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Newsletter

NATIONAL COCHLEAR IMPLANT USERS ASSOCIATION NEWSLETTER

NCIUA

3rd International Music & CI Symposium

The International Music and Cochlear Implant annual symposia bring together experts from hearing research laboratories, clinical experts in rehabilitation and a manufacturer to share insights with professional and gifted amateur musicians who have received cochlear implants. The aims of the Symposium are to help guide the priorities for future research to help make improvements to the enjoyment of music by cochlear implant users. The 3rd Symposium was hosted by the Cambridge Hearing Group in the splendid settings of St John's College, Cambridge on 15th and 16th of September and was sponsored by the William Demant Foundation, Cambridge University, and Oticon Medical.

AGM and Summer Meeting 2022

This has been arranged for Saturday 11th June 2022 and will be held at Birkbeck College, London. Further details will be sent to members and will be available on our website: **www.nciua.org.uk**

The symposium started with technical presentations illustrating the differences and similarities between music and speech and analysing why current cochlear implants are not able to replicate the experience of music, particularly in those who have a memory of music, in the same way as normal hearing. Later presentations dealt with rehabilitation and maximising one's enjoyment of music. The importance of early training in listening to music for cochlear implanted children, while not necessarily improving speech and language, was considered to be important in enabling social integration with their hearing peer groups as they grow older together. The adult cochlear implant user was seen by the cochlear implanted musicians as being left to their own devices when it came to music rehabilitation.

Bob Carlyon, from the Cambridge Hearing Group, explained that the cochlear implant was good at representing the timing, duration and intensity of sounds that are important in recognising and enjoying rhythm in music but was less successful in conveying pitch which is so important in recognising melody and harmony. He titled his presentation appropriately "Rhythm and Blues", recognising the disappointment many of us feel when trying to recognise a melody after receiving a cochlear implant.

He explained the attack and decay of sounds is also well represented by cochlear implants giving some information about which musical instrument is sounding. This is called the sound envelope. He used two other technical terms to describe the sounds of music: pitch and timbre. Pitch is the note we hear when a sound is being played. Some sounds have a distinct pitch that is measured in cycles per second, now named after the 19th century scientist Hertz. A sequence of these forms a melody and a combination of different pitches a discord or harmony. Together with rhythm, these carry the emotional message of the music, though this is heavily dependent upon ones cultural background.

Timbre is the distinctive character of a sound that distinguishes sounds of the same pitch from each other, for example the sound of a piano from a flute when playing the same note. Bob explained that when we hear a vowel sound with normal hearing, spoken by a male voice, we might hear a pitch of 100 Hz (about one and a half octaves below middle C) but the sound is made up of many multiples of 100Hz called harmonics that will mechanically excite additional places in the cochlear. Some of these harmonics will be grouped in bands maybe 5 or 20 times the fundamental pitch or f0 . The presence and position of these bands, called formants, gives the sound its timbre. Pure tones consisting only of f0 are rarely found in nature and we are only likely to experience them when we are listening to the audiologist while recording our audiogram.

The electrodes of a cochlear implant are not currently placed deep enough into the cochlear for electrical signals to be able to excite the auditory nerves that represent low frequencies directly because a compromise has to be made between depth of insertion and the risk of damaging the inner ear. However, they are inserted deep enough to be able to excite the appropriate formant bands to give sounds distinguishable timbres. In a newly implanted ear the brain soon learns to associate the new timbres as speech sounds because the formants have the same relative relationships to each other as with normal hearing.

When listening to musical sounds f0 is required to be represented accurately to follow melody and harmony. Bob explained that many instruments, including the human voice, produce very little of their sound energy at f0 and normal hearing can synthesise the fundamental pitch from the presence of low frequency harmonics, called resolved harmonics, all spaced apart by f0 (To generate significant acoustical energy at 100Hz would require an organ pipe, nearly 2 meters tall!) At present it is not possible to represent the fine structure required to give an accurate representation of pitch at low frequencies with a cochlear implant because of the limitations of the implanted electrodes.

However, what is found at an electrode that represents a formant containing a band of unresolved harmonics is a beating effect, modulating the intensity of the envelope at the f0 pitch. Unfortunately, the spread of current from adjacent electrodes is found to reduce the amount of f0 modulation received by the auditory nerves because, at present, processing strategies for cochlear implants do not synchronise the modulation across separate electrodes. Perhaps this is an area where speech processors can be upgraded to provide a better representation of pitch.

