


Starkey Effortless Fitting Series

From Basics to Brilliance

Judy Grobstein, AuD-FAAA, MACAud Manager of Education and Audiology
Steven Le, BSci, BAppSci, MClinaud(CCP) Consumer Support Specialist and Trainer



Hear better. Live better.

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Starkey Effortless Fitting Series

From Basics to Brilliance

The webinar will start in..

5:00


Options for audio include computer speaker or dial-in at 02 8518 1923 / Access Code: 2633 201 6296



Hear better. Live better.

For technical questions or log-in information please contact Vincent Santana at 0413 834 718
Vincent_Santana@Starkey.com.au


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Hear better. Live better.

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TECHNICAL DIFFICULTIES?


If not using speakers and you haven't already, please call into the call center number 02 8518 1923 and enter access code 2633 201 6296

Please be sure to keep microphones muted

If you have any technical issues, please contact Vincent Santana at vincent_santana@starkey.com.au or call him direct at 0413 834 718

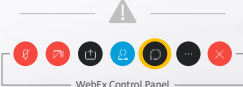


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QUESTIONS?

Please share any questions you may have in the Chat Box directed to **All Panelists**. We will do our best to answer them throughout the training.



WebEx Control Panel

5


ENDORSED SESSION

This Session is endorsed for ACAud, AudA and HAASA points

You must stay logged on for the full session

AudA members must complete a 10 questions quiz with a passing score of 70% as well as your CPD Reflections and Evaluations

ACAud, HAASA and NZAS members must complete the quiz to receive full points.



6

Learner Outcomes


- 1**

Participants will be able to describe the key aspects and critical landmarks of a good ear impression
- 2**

Participants will be able to identify how to choose the appropriate acoustic options based on the patient's audiogram
- 3**

Participants will be able to identify the different types of feedback and describe the approaches used to manage it in today's hearing aids


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Starkey Effortless Fitting Series

- 1** From Basic to Brilliance
- 2** Moving Beyond with Advanced Features

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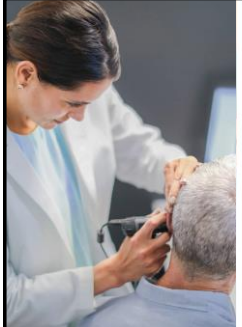


From Basics to Brilliance

Agenda


- Ear Impression Techniques
- Acoustic Options
- Feedback Management
- Troubleshooting

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Ear Impression Techniques


STEVEN LE
Consumer Support Specialist and Trainer



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The best **sounding** hearing aid is only as good as the best **fitting** hearing aid

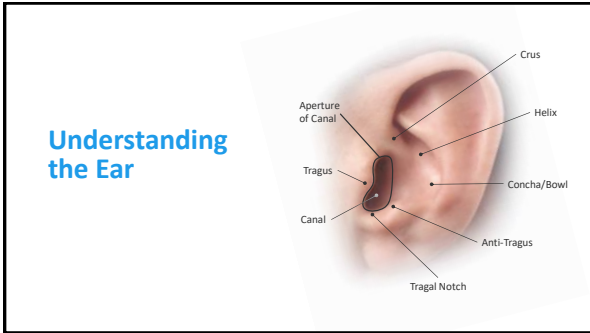
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The **best physical fit** of a custom product starts with a **Good Ear Impression**

