Ear Science Education: Hearing Implants Series 21/22

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EAR SCIENCE Implant Clinic

Workshop 1

Guiding your clients through the journey: A practical approach to cochlear implants.

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Ear Science Education: Hearing Implants

The Hearing Implant Series 2021/2022 includes:

- 2 in-person workshops from 5:00 to 7:00pm in October 2021 and May 2022 both here at the stunning Anzac House location in Perth's CBD; and
- 4 bi-monthly "Translating the Science" research updates available online, offering you the flexibility to complete this in your own time around work and other commitments.

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Workshop 2: Guiding your clients through the journey: From saying 'yes', to rehabilitation and bimodal management

- Thursday 26th May 2022
- In this workshop, we will discuss a pragmatic approach to the underlying factors impacting decision making when considering cochlear implants and the importance of shared care in optimising outcomes for bimodal clients.
- This is an interactive workshop, participants will be involved in case discussions and be mentored by experienced implant audiologist facilitators.

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Program

- 5:00pm | Registration & refreshments
- 5:30pm | Cochlear Implant Candidacy Criteria & Assessment (Presentation)
- 6:10pm | The Value of a CI Assessment (Panel discussion with audience involvement)
- 6:30pm | Case Studies (Facilitated group discussion)

Cochlear Implants: Pre-operative Client Journey

Dr Cathy Sucher & Elle Statham

Senior Implant Audiologists

October 2021

Learning Objectives

- Who and how to refer?

Confidently identify potential cochlear implant candidates

- What we need from you?

Discuss the referral pathway

- What happens in and after the Cochlear Implant Assessment?

Discuss the cochlear implant journey and candidacy assessment

- What do the results mean?

An explanation of results and reports

The Problem

1 in 5 Australians

1 in 10 eligible Australian Adults

Who To Refer: The Research

- 60/60 guideline study for screening CI candidates (Zwolan et al)
- 529 people undergoing CI Assessment
- Used 60/60 guideline for identifying adults meeting traditional indications for CI
  - 60% or worse on word scores in better ear
  - 60dB or worse 3FAHL (Average HTL500, 1000, 2000 Hz) in the better ear
- 60/60 guideline lead to 96% detection rate and a 34% false-positive rate for identifying adults who would meet traditional indications for a cochlear implant

BUT we have lots of people with asymmetrical hearing losses SO.....

Zwolan TA, Schvartz-Leyzac KC, Pleasant T. Development of a 60/60 Guideline for Referring Adults for a Traditional Cochlear Implant Candidacy Evaluation. Otol Neurotol. 2020 Aug;41(7):895-900.

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Who To Refer:

60/60 guideline for Cochlear Implant Referrals

- 60% or worse on word scores
- 60dB or worse 3FAHL (Average HTL500, 1000, 2000 Hz)
- *OK to apply this criteria to **either** ear*

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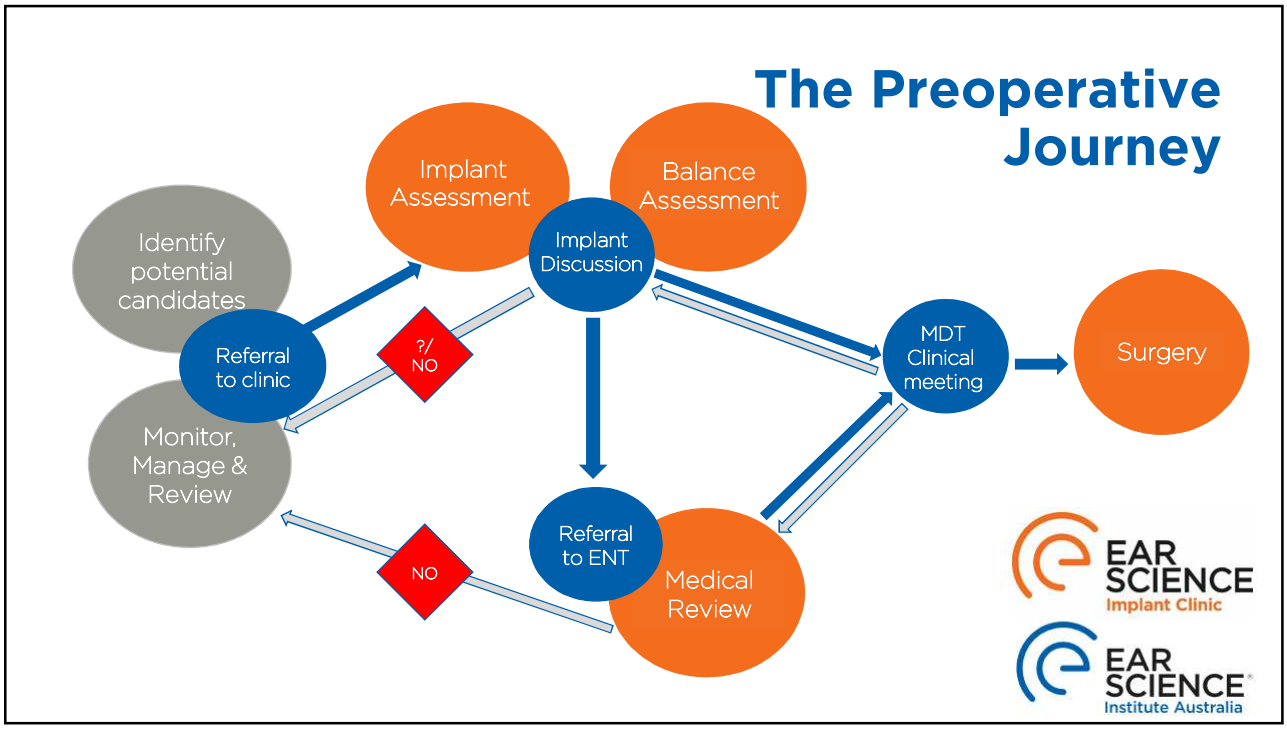

