearing preservation rates in GKS series suggest very favorable outcomes without the possible acute morbidity associated with open microsurgery. To mitigate institutional and practitioner bias, the authors performed an analytical review of the published literature on the GKS treatment of vestibular schwannoma patients. Their aim was to objectively characterize the prognostic factors that contribute to hearing preservation after GKS, as well as methodically summarize the reported literature describing hearing preservation after GKS for VS.

Method:
A comprehensive search of the English-language literature revealed a total of 254 published studies reporting assessable and quantifiable outcome data obtained in patients who underwent radiosurgery for VSs. Inclusion criteria for articles were 4-fold: 1) hearing preservation rates reported specifically for VS; 2) hearing status reported using the American Association of Otolaryngology-Head and Neck Surgery (AAO-HNS) or Gardner-Robertson classification; 3) documentation of initial tumor size; and 4) GKS was the only radiosurgical modality in the treatment. In the analysis only patients with AAO-HNS Class A or B or Gardner-Robertson Grade I or II status at the last follow-up visit were defined as having preserved hearing. Hearing preservation and outcome data were then aggregated and analyzed based on the radiation dose, tumor volume, and patient age.

Results:
The 45 articles that met the authors' inclusion criteria represented 4234 patients in whom an overall hearing preservation rate was 51%, irrespective of radiation dose, patient age, or tumor volume. Practitioners who delivered an average ≤ 13-Gy dose of radiation reported a higher hearing preservation rate (60.5% at ≤ 13 Gy vs 50.4% at > 13 Gy; p = 0.0005). Patients with smaller tumors (average tumor volume ≤ 1.5 cm3) had a hearing preservation rate (62%) comparable with patients harboring larger tumors (61%) (p = 0.8968). Age was not a significant prognostic factor for hearing preservation rates as in older patients there was a trend toward improved hearing preservation rates (56% at < 65 years vs 71% at ≥ 65 years of age; p < 0.1134). The average overall follow-up in the studies reviewed was 44.4 ± 32 months (median 35 months).

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Conclusion:
These data provide a methodical overview of the literature regarding hearing preservation with GKS for VS and a less biased assessment of outcomes than single-institution studies. This objective analysis provides insight into advising patients of hearing preservation rates for GKS treatment of VSs that have been reported. Analysis of the data suggests that an overall hearing preservation rate of ~ 51% can be expected approaching 3-4 years after radiosurgical treatment, and the analysis reveals that patients treated with ≤ 13 Gy were more likely to have preserved hearing than patients receiving larger doses of radiation. Furthermore, larger tumors and older patients do not appear to be at any increased risk for hearing loss after GKS for VS than younger patients or patients with smaller tumors.

* * * * *

Radiosurgery as Treatment for Acoustic Neuromas – Ten Years' Experience

Llópez Carratalá I[1], Escorihuela García V[2], Orts Alborch M[2], de Paula Vernetta C[2], Marco Algarra J[2].

Objective: The acoustic neuroma is a benign tumour that usually affects the vestibular portion of the vestibulocochlear nerve. It represents 8% of all intracranial tumours and 80% of those arising at the cerebellopontine angle. There are 3 treatment options: microsurgery (the technique of choice), radiosurgery and observation. The objective of the study was to evaluate the results and side effects obtained using radiosurgery as treatment for acoustic neuroma.

Method:
We performed a review of all patients treated with radiosurgery (Gamma Knife and linear accelerator) at doses of 1200-1300 cGy for unilateral acoustic neuroma in our hospital from January 1999 until January 2010. In all patients we evaluated the overall state, tumour growth control rate (tumour smaller or remaining the same size), the involvement of v and vii cranial nerves and central nervous system disorders. We also assessed follow-up time and changes in hearing thresholds after radiosurgery.

Results:
From a total of 35 patients studied, with a mean age of 58.29 years and lacking statistically significant differences in gender, the tumour growth control rate was over 90%. The main reason for visit (65.71%) was unilateral and progressive hearing loss. After treatment, 34.28% of patients had hearing loss. The involvement of the cranial nerves (v-vii) was transitory in 100% of cases. Gamma Knife radiosurgery was administered in 82.85% of patients.

Conclusion:
Although microsurgery is the treatment of choice for acoustic neuroma, we consider radiosurgery as a valid alternative in selected patients (elderly, comorbidity, small tumour size and sensorineural hearing loss, among others).

ANAC's Newest Board Member

David Tsang spent the first 16 years of his life in Hong Kong before moving to Canada to further his education. His passion for customer experience led him to opportunities as a contact centre operations leader with noted success in building and managing complex support operations.

Throughout the past 20 years, David has held leadership positions in established and start-up organizations in the Telecommunication, Pharmaceutical, Retail, Government Agency and BPO space. Some of David's career highlights include:

- Being awarded the "Best Mid-sized Contact Centre of the World" from Contact Center World (The Shopping Channel, Rogers Media Group)
- Building contact centre operations from the ground up with proper talent, robust processes and state-of-the-art technology (WIND Mobile)
- Transforming regional contact centre processes to meet an organization's global standards (Baxter Canada)

After David's initial diagnosis of an acoustic neuroma in 2016, his tumour grew rapidly, exacerbating his hearing loss, tinnitus and balance issues. In the spring of 2017, David underwent Gamma Knife radiation treatment and, since then, the size of the tumour has remained unchanged.

David believes he is able to train his brain to compensate for his balance issues by staying active. He says that he has learned to live his life with workarounds and does not let his deficiencies impact his quality of life.

In addition to joining ANAC's Board, David also volunteers as an Advisory Council Member at GTACC (Great Toronto Area Contact Centre Association).

Dr. John F. Demartini former chiropractor and current American researcher, best selling author, had this to say:

"Whatever we think about and thank about we bring about."

I really love this quote. What we consistently THINK about we bring about. Look at your friends and family members. Look at yourself and your life. What are your predominate thoughts on a day to day basis and how do they relate to your life and experiences? We can all start to change what we think about when we give THANKS to all that we have. When we feel thankful in our hearts our thoughts become lighter and happier and our lives more fulfilling.

Upcoming Chapter Meetings Planned

KITCHENER—WATERLOO CHAPTER

Date: **Saturday, April 27, 2019**—10am—12pm followed by a potluck lunch
Location: Home of Tom & Helen Horlings
#30—50 Bryan Court, Kitchener, ON N2A 4N4
For more info: Linda Darkes
(519) 696-3445 / pdarkesc659@rogers.com
Helen Horlings
(519) 954-5581 / healto@rogers.com

BRITISH COLUMBIA: COURTENAY/NANAIMO CHAPTER

Date: **Saturday, April 27, 2019**—12 noon—3pm
Location: Atrium at Crown Isle Resort & Golf Community
399 Clubhouse Drive, Courtenay, BC
Guest Speaker: Dr. Sadhana Kulkarni, Ophthalmologist, Comax
For more info: Evalyn Hrybko
(250) 282-3269 / wehrybko@saywardvalley.net

TORONTO CHAPTER

Dates: **Tuesday, May 28, 2019 (15th Anniversary)**—6:30pm—8:30pm
Tuesday, July 30, 2019—6:30pm—8:30pm
September 24, 2019—6:30pm—8:30pm
Location: Canadian Hearing Society
271 Spadina Road, Toronto, ON (Parking in the rear)
For more info: Lynda Nash
lyndanash02@gmail.com
Kathryn Harrod
(905) 891-1624 / kath.harrod@live.ca

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