The ear dictates what we can build

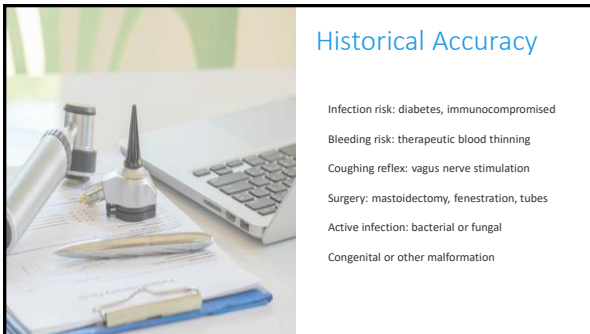
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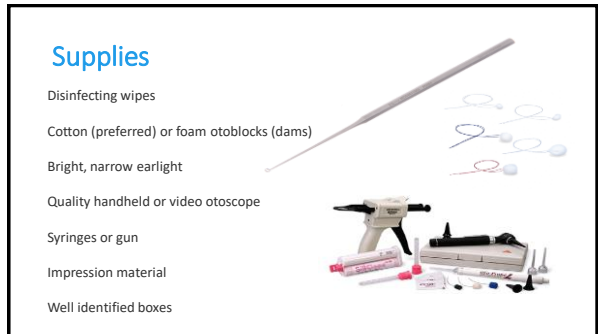
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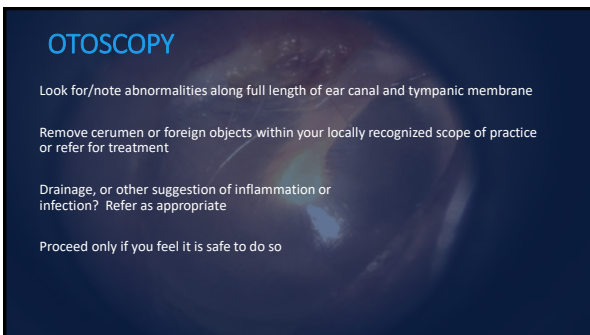
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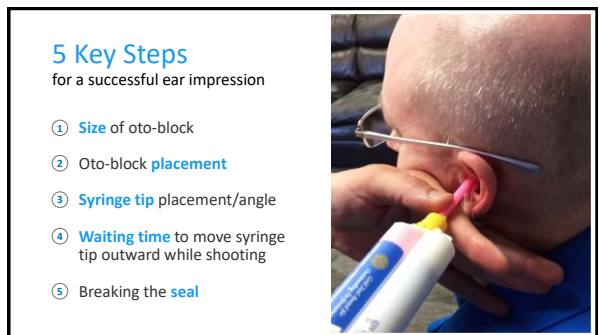
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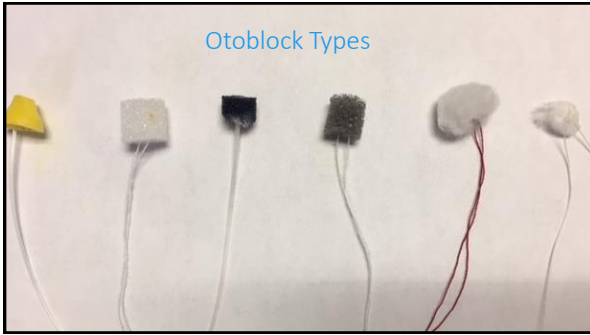
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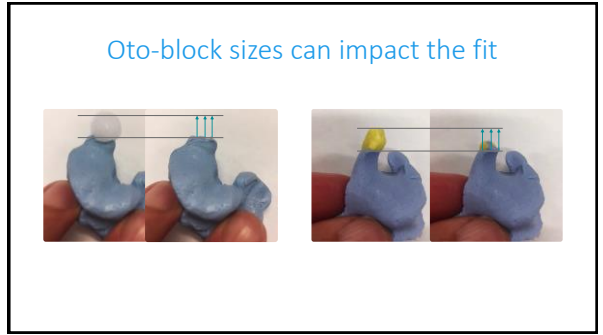
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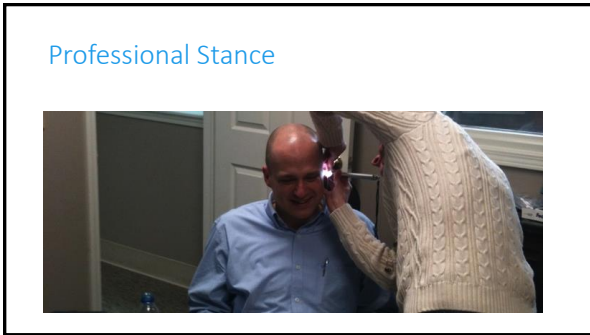
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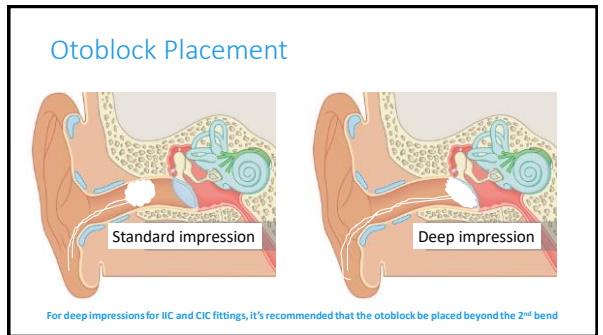
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Prepare the Otoblock

Flatten the dam




- Inspect ear to **determine size of block**
- **Tying** the thread prior to insertion
- **Flatten** the cotton dam before placement


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Prepare the Otoblock

Flatten the dam



Lubricate



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Impression Material

Material Choice
Silicone

Viscosity

- Higher-firm as it flows
- Lower- softer as it flows

Shore Value

- Higher-more firm, finished impression
- Lower-more soft, finished impression



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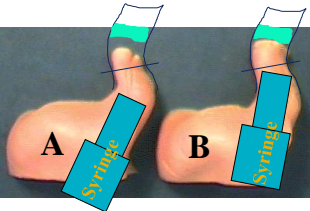
Syringe Placement and Angle



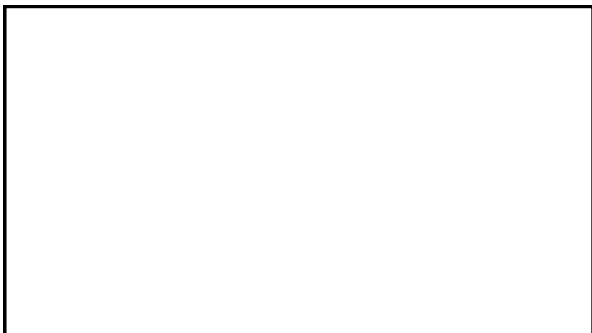
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SYRINGE PLACEMENT & ANGLE

Considerations on Impressions



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PRO TIP

Face Masks

Remove mask ear loop for soft textured ears as to not distort the impression.