Bob reminded use that there are still unanswered questions about how natural hearing perceives pitch. The individual auditory nerves of the some parts of the cochlear synchronise with the waveform of the incoming sound and give rise to different perceived pitches. Once the repetition rate rises above a certain point, about 300Hz (near Eb in the middle of the piano) for individually stimulated cochlear implant electrodes the perceived pitch does not change and seems determined by the place of the electrode in the cochlear. It is not clear in the brain where and how the rate and place information is merged to give a consistent perception of pitch and a better understanding of natural hearing maybe required in order to improve that of the cochlear implanted.

A rather more holistic view was given by the panel of musically trained cochlear implant users. Good appreciation of music relied upon an optimal mapping of the CI processor. Also important is the availability of well designed training tools, able to match ones individual musical preferences, as well as being able to introduce new musical experiences. The CI user needs to be encouraged that making an effort to re-engage with music will be rewarded, if on a longer timescale than that required to understand speech.

After what can only be described as a sumptuous banquet in St John's dining hall we were treated to a recital of piano, piano duet, guitar and double bass by the cochlear implanted musicians proving that musical skills had transcended hearing loss and cochlear implantation.

For those of us who have cochlear implants there were some suggestions that better speech processor programs for music were possible but a suggestion from Professor Brian Moore that users should have more control over their mapping interested me most. Parameters such as threshold and comfort levels for electrodes are best perhaps determined at the clinic but the perception of pitch, harmony and timbre is subjective and users could be given the ability to adjust the frequencies associated with electrodes in spare programs slots to find their optimal maps for listening to music.

As a retired electronic engineering academic I welcomed the chance to catch up on the latest research and meet other fellow cochlear implantees for whom music played and continues to play an important role in their lives.

Video clip *https://www.youtube.com/watch?v=jluqDFcv7NQ*

More information on the Music and Cochlear Implant Symposia can be found at

http://www.implantsandmusic.net/

Ray Glover, October 2021

Manufacturer's News

From Advanced Bionics

Join our Blog: AB Connections
Powerful stories and information on cochlear implants and hearing loss

Here, you'll find stories written by cochlear implant experts, cochlear implant users, or parents of children with cochlear implants. Read about their hearing journey along with helpful articles on hearing loss and cochlear implant technology.

We hope the blog will become a source of information and inspiration for your journey to better hearing.

Subscribe to the blog today, online at: www.advancedbionics.com/blog

If you would like to share your story, click on the 'Share your story' button at the top of the page and complete the short contact form or alternatively email blog@AdvancedBionics.com.

We would love to see your story featured on our blog!

(Re)-Discover the AB YouTube channel

We have recently updated our Advanced Bionics YouTube channel with up to date information and resources www.youtube.com/user/AdvancedBionics

There are a wide range a videos from cochlear implant activations, CI wearers and parents of CI wearers sharing their experiences of living with cochlear implants as well as product videos showing you how to take care of your sound processors.

A good place to start exploring the channel is the AB Support page: *https://bit.ly/3eSHCpe*

Subscribe, like, comment, and share away!

From Cochlear

Partnership announced between the Malala Fund and the Cochlear Foundation

The Cochlear Foundation and the Malala Fund have joined forces in a 3-year partnership to raise awareness globally of the barriers keeping millions of young people with hearing loss from accessing good quality education. Our combined message is that we want girls, children and all young people to be able to realise their full potential and achieve anything they set their minds to.

The partnership was launched globally on the 22nd September with a new website that recognises the achievements of young people with all types of hearing loss or impairment. As part of the launch, Malala has publicly encouraged young people with hearing loss to share their stories of accomplishment here as part of the 'Achieve Anything' programme. This will be open through the first half of the partnership and in the third year a group of young people selected from their submissions will meet with Malala at a special event.

We invite you all to take a look at our partnership website *www.cochlearfoundation.org* to learn more.

"That [hearing loss] is part of me but should never stop me from achieving anything in my life."
Malala Yousafzai, 2018

The Malala Fund is an international, non-profit organisation that advocates for girls' education co-founded by Malala Yousafzai, the Pakistani activist for female education and youngest Nobel Prize laureate and her father. The Cochlear Foundation was established in 2005 and has funded over 120 hearing projects globally.

There will be lots more news following this exciting collaboration…watch this space!

Quality care, from anywhere: Cochlear™ Remote Check

If you have a Cochlear™ Kanso® 2 Sound Processor or Cochlear™ Nucleus® 7 Sound Processor, Remote Check means it's now easier than ever for your clinician to check your hearing health and make sure you are hearing your best.

