Leading Change Together

Cochlear™ Nordic Symposium 2019
Malmö, 23-24 January

Hear now. And always.
WEDNESDAY, 23 JANUARY

Programme Plenary Session 09.30-16.15

Professional Networking Meetings / CI Patient Organization Meetings 16.30-18.30

Dinner at the hotel 19.15-

THURSDAY, 24 JANUARY

Hotel Check Out 09.00

Programme Plenary Session 08.30-11.45

Breakout Sessions 12.45-16.00
Welcome

Dear Colleagues,

It is with great pleasure that we welcome you to Quality Hotel View in Malmö for our 4th Cochlear Nordic Symposium: Leading Change Together.

We are all aware of the increasing pressures that face our healthcare systems today, and the growing need to support more and more people whose lives are affected by hearing loss. The objectives of this Symposium are to share the latest research and ideas, discuss the key topics that are most critical now and for the future, and to explore the different aspects that we can influence within:

• Research & Innovation
• Evolution in Clinical Care and Hearing Rehabilitation
• Healthcare Challenges and Sustainable Care Models

In addition to this, there will be CI clinical/technical and Baha breakout sessions. Cochlear’s mission is to help people hear and be heard. In partnership together, we help to empower people to connect with others and live a full life by transforming the way people understand and treat hearing loss. We innovate and bring to market a range of implantable hearing solutions that deliver a lifetime of hearing outcomes. This meeting is our joint opportunity to come together, challenge and debate in order to drive the future vision of implantable hearing solutions within the Nordics; we look forward to a stimulating, collaborative and productive event which we hope you will enjoy greatly and come away energised.

Let's make a difference together, to help people hear and be heard for years to come.

Lotta Vedholm
General Manager
Cochlear Nordic
**Wednesday, 23 January**

### SESSION 1

**09.30-09.45**  **Welcome:** Lotta Vedholm, General Manager, Cochlear Nordics

#### Research and Innovation – Driving Performance

A session aimed for all professionals, discussing the latest research and innovations in IHS. Surgery, hearing performance, real life benefits

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<td>Dr Myrthe Hol, Radboud University Medical Centre, Netherlands</td>
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<td>11.45-12.10</td>
<td>A systematic review of hearing preservation with CI532 in adults &amp; children</td>
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<td>Dr Filip Asp, Karolinska University Hospital, Sweden</td>
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<td>12.10-12.30</td>
<td>Hearing preservation results with the CI532 – Kuopio</td>
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<td>Dr Aarno Dietz, Kuopio University Hospital, Finland</td>
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Evolution in Hearing Rehabilitation

A session aimed for all, discussing different aspects of progression in clinical care. Implantation in elderly, dementia, early intervention in paediatrics, rehabilitation of isolated adults, rehabilitation models etc may be some topics of interest.

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<td>2.1</td>
<td>Aging, Hearing, and Public Health – Translating Epidemiologic Insights to Clinical Trials and Public Policy in the United States</td>
<td>Prof. Frank Lin, Johns Hopkins University, Baltimore, USA</td>
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<td>14.30-15.00</td>
<td>2.2</td>
<td>Prevention of Deafness and Hearing Loss</td>
<td>Prof. Andrew Smith</td>
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<td>15.15-15.45</td>
<td>2.3</td>
<td>Severe-to-profound hearing impairment: demographic data, gender differences and benefits of audiological rehabilitation</td>
<td>Mrs Satu Turunen-Taheri</td>
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<td>Karolinska University Hospital/Karolinska Institute, Stockholm</td>
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<td>15.45-16.15</td>
<td>2.4</td>
<td>Is cochlear implantation the new treatment for dementia?</td>
<td>Mr Charlie Huins,</td>
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<td>University Hospitals Birmingham NHS Foundation Trust</td>
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<td>16.15-16.20</td>
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<td>Wrap up by Chair and Close</td>
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<td>16.30-18.30</td>
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<td>Professional Networking Meetings</td>
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<td>CI Patient Organization Meetings (Children/Adults)</td>
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<td>Dinner at the hotel</td>
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SESSION 3

