

Introduction to Earmold Impressions

This guide will provide information about earmold impressions so that they can be performed in the next guide, *Earmold Impressions*.

Earmold impressions (EMI's) are a cast of the ear and are used for various purposes including hearing aids, sleep plugs, hearing protection, pressure equalizing plugs, musician plugs, swimming plugs, communication devices, and in-ear monitors.

Earmold impressions are an important part of the services hearing healthcare providers offer. Not only is it important to simply execute the skill but to also do it well since it reduces the chance for remake, provides more information for the manufacturer to use (i.e. the direction of the eardrum), improves retention, minimizes the chance for feedback, increases patient satisfaction, aesthetics, and, of course, demonstrates professional skills.



Considerations for Earmold Impressions

Case History	<ul style="list-style-type: none"> • Medications • Medical conditions • Previous experience • Other considerations (i.e. dexterity)
End User	<ul style="list-style-type: none"> • Adult • Pediatric
End Use	<ul style="list-style-type: none"> • Custom hearing aid • CIC or IIC • Mold for BTE or RITE • Other custom product • High-gain hearing device
Impression Characteristics	<ul style="list-style-type: none"> • Depth required • Open jawed • Closed jawed

Impression Material

- Type
- Shore
- Viscosity
- Stress Relaxation
- Contraction Ratio
- Tensile Strength

Open vs. Closed-Jaw Impressions Considerations

Open	Closed
Deep seated hearing aids (i.e. CIC)	Less severe hearing loss
Dental/Jaw considerations (i.e. missing back teeth, TMJD, denture fit)	Canal shape not impacted by jaw movements
High-gain custom hearing aid	
Earmold coupled with a high-gain hearing aid	
Remake required (i.e. fit issues, feedback, etc.)	

Earmold Impression Materials

There are three types of impression materials:

1. Acrylic/Powder & Liquid

- Combine a powder and a liquid (i.e. methyl methacrylate)
- Sets quickly
- May distort during removal from ear
- Short shelf life
- 2-5 % shrinkage begins in about 1 week
- Climate and heat impacts stability: hot weather can cause distortion and melting
- Care required when shipping to manufacturer: glue down and pack properly

2. Condensation Cured/ C-Silicone

- Example: Dimethyl-siloxane
- Combine a putty with an activator from a tube at a 10:1 ratio
- 0.5% shrinkage

3. Addition-cured/ A-silicone

- Example: Polyvinylsiloxane
- Mix two putties at a 1:1 ratio
- Widely available in pre-measured packages, bulk containers, and cartridges for impression guns
- Low impression shrinkage about 0.1%
- Flexible/elasticity with removal
- Stable

Good to Know

The colour of the impression material does not indicate the type or characteristics. For example, a green silicone from one manufacturer may have different characteristics (i.e. viscosity) than the same colour from another manufacture.



Earmold Impression Material Characteristics

After-Mix Viscosity *most important characteristic	The ease at which the material flows out of the syringe <ul style="list-style-type: none"> ● Higher viscosity=firm/dense <ul style="list-style-type: none"> ○ Severe hearing losses ○ Snug fit ○ Ear hair (will not get stuck in material) ● Low viscosity=soft <ul style="list-style-type: none"> ○ Deep impressions ○ Less severe hearing losses
Dimensional Stability/ Contraction Ratio	Material shrinkage
Stress Relaxation	The ability of the impression to regain its shape after being twisted and stretched during removal from the ear

Tensile Strength	The strength of the material to stay together and not tear during removal
Shore Value/After-Cure Hardness	The ease at which the impression is removed from the ear; not the same as viscosity and this value is not often used. <ul style="list-style-type: none">○ High value=firm○ Low value=soft
Effectiveness of Release Agent	Prevents material from adhering to the ear and produces an oily residue

Earmold Impression Complications

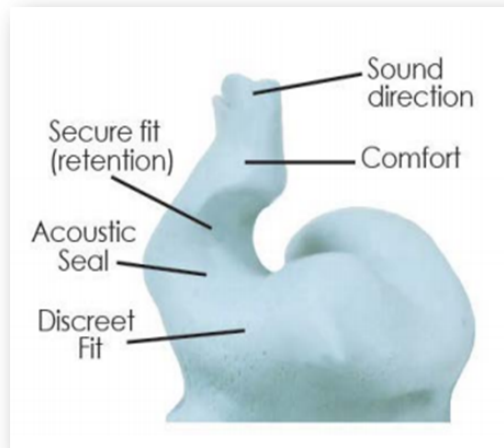
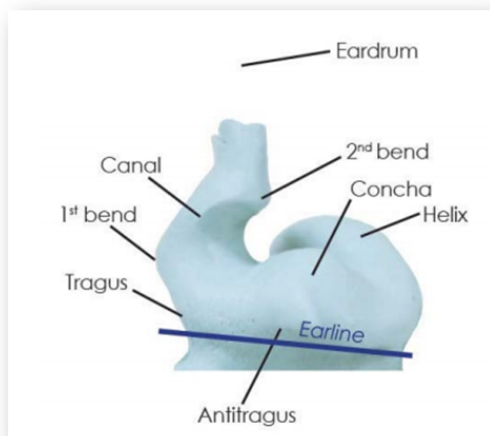
Due to the potential risk of harm, obtaining informed consent and ensuring that you possess the competencies to perform this task is vital. If a complication arises, it may be necessary to refer to Otolaryngology or a Family Physician.

