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Summer Edition 2021

Strategies for Improving Facial Nerve Functional Outcomes in Acoustic Neuroma Surgery: Lessons Learned

By: Joseph Chen MD, FRCSC; Carolyn Lai MD, Justin Lui MD, Farhad Pirouzmand MD, MSc, FRCSC; Sunnybrook Health Sciences Centre



Dr. Joseph Chen



Dr. Farhad Pirouzmand

Acoustic Neuromas (AN), also known as vestibular schwannomas, are benign tumours arising from the vestibular (balance) nerve. They represent the most common tumour that occupies a region of the brain cavity known as the cerebellopontine angle. In addition to the usual challenges of microsurgical dissection in this region, the close proximity of the facial nerve to the tumour capsule puts it at risk of injury. AN removal requires careful identification and separation of the nerve while maintaining its physical integrity and small nutrient blood vessels. When the tumour is large, the nerve becomes thin, fragile and often unpredictable in its orientation.

Facial nerve injuries may lead to mild to severe dysfunction that can be transient or even permanent in nature. Cosmetic outcomes and the resultant psychological impact have an immeasurable effect on quality of life. Moreover, the facial nerve is responsible for relaying secretory fibres to the lacrimal gland for tearing, and saliva glands under the tongue. It also offers taste sensitivity to the tongue. Injury to the facial nerve has a substantial functional impact.

As with any other challenging surgery, experience with skull base surgery is essential in minimizing complication risk such as facial nerve injury. At Sunnybrook Health Sciences Centre, we are a multi-disciplinary team

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experienced in performing skull base surgeries and have developed numerous strategies to mitigate risk to the facial nerve. These include:

1. Translabyrinthine surgical approach: By approaching the skull base laterally, this surgical approach offers a more direct view of the tumour and the facial nerve. Additionally, the minimal brain retraction required further reinforces this approach's superiority. Often, this results in a shortened post-operative stay and a decreased risk of intracranial complications.

With complete hearing loss following surgery for smaller tumours, there is a possibility for preserving the hearing nerve to permit future hearing improvement with a cochlear implant. This is a clinical research project being considered.

2. Direct intraoperative nerve stimulation: Using a concentric bipolar probe to illicit muscular responses is the mainstay of facial nerve monitoring and localization to improve safety. Electrically evoked responses measured before and after tumour removal help us predict short-term and long-term outcomes. We continue to refine this monitoring technique to better understand nerve behaviour and recovery. A skilled neuromonitoring team is an integral part of the multi-disciplinary approach.

3. Brain evoked potential monitoring: In larger tumours, the addition of brain evoked potential monitoring permits continuous transcranial electrical stimulation from electrodes over the scalp to provide real-time feedback of facial nerve function. Such information could have a material impact on decision to continue with surgery or to stop.

4. Near total resection: Attempts to achieve total tumour resection in the presence of a thin and fragile facial nerve may not be desirable. There is a global trend toward optimal facial nerve preservation while achieving near complete tumour removal (i.e. with a residual tumour of <5%). It has been demonstrated that such a practice provides the best balance between long-term tumour control and facial nerve preservation. Situations necessitating this approach may be related to tumour vascularity, firmness and unfavorable facial nerve positions that are particularly dangerous to traction and ischemic injuries. Of course, long-term surveillance MRI scans are required.

5. Facial nerve tractography: This exciting experimental pre-operative MRI technique with automated image manipulation has been used at Sunnybrook in a preliminary fashion to help predict the exact location and course of the facial nerve relative to the tumour capsule. Surgeons in the near future may have a mental roadmap to facilitate intraoperative dissection. Your support in research is directed to projects such as this to optimize patient care.

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6. Facial rehabilitation: Specialized physiotherapy for facial nerve recovery is an integral part of a multi-disciplinary approach and timely management of facial nerve injuries. In those with more severe paralysis, specialized management spans the spectrum of oculoplastic procedures for the eye, to minor and major reconstructive surgeries for facial reanimation to achieve the best possible outcome.

