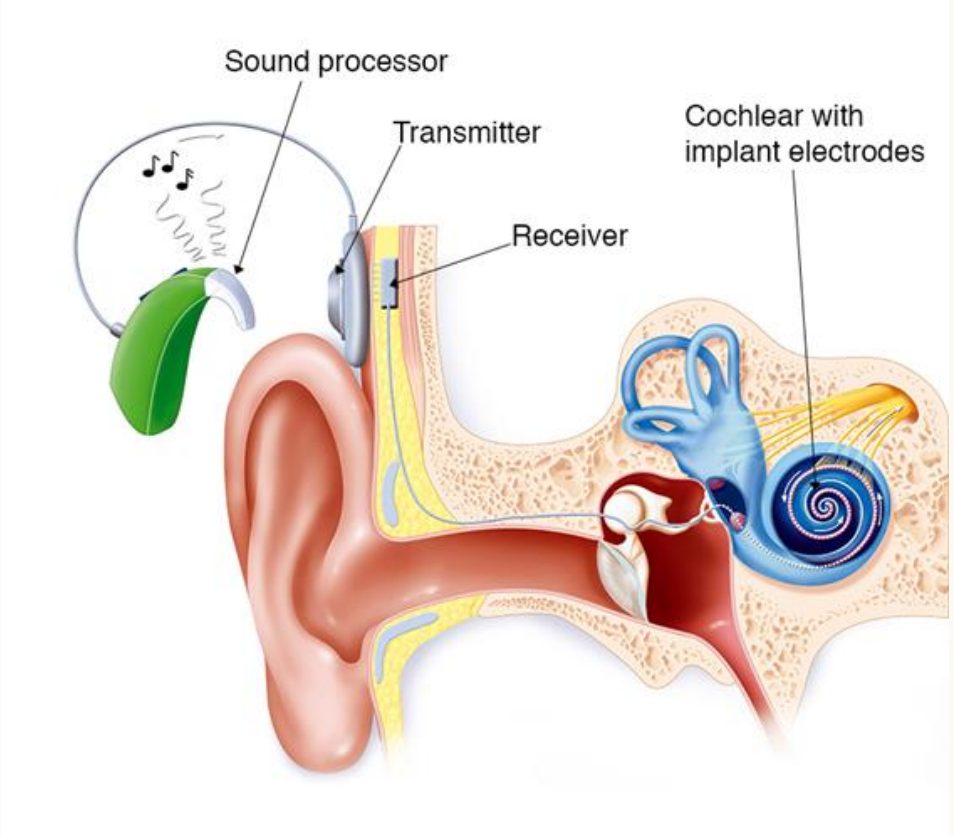
BC CHILDREN'S COCHLEAR IMPLANT PROGRAM

WEBINAR FOR TDHHS

AGENDA

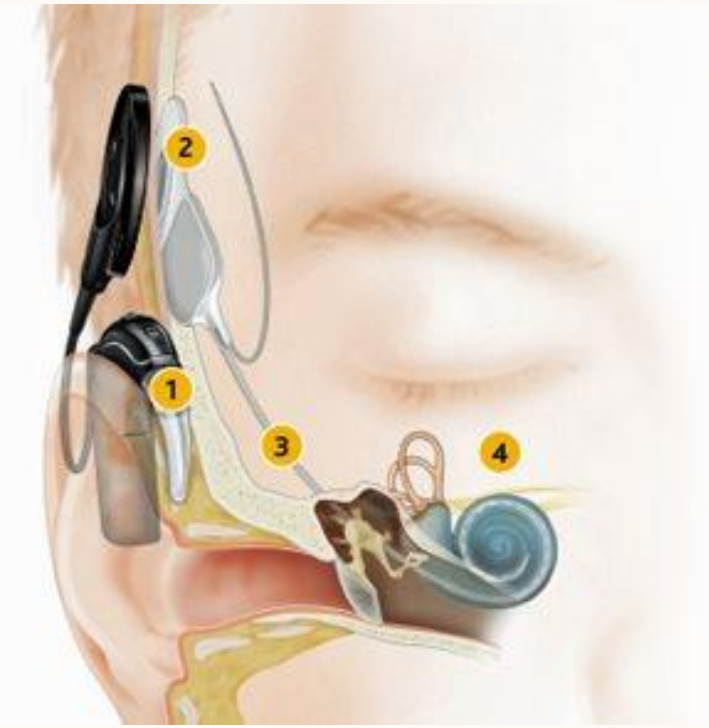
1. How hearing/CIs work
2. Candidacy
3. Appointments at BCCH
4. Outcomes/Habilitation
5. Audiologist/TDHH roles
6. Equipment
7. RMT/Connectivity

