Learner Outcomes

After completion of this seminar, the learner will be able to:

• List the candidacy criteria for Baha® systems for both Single-Sided Deafness (SSD) and mixed and conductive hearing loss
• List three ways clinicians can demonstrate Baha systems to their patients
• Identify important points for counseling a candidate and list resources that are available to support Baha candidates
Our mission

We help people hear and be heard.

We **empower** people to connect with others and live a full life.

We **transform** 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.

Indications for Baha® Technology

Hear now. And always.
Osseointegration

- The process by which living bone tissue bonds with titanium
- Makes direct bone conduction possible
- Provides the basis of long-term predictability and success of the Baha system

Why Baha Technology?

**Direct Bone Conduction:**

- Works independently of ear canal and middle ear
- Direct transmission gives clear and natural sound
  - Pre-operative testing is possible
  - High wearing comfort
  - Safe and straightforward surgery
  - Predictable outcome
Baha System Candidacy

**Conductive & Mixed Hearing Loss (CMHL)**

Candidacy is based on bone conduction thresholds

- Bone Conduction PTA equal to or better than 65 dB at 0.5, 1, 2 & 3 kHz

**Bilateral fitting requires symmetric bone conduction thresholds**

- Less than 10 dB on average (0.5, 1, 2 & 3) or less than 15 dB at individual frequencies

**Single-Sided Deafness (SSD)**

Profound SNHL in one ear and Normal hearing in the good ear

- Defined as Air Conduction PTA equal to or better than 20 dB at 0.5, 1, 2 & 3 kHz

Surgery can be considered for children 5 years of age or older

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**Baha System Candidacy**

- Conductive Hearing Loss
- Mixed Hearing Loss
- Single-Sided Deafness (SSD)
Baha System Candidacy: CMHL

- Direct bone conduction bypasses the outer and middle ear
- Baha solutions treat conductive & mixed hearing loss
  - Atresia
  - Chronic middle ear disease
  - Cholesteatoma
  - Congenital abnormalities
- Baha devices do not have to overcome conductive component, only amplify for any sensorineural component

Baha System Candidacy: CMHL

Treatment option: Middle ear surgery

- Over 300,000 ear surgeries are performed each year in the US (excluding myringotomy and tubes)\(^1\)
- For Tympanoplasty and Ossiculoplasty, 60-70% of patients will have “successful” hearing restoration (air-bone gap of 20 dB or less)\(^2\)-\(^5\)
- Stapedectomy is more successful with over 90% of patients achieving closure of the air-bone gap to within 10 dB\(^6\), although that number drops to 64% for revision surgeries\(^7\)


Baha System Candidacy: CMHL

Treatment option: Aural atresia reconstruction

- Degree of hearing restoration is dependent on severity of atresia

- Majority of pediatric patients who have reconstruction will still require some form of amplification after surgery

- About 75% of patients who did not receive a good hearing benefit will also not benefit from a revision

*Images from www.microtia.us.com, December 2017

Baha System Candidacy: CMHL

Treatment option: Hearing aid

- The greater the air-bone gap, the more a Baha system will outperform hearing aids

- Hearing aid prescriptions for conductive and mixed hearing loss require more gain and receive less clinical research than for sensorineural hearing loss

- Hearing aid fitting can be difficult if there is drainage from the ear, ear pain or a mastoid cavity present after mastoidectomy

*Images from www.microtia.us.com, December 2017
Baha System Candidacy: CMHL

- Nothing worn on the external ear, which is helpful in cases where ear drainage is present\(^1\)
- Baha does not need to be re-adjusted if the air conduction thresholds fluctuate because gain is only required for the bone conduction thresholds
- Pre-operative testing can be used to predict post-operative benefit\(^2\)
- Use of Baha is associated with high user satisfaction and good long-term benefit\(^3,4\)

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Baha System Candidacy: SSD

Two ears:
1. Help overcome the head shadow effect
2. Help understanding of speech in background noise
3. Help in the location of sound

Impact of SSD

<table>
<thead>
<tr>
<th>Problem</th>
<th>% of respondents</th>
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<tbody>
<tr>
<td>Difficulties in public areas</td>
<td>5</td>
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<tr>
<td>Difficulties in meetings</td>
<td>2</td>
</tr>
<tr>
<td>Discerning direction</td>
<td>6</td>
</tr>
<tr>
<td>Difficulties as a pedestrian</td>
<td>56</td>
</tr>
<tr>
<td>Cannot be part of a group</td>
<td>54</td>
</tr>
<tr>
<td>Social exclusion</td>
<td>55</td>
</tr>
<tr>
<td>Lack of &quot;stereo&quot; hearing</td>
<td>79</td>
</tr>
<tr>
<td>Work is more difficult</td>
<td>39</td>
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<tr>
<td>Driving difficulties</td>
<td>41</td>
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<tr>
<td>Difficult on telephone</td>
<td>19</td>
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Survey contained in "Hear the other side" — A report on single sided deafness. More information can be found at www.singlesideddeafness.com A report by the advisory board for single sided deafness. Available from Cochlear — article E80414A.
Baha System Candidacy: SSD