The Neurosurgery Division and the Otolaryngology Department evaluate patients together to determine best management to optimize care. We share operating room and in-patient resources, and focus on a longstanding model of multi-disciplinary care that involves radiation therapy, neuro-radiology, electrophysiology monitoring, nursing, physiotherapy, and facial nerve rehabilitative services. During the pandemic, the group has advocated for additional resources to ensure expeditious care.

Dr. Pirouzmand is head of Division of Neurosurgery, and Hurvitz Brain Sciences Program of Sunnybrook Health Sciences Centre and Associate Professor with the University of Toronto. Previously, he served as Program Director of Neurosurgery at the University of Saskatchewan, where he also completed a Masters in Epidemiology on the topic of skull topographic organization. His areas of interest are skull base, spine, peripheral nerve, and orbital reconstructive surgery and he is actively involved in neurosurgery clinical trials at Sunnybrook.

Dr. Chen, Professor of Otolaryngology at University of Toronto, is Director of Sunnybrook Health Sciences Centre Otology-Skull Base Fellowship Program, and Director of Sunnybrook Cochlear Implantation Program as well as the Provincial Coordinator, Ontario Cochlear Implant Program.

The Challenges of Defining Quality of Life in Acoustic Neuroma

By: James G. Naples, MD Otology, Neurotology, and Skull Base Surgery

Beth Israel Deaconess Medical Centre

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Quality of life (QoL) is a popular term in medicine and surgery. As scientific and medical advancements offer improvements in medical outcomes, particular emphasis has been placed on patient QoL in addition to disease outcomes. Despite the popularity of this term, defining it can be challenging. This is almost certainly because the quality of an individual's life is defined by diverse and personal metrics. There are various disease specific quality of life assessment tools, and for acoustic neuromas, the assessment tool used is called the PANQOL (Penn Acoustic Neuroma Quality of Life) scale. This scale evaluates seven different domains that are relevant to issues caused by acoustic neuromas (facial function, hearing, balance, pain, energy,

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anxiety, general health), and has been validated in numerous studies. While research can validate a scale to measure QoL, it is important for patients with acoustic neuroma to remember that defining QoL is a more complicated, personal issue. I want to discuss some considerations that I have found useful in helping my patients understand their personal QoL concerns and how these QoL issues can influence decision making for acoustic neuroma.

Unlike many medical or surgical diseases, there are few specific guidelines regarding optimal management of acoustic neuroma, and there are various factors that go into the decision-making about treatment approach (observation, microsurgery, or radiation). I believe that a patient-centered discussion should be one of the most important factors in treatment decision-making, and part of the patient-centered discussion is understanding and defining what QoL means to a patient with acoustic neuroma. Defining QoL can be a slow process for acoustic neuroma patients.

This is particularly true when you consider the fact that most people have few symptoms prior to diagnosis, and learning about a new diagnosis of AN is usually a life-altering experience. Often, I find it important to reassure patients that it is ok to be uncertain and confused about the best next steps, and I tell them that deciding on how to proceed is dependent upon personal matters such as QoL concerns.

One of the easiest ways to define QoL is to understand the patient's personal goals and interests. Is the patient someone who likes dancing or hiking outdoors? Is there a big life event on the horizon? Do they have a big project at work to complete in the near future? Are they anxious about their diagnosis, or are they comfortable with a long-term treatment approach? These are all the types of questions that can help patients and their treatment teams choose an approach that suits them. At the same time, patients must define the factors that create their personal QoL. Consider the example of needing to complete a project for work over the next 6-12 months. In most cases, even if you elect for surgery or radiation, this period of observation before treatment will likely be reasonable. This will give the patient the time they need to achieve their professional goals prior to treatment and will likely factor into a positive QoL experience.