HOW HEARING & COCHLEAR IMPLANTS WORK



VIDEOS

- How we hear: https://youtu.be/-jyNWOqi9kU
- How a cochlear implant works: https://youtu.be/YdYjdYD--nk



1. Microphones on the sound processor pick up sounds and convert the sounds into digital information.
2. This information is transferred through the coil to the implant just under the skin.
3. The implant sends electrical signals down the electrode into the cochlea.
4. The hearing nerve fibers in the cochlea pick up the signals and send them to the brain, which is translated as the sound you hear.

We do not present cochlear implant simulation videos as part of our counselling. Cochlear implants sound different depending on the hearing history, age of implantation, anatomy. Cochlear implants do not restore normal hearing, however, the sound becomes more natural to the child over time. For babies who are implanted, that is their normal as they do not have a comparison.

CANDIDACY

We implant bilateral, unilateral and single-sided deafness cases from 10 months to 18 years old. St Paul's Hospital implants >18 years.

Severe to profound degree sensorineural hearing loss and/or poor word recognition (less than 60%), usually determined by aided soundbooth testing.

For congenital cases, duration of deafness without amplification is a factor.

We provide informational counselling to families including limitations and benefits of CI. We support families in making a decision that is best for them (this does not always mean getting a CI).

We do not recommend that families seek information from outside sources, like the internet, individuals who are not experienced in cochlear implant management, etc, as there is a lot of misinformation out there.

APPOINTMENTS AT BCCH

Programming aka Mapping (60-90 minutes):
We program the cochlear implants by stimulating different regions along the cochlea and look for a response from the child.

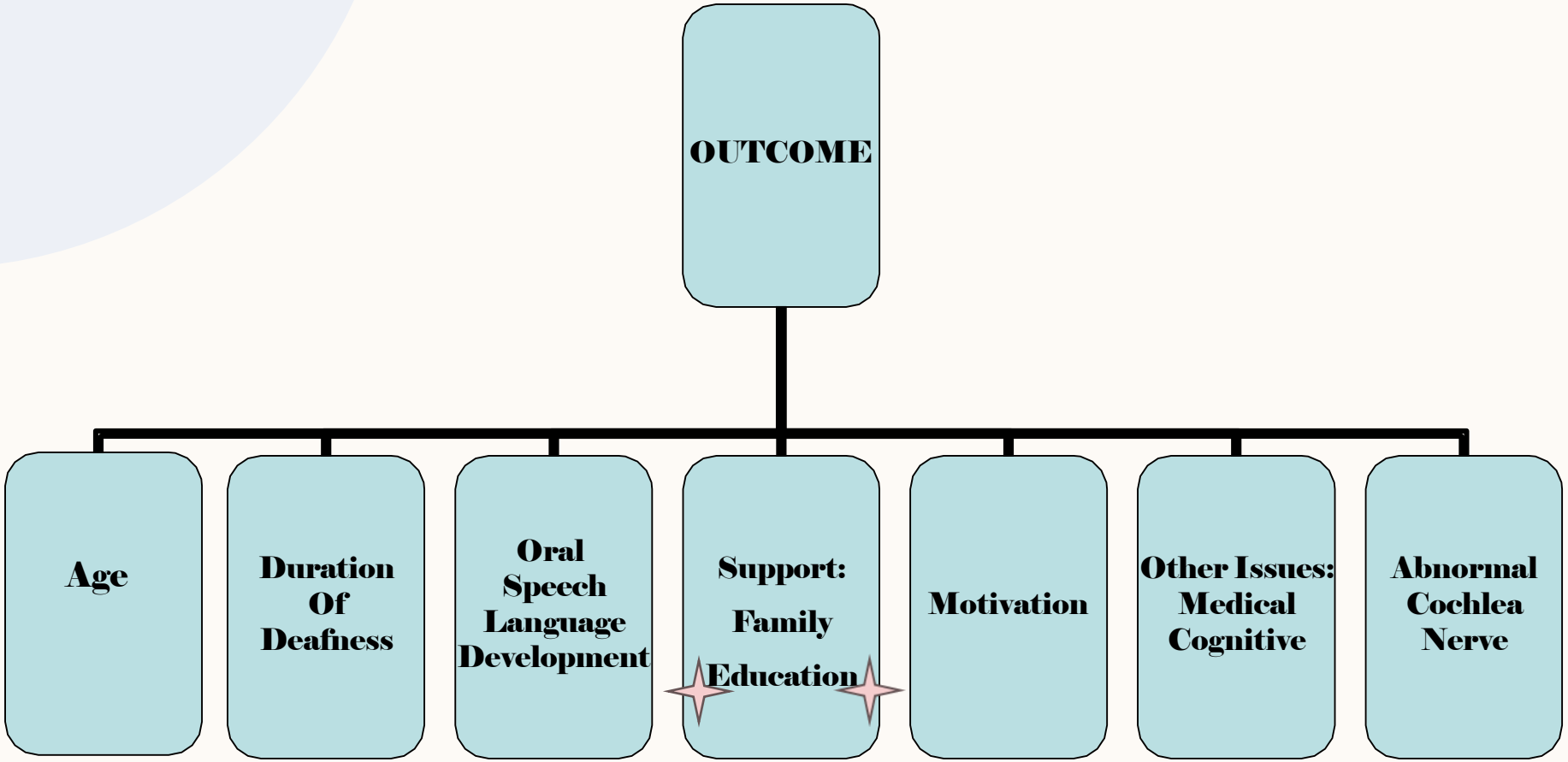
Response methods include hand raising, loudness scale, head turn, beep counting, games.