Remote Check is a convenient new feature in the Nucleus Smart App that takes advantage of the latest technology. Now being introduced in clinics worldwide, Remote Check marks the beginning of increasingly innovative, modern ways to monitor and care for your hearing health remotely.

With Remote Check, you use a compatible mobile device* to complete your routine hearing review at a time or place that works for you. Your clinician reviews the data submitted by you after completing the Remote Check appointment on your mobile device and provides you with personalised feedback via the app. If all is well, it has saved you a visit to the clinic.

The Remote Check activities are set for you by your clinician, according to your specific needs. You can complete them whenever and wherever it's convenient, for example whilst your spouse cooks dinner for a relaxed evening at home or during a quiet pause in your day at work. The activities are designed to be easy and can be completed in as little as 15 minutes1.

"I did it all in the comfort of my home. It was so convenient; I could do it of an evening when the kids were in bed. It took away some of the stress of having to travel to the hospital which, for me, is a 2-hour journey" Katie R, Nucleus 7 recipient.

Remote Check is being gradually introduced across the UK & Ireland, please contact your clinic directly to discuss if this service is available to you.

References
**The Remote Check feature of the Nucleus Smart App is available on compatible mobile devices. For compatibility information visit www.cochlear.com/compatibility.*
1 D1739391. Remote Check Usage Investigation Report. Data on file. April, 2020.
The Cochlear Nucleus 7 Sound Processor is compatible with Apple and Android devices. For compatibility information visit www.cochlear.com/compatibility
The Cochlear Nucleus Smart App is available on App Store and Google Play. For compatibility information visit www.cochlear.com/compatibility
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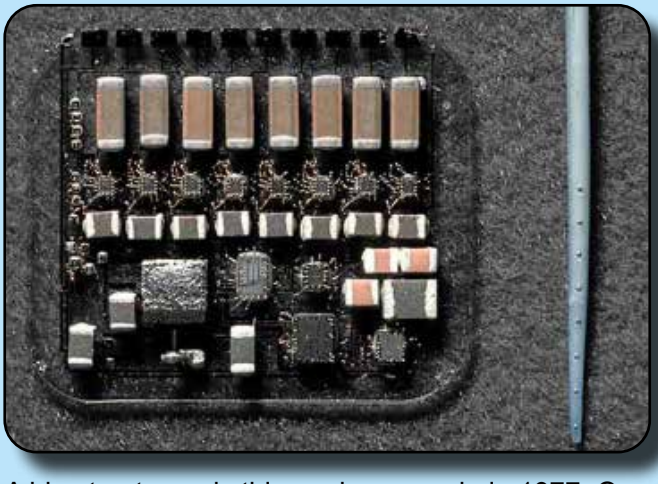
From MED-EL

The Early History of Cochlear Implants and MED-EL

Hundreds of thousands of people around the world can hear thanks to our implants. But getting here was a long journey. It goes back almost 50 years to when MED-EL CEO Ingeborg Hochmair and her husband Erwin pioneered the modern multi-channel cochlear implant. Let's step back in time and take a closer look at how it all began.

The Start of Cochlear Implant Development
In 1975, Ingeborg and her future husband Erwin Hochmair were studying cochlear implant development at the Technical University of Vienna. At the time, there was a lot of scepticism about whether it was even possible for a cochlear implant to help treat deafness. But the Hochmairs knew what they wanted to accomplish. "Our very optimistic goal was to design an electronic implant that would enable the user not only to hear sounds but also to provide the ability to understand some speech," Ingeborg said.



A big step towards this goal was made in 1977: On December 16, 1977, a cochlear implant designed by the Hochmairs was surgically implanted at the University Clinic in Vienna by Prof. Kurt Burian.

Ground-breaking Hearing Technology

Just like modern cochlear implants, the first cochlear implant had two primary parts: an external processor that turned sound into electrical signals and an internal implant that sent information to the brain. The implant itself had two sections: a computer that received information from the external processor, and an electrode array that is put into the ear. Its computer chip worked with a long electrode array that provided electrical stimulation to many different parts of the cochlea. This was done because early research showed that where the stimulation happened would change the perceived pitch of the sound, just like what happens in a piano: press keys that are far apart and they will sound very different.

