

CARL

Lesson – Cerumen Management

This lesson is appropriate for:

Professionals and student clinicians in medicine, physician assistant, nursing, audiology, and hearing instrument specialist

Lesson Overview

Simulated cerumen management using CARL:

- Provides a safe practicing environment which allows the student clinician to become more **comfortable** and **experienced**
- Increases the amount of training and experience clinicians have which can **strengthen** their skills and **improve** the possibility of successful cerumen management
- Allows student clinicians to work **independently** without the need for direct supervision
- Allows students to take **ownership** of their learning and **reflect** on the skills that need to be improved
- Promotes continued **development** of the essential skills and attributes required in healthcare
- Provides **unlimited** learning since CARL never gets tired and is always available
- **Reduces** the need for infection control products

Lesson Objectives

Student clinicians will:

- Obtain consent by providing information regarding the nature, benefits, risks, alternatives, and consequences of otoscopy, irrigation, and manual techniques
- Improve critical thinking skills to determine best outcomes using a specific technique with minimal risk of harm
- Practice proper force and bracing techniques involved with otoscopy and cerumen removal
- Remove a cerumen-like substance using manual techniques and irrigation
- Create comprehensive chart-notes based on session

Lesson Prep

- Prepare scripts for student clinicians on instructions they are to give to CARL for otoscopy and cerumen removal using different techniques
- Review: infection control guidelines, ear anatomy including cranial nerves, epidemiology, cerumen management tools and devices, obtaining a thorough case history including modifying factors and symptoms of cerumen impaction, potential risks of harm, emergency protocols, government regulations, and regulatory college practice standards and regulations including professional liability insurance

Lesson Prep

Other Relevant Lessons:

- For practice using an otoscope refer to the lesson: Intro to Audiometry and Occupational Hearing



Lesson Prep: Materials and Equipment

- CARL
- Different CARL ears
- CARL Patient Chart
- Illumination using different light sources
 - Otoscope
 - Electric headlight
 - Video otoscope
 - Operating microscope
- Aural specula
 - Plastic
 - Metal



- Aural forceps
- Currettes
 - Stainless steel
 - Plastic
- Irrigation equipment with emesis basin
 - Electric
 - Manual
- Suction Machine
- Suction Tips
- Simulated earwax
 - Pre-made
 - Home-made



You can follow along with the workbook

- The workbook contains:
 - Extra materials
 - Exercises
 - Name the equipment
 - Reflection
 - And more...
 - Case studies to practice
 - Keep your notes in one place



For the workbook, go to:

<https://www.aheadsims.com/carl-lesson-plans>

Remote Learning/Additional Practice

- Students can continue to improve their skills anywhere using the AEar
- Students can practice:
 - Otoscopy
 - Cerumen management
 - Probe tube placement
 - Hearing aid physical fit
 - Earmold impressions
 - Custom and non-custom earmold fit
 - Foreign-body extraction
- Additional hands-on learning
- Contact info@aheadsimulations.com



*Materials not included

Lesson Extensions

- Over-the-counter (OTC) cerumen management
 - Example: cotton swabs, Earigate, ear bulb syringe
- Foreign bodies in the external ear canal (i.e. hearing aid dome, hearing aid battery, cotton swab tip)
- Earmold impressions
- Proper fit, insertion, and removal of hearing aids, earmolds (i.e. hearing aid, noise, swim, musician, and sleep)

Introduction to Cerumen Management

- Cerumen is a naturally occurring substance produced in the cartilaginous portion of the external auditory meatus
- Excessive or occluding earwax is found in:
 - 13% of Canadian adults (Feder et al., 2015)
 - 11% of 20-39 year olds and 21% among 70-79 year olds (Feder et al., 2015)
 - 17% of Canadian children and adolescents (Feder et al., 2016)
- Symptoms of cerumen impaction include tinnitus, aural fullness, otalgia, cough, and hearing loss (Schwartz et al., 2017)

Introduction to Cerumen Management

- Cerumen management is the act of removing cerumen or ear wax from the external auditory canal
- Presence of cerumen can impact various tests including otoscopy, immittance, audiometry, electrocochleography, auditory brainstem response, caloric testing, and real-ear measures (Schwartz et al., 2017)
- Cerumen can also impact earmold impressions, earmold fittings, and hearing aid fittings
- There are several techniques that can be used to remove cerumen
- Discussed in the proceeding slides are manual techniques including curette and suction, and irrigation

Simulated cerumen

Making your own and pre-made

What can be used to simulate cerumen?