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Surgical Ear Impressions

Mastoidectomies

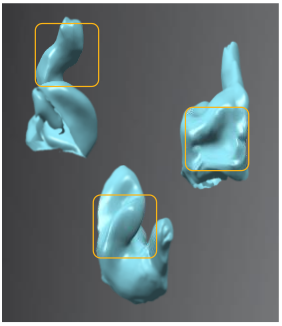
- Examine ear carefully
- Fill in all spaces
- Use caution
- What you see is not always what you get
- Mark where TM is located



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Impression Inspection Checklist

- Does the impression capture the **concha bowl, helix, and ear canal?**
- Is the impression past the **2nd bend?**
- Are there any natural voids or gaps I should note on the order?




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PRO TIP

Custom Rechargeables

Rechargeable Considerations

- Patient anatomy
- Size of the rechargeable battery
- Modular faceplate



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PRO TIP


IIC and CIC Fittings

Impression Considerations

for IIC and CIC fittings, it's recommended that the otoblock be placed beyond the 2nd bend

The deeper the fit, the less occlusion

If impression is not deep enough, we need larger venting



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Reduced Occlusion

Deeply seated canals reduce the negatively perceived own-voice occlusion effects

- By reducing the residual volume between the tip of the aid and the tympanic membrane
- By preventing soft tissue in the external ear canal from vibrating and becoming a sound source which contributes to the occlusion effect


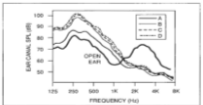
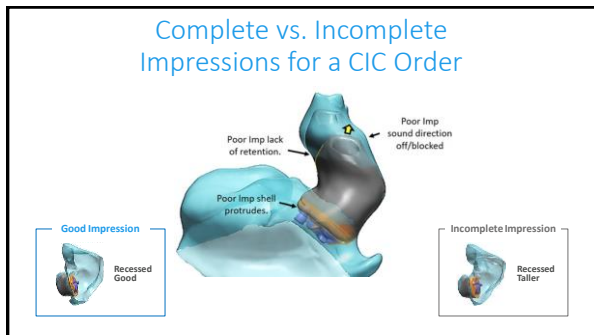



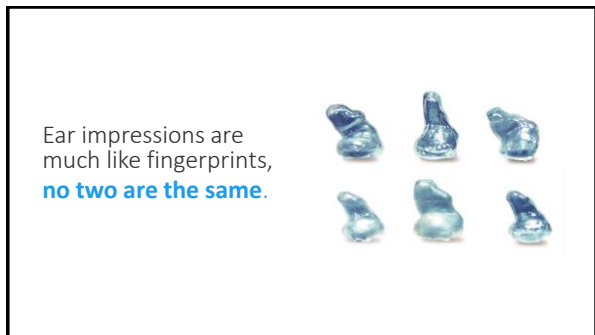
Figure 2. Four completely-in-the-ear (CIC) hearing aids used for air-conduction measurements, differing in length from 12 mm (B) to 21 mm (A).

Figure 3. Open ear SPL and the ear canal SPL when OCE A, B, C, and D (see Figure 1) were placed in the ear. Measurements obtained during the occlusion by subject.

