Taking your impression to the next level
Aly Hoffman, Clinical Trainer

Learning Outcomes

• Participants will be able to explain the custom production process
• Participants will be able to explain how landmarks in earmold impressions are utilized throughout the custom production process
• Participants will be able to describe the benefit of the measurement tools used for earmolds and in-the-ear candidacy

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The ideal customer journey

- Hearing aid evaluation
- Hearing aid delivery
- First follow-up
- Maintenance

The occasional reality of the customer journey

- Hearing aid evaluation
  - Small ear canal
  - Higher power needs
  - Expectation management
- Hearing aid delivery
  - Occlusion
  - Feedback
  - Unmet expectations
  - Discomfort
- First follow-up
  - Fine tuning
  - Remake
  - At risk of return
- Maintenance
  - "I've never been happy"
  - "These don't work for me"
  - Repair
  - Relate
  - Unreliable

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Is form factor important?

40% of non-owners would prefer a custom solution.
46% RIC/BTE
14% undecided

Source: Anovum EuroTrak 2018

98% of CIC wearers report the highest satisfaction rating.
86% ‘invisible’
85% BTE
82% RIC

Source: MarkaTrack 9 2015

Top 10 reasons for not having a hearing aid

<table>
<thead>
<tr>
<th>Reason</th>
<th>Not a reason</th>
<th>Somewhat a reason</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing loss not severe enough</td>
<td>34%</td>
<td>40%</td>
<td>26%</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>30%</td>
<td>40%</td>
<td>16%</td>
</tr>
<tr>
<td>Would be embarrassed to wear a hearing aid</td>
<td>36%</td>
<td>36%</td>
<td>20%</td>
</tr>
<tr>
<td>Do not admit I have a hearing loss in public</td>
<td>37%</td>
<td>36%</td>
<td>16%</td>
</tr>
<tr>
<td>They do not work well in noisy situations</td>
<td>36%</td>
<td>36%</td>
<td>16%</td>
</tr>
<tr>
<td>Have more serious priorities</td>
<td>33%</td>
<td>40%</td>
<td>16%</td>
</tr>
<tr>
<td>They do not restore your hearing to normal</td>
<td>34%</td>
<td>36%</td>
<td>16%</td>
</tr>
<tr>
<td>Hear well enough in most situations</td>
<td>29%</td>
<td>26%</td>
<td>15%</td>
</tr>
<tr>
<td>Have not had hearing tested yet</td>
<td>34%</td>
<td>40%</td>
<td>16%</td>
</tr>
<tr>
<td>Have tinnitus (ringing in ears)</td>
<td>33%</td>
<td>37%</td>
<td>16%</td>
</tr>
</tbody>
</table>
...and the market tells us small is trending upwards

![Graph showing trends in CIC/IIC, ITC/HS, and FS units from 2013 to 2020.]

**Why Customs?**

- Broad range of treatment (mild to profound)
- Bespoke, tailor made
- Nearly or completely invisible (CIC - IIC)
- Comfortable
- Attractive for first time users
- Easy to handle (1 piece), real all in one device
- Premium image
- Custom users are likely to repurchase (sticky clients)
- Localization
- Natural sound quality
- Increased max stable gain
- No (less) wind noise
- Easy phone use
- Highlight professionalism of the hearing care professional (HCP)
- Differentiation
Audiological candidacy

- Audiological
  - Mild to profound hearing loss
  - First time or experienced users
  - Typically it is recommended that the client have some hearing loss in the low frequencies
  - Better hearing in the low frequencies requires a larger vent for occlusion management
  - Overly enlarged vents may be more prone to feedback or not provide sufficient gain where it is needed

Anatomical candidacy

- The size of the ear canal is absolutely linked to the size of the final device
- Smaller ear canals provide less real estate for modeling devices deep into that space.
- Larger ear canals are helpful to model deeply fitting, discreet devices
- Select the receiver size according to:
  - Audiological requirement
  - Anatomical considerations
- Consider skin flexibility TFG
- Consider straight or curvy canal
Anatomical candidacy - Contraindications

- Very narrow or severely angled canals
  - Would a size 10 battery fit?
  - Test with Titanium FitGuide
- Very high cerumen production
  - Perhaps a slim tube or standard earmold is a more durable option
- Individuals with dexterity or neuropathy challenges
  - Consider larger ITE e.g. Full shell, ¾ shell, or half shell

Anatomical candidacy - What Product?

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CONTINUED
Ear impressions

• The ear impression is critical from the beginning for the size of the device, the perfect fit and wearing comfort
• Starting point for modeling process
What’s happening in the ear canal?