06.30-08.30  BREAKFAST

Healthcare challenges and building sustainable care models
A session aimed for all, discussing the challenges we face in the current care models and how we can make it sustainable, cochlear care, remote care may be some of the topics.

| Chair and Opening Remarks: | Mr Charlie Huins  
University Hospitals Birmingham  
NHS Foundation Trust, UK |
|-----------------------------|-------------------------------------------------|
| 08.30-09.00  3.1            | Inspirational Speaker - The story of an ear-witness  
Dr Lennart Arlinger, Sweden |
| 09.00-09.30  3.2            | How connectivity can enable new care models; insights into the future of implant care  
Mr Luke Crowe, Global Manager Innovation, Product Management & Commercialisation, Cochlear Ltd, Australia |
| 09.30-10.00  3.3            | Prepared for the future - A sustainable service model  
Mrs Tracey Twomey, Consultant Clinical Scientist, Head of Service Nottingham Auditory Implant Programme, UK |
| 10.00-10.20 | COFFEE BREAK |
| 10.20-10.50  3.4            | Patient Privacy and Clinic Compliance in a GDPR World  
Mr Stephen Bolinger, Chief Privacy Officer Cochlear Ltd, Australia |
| 10.50-11.20  3.5            | Tele audiology - new ways of patient engagement  
Dr Miguel Angel Aranda de Toro, Director of External Relations Medical Affairs, GN Hearing, Denmark |
| 11.20-11.30 | Wrap up by Chair and Close |
| 11.30-12.45 | LUNCH |
**SESSION 4a (Breakout)**

**CI Clinical & Technical**
A session aimed at audiologists, technicians, and other professionals who work with CI, a successor to the Nordic technical meeting.

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<td>12.45-13.25</td>
<td>4a.1</td>
<td>Listening to music through a CI: It is not so bad after all!</td>
<td>Prof. Jeremy Marozeau, Technical University of Denmark</td>
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<td>Dr Ville Sivonen Helsinki University Central Hospital, Finland</td>
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<td>13.25-13.55</td>
<td>4a.2</td>
<td>Assessing the benefits of bilateral cochlear implants in complex listening environments</td>
<td>Dr Ville Sivonen, Helsinki University Central Hospital</td>
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<td>13.55-14.25</td>
<td>4a.3</td>
<td>First results with the virtual reality spatial discrimination tool in sequentially implanted children</td>
<td>Dr Cristina Simoes-Franklin, National Hearing Implant and Research Centre, Beaumont Hospital, Dublin, Ireland</td>
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<td>14.25-14.45</td>
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<td>14.45-15.15</td>
<td>4a.4</td>
<td>Evidence-based Bimodal Fitting</td>
<td>Dr Bas van Dijk, Program Manager, Cochlear Europe Ltd, Belgium</td>
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<td>15.15-15.40</td>
<td>4a.5</td>
<td>Trauma detection during CI surgery using objective measures and imaging</td>
<td>Dr Ralf Greisiger, Oslo University Hospital, Norway</td>
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<td>15.40-16.00</td>
<td>4a.6</td>
<td>Changes ahead in reliability reporting</td>
<td>Dr Barry Nevison, Clinical &amp; Technical Support Manager, Cochlear Europe Ltd, UK</td>
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<td>16.00-16.15</td>
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SESSION 4b (Breakout)

New adventures in Baha

Baha topics.