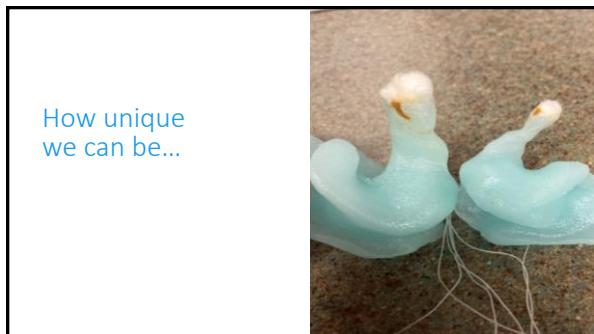
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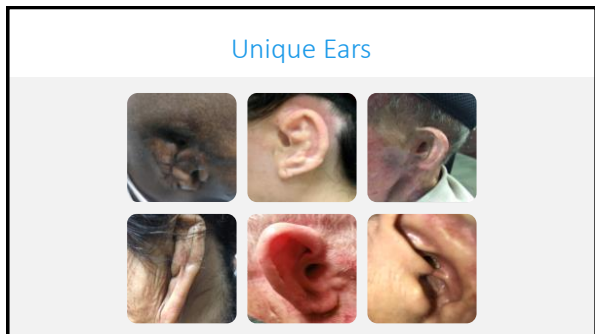
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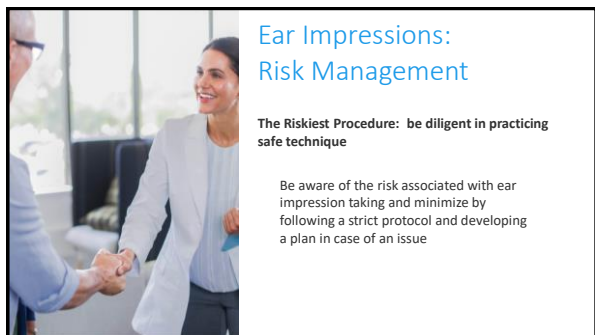
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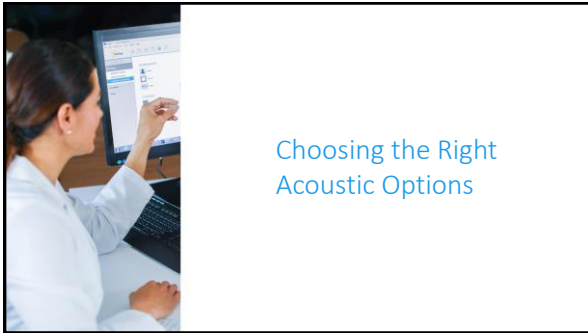
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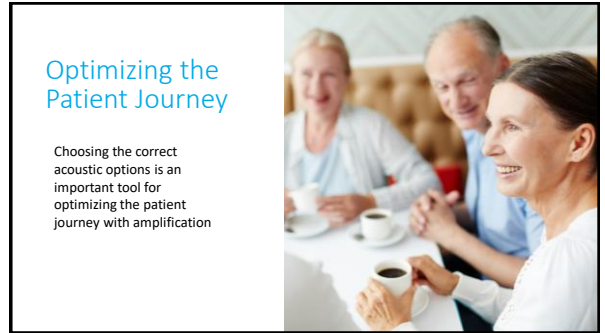
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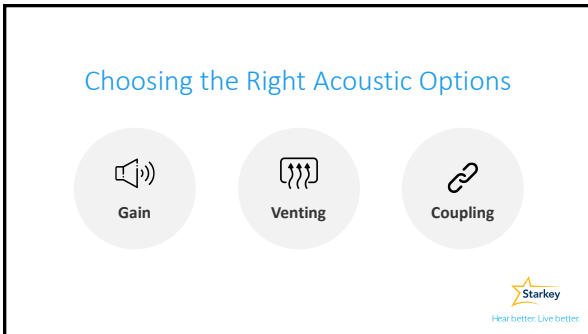
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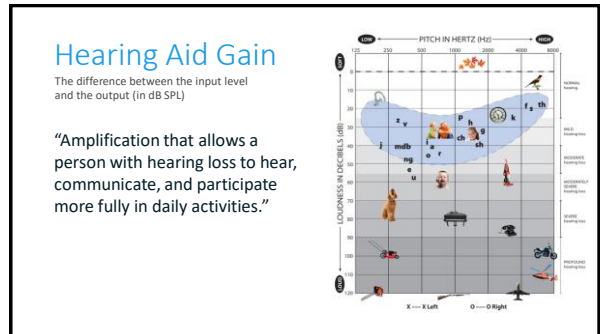
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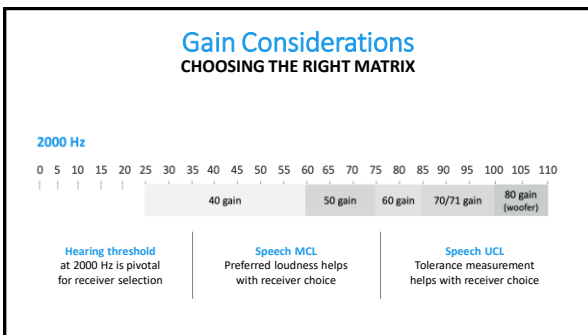
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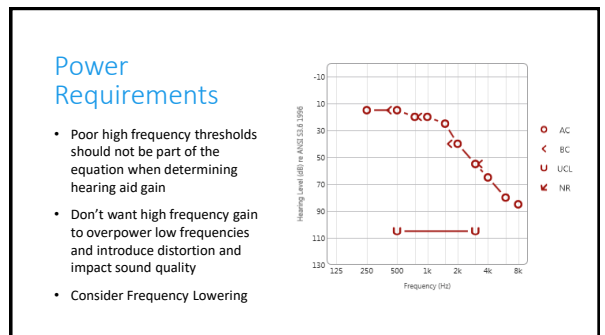
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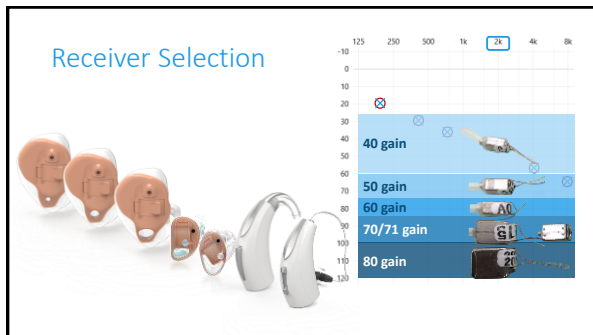
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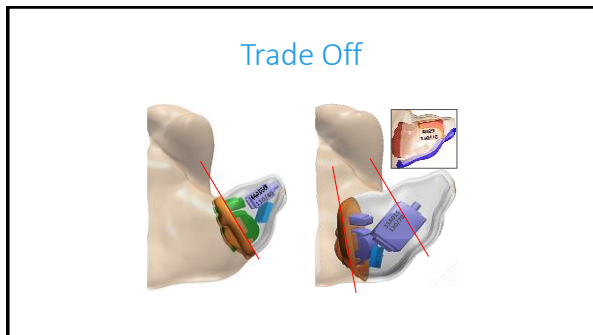
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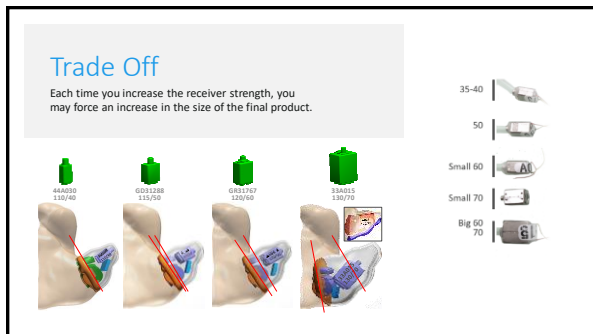
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“Build it as Small as Possible”