We program to provide best access to sound. Within that, we can manage different features to support them in different listening situations (noise, music).

Soundbooth Testing (60 minutes):
Obtain soundfield thresholds for each implant across the speech spectrum.

Conduct speech perception testing using picture pointing or word and sentence repetition at average conversation speech volume (60 dB SPL).

OUTCOMES / HABILITATION


OUTCOME
Age
Duration Of Deafness
Oral Speech Language Development
Support: Family Education
Motivation
Other Issues: Medical Cognitive
Abnormal Cochlea Nerve

What can a cochlear implant do for a child with hearing loss?

- Improved detection of environmental sounds
- Improved access to speech sounds
- Word discrimination
- Spoken language understanding
- Meet listening, speech, and language milestones

What can a cochlear implant do for a child with single sided deafness?

- Decreased listening fatigue
- Improved binaural hearing
- Improved ease of listening in background noise
- Slightly improved localization ability
- Improved speech understanding in implanted ear

HOW CAN THE CI AUDIOLOGIST AND TDHH OPTIMIZE THE OUTCOME OF A COCHLEAR IMPLANT

What is the audiologist's role in optimizing the outcome?

- Ensure that each child is programmed properly
  - Programming appointments every 3 months for first year; 1 – 2 appointments per year thereafter
- Support families and foster independence in their use of the equipment
- Monitor progress
  - Datalogging, sound booth thresholds, speech perception testing, questionnaires
- Communicate with TDHHs about child's progress, habilitation recommendations, etc
- Refer for additional support when needed
  - Social work, psych ed evaluation, hearing loss team, PRP-AO, POPDH/H

What can a TDHH do to optimize the outcome with CI?

- After surgery, ensure child remains at a low activity level for 6 weeks, then can return to active play. Avoid sports with direct impact to head thereafter.
- Once at full volume, set up a habilitation plan that includes listening activities
  - Hearoes, Angel Sound, Cochlear's Communication Corner, the Listening Room, Tools for Schools, familiar audiobooks or music.
- Frequent visits – at least once/week for the early years after activation
- Teaching appropriate use and care of Remote Microphone Technology
- Ensure daily listening checks are conducted at school
- Work on advocacy skills / educating hearing peers
- Monitor academic progress
- *Communicate* goals, progress and issues with the audiologist and parents

EMERGENCY PLAN

- In the event of a significant head injury, inform the family and have them contact the ENT nurse or take the child to the emergency room.
- In the event of a natural disaster, child should have backup power/parts:
  - **On-ear:** disposable batteries + disposable battery frame + holder. Spare cable/coil .
  - **Off-ear:** charged power bank They should also have a spare cable/coil if applicable.
- PA announcements/alarm will be perceived as appropriately loud but not painfully loud by CI student.