The electrode array also used a special design pioneered by the Hochmairs: wave-shaped wires. These wires were inside of the electrode array and allowed the electrode array to be really flexible so it could softly fit inside of the cochlea, which is about the size of a pea. These special wires also help to provide Structure Preservation, which means preserving the delicate nerves that are inside the cochlea.

This first cochlear implant, like all others at the time, helped the recipients to hear sound but understanding speech was still difficult and at the very least required the recipient to watch the speaker and lip-read closely.

Understanding Speech with a Cochlear Implant

One of the most famous early recipients of a Hochmair cochlear implant is Connie, as she was known in scientific journals.

Connie worked closely with Ingeborg in these early years. She received a Hochmair cochlear implant in 1979 and was so enthusiastic that she would spend hours and hours with Ingeborg testing different ways that the implant could send electrical information to the cochlea. These tests formed the foundation of how today's MED-EL cochlear implants process sound. "One cannot avoid being passionate about clinical medical research in the field of CIs because of the close contact and trustful cooperation with users," Ingeborg said.

Connie soon was part of making the Hochmair's first goal a reality. After she received a new processor in March, 1980, she was the first person ever who used a cochlear implant to understand speech by only listening: she did not need to lip-read or have visual cues as to what words were being said. At last, just five years after they started their research into cochlear implants, the Hochmairs had achieved their goal and set the direction for the cochlear implant development that still continues today.

Founding MED-EL and Pushing Forward

Carrying out research, developing new hearing solutions for different types of hearing loss, and improving our products to provide our users their best possible hearing—that's part of the everyday work of the Hochmairs and a team of experts from around the world in our MED-EL headquarters in Innsbruck, Austria.

Ingeborg and Erwin moved to Innsbruck with their recently founded start-up company MED-EL, and in 1990 hired the first employees. In the following decades, we invented multiple new hearing solutions and achieved many milestones in hearing technology development.

Today, more than 2,200 people from around 75 nations in 30 locations worldwide work for MED-EL. But one thing has stayed the same throughout the years: MED-EL's mission to overcome hearing loss as a barrier to communication.

Want to learn more about the history of MED-EL and the milestones in hearing technology? Then discover more on *https://www.medel.com/about-medel/our-history*.

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From Oticon Medical

Safe MRI scans with your Neuro Zti cochlear implant

At some point in our lives, many of us will need an MRI scan. MRI stands for Magnetic Resonance Imaging and this type of scan uses powerful magnets and radio waves to create detailed pictures of your body. MRI scans are often used to make a diagnosis or to see how the body is responding to treatment.

With the updated Neuro Zti cochlear implant from Oticon Medical, you can have the MRI scans you need without worrying about your cochlear implant. This applies to both the most commonly used MRI scans of 1.5 Tesla, as well as the more powerful 3.0 Tesla scans.

Your comfort and safety first

The innovative Neuro Zti is designed so the internal magnet in your implant can be left in place during the scan. In other words, no surgery is required to remove the magnet and your hearing will remain unaffected before and just after the scan. The implant magnet can withstand scans of up to 60 minutes, which gives the radiologist ample time to perform the scan. Even if you need multiple MRI scans, the Neuro Zti implant and the magnet are designed to remain securely in place.

Easy to remove the magnet, if needed

During head scans it might be necessary to remove the internal magnet as it could interfere with the MRI scan image. If this is the case the Neuro Zti magnet is easy to remove. This can be done under local anaesthetic in a process that does not take long.

Oticon Medical – your long-term hearing partner

For almost 50 years, Oticon Medical has been delivering hearing health solutions that meet the challenges people face in daily life. This includes being able to have an MRI scan safely and easily. Find out more about the Neuro System and MRI scans at *oticonmedical.com/ci-mri*

Global Cochlear Implant Futures Forum Series 2 webinar on 27th July 2021

The Relationship between Hearing Loss and Depression, Cognition and Dementia

Chaired by Gerard O'Donoghue, presentations in this webinar looked at the evidence surrounding the relationship between hearing loss, and depression, cognition and dementia,and the opportunity for targeted intervention this provides.

The first presentation was from Isabelle Mosnier of France. Her subject was the relationship between hearing loss and cognition and whether there was any cognitive benefit from cochlear implants. The study, in which she was involved, concluded that cochlear implantation resulted in an improvement in cognitive scores in all cognitive domains. The main message was that there should be better information for health professionals and public authorities on the impact of hearing loss on cognition and the benefit of hearing rehabilitation.