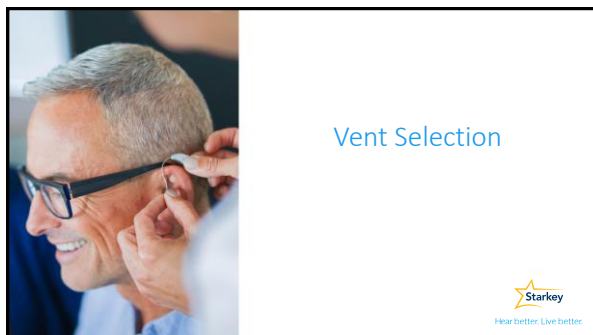
But...

- Want wireless
- Want multiple memories
- Want directional microphones
- Want a large vent
- Want a 312 battery

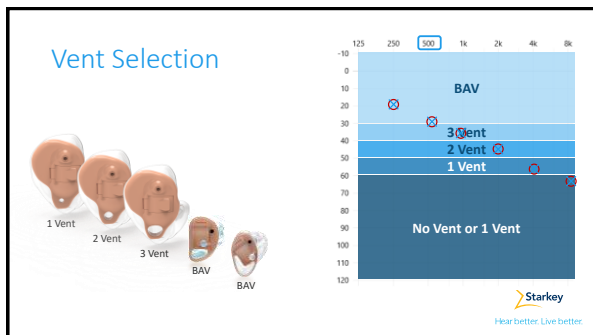
Size vs. Features Set and Realistic Expectations.
The more that's requested, the larger the hearing aid

If you want a full kitchen, dining room or garage, this is not the right house!

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Vent Selection

- 500-750 Hz is the most important frequency range for vent selection
- Better thresholds warrant a larger vent
- Poorer thresholds warrant a smaller vent
- Enlarging the vent may resolve reports of occlusion

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Open Ear Fitting

- Loss of low-frequency output
- Reduction of maximum available gain
- Increased contribution from direct sounds
- Compromise signal processing

Effect of Venting

Output

Vent Diameter/Length
— 3mm/6mm — 2mm/6mm — 1mm/6mm

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Partially Ventilated or Occluded Fitting

May provide benefit in noise

May improve streaming sound quality

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Acoustic Coupling

Earmoulds

Imbedded Receivers

Domes, tips

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RICs

Custom Coupling

- Comfort
- Retention
- Sound Path
- Power

RIC EARMOLDS

ABSOLUTE POWER

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BTEs

BTE EARMOLDS

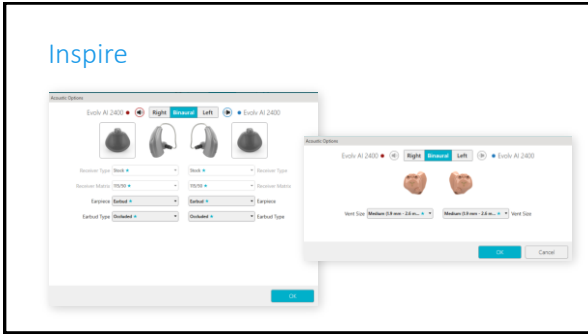
THIN TUBE EARMOLDS

Coupler SPL dB re: 20 uPa

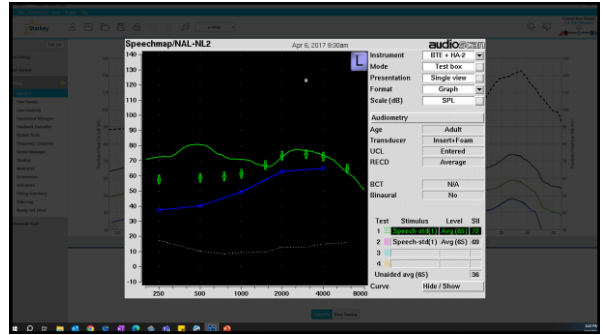
Frequency (kHz)

Tubing Internal Diameter
— 13 — .031

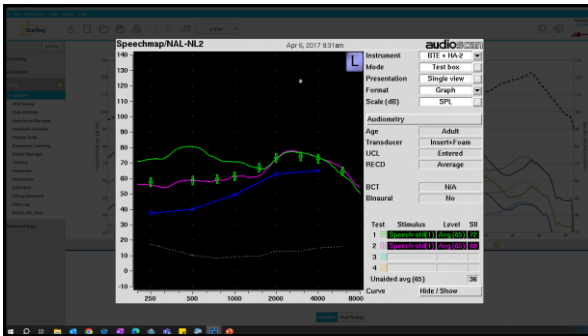
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The slide features a photograph of a woman in a white lab coat pointing at a computer monitor. To the right of the photo is the title 'Feedback Management in Hearing Aid Technology' and the author's name 'JUDY GROBSTEIN, Manager of Education and Audiology'.