As a patient, be sure to consider your options, and make your surgeons aware of activities or interests of importance to you. Recognize that there will be a lot of medical information to integrate as well, and don't be afraid to ask how the treatment options will impact things that are important to you – your QoL.

One of the reasons I encourage acoustic neuroma patients to consider these personal questions is that it allows the surgeon to set more realistic expectations regarding outcomes. Various studies

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have shown that PANQOL scores do not change much, regardless of the treatment modality (observation, radiation and surgery) that is chosen. It is impossible to say exactly why these outcomes are so consistent, but it is almost certainly, in some part, due to the fact that patients are making more informed decisions and their personal QoL is factored into their treatment plan. In some ways, the lack of a defined treatment algorithm allows acoustic neuroma patients to control the impact on their QoL by self-selecting modalities that they have had time to think about and plan for. For example, small tumours can often be treated using any modality, and while many people prefer conservative options that do not require surgery, others are more comfortable with the idea of surgical removal because they are anxious about conservative approaches to management. If the anxiety created by the tumour is worse than the potential risks of surgical intervention for the patient, surgery will likely improve this patient's QoL despite the more aggressive approach.

It is important to recognize that organizations like the Acoustic Neuroma Association are creating platforms for patients to become more informed and educated about the medical and surgical complexities. As a result, patients and physicians can spend more time discussing personal expectations as opposed to overwhelming patients with scientific and procedural details.

In addition to a thorough discussion on patient-centered QoL issues, one final thing I encourage AN patients to do is include their social circle in the discussion. There is a lot to think about when newly diagnosed, and often times, family and friends can offer perspectives that help to reach a decision. As much as QoL is a personal matter, it is also true that our personal lives involve socializing with others. For this reason, I often ask if there is anyone else that my patients want to include in each conversation, and I suggest that they discuss the options with their inner circle before finalizing a decision. This approach often raises key considerations that provide important perspectives for acoustic neuroma patients.

Ultimately, I want to highlight that QoL in acoustic neuroma is complex and personal. As a surgeon, it is important to be sensitive to the needs of each patient as an individual. The challenge of acoustic neuroma discussions is that there are no standardized treatment options, but this lack of standardization is also an opportunity for patients to have some control in their decision-making. While there is no right answer in the treatment of acoustic neuroma, there is a right approach, and it should most certainly include a discussion on patient QoL considerations.

The Challenges of Defining Quality of Life in Acoustic Neuroma

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James Naples, MD Otology, Neurotology, and Skull Base Surgery

Dr. Naples is an Assistant Professor of Otolaryngology-Head and Neck Surgery at Beth Israel Deaconess Medical Center Department/Harvard Medical School. Clinically, he is interested in acoustic neuroma and disorders of lateral skull base surgery. Dr. Naples earned his medical degree from the University of Connecticut School of Medicine and stayed there to complete his residency training in otolaryngology-head and neck surgery. He then completed his fellowship training in neurotology at the Perelman School of Medical at the University of Pennsylvania.

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Melody Beattie, American author reminds us that:

“Gratitude turns what we have into enough, and more.

It turns denial into acceptance, and confusion into clarity. It makes sense of our past, brings peace for today, and creates a vision for tomorrow.”

Gratitude is an important quality to nurture. Even in difficult times, gratitude can help us see the good in things.

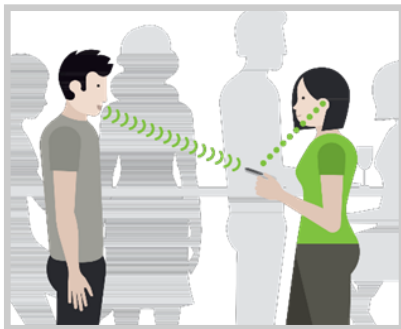
Wireless Microphone Options for Patients with Unilateral Deafness due to Acoustic Neuroma

*By: Peter Stelmacovich, B.Sc., M.Cl.Sc, M.H.Sc.
Alicia Kuriakose, B.A.*



Patients with an acoustic neuroma may present with several symptoms with unilateral hearing loss occurring in 90% of patients. This in turn has a significant impact on communication, specifically difficulties communicating in background noise and loss of the ability to localize the location of sounds. Several remedial treatments for unilateral hearing loss are available including hearing aids, CROS hearing aids (Contralateral Routing of Signal) and cochlear implants. One additional option that patients with an acoustic neuroma can consider is a wireless microphone system.