- Impression material in middle ear space
- Tympanic membrane perforation
- Disturb surgical areas/procedures such as PE tube, mastoidectomy
- Trauma to skin or tympanic membrane
- Irritate skin
- Impact cerumen
- Vasovagal response
- Aggravate certain conditions such as Meniere's disease



College of Speech and Hearing Health Professionals [CSHBC], 2018

Parts of an Earmold Impression



CSHBC, 2018

Considerations for a Custom Mold for a RIC

- Secure fit/Prevent loss
- Customized fit to a non-custom hearing aid (i.e. RIC/RITE)
- Comfort
- Dexterity concerns
- Ease of use (i.e. cleaning and maintenance)
- Non-custom ends do not fit properly (i.e. domes)
- High gain
- Feedback
- Surgical ear
- Personalization (i.e. colour, name)
- Aesthetics (i.e. discreet)



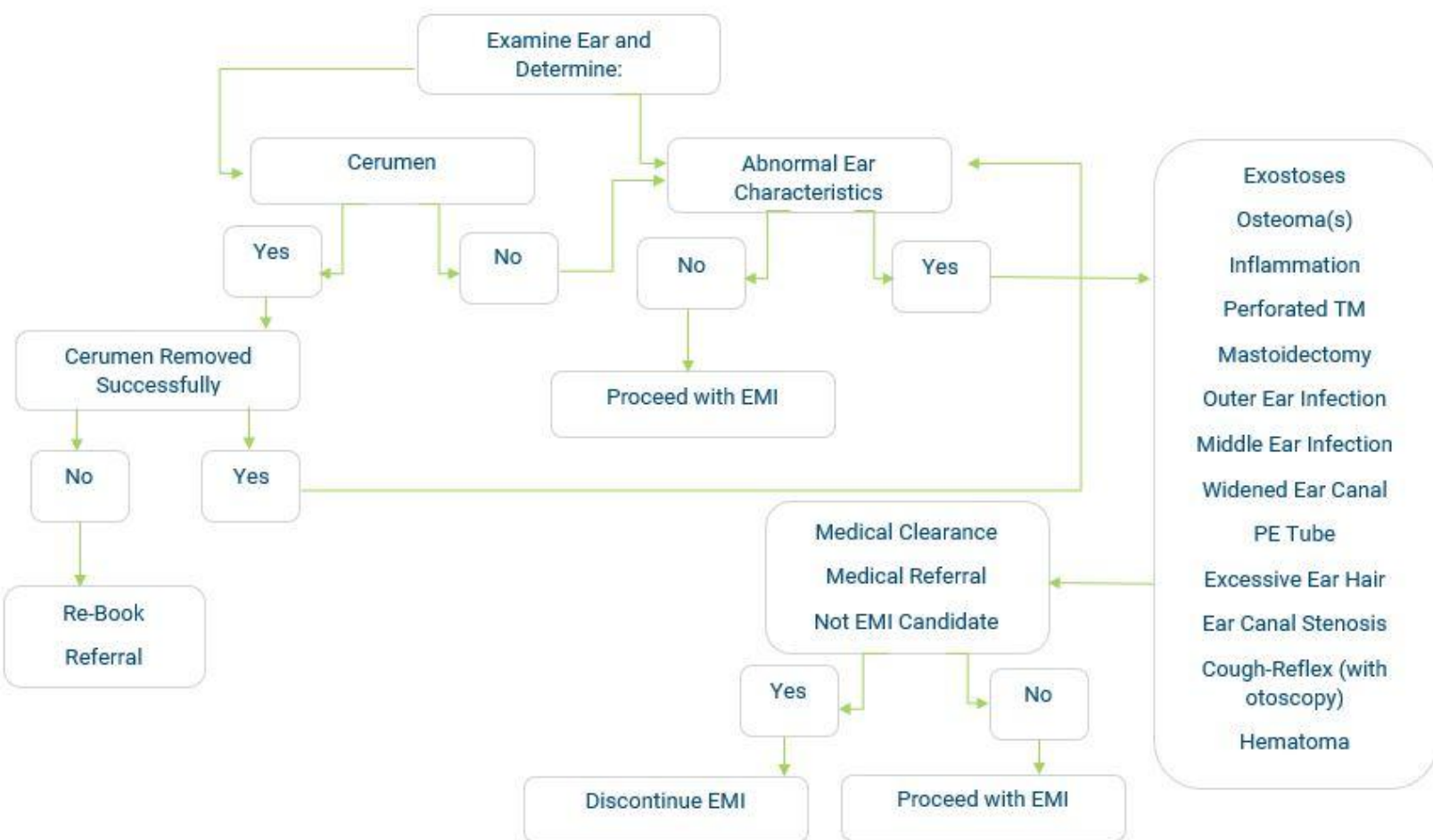
Oticon, n.d.