What we need from you...

- Reason for referral
- Most recent audiogram (within last 12 months)
- AB words scores (masked if appropriate)
- Hearing aid history and compliance
- Simple explanation to the client on why they are being referred

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Explanation…

"Your hearing is at a point that hearing aids are only making things louder and not clearer.

A cochlear implant has the potential to provide more speech understanding than your hearing aid can.

I think it would be worthwhile you seeing an implant audiologist to see if an implant is an option for you"

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Candidacy Assessment

CI Audiological testing (1hr)

- Audiogram
- Hearing aid optimization or fitting of clinic hearing aids
- FF Aided speech testing
- Additional testing for SSD and EAS

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Cochlear Implant Discussion (1hr)

- **Hearing History**
- **COSI Goals**
- **Criteria and where they fit, discussion of results**
- **Difference between a CI and Hearing aid**
- **How a CI works**
- **Realistic expectations (What will it sound like)**
- Surgical process and risks
- Post op Rehabilitation process and commitment
- Cost
- Device Choice
- Mentor Program and support groups
- ENT Referral

What are the client's listening goals?


Hearing music


Awareness of alarms/doorbell


Hearing the TV


Cinema


Music


Conversation in quiet areas


Talking on the phone


Following Meetings


Conversation in restaurants/cafes

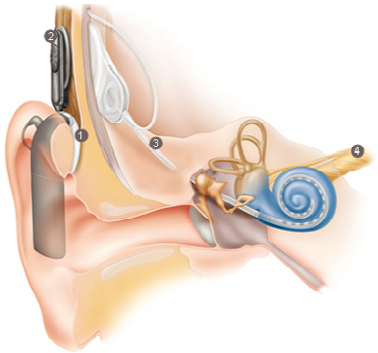

Comfort in noise

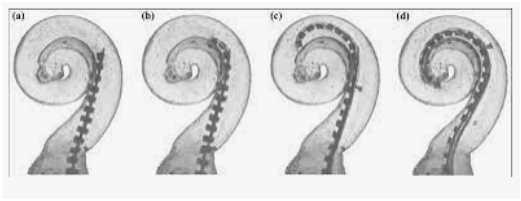

Conversation in small groups


Following lectures and church


Hearing children

How a cochlear implant works





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Cochlear Implant Vs Hearing aid

Cochlear Implant	Hearing Aid
Replaces the function of the damaged hair cells	Provides amplification and relies on the hair cells to be functioning
Progress can be slow	Outcome is relatively quick
Electrical signal	Acoustic signal

What will a cochlear implant sound like?

- The aim of a cochlear implant is to improve speech discrimination
- It will not restore natural or normal hearing
- Speech may sound artificial
- Hearing in background noise should be better than a hearing aid but can still be difficult

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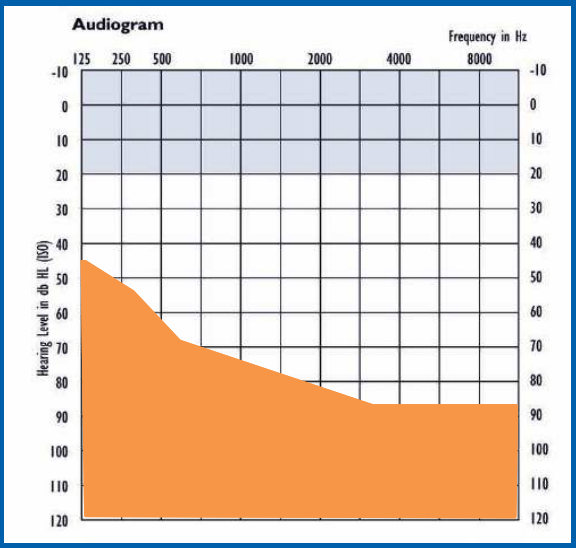
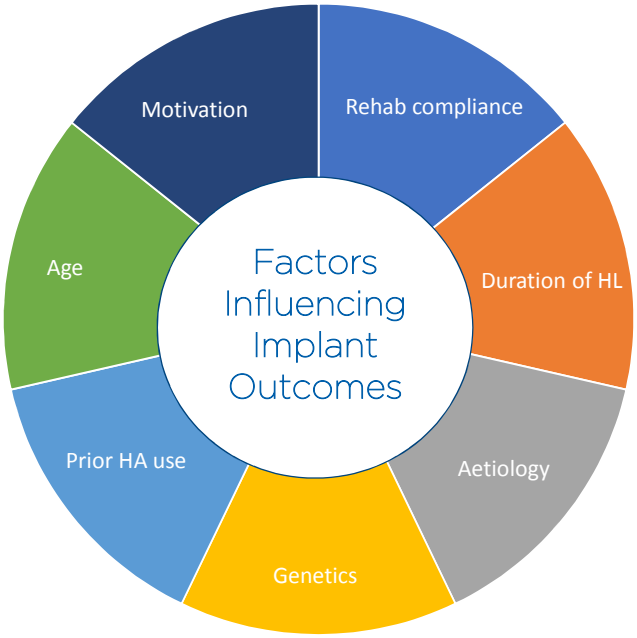
Traditional Cochlear Implant Candidacy