A wireless microphone system, such as the Phonak Roger system, consists of a microphone transmitter that picks up the voice of the speaker and transmits this wirelessly over 2.4GHz to miniature ear-level receivers. Unlike Bluetooth microphones, the Roger system automatically adapts to the room noise to ensure the listener is able to hear the talker above the background



noise, which is a common complaint of people with a unilateral hearing loss. Studies have consistently shown that the Phonak Roger microphone system provides the highest signal to noise ratios compared with any other hearing technology.

When selecting a Phonak Roger system, patients can choose from several different Roger microphone options, with the newest option being the Roger On microphone. This sophisticated microphone has an accelerometer or motion sensor that can detect its position in space and adjust itself automatically. When placed flat on the table, the Roger On uses a rotating directional microphone that automatically orients itself to the person talking. The Roger On can also be worn by a talker, and again the microphone will automatically change to upward directional microphone orientation. Finally, the Roger On can be held in the hand and pointed at a talker in a work or social situation. Once again, the microphone will detect this position and automatically provide the most appropriate directional microphone settings.

Other Roger microphone solutions include Table Mic II which is specifically designed for work meetings. These also have rotating directional microphones that automatically orient themselves to the person talking. In addition, several Roger Table Mic II's can be strategically placed in the meeting room to ensure all talkers will be audible.

Wireless Microphone Options for Patients with Unilateral Deafness due to Acoustic Neuroma

There are several miniature receiver options. For patients with no serviceable hearing in the ear affected by the acoustic neuroma, the Roger Focus II can be worn in the unaffected ear with normal hearing. The microphone will deliver a high-quality low noise signal to the better ear regardless of where the person talking is situated. For patients who are using a conventional hearing aid, the Roger X receiver can be attached to the bottom of the hearing instrument, or in the case of the Phonak Marvel or Paradise hearing aids, can be digitally installed directly into the hearing aid in order to receive the signal. There are also Roger receivers that can be attached to cochlear implants.

Where will you use a Roger wireless microphone system? Below are some examples of how and where the Roger microphones can help.

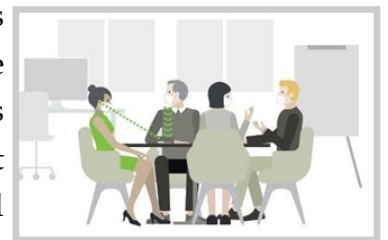
In a Car

Communicating in a car represents two challenges for people with a unilateral hearing loss. First, a car is a noisy environment and the Roger system will deliver the speech while reducing the perception of car noise. Secondly, depending on the ear that has been affected, the better ear may not be facing the other person in the car. For example, if a driver of the car has a hearing loss in the right ear, then it will be more difficult to understand the person in the passenger seat due to the head shadow effect. The Roger system solves this problem by ensuring the better ear always receives the speech signal.



Meetings

The challenge in meetings for a person with unilateral hearing loss is understanding speech at a distance and comprehending people who are speaking on the side of the affected ear. Several microphones such as the Table Mic II can be strategically placed on the table to ensure that the person with the unilateral hearing loss hears and understands all meeting participants, regardless of where they are seated in the meeting.

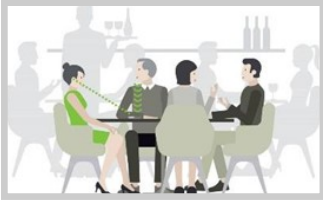


Social Situations

The Roger On microphone can be held in the hand and discretely pointed at the person speaking, a great option if in a mobile setting where a person with unilateral hearing loss is standing in constantly changing environments. It can also be placed on the table top or left in automatic mode to automatically detect the right mode for the situation.