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<tr>
<td>12.45-13.05</td>
<td>4b.1</td>
<td>A better fit starts inside</td>
<td>Ms Tracey Adams, Clinical Technical Support Department EMEA, Cochlear Europe Ltd, UK</td>
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<td>13.05-13.25</td>
<td>4b.2</td>
<td>Baha SoundArc - hearing and speech understanding with an alternative to the softband</td>
<td>Prof. Martin Kompis, Inselspital Bern, Switzerland</td>
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<td>13.25-14.05</td>
<td>4b.3</td>
<td>Binaural hearing with bone conduction stimulation</td>
<td>Prof. Stefan Stenfelt, Linköpings University, Sweden</td>
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<td>14.05-14.30</td>
<td>4b.4</td>
<td>Single center experience of 100 implantations of transcutaneous bone conduction</td>
<td>Prof. Jaydip Ray, Sheffield Teaching Hospitals, UK</td>
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<td>14.30-15.00</td>
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<td>COFFEE BREAK</td>
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<tr>
<td>15.00-15.30</td>
<td>4b.5</td>
<td>National BCD guideline - is there a need to improve quality?</td>
<td>Dr Myrthe Hol, Radboud University Medical Centre Nijmegen, Netherlands</td>
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<td>15.30-16.00</td>
<td>4b.6</td>
<td>Challenges with bone conduction</td>
<td>Mrs Theres Björk, Clinical Research Audiologist Cochlear Bone Anchored Solutions, Sweden</td>
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<td>16.00-16.15</td>
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<td>Wrap up by Chair and Close</td>
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Presentation Abstracts

1.1 Global perspectives and insights in Cochlear’s long term strategy

Mr Richard Brook
President, Cochlear EMEA & Latin America, Switzerland

This presentation intends to provide an update on Cochlear’s longer term growth strategy, highlighting some of the key clinical, technological and market challenges that lay ahead of Cochlear and its partners. Building on the background of Cochlear’s pioneering work in implantable hearing, this session aims to stimulate the audience to reflect on the opportunities to help many more candidates benefit from implantable hearing solutions.

1.2 Functional near infrared spectroscopy can help predict and monitor clear cochlear implant outcome

Professor Douglas Hartley
Consultant ENT Surgeon, Nottingham University Hospitals NHS Trust, UK

Many patients receiving cochlear implants unexpectedly fail to reach, or unexpectedly exceed predicted performance. Individual differences in brain reorganisation following deafness and cochlear implantation may help explain these variable outcomes. Our research at the Hearing Biomedical Research Centre in Nottingham aims to improve our understanding of the changes that occur in the brain following deafness and subsequent restoration of auditory input by a cochlear implant.

We use a novel functional neuroimaging method called functional near infrared spectroscopy (fNIRS) that provides a highly valuable avenue of investigation because it is completely safe for use in an implanted population and, unlike other neuroimaging methods, is unaffected by electrical and magnetic artefacts associated with the implant. fNIRS allows investigation of brain reorganisation after cochlear implantation, and we have used it to develop a neuroimaging marker that correlates with clinical cochlear implant outcome in adults.

In ongoing studies in our laboratory we are evaluating whether this prognostic tool can predict cochlear implant outcomes in children. Our long-term goal is to use this tool to improve post-operative rehabilitation based on the predicted needs of an individual, and provide recipients with realistic expectations of performance following implantation.
1.3 Changes and challenges in indications, combined with assessments of complications in bone conduction systems

Dr Myrthe Hol
Radboud University Medical Centre, Netherlands

Myrthe Hol is an ear surgeon at Radboudumc, Nijmegen, the Netherlands, with particular attention to titanium temporal bone implants (BI) and auricular reconstructions/prosthesis. She combines her clinical duties with research on most of the bone conduction hearing devices on today’s market. Next she has been working on the Dutch Guideline BCD over the past years and she will share some highlights with us. In order to address the current challenges in indications she will inform us about the assessment of complications and how to guide patients and professionals in the decision making process.

2.1 Aging, Hearing, and Public Health – Translating Epidemiologic Insights to Clinical Trials and Public Policy in the United States

Professor Frank R. Lin, M.D. Ph.D.
Director, Cochlear Center for Hearing & Public Health
Johns Hopkins University

Medicine and public health have evolved through three eras over the past century. Beginning in the first half of the 20th century, infectious diseases were controlled for the first time in human history through vaccinations, antibiotics, and other strategies. Subsequently, throughout the 20th century, chronic diseases of middle and later life (e.g., cardiovascular disease, cancers) became the leading causes of mortality but have also increasingly been better controlled. These successes of public health have led to a rapidly increasing population of older adults living longer than even before. In this third era of public health and medicine, we are now confronting the challenges of aging and how to best optimize the health and functioning of a growing population of older adults. In this era, hearing and our ability to engage effectively with the environment around us are critically important but not yet priorities in the spheres of public health and public policy.