- Most movement at cartilaginous and boney junction
  - Longer impression allows for:
    - More deeply seated device
    - Less opportunity for feedback
  - Accurate representation of this junction with open mouth
    - Represent changes in EAC with movement*
    - Reduce remakes**


Impression requirements

- 2mm beyond second bend **even** for a full shell order
### 4 mm past second bend positively impacts remake

<table>
<thead>
<tr>
<th>Dispensers with low remake rate (n=215)</th>
<th>Dispensers with high remake rate (n=110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impressions with canals extended 4 mm past 2nd bend</td>
<td></td>
</tr>
<tr>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Data from Phonak UK database, 2019

### How do we ensure we get it all?

- Include 2\textsuperscript{nd} bend of ear canal
  - How?
    - Use cotton blocks*
    - Place 3-4mm medial to second bend
- Fill concha bowl
- Full helix
- No air bubbles or gaps
  - How?
    - Remove all debris from ear prior to taking impression
    - Use electric impression gun

*Or EVOB
Recommended ear impression equipment

Dreve
- Otoform A softX
- Injector & canulas
EasyView Otoblock
C&C wipes
Scissors
Foam or cotton otoblocks
- Small ears
Pen light
Otoscope

Clockwise starting at 9 o’clock

Considerations

- Impression material
  - Debate over low vs. high viscosity material
  - Low viscosity – can better represent EAC change with jaw movement*
    - Examples: 48ml cartridge (e.g. Silhouette, Silhouette Plus, Siliclone)
  - High viscosity – combined with open jaw impression can lead to decrease in remakes**
    - Examples: One-To-One (e.g. Silicone Singles, Silhouette Tub, SiliCast)
  - Shore value of at least 22 (S50 cartridges have shore value of 40)

- Injector
  - Infection control
  - Quality control
  - S50 cartridges medium viscosity

Considerations

- Give a full picture of the ear regardless of device size
  - Most common calls made to customers:
    - Canal too narrow/short
    - Concha bowl too shallow
- Remove all debris from the ear canal
  - Debris attached to the impression will be removed prior to scanning, leaving a gap in material
    - When gaps need to be filled this can lead to remakes
    - Multiple impressions can help determine whether “flaw” is truly a flaw or anatomical in nature

Impressions: Good vs Bad

- Good
  - Beyond 2nd bend
  - Shows path toward eardrum
  - Includes all anatomical structures
- Bad
  - No shape
  - Whipped cream effect
  - No canal

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Good impressions

• The ear impression length behind the second bend is complete.
• Otoblock is attached to the impression material.
• The impression is free of bubbles and wrinkles.
• The sealing areas are present (between tragus/antitragus, notches and first bend).
• The Cavum Concha and Cymba Concha are filled completely.

Difficulty with deep impressions?
EasyView Otoblock

1. Small
2. Medium
3. Large

The benefits of the EasyView Otoblock

- **Pathway** towards ear drum
- **Implements** canal length information
- **Vented** for comfort
- **Stays on the impression** while scanning
- **Used** with your impression material and specula
- For any type of custom impression
EasyView Otoblock vs standard otoblock

With EasyView: 6mm longer ear impressions!

Δ EasyView to standard otoblock impression (mm), n=22
The End Product

Deep ear impressions made easy.
Impression taking with EasyView

1. Select size (S, M, L)

2. Attach to speculum
Impression taking with EasyView

1. Select size (S, M, L)

2. Attach to speculum

3. Place Easyview and check the seal

4. Insert impression material
Recommendations

Specula

Compatible with all specula

Ø 2.4-3 mm

Best used with pediatric otoscope

EasyView not required for ordering Titanium

Remakes are inevitable, how can we be proactive?

- Time is of the essence
  - Phone calls made only when requested
  - RSM model will be reviewed with you if you wish

- Getting to the root of the issue
  - Anticipate information needed
    - Where is soreness occurring?
    - Is shell too tight or too loose?
      - Is shell slipping with jaw movement?
      - What type of impression was taken?

Expert tip: If a custom instrument is “walking out” it is often thought to be too loose when, in actuality, it could be walking out due to changes in ear canal shape when the shell is built too tight.
How the impression impacts the device build

Impression scanning
Every impression scanned

- First step in the modeling process
  - Impression provides overall picture of ear
  - Ear anatomy in entirety helps model even smallest devices
- Oto-block removed from the impression before scanning
- Multiple impressions for single patient can be stored

*Expert tip: Include two impressions when possible. Open mouth and closed mouth impressions can be blended for a better end result.*

**Biometric Calibration**
RSM

• Impression is sent to modeling after being scanned
• Creates a digital view of the custom product in the ear
  – Positioning of components
• More than a simple model
  – Vent calculation is derived
  – Calculations are made that affect fitting and programming parameters

• What does this mean for your patients?
  – Impression scans saved
  – Saves you and your patients time in the future

Acoustically Optimized Venting (AOV)

• Acoustically Optimized Venting
  – Individualized venting based upon shell size and audiogram thresholds
  – Integration of AOV into Target
• AOV directly affects fitting outcomes
• Sound quality may be affected due to missing AOV information
Additional venting options