AIDED SPEECH*	Better Ear	Poorer Ear
CNC phonemes in quiet 65dB SPL	< 74%	< 54%
CNC words in quiet 65dB SPL	< 50%	< 26%
Open set CUNY in Quiet 65dB SPL	< 90%	< 62%



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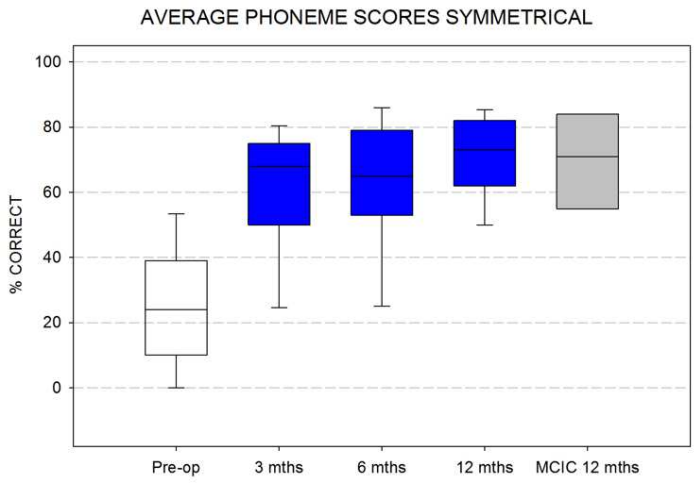
Outcomes: Symmetrical Hearing Loss



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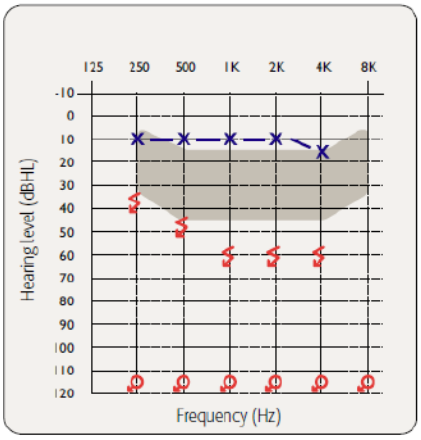
Single Sided Deafness (SSD) – Candidacy Criteria

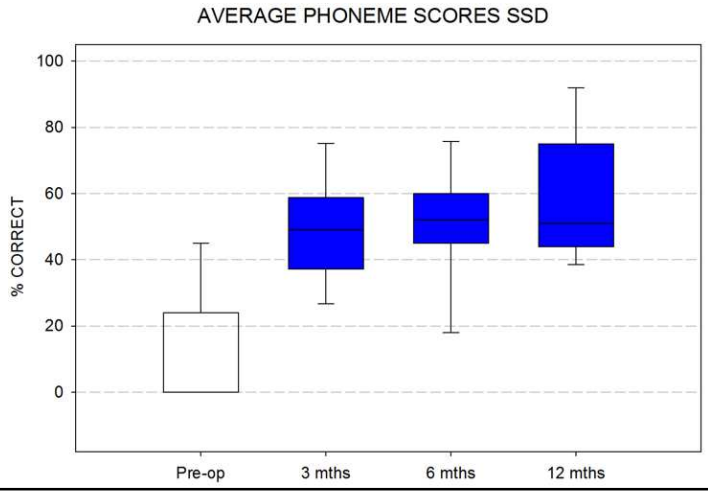


- Stable, normal to near-normal BC thresholds (good ear)
- Dissatisfaction with results obtained with non-implantable options
- Non-surgical options (e.g. CROS/BiCROS/HA) must have been discussed and trialed if appropriate (unless there is a good reason not to)
- Aided speech in quiet (for BC trial)
  - results should be ≥ BiCROS/CROS and/or unaided results
- Aided speech in noise
  - 1dB SNR improvement between unaided and aided results when noise is presented to the better cochlea