Wireless Microphone Options for Patients with Unilateral Deafness due to Acoustic Neuroma



Restaurants

Restaurants are very noisy environments that people with hearing loss may be avoiding. A Roger On microphone placed in the middle of the table is a highly effective solution to hearing in groups of 4 to 5 people.

Lectures

All Roger microphones with the exception of the Table Mic II can also be worn by the lecturer. This will bring the speech directly to the ears even at a distance or in a difficult listening environment like a room with an echo.



Television/Multimedia

All Roger microphones have the ability to plug into the audio output of a television, computer or tablet while still allowing others to watch and hear normally.

In terms of funding for this equipment, many provinces in Canada have government funding programs available to help defray the costs of purchasing this equipment. Under the provincial and federal Human Rights Codes, employers and service providers have a legal duty to accommodate the needs of people with disabilities, including people with hearing loss. The goal of accommodation is to ensure that employees with hearing loss who are otherwise fit to work are not unfairly excluded where working conditions can be adjusted without undue hardship.

If you are interested in learning more about Phonak Roger wireless microphone systems, talk to your Hearing Care Provider or visit <https://www.phonak.com/us/en/hearing-aids/accessories/roger.html>.

Peter Stelmacovich B.Sc., M.Cl.Sc., M.H.Sc

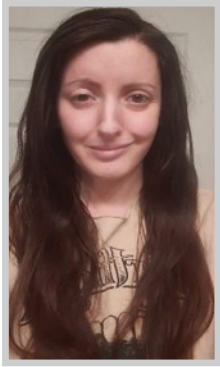
Peter was diagnosed with severe hearing loss as a young school child and did not allow it to deter him from becoming a musician in a band and playing a base guitar or becoming an audiologist and a FM Sound Field Product Manager. His articles about the impact of hearing loss are frequently featured in Canadian Audiologist. Peter wears a cochlear implant in one ear, a hearing aid in the other and uses Phonak wireless microphone systems every day.

This article is provided to help identify strategies and educate the AN Community about resources available to enhance quality of life and should not be construed as an endorsement by ANAC.



Tumour of Opportunity

By: Brittany Blanchard, Guelph, Ontario



In early 2017, I had never heard of an acoustic neuroma, nor considered that one day I would be having brain surgery. By the end of 2017, I was living a totally different life! This is the story of how a tumour, which almost stole my life, instead ended up illuminating my path to success.

In January 2017, while watching TV, I suddenly realized, *I think I'm losing the hearing in my left ear*. With that ear on a pillow, I was able to hear well; however, with my right ear on the pillow, I was unable to hear any sound on the TV.

Concerned, I spoke to the only person I knew who wore hearing aids. She told me about a nearby clinic where I could have my hearing tested . . . I was only 25-years-old!

A few weeks later, I started having tinnitus in the left ear, so I scheduled a hearing assessment at the clinic. It was almost two months since I first noticed my hearing loss, and three weeks since the unilateral tinnitus first began. Upon filling out the case history form, I came across a question about vertigo, something I had developed about five years prior, but never looked into as it was so mild. Seeing it on a form for a hearing test, I found both intriguing and disconcerting.

The results revealed normal hearing in my right ear, with a mild loss in the high frequencies, and a mild hearing loss in the left ear, with a severe loss in the high frequencies. I was then referred to an ENT, who retested my hearing. As there was further decline, the ENT ordered an MRI. During the MRI, they pulled me out and said they had to inject me with dye so they could see more information in my brain. This is when I knew something was *really* wrong.