Treatment options: SSD

- Patient remains untreated*
- CROS hearing aids
- Steroids (sudden hearing loss)
- Medical intervention – surgery
- Bone conduction devices (e.g., Baha)

*Patient or physician choice

Baha System Candidacy: SSD

Treatment option: Bone conduction

- Improved speech understanding in noisy environments
- Helps to lift the head shadow effect
- Reduces the psychosocial consequences associated with hearing impairment
- Long-term patient satisfaction and hearing benefits

Baha System Candidacy: SSD

Treatment options: CROS vs Baha

- The Baha system is a discreet solution worn on one side, while CROS hearing aids require users to wear devices on both ears.
- Baha allows wireless streaming to be mixed with environmental mic from the bad side while CROS aids may require turning off the bad side in order to stream\(^1\).
- Baha 5 sound processors are the first Made for iPhone solutions for individuals with SSD.
- The Baha System bypasses outer and middle ear and sends clearer, more crisp sound directly to the inner ear\(^2\).
- Studies show that the Baha System provides better speech understanding in noise than CROS hearing aids\(^3\)-\(^4\).

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MCHL: Compare the patient’s bone conduction thresholds to the fitting range of the Baha system

TIP: With borderline decisions; may compare BC direct thresholds from Baha Fitting Software to the fitting range
SSD: Compare the air conduction thresholds in the good ear to the Baha indications

Determine Candidacy

- Demonstration & Testing
- Device Selection
- Counseling

**Demonstration**
- A quick, limited experience
- Processor may be used in “demo” setting
- May be completed by surgeon, audiologist, tech, etc.

**Evaluation**
- Audiological evaluation of benefit
- Processor is fit using software
- Speech perception testing is completed
- Performed by the Audiologist

**Trial**
- Candidate is given the Baha system to try for a period of time
- May take place in the clinic or in the patient’s home
- Processor is fit using software

Course presented in partnership with
Determine Candidacy

Bone Conduction Thresholds  Demonstration & Testing  Device Selection  Counseling

Demonstration

Suggested “Demo” settings in the sound processor:
- Program 1: Conductive Hearing Loss (10 dB BC thresholds)
- Program 2: Mixed Hearing Loss (Program 1 plus 5 clicks overall gain)
- Program 3: SSD (Program 2 minus 5 clicks gain in low frequency band)

TIP: Baha 5 Power is recommended for demonstrations

Determine Candidacy

Bone Conduction Thresholds  Demonstration & Testing  Device Selection  Counseling

Evaluation

- Establish benefit before surgery\(^1,2\)
- Can provide the patient with realistic expectations of surgery
- Can help identify the best surgical candidates
- Can assist in choice of processor

TIP: Test the patient with and without the Baha to determine potential benefit

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Determine Candidacy

1. Fit the SoundArc™ or Softband to the patient’s head with a demo processor
2. Use Baha Fitting Software to program the sound processor
3. Perform objective testing in the soundbooth to determine benefit

Evaluation

MCHL: Functional Listening Evaluation

Test two situations to help determine individual benefit

1. **Unaided Condition**: to establish the SNR or speech perception ability without treatment
2. **Aided Condition (Baha)**: to establish SNR or speech perception ability with the Baha System.

Pre-operative testing is predictive of benefit after surgery

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SSD: Hearing in Noise Testing

Noise should come from the speaker facing the hearing ear while speech comes from the speaker nearest the deaf ear.

Test two situations to help determine individual benefit:

1. **Unaided Condition**: to establish the SNR or speech perception ability without treatment.
2. **Aided Condition (Baha)**: to establish SNR or speech perception ability with the Baha System.

Difference in the SNR between the two situations has been shown to be a good predictor of individual benefit.1


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TIP: A trial is excellent in cases where candidacy may be unclear or “borderline”.