What to expect with SSD: CI vs BCI

Benefit	Bone Conduction Implant	Cochlear Implant
Improved understanding of speech in quiet	✓	✓ (may take 6-12 months, auditory training is vital)[•,•••]
Improved hearing for people sitting at the poorer ear	✓	✓
Greater awareness of environmental sounds from poorer ear	✓	✓
Understanding speech in noise	×	✓ (improvement over 6-12 months)[••]
Sound localisation	×	✓ (improves over time)
Tinnitus improvement	×	✓
Using the telephone on the poorer ear	✓	✓ (not clear right away, should improve over time)[••]

Outcomes: Single Sided Deafness



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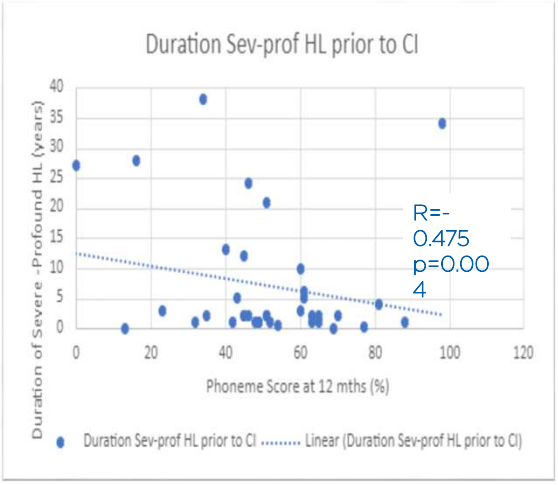
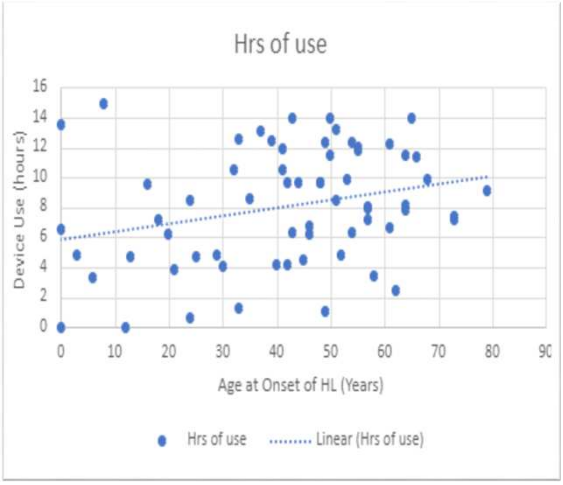
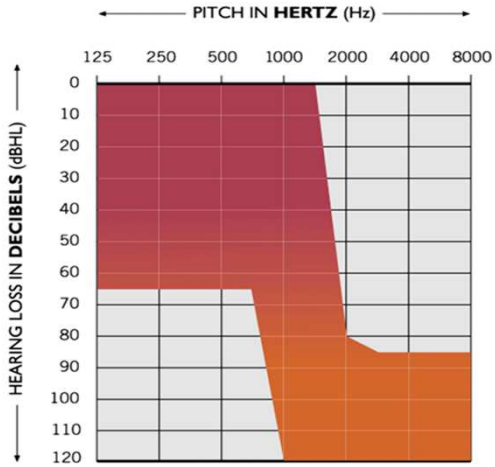
Effect of duration of hearing loss on implant use and phoneme scores





Electric Acoustic Stimulation (EAS) – candidacy criteria



Aided Speech	Implant Ear
CNC words in quiet 65dB SPL	10% - 60%

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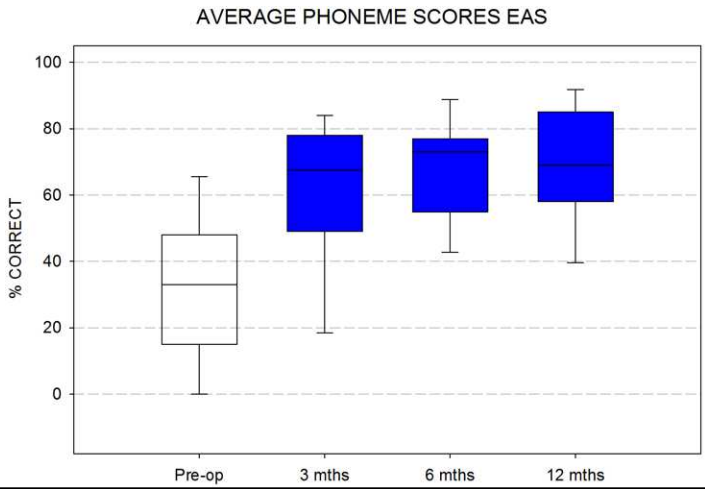
Outcomes: EAS



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Non-Traditional CI candidates

- **Where surgical intervention results in an unaidable hearing loss but the auditory nerve is still viable or intact e.g.** labyrinthectomy **or acoustic neuroma removal**
- **Pre-lingually deafened adults**
- **Borderline candidates**