Before You Begin

Before you begin, it is important that you and your patient are positioned/seated comfortably.

Earmold Impression Procedure & Considerations

1. **Otoscopy:** Examine the ear thoroughly. Refer to the flowchart below.



- 2. Otoblock Selection & Placement:** The otoblock prevents impression material from reaching the eardrum. When selecting the size and type of otoblock consider the following:
 - Too small: material will flow past
 - Too big: uncomfortable or limit depth of impression
 - Foam: takes up more space (less information about the ear) and is more abrasive
 - Cotton: modifiable and comfortable for deep impressions. When doing a deep impression (i.e. CIC or IIC), consider using a cotton block with a pressure-relief tube.
 - Phonak Easy View Otoblock: allows for visualization of tympanic membrane during placement

- 3. Impression Material Selection & Mixing:** Refer to the earmold impression instructions provided by the manufacturer to ensure proper usage.
 - Try using a spatula and mixing plate to mix the material since it can be adversely affected by manipulating it in your hands by raising its temperature and introducing substances that are on your skin.

CARL earmold impression ears do not require lubrication.
Regular CARL ears (translucent or regular) require the use of lubrication such as, Vaseline, on all surfaces that will come into contact with impression material.



4. Taking an Impression

- As the ear fills, the material will flow back onto tip, when there is about 6mm (Dillon, 2012), start to slowly remove syringe laterally while maintaining pressure and keeping the end of syringe surrounded in the material
- Do not use excessive pressure

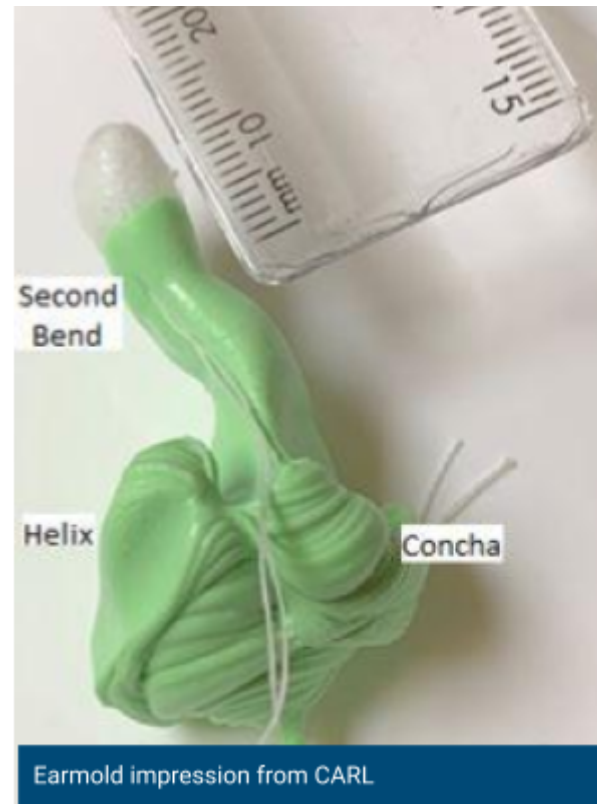
5. Inspect Ear & Impression:

After removing the impression, check the ear with the otoscope. Examine impression:

- Past second bend
- Free from air pockets, creases, underfilled areas
- Connected to otoblock
- Includes all anatomical structures (i.e. helix)

6. Document & Complete Order

7. Proceed to Next Guide: *Creating Earmold Impressions*



Earmold Impressions

If you are new to earmold impressions, make sure to review the lesson, *Introduction to Earmold Impressions*, for important background information.