He will discuss research over the past several years that has demonstrated the broad implications of hearing loss for the health and functioning of older adults, particularly with respect to cognitive functioning, brain aging, and dementia. He will then discuss how this epidemiologic research has directly informed and led to current national initiatives in the U.S. focused on hearing loss and public health. These initiatives include the Aging and Cognitive Health Evaluation in Elders (ACHIEVE) randomized controlled trial and recent passage of the bipartisan Over-the-Counter Hearing Aid Act in 2017. This federal law over-turns over 40 years of regulatory precedent around hearing aids in the U.S. in order to
directly improve the accessibility and affordability of hearing care for older adults.

### 2.2 Prevention of Deafness and Hearing Loss

**Professor Andrew Smith**  
London School of hygiene and Tropical Medicine

The global burden of hearing loss is large and rising rapidly. The public health approach to hearing loss is needed to reduce this burden, especially in low and middle income countries where almost 90% of the people with hearing loss live. Prevention is one of the key components in the public health approach to deafness and hearing loss. This has been recently highlighted by the 2017 World Health Assembly (WHA) Resolution on Prevention of Deafness and Hearing Loss. This presentation will address prevention of hearing loss in the light of this new WHA resolution. It will describe the different methods of prevention recommended by the World Health Organisation (primordial, primary, secondary, and tertiary prevention) and the challenges and benefits of including these methods in national health programmes.

### 2.3 Severe-to-profound hearing impairment: Gender differences and benefits of audiological rehabilitation

**Ms Satu Turunen-Taheri**  
Ph.D student, MSc, lic audiologist

Turunen-Taheri S\(^1\), Carlsson P-I\(^3,4\), Johnson A\(^5\) and Hellström S\(^1,2\)

\(^1\) Karolinska Institutet, Dept of CLINTEC, Division of Ear, Nose and Throat Diseases, Stockholm, Sweden  
\(^2\) Karolinska University Hospital, Dept of Audiology and Neurotology, Stockholm, Sweden  
\(^3\) Örebro University Hospital, Audiological Research Center, Örebro, Sweden  
\(^4\) Central Hospital, Dept of Otorhinolaryngology, Karlstad, Sweden  
\(^5\) Karolinska Institutet, Dept of CLINTEC, Division of Audiology, Stockholm, Sweden

**Introduction:** Based on the Swedish quality register, an estimation of 20,000 adult patients suffer from severe-to-profound hearing loss. The overall aim of the present study was to identify patients with severe-to-profound hearing loss who participated in audiological rehabilitation. The study also investigated in detail which kind of rehabilitation this patient group had received, and particularly, the benefits of hearing health care. The study examined gender equality in the hearing health care for this patient group.
Methods: Data on 4286 patients with severe-to-profound hearing impairments registered in the Swedish Quality Register of Otorhinolaryngology (2006-2015) were studied. The classification for extended audiological rehabilitation is fulfilled if the patient has participated in group rehabilitation, or rehabilitated from at least three different professions in hearing health care. The study analysed demographic data, gender differences, and evaluated the audiological rehabilitation efforts.

Results: The study shows that group rehabilitation and visit to a hearing rehabilitation educator provided significantly most benefits in audiological rehabilitation. Only 40.5% of patients with severe-to-profound hearing loss received extended audiological rehabilitation, with significantly more women (54.5%). A total of 9.5% participated in group rehabilitation, of which significantly more women (59.5%). Women also visited technicians, welfare officers, hearing rehabilitation educators, psychologists, and physicians and received communication rehabilitation in a group, and being fit with a CI significantly more often than men. Female patients appeared to have a significantly greater negative impact of hearing impairment on their daily life.