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Surgery

- **Around 90-minute surgery**
- **General anesthetic**
- **One night in hospital**
- **1 to 2 weeks off work**
- **Stiches removed around day 10**
- **Switch on of implant around day 14**

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Rehabilitation Schedule – CI/EAS

Month	Week	Appointment Description	Appointment Length
Month 1 (1-3 weeks after surgery)	1	• Activate sound processor • Adjust device • Rehabilitation	1.5 hrs 30 mins included for device management
	2	• Adjust device and rehabilitation	1 hr
Month 2	5	• Adjust device and rehabilitation	1 hr
Month 3	9	• Adjust device and rehabilitation	1 hr
	12	• Progress assessment	1 hr
Month 6	24	• Adjust device and rehabilitation	1 hr
	26	• Progress assessment	1.5 hrs
Month 12	52	• 12-month check-up	1 hr
	54	• Progress assessment	1.5 hrs

Cost associated with cochlear implants

Appointment Type	Cost
Implant Assessment	$150
Implant Pre-op counselling (optional)	No cost
Vestibular Assessment	Up to $115
Surgical and Hospital Fee	Please discuss with your surgeon
Acute Care Package Includes all audiology appointments needed in the first 6 months, including your switch on, programming appointments, device troubleshooting and 3-month & 6-month reviews.	$500
Annual Mapping appointments (60 min) To program your device to optimise your hearing	$110
Review Appointments (90 min) At 12 months, 3 years, and 5 years post switch-on	$165

Medicare funding is available provided the client has an Australian Medicare Card

Maintenance costs?

- CI manufacturer's warranty (around 3 to 5 years)
- Future maintenance costs and upgrades
  - Private Health
  - Hearing Australia
  - NDIS funding
  - DVA Gold Card

ENT Choice

- Prof Marcus Atlas (Subiaco Private Hospital, SJOG Subiaco)
- Prof Peter Friedland (Joondalup Private Hospital)
- Dr Stephen Rodrigues (Hollywood Private Hospital)
- Dr Jafri Kuthbutheen (South Perth Hospital, SJOG Murdoch)
- Dr Latif Kadhim (SJOG Murdoch & SJOG Bunbury)





What happens next...

Is a candidate	Is a borderline candidate	Is not a candidate
CI Pack given	Discussion regarding the pros and cons of proceeding	Non-surgical options discussed
2nd counselling appointment	Recalled in a year to retest	Go back to referring audiologist
Referred to an ENT	Go back to referring audiologist	
Balance screening or full VNG		
Go back to referring audiologist		

Results and Reports

Relevant History

Audiological Results:
- Audiogram
- Aided Speech Scores

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 15/9/2021	
	Words	Phonemes
R + L	4 %	17 %
R	0 %	16 %
L	0 %	16 %

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 15/9/2021
R + L	0 %
R	0 %
L	2 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 15/9/2021
Left Device: Hearing Aid (Own) Right Device: Hearing Aid (Own)	21.5 dB S:N

Recommendation:
- Is/Isn't a candidate
- Which ear
- What device
- ENT referral

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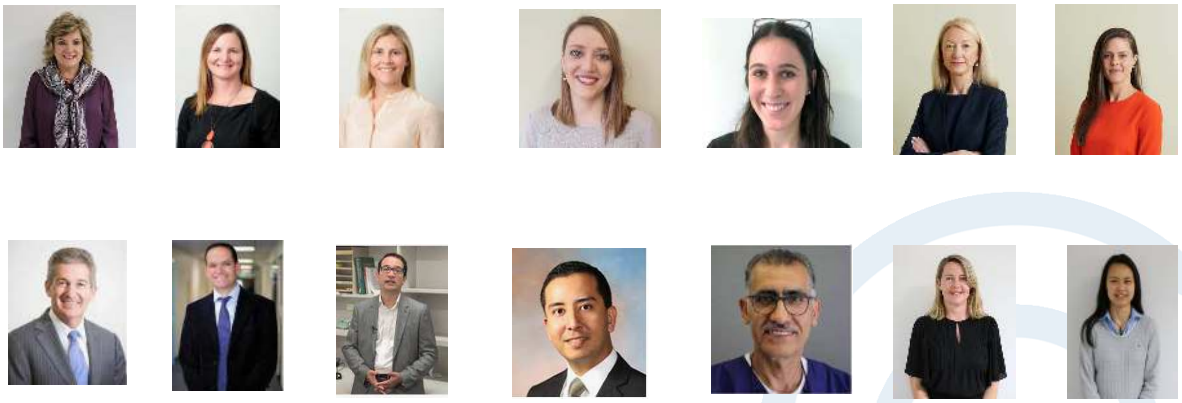
Multidisciplinary Clinical Meetings are held once a month



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Thank you for listening

Contact details

Cathy Sucher: cathy.sucher@earscience.org.au
Elle Statham: elle.statham@earscience.org.au
Ronel Chester-Browne: ronel.chester-browne@earscience.org.au