Materials

- CARL
- CARL EMI ears
- Illumination
- Earlight/Penlight with tip
- Impression material
- Selection of otoblocks/dams
- Impression syringe
- Impression gun and accessories

Learning Outcomes

- Effectively use bracing techniques during otoscopy and earmold impression stages
- Utilize techniques to create earmold impressions
- Understand earmold impression process/stages

Consent

Prior to engaging in any procedure, you must obtain informed consent from the client. For more information, consult with your licensing body.¹



¹ Obtaining consent by the College of Audiologists and Speech-Language Pathologists (CASLPO)
http://www.caslpo.com/sites/default/uploads/files/GU_EN_Obtaining_Consent_for_Services.pdf

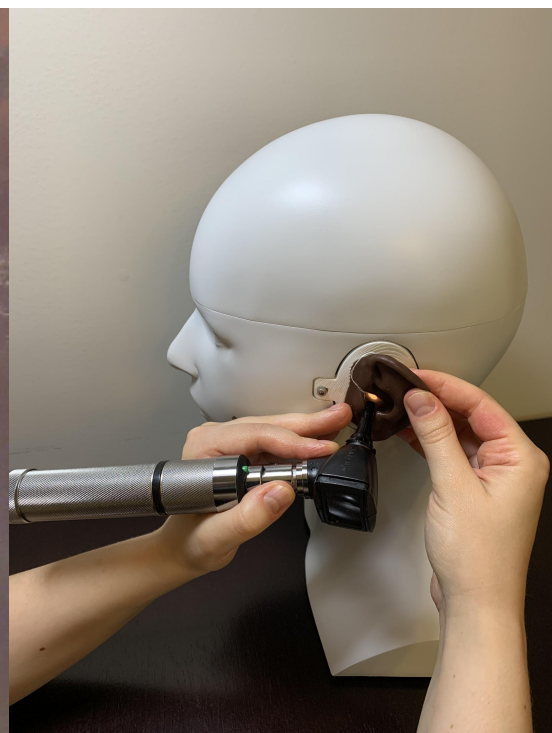
Procedure

Step 1: Otoscopy

1. Perform otoscopy using techniques from *Otoscopy Quick-Guide*.
 - During the ear examination work through the flow chart found in the *Introduction to Earmold Impressions Quick Guide*.

Step 2: Otoblock Selection & Placement

1. Use the otolight to carefully place an otoblock in the correct position, ideally past the second bend, about 5 mm², especially for a deep-fitting hearing aid.
 - Pay attention to the amount of ease it takes to position the otoblock; easier insertion may indicate a widening in the canal which could make it difficult to remove the impression.
2. Using otoscopy, check that the otoblock is positioned at the proper depth and that there are no spaces where impression material can flow through.



Place

Check

² Dillon, H. (2012). Hearing aid earmolds, earshells and coupling systems. In *Hearing aids* (2nd ed., pp. 127-169).Boomerang Press.

Step 3: Impression Material Selection & Mixing

1. Select impression material, mix completely, and quickly, according to the manufacturer's guidelines.
2. Place impression material into the syringe and ensure the plunger stopper is at the plunger tip. Push plunger stopper until material has reached the end of the syringe.

Step 4: Taking an Impression

1. Using proper bracing techniques, insert the tip of the syringe into the ear canal without plugging the canal. Inject the material into the canal with constant but not excessive pressure and small, circular motions to fill the canal, concha, tragus and helix areas.
 - As the ear fills, the material will flow back onto the tip. When there is about 6mm³, start to slowly remove the syringe laterally while maintaining pressure and keeping the end of the syringe surrounded in the material.
2. Allow the material to harden, around 5-10 minutes (refer to the manufacturer's instructions).

Tip: If making an ITC or ITE while material is soft, you can use an edge to make a horizontal indent in the impression to assist manufactures with the placement of the directional microphone ports.

3. Check if the impression is completely hardened by using a fingernail; if no mark is made then it is ready to be removed.
4. Gently move pinna in a circular motion while removing the impression first by releasing the helix and rotating the Impression forward toward the patient's nose.

Tip: Instruct the patient to open and close their jaw to relieve pressure especially for deep Impressions.



³ Dillon, H. (2012). Hearing aid earmolds, earshells and coupling systems. In *Hearing aids* (2nd ed., pp. 127-169).Boomerang Press.



Step 5: Inspect Ear & Impression

1. After removing the impression, check the ear with the otoscope.
2. Examine impression and check for the following:
 - ✓ Past second bend
 - ✓ Free from air pockets, creases, & underfilled areas
 - ✓ Connected to otoblock
 - ✓ Includes all anatomical structures (i.e. helix)

Step 6: Document & Complete Order

1. Document procedure, as outlined by your licensing body.
2. Complete manufacturer order form (optional)

Step 7: Repeat Procedure on the other side and then try the *Earmold Impressions: Case Studies* lesson.