Conclusion: The study emphasizes the importance of participate in group rehabilitation and meet a hearing rehabilitation educator to experience greater benefits of hearing rehabilitation for patients with severe-to-profound hearing loss. There is a need to offer equal hearing health care with extended audiological rehabilitation to this patients group, especially in terms of gender differences.

2.4 Is cochlear implantation the new treatment for dementia?

Mr Charlie Huins FRCS (ORL-HNS) - Consultant ENT Surgeon
Mrs Louise Craddock - Audiological Scientist
Midlands Hearing Implant Programme (Adult service)
Queen Elizabeth Hospital Birmingham NHS Foundation Trust, Birmingham, UK

Introduction: Hearing loss is estimated to affect up to 30% of the adult population in developed countries and has been independently associated with accelerated cognitive decline. Globally, 0.9% of the elderly have profound hearing loss and, in the UK, it is estimated that there are currently 855,500 severely to profoundly deaf adults. We reviewed the current literature and performed a retrospective analysis of outcomes together with a subjective assessment of outcomes of 100 patients.

Method: A review of the literature was performed using search terms ‘hearing loss’, ‘cognition’, 'dementia', 'quality of life', 'elderly' and 'mental health'. Papers were identified and selected for relevant content. A meta-analysis was not possible due to the heterogeneity of the results. Outcome data of two groups was compared - over 65 years and under 65 years - via a retrospective review of 100 newly implanted adults' notes. Analysis of age at
implantation and outcomes was performed together with a survey completed by patients to evaluate self-reported benefits, including aspects unrelated to hearing.

**Results:** Collectively, the literature has identified hearing loss as a risk factor for incident dementia and cognitive decline in the elderly. Patients over the age of 70 have lower baseline cognitive scores and a 41% greater rate of annual cognitive decline compared to those with normal hearing. Cochlear implants (CI) have been shown to reduce depression and improve cognitive function, concentration and executive function. Analysis of speech perception outcomes shows that all post-lingually deaf patients achieve significant improvements in the first year at each test interval. Moreover, there was no statistical difference in group performance of the over 65s and under 65s at any test interval.

The survey indicated that all patients reported greatest subjective benefits since they were implanted in the following areas: hearing, confidence, listening and overall quality of life. Moderate improvements were reported in social life, concentration and general health. There were no significant differences in subjective ratings relative to age at implantation in any aspect.

**Conclusion:** CIs for severe to profoundly deaf patients are known to improve hearing and speech perception, irrespective of age. However, hearing loss may be causally related to dementia, possibly through exhaustion of cognitive reserve, social isolation, environmental deafferentation, or a combination of these pathways. Therefore, the benefits of CI to elderly patients appear to go far beyond hearing and speech understanding alone. Our data suggests elderly CI recipients adapt well to CI and report a higher quality of life, better general health and less depression. Moreover, the improvements in hearing result, together with reduced listening effort, in this patient group has a beneficial effect on cognitive function. Both age groups gain equivalent measurable benefits in speech perception and subjective benefits are reported in many other aspects of daily life, including areas unrelated to hearing, which is irrespective of age at implantation.

**3.1 The story of an ear-witness**

**Mr Lennart Arlinger, Ph.D**

Inspirational speaker, CI-user, Sweden

After a work life in a major international biotech supply industry – as a researcher, R&D Director, Business unit director, VP - my early retirement period was divided between consultancy and volunteering activities. That was the time period – some 13 years - when my hearing deteriorated until I had very little use of my left ear, relying on the less rapidly but still declining right ear, all the time assisted by several hearing aids. I began to seriously contemplate leaving my board positions and other engagements since I had difficulties following discussions and noticed an unavoidable evolving social shyness. This situation
was even more troublesome in my private sphere, which includes five grandchildren. The older kids could take notion of my special demand for clear talk, but that is impossible with smaller children. And in any case the contact with kids is severely impaired by poor hearing, a spontaneous chat turns into a dutiful conversation.