Phone number: 6380 4944

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Panel Discussion

The Value of a CI Assessment

Panel Members:
Elle Statham – Senior Implant Audiologist
Cathy Sucher – CI Research Lead and Senior Implant Audiologist
Robert (Bob) Edwards – Implant Recipient
Melanie Atkinson – Audiologist, Brad Hutchinson Hearing

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Case Studies

28 October 2021

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Facilitated Group Discussions

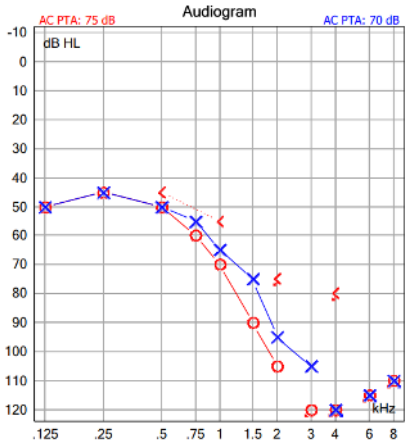
- **At your table, work together through your case study**
- **One person should document your team's recommendations using the worksheet provided**
- **We will then regroup to discuss management and outcomes**
- **You will have 15 minutes to review your case**

Case 1: 84 year old male

Hearing History

- Onset of hearing loss approximately 28 years ago
- Slow progressive bilateral hearing loss due to noise exposure for many years, worked in a printing office and exposure to noise in the defense force for 2 years
- Worked as an OT assistant following that, always found it difficult to hear his clients
- Tinnitus in the past, no longer present

Case 1 Hearing Assessment: Pre-op



Otoscopy
Right: Clear
Left: Clear

Tympanometry

	TYPE	Canal Vol (mL)	Compl (mL)	PRES (daPa)
Right	A	3.3	0.7	-17
Left	A	3.1	0.9	-31

AB WORDS

Side	Left MR	Right ML		
100dB	43%			
100dB		48%		

Case 1 cont.

- Balance: No concerns
- General health: Very good
- Very good support from his wife
- Memory concerns, which he feels is the result of the hearing loss
- Anxiety due to limited hearing, concerns of not hearing the correct information
- Telephone use: Uses the right ear for the telephone, without a hearing aid
- Amplification History
  - Bilateral hearing aids for many years
  - Trialed new hearing aids a month ago, no improvement
  - Uses a streamer

Case 1 Hearing Assessment: Aided Speech Perception (Pre-op)

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 27/5/2020	
	Words	Phonemes
R + L	24 %	49 %
R	8 %	49 %
L	4 %	36 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 27/9/2018
Left Device: Cochlear Implant Right Device: Hearing Aid (Own)	DnT
Left Device: Hearing Aid (Own) Right Device: Hearing Aid (Own)	14.5 dB S:N

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 27/5/2020
R + L	72 %
R	59 %
L	52 %

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Case 1 COSI

1. Very active lifestyle, attends meetings in the retirement village and finds it difficult, would like to hear speech better over distance

2. Very social, group and noise environments difficult and would like to hear better in these challenging listening environments

3. Relies on wife to hear, especially his grandchildren. They report he speaks too loud. Would like more independence and monitor his own voice better

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Questions for Case 1

- What are the options for this client?
- What are the risks involved?
- Memory problems – is this a concern?
- Is management of the device a concern?
- Is his age a concern?
- Expectations?
- Which ear to implant?

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Case 1: Management and outcome

- Implanted with Med-El EAS Flex electrode on the left side
- No residual hearing following surgery, however, good aided thresholds providing access to soft speech sounds
- Wears comfortably all day
- Very pleased with the device and hearing outcome, very good hearing improvement within first few weeks following switch-on
- Able to hear better in all environments, still finding noisy environments challenging, although it has improved
- Improvement on left side – long term stable outcome

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Case 1: Aided Speech Perception (Post-op)

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 27/5/2020	Post-Op 3 Mth 8/9/2020	Post-Op 6 Mth 14/12/2020	Post-Op 12 Mth 28/7/2021
R + L	72 %	85 %	92 %	100 %
R	59 %	73 %	89 %	74 %
L	52 %	60 %	81 %	94 %

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 27/5/2020		Post-Op 3 Mth 8/9/2020		Post-Op 6 Mth 14/12/2020		Post-Op 12 Mth 28/7/2021	
	Words	Phonemes	Words	Phonemes	Words	Phonemes	Words	Phonemes
R + L	24 %	49 %	32 %	61 %	48 %	76 %	72 %	91 %
R	8 %	49 %	0 %	28 %	20 %	52 %	12 %	41 %
L	4 %	36 %	16 %	48 %	32 %	69 %	60 %	85 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 27/9/2018	Post-Op 3 Mth (dB SPL) 8/9/2020	Post-Op 6 Mth (dB SPL) 14/12/2020	Post-Op 12 Mth (dB SPL) 28/7/2021
Left Device: Cochlear Implant Right Device: Hearing Aid (Own)	DnT	16.5 dB S:N	14.5 dB S:N	12.5 dB S:N
Left Device: Hearing Aid (Own) Right Device: Hearing Aid (Own)	14.5 dB S:N	DnT	DnT	DnT