- Select a demo Sound Processor most appropriate for the patient’s hearing loss.
- Fit the sound processor on a SoundArc or Softband using Baha Fitting Software.
- Instruct the patient on use of the device.
- Ask the patient to keep a journal or log of their experiences.
Determine Candidacy

Bone Conduction Thresholds  Demonstration & Testing  Device Selection  Counseling

**Baha Attract**
- Cosmetically appealing
- Low risk of soft tissue reaction
- MRI safe (up to 1.5 Tesla)

**Baha Connect**
- Maximum hearing performance
- No soft tissue reduction
- MRI safe

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**Comparison of sound transmission through the Baha Connect System, Baha Attract System and Baha Softband.**

**TIP**: Performing BC Direct thresholds with a Softband or SoundArc can be a good predictor of the BC Direct thresholds that will be seen with a Baha Attract.
Determine Candidacy

Bone Conduction Thresholds | Demonstration & Testing | Device Selection | Counseling

TIP: If bone conduction thresholds fall in the lower 10% of the fitting range, consider the more powerful device

All Baha System orders come with one FREE wireless device

**MiniMic 2 or MiniMic 2+**
- Portable, wireless microphone that transmits speech directly to sound processor
- Excellent for students, active adults, those with iPhones®

**Phone Clip**
- Hands-free connection between processor and smartphone
- Excellent for active adults, those with Android™ phones

**TV Streamer**
- Hands-free connection between processor and television
- Excellent for less active adults or those who don’t need a MiniMic or Phone Clip

TIP: Consider the candidate’s daily needs and challenging listening environments
Determine Candidacy

Determine goals for treatment:
- AAA recommends the use of formal hearing handicap inventories such as:
  - Abbreviated Profile of Hearing Aid Benefit (APHAB)
  - Client-Oriented Scale of Improvement (COSI)
- Can also use informal counseling discussion or Cochlear’s Candidacy Worksheet

Advantages of Baha System:
- Can be worn off the ear
- High level of user satisfaction\(^1,2\)
- Costs may be covered by insurance
- Choice between magnetic solution (Attract) and direct connection (Connect) and can transition between them if necessary
- Access to Cochlear True Wireless™ technology

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Determine Candidacy

Connect with a Cochlear Concierge

Speak to a team of experts and audiologists, who include cochlear and Baha implant users, here to support and guide your patients through their hearing journey

- Discover the benefits of an implantable hearing solution
- Learn about the experiences of others using Cochlear™ Nucleus® Implant, Cochlear Nucleus Hybrid™ or Baha® Systems
- Get answers to their questions

Email: Concierge@Cochlear.com
Call: 1(800)216-0228

Case Studies
Case Study #1: Roy

- 52 year old man with a history of cholesteatoma in both ears
- History of surgeries
  - RE: 2 surgeries, most recent 1 year ago (ossicular reconstruction)
  - LE: 4 surgeries, most recent 2 years ago (tympanoplasty)
  - No upcoming surgery is planned at this time
- Has an ITE hearing aid for the left ear; often does not wear due to excessive drainage from the ear and he is also not sure it helps him
- Middle school teacher; concerned he may have to retire early since he is so tired by the end of the day due to hearing

Polling questions for the group:
- Do you feel a Baha demonstration would be appropriate for Roy?
- Would you consider the left ear first? Or the right?
- Would you test Roy in quiet? Or in noise?
- Do you think Roy will be a candidate for Baha technology?
Case Study #2: Kira

- 36 year old woman with a history of hearing loss since childhood and chronic middle ear disease
- History of tympanoplasty in both ears; no further surgeries are planned and she no longer has drainage from her ears
- Currently using ITE hearing aids in both ears that are about 6 years old – reports feeling like she can’t get enough volume on the right side

<table>
<thead>
<tr>
<th>Ear</th>
<th>SRT</th>
<th>Score</th>
<th>Level</th>
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<tbody>
<tr>
<td>Right</td>
<td>50 dB</td>
<td>76%</td>
<td>80 dB</td>
</tr>
<tr>
<td>Left</td>
<td>35 dB</td>
<td>92%</td>
<td>65 dB</td>
</tr>
</tbody>
</table>

Polling questions for the group:
- Would you recommend a Baha demonstration for Kira?
- Do you think Kira might benefit from a trial with new hearing aids?
Case Study #3: Max

- 37 year old man with a long history of hearing loss in the right ear
- Surgery in the right ear as a child (he is unsure of the details) but has not had any middle ear problems in either ear since childhood
- Has tried CROS aid in the past but did not like wearing something in his good ear
- Feels he is struggling more over the past few years and his wife agrees
- Works as a software engineer and spends time on the phone with global colleagues; reports he struggles to understand people with accents on the phone

<table>
<thead>
<tr>
<th>Ear</th>
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<th>Score</th>
<th>Level</th>
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<tbody>
<tr>
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<td>12%</td>
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</tr>
<tr>
<td>Left</td>
<td>15</td>
<td>100%</td>
<td>55 dB</td>
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Case Study #3: Max (Cont.)

Polling questions for the group:
- Would you recommend a Baha demonstration for Max?
- Let’s assume Max has the demo and scores the following:
  - Quick SIN Unaided = +9 dB SNR loss
  - Quick SIN with Baha = +3 dB SNR loss
- Would you recommend Max proceed with Baha surgery?