The private clinic I had attended for my hearing aids advised me that the county’s offers were not sufficient to cope with my problems and instead buy expensive hearing aids, but fortunately my private network advised me about the CI opportunity. After anesthetics during an operation clearly kicked my hearing ability below what qualified me for an implant. I have now one year’s experience as a CI user of an N7, lately in combination with a matching GN ReSound LiNX 3D. This background has told me a number of things, some of which I will share with the audience – not the least about what it takes to be a patient in the healthcare organizational maze.

3.2 How connectivity can enable new care models; insights into the future of CI care

Mr Luke Crowe
Global Manager Innovation, Product Management & Commercialisation, Cochlear Ltd, Australia

With the availability of the Cochlear™ Nucleus® 7 Sound Processor, connectivity to a mobile phone, combined with cloud technology, provides the opportunity to create new tools for CI clinicians and their patients which can transform CI aftercare in ways that deliver benefits for clinics and people living with a cochlear implant. An overview and demonstration of a solution that can enable a remote care model will be provided.

3.3 How Cochlear Care can transform long term patient care cost effectively

Ms Tracey Twomey
Consultant Clinical Scientist, Head of Service Nottingham Auditory Implant Programme

In 2014, NAIP introduced Cochlear Care, the company-based support programme through which Cochlear provides direct spares, repairs and trouble-shooting services to patients. This has proven to be clinically and cost-effective for our service and has been extremely well received by patients and clinicians alike. The rationale for this decision, the methodology employed to develop the case of need, how this was achieved, its impact and our experience using the service to date will be discussed.
3.4 Patient Privacy and Clinic Compliance in a GDPR World

Mr Stephen Bolinger, Chief Privacy Officer
Cochlear Ltd, Australia

On 25th May 2018, the EU’s General Data Protection Regulation ushered in a new era of privacy protection for European residents. It brought with it a host of new obligations for organisations collecting and using personal data, and potentially massive fines for non-compliance. Personal data is an increasingly important input to health services that utilise mobile apps, cloud computing, and machine learning. Join Cochlear’s Chief Privacy Officer for a discussion of how Cochlear is addressing GDPR compliance through a patient centred approach to privacy.

3.5 Teleaudiology: New Ways for Patient Engagement

Mr Miguel Angel Aranda, Ph.D.
Director of External Relations, Medical Affairs, GN Hearing

Tele-audiology is the use of telecommunications to provide audiological services remotely and may include the full scope of audiological practice. With the fast development of telecommunications –and especially since the introduction of “smartphones” –tele-audiology is currently one of the “hot topics” within the hearing aid industry. On the one hand, patients seem to be attracted to the many benefits of tele-audiology, as it can save time, reduce travel costs and facilitate communication with their hearing care professional (HCP). On the other hand, many HCPs are still hesitant to incorporate tele-audiology services into their daily practice, probably because they are not yet fully aware of the multiple options currently available and the methodology behind them.

In this presentation we will discuss how tele-audiology can be an important tool to enhance patient engagement and we will focus on three aspects: 1) how tele-audiology is currently used to provide audiological services; 2) which options developed by hearing-aid manufacturers are currently available and what the benefits are for the end-user; and 3) the importance of tele-audiology during the patient journey and how it can influence hearing aid satisfaction.

4a. Listening to music through a CI: It is not so bad after all!

Professor Jeremy Marozeau
Technical University of Denmark

Many studies have shown that most of the cochlear implant (CI) users have great difficul-
ties perceiving pitch differences or recognising simple melodies without words or rhythmical cues. Consequently, CI users report finding music less pleasant compared to their pre-deafness period. Despite this, many of those users do not entirely reject music, and it is not uncommon to see young CI users listening to music all day, or even playing an instrument.

Listening to music is an experience that arises from more than the sum of the sensations induced by the basic elements of music: pitch, timbre, rhythm. Listening to music is a pleasant experience because it prompts high-level cognitive aspects such as emotional reactions, needs to dance, or the feeling of musical tension. Therefore, CI users still engaged in musical activities might experience some of these high-level features.