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Case 2: 49 year old female

Hearing History

- Sudden onset hearing loss in her left ear following a stroke when she was in her 20's
- One week following stroke, vertigo and total loss of hearing
- In view of 26 years unaided hearing on the left side, criteria for CI excluding long duration h/loss at the time, BC implant was recommended
- Implanted with BoneBridge in Dec 2013
- Client reports limited use of BC device. Keen to improve hearing in left ear, interested in other hearing amplification options

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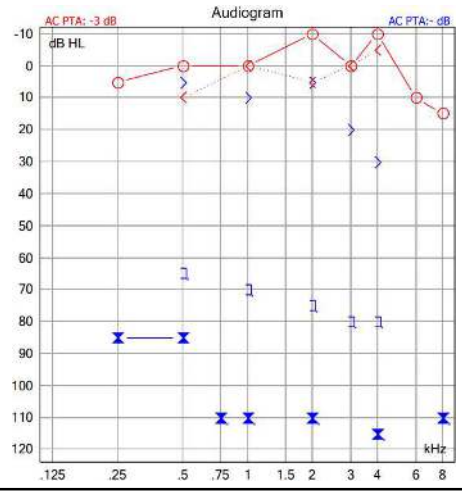
Case 2 Hearing Assessment: Pre-op



Otoscopy
Right: Clear NAD
Left: Clear NAD

Tympanometry

	TYPE	Canal Vol (mL)	Compl (mL)	PRES (daPa)
Right	A			
Left	A			

Speech table

Material AB Words

Ear	R	L				
Level	50	110 (M)				
%	100	0				

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Case 2 Hearing Assessment: Aided Speech Perception (Pre-op)

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 1/12/2020	
	Words	Phonemes
R + L	DnT	DnT
R	100 %	100 %
L	0 %	0 %

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 1/12/2020
R + L	DnT
R	100 %
L	0 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 1/12/2020
Left Device: Cochlear Implant Right Device: Unaided	DnT
Left Device: Unaided Right Device: Unaided	.5 dB S:N
Left Device: Bone Conduction Implant Right Device: Unaided	-.5 dB S:N

BKB/SIN - Sentences in Noise
Speaker Orientation: SP. Bad Ear : N. Good Ear

Condition	Pre-Op (dB SPL) 1/12/2020
Left Device: Cochlear Implant Right Device: Unaided	DnT
Left Device: Bone Conduction Implant Right Device: Unaided	6.5 dB S:N
Left Device: Unaided Right Device: Unaided	7.7 dB S:N

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Case 2 COSI

1. To improve her awareness of sound and be able to localise better
2. To be able to understand speech in her left ear, especially in view of work in an admin position
3. To improve her hearing in noisy environments

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Questions for Case 2

- Would you consider a CI in view of the long duration, unaided hearing loss?
- What are the risks involved?
- What kind of counselling would you provide in a case like this?
- What is a realistic expectation?

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Case 2: Management and Outcomes

- BC device explanted and simultaneous CI in March 2021, CI 632 Cochlear electrode and Kanso 2 processor
- In general very pleased with the outcome, even at 3 months post-op which is early stage
- She reports better hearing in noise
- Speech clarity still limited, however, overall hearing much better than before she received the implant
- Aided thresholds indicated very good access to soft speech sounds
- Very motivated and diligent with rehabilitation, direct streaming through an iPhone and her Kanso 2 using hearing rehab apps

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Case 2: Aided Speech perception (Post-op)

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 1/12/2020	Post-Op 3 Mth 10/6/2021
R + L	DnT	DnT
R	100 %	DnT
L	0 %	20 %

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 1/12/2020		Post-Op 3 Mth 10/6/2021	
	Words	Phonemes	Words	Phonemes
R + L	DnT	DnT	DnT	DnT
R	100 %	100 %	DnT	DnT
L	0 %	0 %	24 %	51 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 1/12/2020	Post-Op 3 Mth (dB SPL) 10/6/2021
Left Device: Cochlear Implant Right Device: Unaided	DnT	.5 dB S:N
Left Device: Unaided Right Device: Unaided	.5 dB S:N	DnT
Left Device: Bone Conduction Implant Right Device: Unaided	-.5 dB S:N	DnT

BKB/SIN - Sentences in Noise
Speaker Orientation: SP. Bad Ear : N. Good Ear

Condition	Pre-Op (dB SPL) 1/12/2020	Post-Op 3 Mth (dB SPL) 10/6/2021
Left Device: Cochlear Implant Right Device: Unaided	DnT	1.5 dB S:N
Left Device: Bone Conduction Implant Right Device: Unaided	6.5 dB S:N	DnT
Left Device: Unaided Right Device: Unaided	7.7 dB S:N	DnT