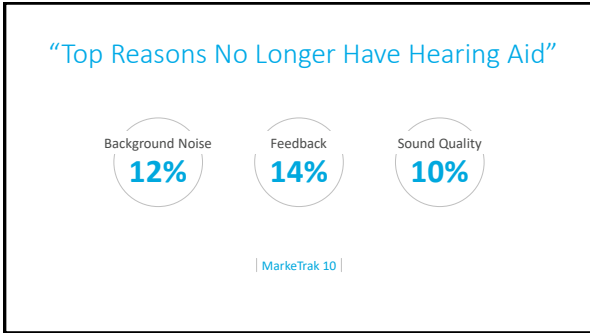
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The slide contains a quote: "The most common reasons people stop wearing or return their hearing aids are because the device is physically uncomfortable or does not perform as well as expected... Performance falls short of expectations when there is too much background noise, too much feedback and/or poor sound quality." Below the quote is the source 'MarkeTrak 9'. To the right, there are three circular statistics: Background Noise 21%, Feedback 17%, and Sound Quality 16%.

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Feedback

ACOUSTIC	Occurs when the output of the receiver leaks out of the ear canal, enters the microphone and is reamplified
MECHANICAL	Occurs when physical vibrations of the receiver diaphragm are transmitted back to the microphone diaphragm through contact with the hearing aid casing
ELECTRONIC	Occurs when there is a malfunction in the device's circuitry

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Mechanical Feedback

Customs	BTEs and RICs
More susceptible	Less susceptible
Receiver and microphone are in the same housing	Greater physical separation between components
Vibrational energy can lead to feedback	RIC receiver is moved out of the instrument case

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Electronic Feedback

Malfunction in the components of the device

Solution involves opening the case and determining the source of the problem and possible replacement of the electronics of the device

Requires attention from the manufacturer

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Testing for Internal Feedback

Seal the receiver off at the canal tip and hold the device up to the ear to listen - any whistling will verify and confirm internal feedback.

- Fingertip
- Putty
- Listening stethoscope

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Acoustic Feedback

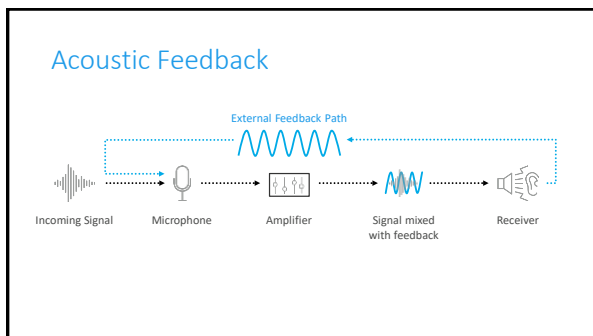
Sound wave from the receiver leaks back to the microphone

Amplified signal → reamplified

Undesired oscillations in the hearing aid create instability

Instability can lead to an audible sound that is usually unpleasant

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Factors Influencing the Feedback Path

- Venting
- Loose fit / Poor coupling
- Cracked or damaged earmold or shell
- Improper alignment of the receiver
- Hearing aid gain

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Factors Influencing the Feedback Path

- Cerumen
- Hats, Scarves and other Head Coverings
- Jaw and head movements
- Hugs
- Coughing, chewing, sneezing, yawning, talking
- Positioning an object near the ear
- Hand – inserting/removing the hearing aids

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Effects of Feedback

- Loudness Discomfort
- Sound Annoyance
- Distortion / Reduced Sound Quality
- Reduced Speech Understanding
- Reduced Perceived Benefit of Amplification
- Hearing aids don't work well - Stigma
- Embarrassing
- Hearing aid rejection

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Managing Feedback

- Acoustic Adjustments
- Gain Reduction
- Feedback Cancellation

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Acoustic Adjustments

Reduce the leakage of sound


- Vent Diameter
- Diameter of 1st Bend
- Tubing Size
- Dome Size
- Stock Earmoulds
- Custom Earmoulds

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Earmoulds/Domes

When to replace:


- Weight changes
- Size changes (children/surgery)
- Hearing threshold changes
- Ear canal tissue stretching
- Damage
- Loose Fit
- Feedback



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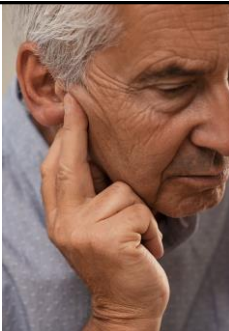
Gain Reduction

- Equally over all frequencies
- For the lowest input level (highest gain re: WDRC)
- In critical frequency regions where feedback is expected to occur
- Notch filtering - gain is reduced in narrow frequency bands around critical frequencies