- **Default venting**
  - Optimized for size and performance
  - Best for **size priority**

- **Additional ordering option**
  - Optimized to reduce occlusion
  - Best for **comfort priority**

Receiver Placement

- Consider length of instrument
- Consider direction of second bend
  - Sound quality poorly affected if second bend is not accounted for

*Expert tip: If your patient hears better with instrument pulled slightly out of the ear, this is a clue the direction of the sound bore may need to be changed.*
Receiver size implications
The more powerful the receiver, the more space is required

RSM allows us to build the canal, but ....
1. Impression scanned – Note short canal
2. Build up needed to accommodate device
3. Build up extends canal based on original impression
4. Actual ear canal narrows, red spots show excessive material on built up device

...we still cannot know exactly what the ear canal shape may be.
What about challenging ears?

What about retention with challenging ears?

- Individualized solutions
  - Open mouth vs. closed mouth impressions
  - Blending
  - Canal lock
  - Rim of concha bowl
  - Soft coat
  - Retention ring/Barber pole

- Expert tip: Fill entire concha bowl and include outer ear anatomy (i.e. intertragal notch, top of tragus, helix, etc.) even when ordering smaller devices. A full picture of the ear will help create a better product and a happier patient.
The challenge with impressions

Ear impressions are static but ear canals are flexible.

Introducing the Titanium FitGuide

Taking this flexibility into account enables deeper fitting and more discreet hearing aids.
Titanium FitGuide

Indicates how deep a Virto B-Titanium can be placed comfortably

Introducing the new even more discreet Phonak Virto™ B-Titanium
What are the benefits?

The new Titanium FitGuide gives more than 50% of people a deeper fitting Virto B-Titanium by an average of 2.5 mm.

Benefits explained: Results from Validation

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Benefits explained: results from study at PARC

Improvement in depth with Titanium FitGuide (compared to standard modeling)

2.9 mm average

Subjects

- 15 subjects included in the study
  - 10 male
  - 5 female
  - Average age 70 with range of 52-82 years
  - 6 new hearing aid users
  - 9 experienced hearing aid users
Results: Comfort

Wearing comfort in general; P-receiver only

<table>
<thead>
<tr>
<th></th>
<th>Bad</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Titanium (n=28 ears)</td>
<td>0%</td>
<td>7%</td>
<td>11%</td>
<td>71%</td>
<td>9%</td>
</tr>
<tr>
<td>Titanium (n=26 ears)</td>
<td>0%</td>
<td>3%</td>
<td>19%</td>
<td>62%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Handling of insertion; P-receiver only

<table>
<thead>
<tr>
<th></th>
<th>Very Easy</th>
<th>Easy</th>
<th>Neither</th>
<th>Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Titanium (n=28 ears)</td>
<td>14%</td>
<td>46%</td>
<td>4%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Titanium (n=26 ears)</td>
<td>12%</td>
<td>41%</td>
<td>4%</td>
<td>12%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Results: Comfort Cont’d:

Wear test device for at least 8 h w/o discomfort? P-rec

<table>
<thead>
<tr>
<th></th>
<th>Yes, both</th>
<th>left only</th>
<th>right only</th>
<th>No, both</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Titanium (n=14)</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Titanium (n=13)</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

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Benefits for everyone!

• Patients get the discreet devices they want  →  Smaller, more discreet devices
• Determine IIC candidacy  →  In-office indicator of visibility
• Assess tolerance of deep fitting  →  Feel for depth of hearing aid
• Expectation management for patients before order  →  Expectation and ownership of comfort
• Confident recommendations  →  Confident purchase
• Potentially less trouble with comfort and remakes

Benefits of the Titanium FitGuide for you

Benefits of the Titanium FitGuide for your patients
Which patient can benefit most from the Titanium FitGuide?

1. New users with a priority on size
2. Stenotic canals
3. Very soft ear texture
4. All existing users who want a more discreet solution

Benefits of Titanium FitGuide

Before TFG

After TFG
Benefits of Titanium FitGuide

Before TFG

No AutoVent detected

After TFG

4 mm deeper with TFG

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Continued
The occasional reality of the customer journey

- Small ear canal
- Higher power needs
- Expectation management

- Occlusion
- Feedback
- Unmet expectations
- Discomfort

- Fine tuning
- Remake
- At risk of return

- "I've never been happy"
- "These don't work for me"
- Repair
- Return
- Unreliable
The ideal customer journey

- Hearing aid evaluation
- Hearing aid delivery
- First follow-up
- Maintenance

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Ear Scanning

- Custom hearing aids are highly desired by clients and are an opportunity to differentiate
  - For many potential new users, ‘invisible’ is considered the only option
- Custom hearing aids are a highly viable alternative to RICs and is likely to generate new clients rather than cannibalize those happy to accept a post-aural option
- Improvements in measurement and production techniques fill facilitate the process
Questions