Case 3: 78 year old female

Hearing History

- Severe vertigo attacks since 2013. Meniere's disease was diagnosed. Deterioration in hearing on left. In 2018 still some usable hearing on the left, was able to use the telephone on this side. Gradual deterioration over time. Slight h/loss on right
- Vertigo still present and managed with medication
- Aided assessment indicated a phoneme score of 68% on the left side in March 2021. CI not recommended
- One previous trial 4 years ago for a very short period of time, unsuccessful
- Client referred for another hearing aid fitting

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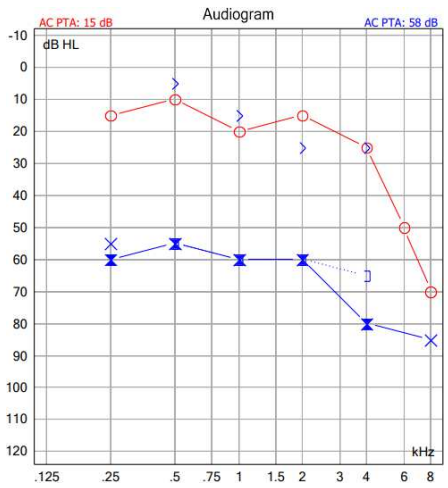
Case 3 Audiogram Pre-op



Otoscopy
Right: Clear
Left: Clear

Tympanometry

	TYPE	Canal Vol (mL)	Compl 0mD	PRES (daPa)
Right	As	1.5	0.2	-54
Left	A	1.5	0.3	4

Speech table

Material AB WORDS						
Ear	Left	Left		Right		
Level	80 (NR)	90 (NR)		40dB		
%	47%	71%		93%		

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Case 3 Follow-up review 6 months later

- Client returned for a follow-up appointment
- She reports the hearing aid did not provide significant benefit, she did not really notice a difference in her hearing
- She feels as if the hearing has deteriorated further and would like to review her options again

Case 3 Hearing Assessment: Aided Speech Perception (Pre-op)

CNC Words in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 17/8/2021	
	Words	Phonemes
R + L	DnT	DnT
R	DnT	DnT
L	20 %	48 %

BKB/SIN - Sentences in Noise
Speaker Orientation: 0 : 0

Condition	Pre-Op (dB SPL) 17/8/2021
Left Device: Hearing Aid (Clinic) Right Device:	-.5 dB S:N

CUNY - Sentences in Quiet

Listening Condition Recorded 65 dB SPL	Pre-Op 17/8/2021
R + L	DnT
R	DnT
L	50 %

BKB/SIN - Sentences in Noise
Speaker Orientation: SP. Bad Ear : N. Good Ear

Condition	Pre-Op (dB SPL) 17/8/2021
Left Device: Hearing Aid (Clinic) Right Device:	-.5 dB S:N

Questions for Case 3

- Would you recommend a cochlear implant?
- What is the risk regarding residual hearing?
- Is the Meniere's a concern?
- How would you counsel expectations?

Case 3: Outcome and Management

- The client decided not to proceed with a cochlear implant at this stage
- She will review this later, should her hearing deteriorate further
- Not keen on a labyrinthectomy with simultaneous CI – concerned about losing the residual hearing
- Would like to proceed with a h/aid fitting. She feels her expectations regarding the amplification is more realistic and she will keep on stimulating the aud nerve with sound
- Her H/aid audiologist will keep on reviewing her and refer back to us, should her hearing needs change in future

Thank you

Cathy Sucher: cathy.sucher@earscience.org.au
Elle Statham: elle.statham@earscience.org.au
Ronel Chester-Browne: ronel.chester-browne@earscience.org.au

Ear Science Clinic Phone: 6380 4944

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Translating the Science

- Bi-monthly research updates you can access online, on-demand.
- First update released in November (then January, March and May)
- Provide an update on research from some of WA's most influential researchers about the journal articles they have published
- Opportunity to ask the researchers questions
- Will give you the confidence to apply these learnings to your clinical practice
- Email notification when these are available
- Eligible for AudA 1 non-endorsed point per update, and ACAud CEP approved (in progress, further information will be provided)

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Workshop 2
Guiding your clients through the journey: From saying 'yes', to rehabilitation and bimodal management

- Thursday 26th May 2022
- In this workshop, we will discuss a pragmatic approach to the underlying factors impacting decision making when considering cochlear implants and the importance of shared care in optimising outcomes for bimodal clients.
- This is an interactive workshop, participants will be involved in case discussions and be mentored by experienced implant audiologist facilitators.

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CPD Points

Audiology Australia

- Workshop 1 and Workshop 2: CPD2122 027
- Category 1.1: 2 CPD points
  Category 2.2: 1 CPD point
- *Attendance at both workshops accrues 3 endorsed CPD points. Attendance at only 1 workshop will allow you to log the event for 1.5 non-endorsed points.*
- *1 non-endorsed point per Translating the Science research update*

Australian College of Audiology

Workshop 1: 202154 - 3 CEP points

Workshop 2: 202155 - 3 CEP points

Translating the Science research updates CEP approval in progress

PLEASE SUBMIT YOUR EVALUATION FORM

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Thank you

- Please let us know if you have any questions
- We appreciate you joining us this evening

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