Dakota Bysouth-Young of Australia said that, as their patients were spread out over a large area, they used telehealth as an ongoing part of clinical care. They found, twelve months after implantation, that there were substantial improvements in quality-of-life measures, in relationships and mental health in their CI patients. During the pandemic they are running group telehealth sessions for their patients so that they can stay connected and have meaningful conversations.

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Craig Buchman of Washington University said that there were 460 million adults and children with a severe hearing loss but only 10% were being helped despite the known benefits of cochlear implants. He and his colleagues on the Delphi Consensus Group, which was a worldwide panel, did a survey of some 6500 articles on hearing loss of which 74 were relevant. The consensus statements concluded, among other things, that the awareness of the benefits of cochlear implantation among primary and hearing health care providers was inadequate, that age should not be a factor in the provision of implants and that eligible adults should be implanted as soon as possible.

Robert Mandara of Finland, himself born deaf and with bilateral implants, was also a participant on behalf of EURO CIU. He said more attention should be paid to mental health and not audiograms. When hearing people think of deafness they think of silence. They cannot begin to imagine the associated problems – social isolation, loss of independence, misery, frustration, under education, unemployment, exclusion, insecurity, misunderstandings and missed opportunities. No wonder deafness and depression go hand in hand.

Frank Lin of John Hopkins University spoke about a randomised trial of older adults that is being run in the United States. Nearly 1,000 people were recruited for the trial with half being treated with hearing aids and counselling and half just given advice on healthy living. The trial is costing millions of dollars and the results will not be ready until 2023. Although it is known that hearing loss in late life has been identified as the largest modifiable risk factor leading to cognitive decline and dementia the results from the trial should lead to policy changes in a way that smaller studies do not.

Further information on CI Global Futures Forums can be found at: adulthearing.com/CI-futures-forum/

UK facts and figures from the British Cochlear Implant Group

The BCIG have now published the figures which they have collected from the cochlear implant centres. The UK activity for the year 1-4-20 to 31-3-21 is surprisingly good in view of the immense problems posed by Covid-19. 848 new people received cochlear implants. Of these 404 were adult unilateral implants and 355 were child bilateral simultaneous implants and 58 were child unilateral implants. Last year 1623 new people received cochlear implants so the numbers halved this year but this year's activity is still impressive. The total maintained cochlear implant population is now 20059.

BRITISH COCHLEAR IMPLANT GROUP

The BCIG have just published their Autumn newsletter. This can be seen at:
https://www.bcig.org/category/news

Apple's plans recognise people wearing a cochlear implant

Together with our partners, we are always advocating for greater awareness and better representation and inclusion for cochlear implant recipients. We're excited to see a cochlear implant memoji is now available!

Memojis are Apple's version of emoji characters that help you visually describe your personality and key physical features that are special or defining to you. In your messages, they are also a way of visually describing the way you are feeling or your mood.

Cochlear sees this as an important step to help build awareness and normalise the role cochlear implants play in treating severe to profound hearing loss.

"The Apple Memoji is an important stepping-stone in raising recognition and awareness of cochlear implants around the world," says Julie Ligeti, Director of Global Public Advocacy for Cochlear.

"Everyone with an Apple iPhone will have the Memoji, and the scale of Apple's reach is massive," she says.

"However, the next and bigger challenge is to make sure that communities not only recognise that the Memoji has a cochlear implant, but they also understand what cochlear implants can do to transform the lives of people with severe to profound hearing loss."

"Whilst we are on the right pathway … we will only achieve 'normal' when cochlear implants are both recognised and understood."

Julie adds that raising awareness of cochlear implants in our communities is also crucial because a lack of awareness means people who could benefit from appropriate treatment for their hearing loss may miss out.

Cochlear is working with partners around the world to address under-recognition of the effectiveness of hearing implants and on improving access for those who could benefit.

"Advocacy can help individuals gain better access to care and support and it can help wider society to learn and understand the needs of people with hearing loss. The views of communities can help to persuade policy makers to make better policies."

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Tell Me About It

Advocacy, as a means of spreading the word about the benefits of having a cochlear implant, is the way forward to securing more adult implants.

We can all play a role in this mission by explaining to others what a cochlear implant is all about and what are the huge benefits of an implant.to someone severely or profoundly deaf.

To help us the British Cochlear Implant Group (BCIG) have produced a lapel badge to provoke questions from observers.

They are free of charge and can be acquired by emailing ***info@bcig.org.uk*** and asking for them.

National Cochlear Implant Users Association

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