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Feedback Cancellation



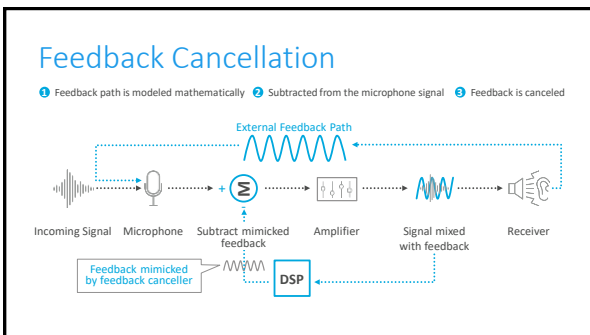
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Goals of Feedback Cancellation

- Better physical fit and comfort
- Make soft sounds more audible
- Improve sound quality
- Increase speech understanding
- Better performance in all environments



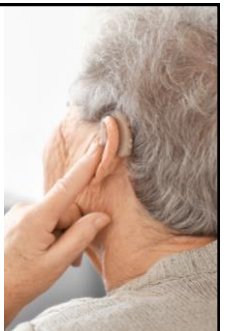
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Feedback Cancellation

- No gain reduction
- Can improve the stability of the hearing aid and provide additional gain (Compared to an instrument setting that does not use feedback cancellation)
- Effective with open fits and large vents
- Static and Adaptive Filters
- Artifacts
- Entrainment




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Static Filter

Static Feedback Cancellation Filter

- Single filter applied
- Based on area where the highest feedback potential exists
- Useful for stable environments where the feedback path won't change
- Option for eliminating entrainment
- No artifact (warble) from output phase modulation




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Adaptive Filter

Adaptive Feedback Cancellation Filter


- Filter is always changing to address changes to the feedback path
- Feedback canceller settings regulate the speed of adaptation to the new signal
- Balancing act re: speed of filter changes
- Faster helpful to address changing path but may yield artifacts



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Feedback Canceller Initialization

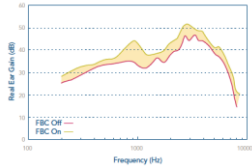
- Broadband noise with a known spectrum (white noise) played through the hearing aid
- Creates a buzzing sound
- Frequency response of the signal at the source is compared to the response at the microphone of the hearing aid
- Measures potential feedback paths
- Frequency regions in which feedback is most likely to pose a problem are identified
- Accounts for individual anatomy and fitting
- Performed in a quiet environment



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Maximum Stable Gain (MSG)

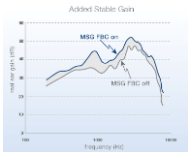
- Highest amount of gain that can be provided without risk of audible feedback or degraded sound quality due to feedback oscillation
(Johnson et al., 2007; Ricketts et al., 2008)
- Varies as a function of frequency
- Should be greater with FBC enabled vs. disabled



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Added Stable Gain (ASG)

- Difference in MSG with FBCX algorithm OFF vs. ON
- Additional gain available when the hearing aid's feedback cancellation algorithm is active
- Varies across manufacturers



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Starkey Feedback Canceller

Channel specific stable gain margins

Memory specific sensitivity settings

Gain Margin: Number of dB programmed gain is below maximum stable gain

Initialization does NOT limit response modifications



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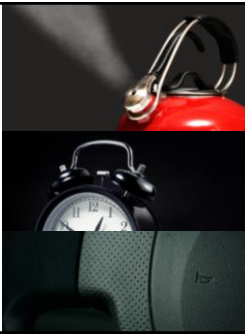
Entrainment

What is that?

When a feedback canceller mistakenly attempts to cancel a tonal input or the addition of a tone to the original source by the hearing aid itself.

May report hearing
The additional tone
Feedback after the original sound has stopped
Modulation-type distortion of the sound
Distortion

Consider changing feedback canceller sensitivity settings from high to low




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Feedback Canceller

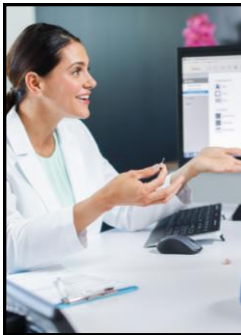
Starkey has three feedback canceller settings

- Adaptive, Low Sensitivity**
- Adaptive, High Sensitivity**
- Off**

This allows the professional to optimize performance and sound quality for each patient per memory



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Troubleshooting Considerations

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Ask the Right Questions

- What is the complaint?
- When did it happen?
- Where do you store the hearing aids?
- Was it a sudden change or gradual?
- What were they doing when this happened?
- How often does it happen?
- Where are they when this happens?

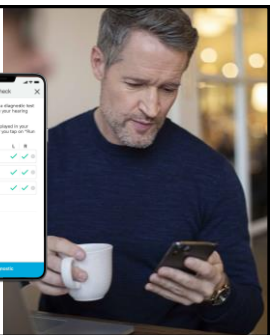
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How does the Hearing Aid Sound?

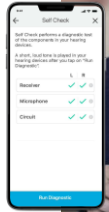
- Is the hearing aid dead?
- Is there feedback but no amplification?
- Is there circuit noise but no amplification?
- Is the hearing aid weak?
- Is the sound distorted?
- Is there intermittency?
- Is there feedback?

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Self Check






Quick, convenient way for patients to analyze their hearing aid system's performance.



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Is the Hearing Aid “Dead”?