Three days after my MRI, I learned that I had a very large acoustic neuroma and required brain surgery. The ENT referred me to Dr. Izukawa, a neurosurgeon in Mississauga, and to Dr. Joseph Chen, ENT surgeon. I had my first appointment with Dr. Izukawa in August 2017. He showed me and my parents the MRI images revealing my 4.5 cm tumour, which was crushing my brain, bending my brainstem, and pressing on my optic nerves. He told us that although this tumour is benign in nature, its sheer size was threatening to snap my brainstem. To put into perspective just how large this tumour was, it was about a quarter of the size of my brain.

I met Dr. Chen for the first time ten days before the surgery, in October 2017. Having lived with the knowledge of my tumour for a few months, I had had a chance to tell my family and friends about it. Naturally, they wanted to discuss it extensively and the word "tumour" became a source of panic in itself. As a result, I decided to give it the least threatening name I could think of, *Winnifred*! Dr. Chen informed my mother and I that he would be severing my 8th nerve on the

Tumour of Opportunity

left side, and I would become permanently 100% deaf in that ear. Due to the size of my tumour, there was also an extremely high chance that he would have to sacrifice my 7th nerve, which would result in the left half of my face being paralyzed. As a now 26-year-old woman, I was devastated, terrified, and lost. Although I was surrounded by love, I felt alone and isolated. I had had reconstructive knee surgery a year prior and comforted myself by thinking, “at least it’s not brain surgery!”. *And then it was.*

The morning of the surgery, I woke up feeling an almost unsettling sense of calm, likely because, for about three months, I was afraid to sleep because I did not know if I would wake up or not. My dad picked me and my boyfriend up at 6 a.m. to drive us to the hospital where we met my mom and grandmother. Walking to the operating table was surreal. As I climbed onto it, I couldn’t help but think, “this is *brain* surgery . . . I might not leave this table alive.” My wonderful little support team patiently waited 12 hours while I had the tumour removed.

Although I was dizzy, no longer had hearing in my left ear, the left side of my face was paralyzed and my vision was impacted, I was grateful for the surgeons and the nurses who took care of me.

About six months post-op, I was fitted with a CROS system, and my life changed again. I fell so deeply in love with my hearing aids that, within a few weeks of wearing them, I registered for college to become a Hearing Instrument Specialist. I knew that I had to help other people. Just ten months after surgery, I was sitting in a classroom. Still experiencing dizziness, and having to undergo surgery to correct vision complications, I had the feeling that I may have rushed myself. Nevertheless, I knew I had made the right decision because helping people has always been a passion of mine, but I had not been able to decide on a career . . . until now.

I graduated in April 2020, completed my internship and passed the International Licensing Exam in 2021. I am now a certified Hearing Instrument Specialist, on top of being an acoustic neuroma survivor. My next goal is to support other young individuals diagnosed with this tumour and ensure that they never feel they have to face this diagnosis alone.

My acoustic neuroma threatened my life but, with the help of my family, friends, and phenomenal surgeons, I overcame it and have now been tumour-free for four years! It is extremely easy to feel alone when you have an acoustic neuroma, so it is fantastic that there is an entire community for support within ANAC!

“Life is like riding a bicycle. To keep your balance you must keep moving.”

Albert Einstein



Upcoming Chapter Meetings Planned

KITCHENER—WATERLOO CHAPTER

Date: Wednesday, September 22, 2021—7pm—9pm

Wednesday, December 1, 2021—7pm—9pm

Location: Virtual Meeting—Details to follow.

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, September 2021 TBD—10am—12noon

Location: Virtual Meeting or TBD—White Spot, 2299 Cliffe Ave., Courtenay, BC

For more info: Evalyn Hrybko

(250) 282-3269 / wehrybko@saywardvalley.net

Caroline Bradfield

(250) 897-3553 / digitalgal@shaw.ca

TORONTO CHAPTER

Date: Tuesday, September 28, 2021—6:30pm—8:30pm

Tuesday, November 23, 2021—6:30pm—8:30pm

Location: Virtual Meeting TBD—Details to follow.

For more info: Kathryn Harrod

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