During this presentation, I will talk about two different studies that showed that CI listeners could perceive the emotion and the tension induced by the music. Overall these studies suggest that although most CI users have difficulties with perceiving pitch, additional music cues such as tempo and dynamic range might contribute positively to their enjoyment of music.

4a.3 First results with the virtual reality spatial discrimination tool in sequentially implanted children

Dr Cristina Simoes-Franklin, Ph.D, Medical Physicist / Neuroscientist
National Hearing Implant and Research Centre, Beaumont Hospital, Dublin, Ireland

It is well established that sequential bilateral implantation offers functional benefits to children with bilateral hearing loss, mainly in spatial and speech in noise discriminations. Despite these functional advantages, getting long term unilateral users to adapt to a second implant can be challenging and requires considerable effort from patients and clinical teams, especially in older users with long inter implant delays (IID).

The objective of this study was to look at the different factors that can affect functional outcomes of sequential implantation, in particular inter implant map differences and its effects on binaural CI usage. Sequentially implanted children who had at least 1 year experience with CI2 were included in this study. Programming parameters, device usage and functional outcomes were analysed after one year of CI2 use. Spatial discrimination ability was assessed using a novel portable virtual reality tool and head related transfer functions that replicate 3D sounds delivered to the users via direct connect.

Overall, older sequential implanted children show some functional benefits with the second implant, but this functional advantage is appears to be highly dependent on inter-implant delay and asymmetries between the two implant settings.
4a.4 Evidence-Based Bimodal Fitting

Mr Bas Van Dijk, Ph.D, Advanced Innovation Program Manager – Clinician Tools
Cochlear Europe Ltd, Belgium

Cochlear has been partnering with GN Resound to form the Smart Hearing Alliance. The Smart Hearing Alliance (SHA) aims to deliver state-of-the-art bimodal hearing for the growing group of CI users that have usable residual hearing in the contralateral ear. In this presentation he will review the elaborate research program that SHA has run to come to the current SHA bimodal fitting recommendation. He will discuss the clinical consequences of the findings, also in light of other research that is out in the field.

The talk will explain that the data supports the SHA message that there is no magic to bimodal fitting and it’s best to fit both devices optimally without the need for complicated matching of signal processing and fitting parameters. This view is also expressed in more detail in the Cochlear/SHA white paper on bimodal fitting. In the last part of the presentation he will discuss some exciting new research on bimodal hearing that was done with the research partners at KU Leuven in Belgium.

4a.6 Changes ahead in reliability reporting

Mr Barry Nevison, Ph.D
Clinical & Technical Support Manager, Cochlear Europe Ltd, UK

Cochlear have a proud history of seeking to champion standards, adopt consensus and live the principles of open and honest communications about implant reliability. But despite standards and consensus, there remains divergence in how reliability is presented, both to the clinic and to the potential candidate; there may even still be differences in what’s included in the figures you see from one company to the other.

So is all this about to change? In 2019 it is expected that companies will need to adopt the new AAMI/CI86 standard developed in America and to report this alongside ISO5841-2:2014. So what’s this new standard all about? How will it affect the industry? And will there finally be a level playing field allowing truly objective comparison of data between companies?
4b.2 Baha SoundArc – hearing and speech understanding with an alternative to the softband

Professor Martin Kompis
Inselspital Bern, Switzerland

Kompis M 1, Gawliczek T 2, Caversaccio M 1,2, Wimmer W 1,2

1) Department of ENT, Head and Neck Surgery, Inselspital, University of Bern, Switzerland
2) Hearing Research Laboratory, ARTORG Center for Biomedical Engineering Research, University of Bern, Switzerland

Objectives: To compare the performance of a bone conduction device (Baha 5, Cochlear Inc.) attached to either (i) a Softband and (ii) to a novel non-invasive wearing device (SoundArc) in adults with normal conductive hearing losses and normal inner ear functions.