-  Check the battery
Dead battery is the #1 cause of hearing aid complaints
-  Listening for feedback is a good indicator that your battery is ok
-  Is it the microphone?
-  Is it the receiver?
-  Did you squeeze the casing?

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Is it the Microphone?

If you can hear feedback or the indicator tones, the receiver is still good and it is likely the microphone

- Remove microphone cover – listen again
- If necessary, use chemical solvent (alcohol)
- Use hook on cleaning brush to attempt to clear wax from receiver if necessary
- Sometimes lightly brushing of the surface of the microphone will remove debris
- If unsuccessful, send for repair



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Is There Circuit Noise But No Amplification?

- Check the battery
- Likely a microphone issue – if you hear circuit noise, the receiver is still good
- Remove microphone cover - listen again



105

Is the Hearing Aid Weak?

- Check the battery
- Likely a receiver issue
- Remove wax guard (if applicable)
- Listen to hearing aid
- Check for wax blockage
- If applicable, change receiver



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Is the Sound Distorted?

- Likely caused by moisture in the hearing aid
- Might be caused by debris lying on the diaphragm of either microphone or receiver
- Check for moisture in the battery housing
- If applicable, check for moisture in the tubing
- Check to be sure the vent is not plugged with debris




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Using Modification to Increase Patient Satisfaction

- Venting to address feedback or occlusion
- Dampers to adjust frequency response
- Horns to adjust frequency response
- Modifying the shell to address occlusion, discomfort or feedback
- Earbuds to adjust frequency response




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PRO TIP

Request a soft coat/ultra violet coat on digital SLS earmolds to help with retention or feedback issues.

Add Hydrashield on any material to help repel moisture



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PRO TIP

When measuring the receiver wire for an AP receiver, report the number that correlates with the top of the entrance to the ear canal

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PRO TIP

If switching from a standard RIC earmold to an AP earmold, reduce the receiver length by one.

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Patient Report

My own voice sounds strange

I feel plugged up

Speech is too tinny...


“My voice sounds.....”

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Sound Quality Cheat Sheet

<p>Feeling in a barrel or hollow voice</p> <ul style="list-style-type: none"> Reduce 250Hz, 500Hz, 750Hz Reduce MPO Decrease loud gain 250Hz, 500Hz, 750Hz 	<p>Voice is in their chest or throat</p> <ul style="list-style-type: none"> Increase gain at 1000Hz and 1500Hz
<p>Plugged up</p> <ul style="list-style-type: none"> Increase gain at 1000Hz and 1500Hz 	<p>Voice sounds muffled</p> <ul style="list-style-type: none"> Increase loud gain Increase MPO Increase high frequency gain
<p>Voice is nasally or in their head</p> <ul style="list-style-type: none"> Decrease gain at 1000Hz and 1500Hz 	

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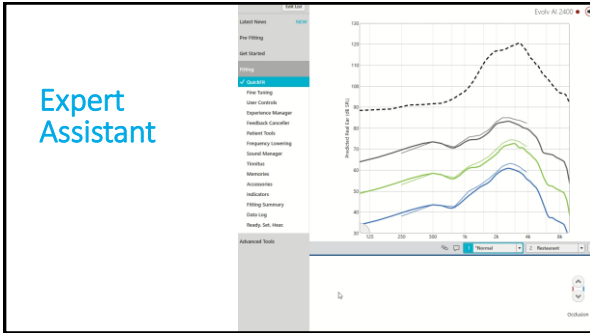


Starkey Troubleshooting Guide

Patient's Own Voice

<p>Wire Sounds</p> <ul style="list-style-type: none"> Intermittent Static Click Intermittent Intermittent Intermittent 	<p>Inputs & Adjustments</p> <ul style="list-style-type: none"> Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable 	<p>Other Considerations</p> <ul style="list-style-type: none"> Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable Check the Receiver Cable
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- ### Ingredients for a Successful Outcome
- ✔ Partner with your manufacturer
 - ✔ Give us a full ear impression without voids and note any abnormalities or concerns
 - ✔ With customs, limit features if vanity is an issue
 - ✔ Give us the history about your patient's previous experience

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Hearing aids can transform someone's life and connect them back to the activities and people they love.

— William F. Austin

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Vincent Santana NSW/SA
 Connie Lu VIC/TAS
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 Georgina Allam WA/ACT

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Resources QuickTips

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- Access to Quiz and Evaluations



The screenshot shows the Starkey Learning Hub website. At the top is the Starkey logo and the tagline 'Hear better. Live better. Clearer.' Below that is the heading 'Starkey Learning Hub' and a sub-heading 'Upcoming webinars'. The main content area features a photograph of a man in a suit looking at a smartphone. The text on the page describes the benefits of the learning hub, such as providing access to recorded endorsed webinars and resources. The bottom of the page has a blue button labeled 'Upcoming webinars'.

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Starkey Effortless Fitting Series

- 1 From Basic to Brilliance
- 2 **Moving Beyond with Advanced Features**
 Tuesday 5 September

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Thank You

Endorsement Numbers
 ACAud Endorsed: 2023132 (2 CEP points)
 AudA Endorsed: CPD2324012 (Category 1.2) (1 CPD point)
 HAASA Endorsed: CPED2023-2025 (2023-004) (1.5 CPED points)



Starkey
 Hear better. Live better.

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