EQUIPMENT

MED-EL

SONNET 2

RONDO 3

COCHLEAR

NUCLEUS 7

NUCLEUS 8

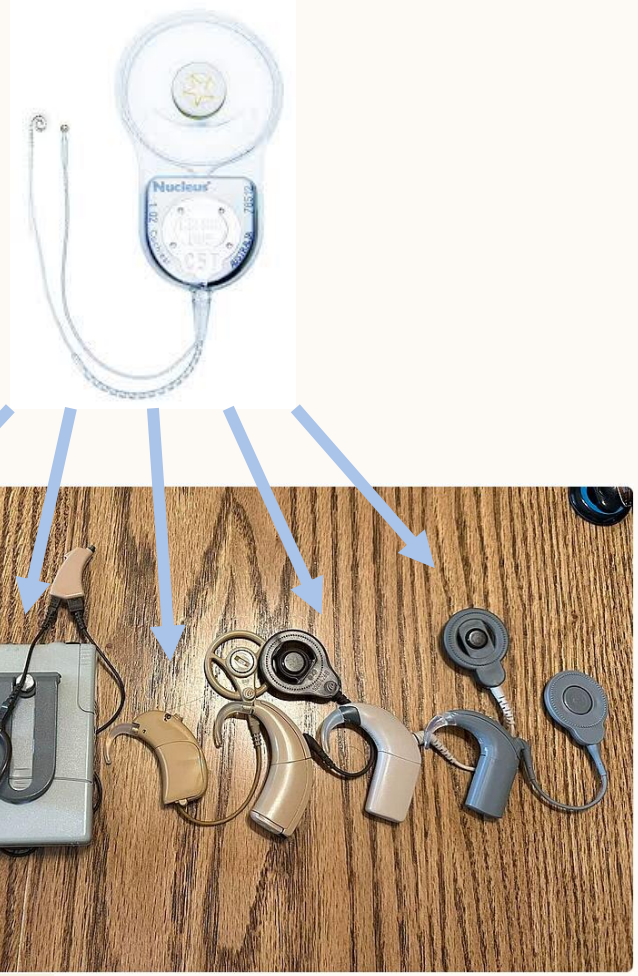
KANSO 2

ADVANCED BIONICS

NAIDA CI

CHANGING TECHNOLOGY

- Implant technology remains the same while it is in the child's head.
- The sound processor technology (externals) change every 5 – 7 years.
- We offer children sound processor upgrades every 5 – 7 years (exceptions can be made for transfer students with obsolete equipment)
- The benefits of an upgrade depend on the technology that is released – it can benefit hearing in noise, ergonomics (more compact), battery life, etc.
- All implant (internal) technology is backwards compatible for new sound processor technology



EQUIPMENT TROUBLESHOOTING

Sound processor : In consultation with parents, contact the manufacturer. They will walk you through troubleshooting steps. As a last resort you can contact our clinic, however we are often busy with patients and not available on short notice.

RMT : refer to PRP-AO's easy sheets. If issue is not on the easy sheet then contact Carrie Siu

BIMODAL STUDENTS

Hearing aid is selected to provide the best access to sound and speech understanding in that ear – not for streaming compatibility with CI.

RM equipment will be selected accordingly. Of note, the Roger system is considered gold standard of RMT systems.

REMOTE MICROPHONE TECHNOLOGY & CONNECTIVITY

MED-EL Remote Microphone Technology

SONNET 2

Roger 21

Touchscreen

ON

RONDO 3

Audiolink

COCHLEAR Remote Microphone Technology

NUCLEUS 7

NUCLEUS 8

Roger 20

Touchscreen

ON

KANSO 2

MiniMic2+

ADVANCED BIONICS Remote Microphone Technology

NAIDA CI
Integrated receiver

Touchscreen

ON

LOOP SYSTEMS

Processors can connect to loop systems and telecoil, however this is not typically activated as a standard setting. We will activate it upon request.

THANK YOU