Materials and Methods: Fifteen normal hearing subjects participated in this study. Both ears were occluded to simulate a bilateral conductive hearing loss, resulting in an unaided hearing loss of 49 dB (pure tone average 500 to 4000 Hz). The following tests were performed in unaided conditions, and with unilateral and bilateral bone conduction devices: sound field thresholds, speech reception thresholds in quiet and in a diffuse noise field (German Freiburg tests and German matrix test), and sound localization.

Results: All outcome measures were significantly better in the aided conditions with either the Softband or the SoundArc than in the unaided condition. Sound field thresholds improved by 24 dB (p < .001), speech reception thresholds in quiet by 20 dB (p < .001) and in noise by 4 dB (p < .001). Sound localization and speech understanding in noise was improved significantly (by +4 dB and by +28°), but only when the bone conduction devices were used bilaterally. Differences between the Softband and the SoundArc wearing options were not statistically significant in any of the test conditions.

Conclusions: Both non-implantable wearing options bone conduction systems showed significant improvements in speech understanding in quiet and in noise, when compared to the unaided condition. No significant difference between the 2 wearing options Softband or SoundArc was found. Using 2 devices bilaterally instead of just one improved speech understanding in noise and sound localization.
4b.3 Binaural hearing with bone conduction stimulation

Professor Stefan Stenfelt
Linköping University, Sweden

Binaural hearing is often defined as the hearing benefit obtained using two ears compared with only listening with one ear. When the stimulation is by bone conduction (BC), both ears are excited by the BC stimulation from one position. Consequently, the binaural hearing ability is affected by the cross hearing in the skull. This has often led to the misinterpretation that binaural hearing is not possible with BC stimulation.

In a systematic approach to determine the benefit of bilateral application of BC sound, the speech perception in noise (spatial release from masking and binaural intelligibility level difference) and the ability to fuse the sounds from the two sides as one percept from a spatial position (precedence effect) was investigated in relation to (1) position of the BC transducer on the skull, (2) the hearing ability (sensorineural hearing loss), and (3) the symmetry of the hearing loss.

In all types of situations, there was a significant binaural benefit with bilateral BC application compared with monaural BC application of the sound. However, the binaural benefit with BC applied sound is less than with sound through air conduction (AC). The closer to the cochlea the sound is applied, the better the interaural separation (less cross head transmission) and the better the binaural benefit. A sensorineural hearing loss affects the binaural benefit negatively independent of stimulation modality. In addition, the more asymmetric the hearing loss is the worse the binaural benefit. Binaural hearing is present when stimulation is applied bilaterally by BC for most types of hearing configurations. This implies that most people with bilateral need of BC hearing aids benefit from a bilateral fitting.

4b.5 National BCD guideline - is there a need to improve quality?

Dr Myrthe Hol
Radboud University Medical Centre, Netherlands

Myrthe Hol is an ear surgeon at Radboudumc, Nijmegen, the Netherlands, with particular attention to titanium temporal bone implants (B1) and auricular reconstructions/prosthesis. She combines her clinical duties with re-search on most of the bone conduction hearing devices on today’s market. Next she has been working on the Dutch Guideline BCD over the past years and she will share some highlights with us. In order to address the current challenges in indications she will inform us about the assessment of complications and how to guide patients and professionals in the decision making process.
4b.6 Challenges with bone conduction

Mrs Theres Björk
Clinical Research Audiologist, Cochlear Bone Anchored Solutions, Sweden

Understanding bone conduction from a practical point of view could in many cases make the fitting procedure easier. During these 30 minutes, Theres would like to share her “aha-s” within the area and how she use the information to rapidly find the right settings for her patients.
As the global leader in implantable hearing solutions, Cochlear is dedicated to bringing the gift of sound to people with moderate to profound hearing loss.

Together, we have helped over 450,000 people of all ages live full and active lives by reconnecting them with family, friends and community.

We aim to give our recipients the best lifelong hearing experience and access to innovative future technologies. For our professional partners, we offer the industry's largest clinical, research and support networks.

Thank you for your continued partnership with Cochlear and we look forward to making a difference together to help more people hear and be heard.