- Play Dough
 - Very soft
 - Possible uses: Irrigation
 - Pro: can make at home
- Sticky Tack
 - Soft and pliable
 - More structure than playdough
 - Possible uses: curette, irrigation
 - Pro: often found in clinics and works best for curette
- Banana
 - Very soft
 - Possible uses: Suction and irrigation
 - Pro: inexpensive
- Slime
 - Semi-liquid
 - Possible uses: Suction and irrigation
 - Pro: can make at home
- GT Simulations Ear Wax
 - Costly
 - Shipping time
 - Pro: Premade
- Heartzap Simulated Ear Wax
 - Costly
 - Shipping time
 - Pro: Premade
- Experiment with other materials

Home-Made Cerumen

Two-Ingredient “Play-Dough”

- Ingredients
 - Cornstarch
 - Baby lotion or hair conditioner or dish soap
 - Optional: food colouring
- Directions
 - In a bowl, mix first two ingredients.
 - Experiment with portions; more cornstarch will make it more crumbly.
 - Optional: Add few drops of food colouring so it shows up better on the camera

Note: this will dissolve if used for irrigation



Equal amounts of cornstarch and baby lotion



Very thin consistency;
inconsistent with
cerumen

Extra cornstarch added



Very soft and crumbles
easily into small pieces.
Place into ear with hands;
too thick for syringe

Home-Made Cerumen

Soft Sticky Tack

- Ingredients
 - Sticky Tack
 - Lotion or hand soap (foam works best)
- Directions
 - Add a small amount of lotion or hand soap to the sticky tack and combine
 - Add more lotion to make the sticky tack softer and stretchy
 - Optional: Add beads or other elements to give texture

This is a great option since its readily available, low cost, and can be manipulated to make some different textures.

Quick and easy recipe



Softened sticky tac with cream of wheat added for texture

Otoscopy

Step 1

Otoscopy

Procedure

- Provide instructions to CARL
- Inject/deposit simulated earwax into ear canal
- Using otoscopy techniques previously practiced, assess the amount, location, and consistency of the simulated earwax and determine the best technique for removal

Demonstration



Determine best treatment option which may include a combination of the following:

Observation, cerumenolytics, manual removal, irrigation, or medical referral

Consider the Risks

All techniques pose a risk to the patient especially when they are not used properly

Before you begin: Positioning

Important that you and your patient are positioned/seated comfortably

Continually Assess



Manual Removal: Curette, Forceps, & Hook

Option 1

Curette

Advantages

- Low-tech
- Inexpensive
- Effective
- Convenient
- Portable
- Low space requirement
- Acceptable for the use in patients that have certain modifying factors that preclude the administration of other techniques
 - May reduce risk of infection by not exposing the ear to moisture (McCarter et al., 2007)

Potential Risks/Drawbacks

- Tympanic membrane perforation
 - Hearing loss
- Otolgia
- Injury to ear canal
 - Laceration
 - Bleeding
 - Pain/Discomfort

Curette

Procedure

- Provide instructions to CARL
- Select light source and appropriate curette, forceps, and/or hook based on consistency and degree of cerumen impaction:
 - Currettes: Buck, Shapleigh, Billeau, Lucae
 - Forceps: Alligator
 - Hooks: Day, Lucae
- According to Bankaitis (2013), the larger the occlusion, the smaller the surface area of the instrument's tip
- If the wax is not occluding and there is an open space, place the tip of curette in the opening and gently remove debris laterally

Procedure Continued

- If the wax is occluding, try to create an opening by breaking off pieces of wax using a hook (i.e. Day hook)
- During cerumen removal, you may need to switch to a different size or type of curette, or a different technique
- No leveraging (Bankaitis, 2013). It is important to avoid too much pressure/force and dragging the instrument along the canal wall as this would be uncomfortable/painful to a real patient
- Tip: a metal speculum can be used to focus light into the canal (Purdy, 2002) and to improve accuracy (Wilson, 1997)



**Sticky tac with metal speculum and Bionix
microloop curette (painted black for
demonstration)**



Hartmann speculum



**Hartmann speculum with Bionix lighted
curette**

Manual Removal: Aural Suction

Option 2

Aural Suction

Advantages

- Effective
- Portable option available
- Acceptable for the use in patients that have certain modifying factors that preclude the administration of other techniques
 - May reduce risk of infection by not exposing the ear to moisture (McCarter et al., 2007)

Potential Risks/Drawbacks

- Expensive
- Maintenance
- Bulky
- Injury to ear canal
 - Laceration
 - Bleeding
- Perforated tympanic membrane
- Nystagmus and vertigo (Schwartz et al., 2017)
- Loud noise
- Sound may startle patient
- Pain/Discomfort

Aural Suction

Procedure

- Best for very soft or semiliquid cerumen (Wilson, 1997)
- Provide instructions to CARL
- Optional: Use the largest aural speculum possible for comfortable placement in the ear canal
- Select light source and appropriate suction tips
- Have warm water nearby to unclog instrument
- Tip: a metal speculum can be used to focus light into the canal (Purdy, 2002) and to improve accuracy (Wilson, 1997)



Irrigation

Option 3

Irrigation

Advantages

- Various options
 - Manual or electric versions
- Various cost options
- Effective
- Convenient
- Portable
- Minimal space requirement

Potential Risks/Drawbacks

- Limitations in patients that have certain modifying factors
- Tympanic membrane perforation
- Patient discomfort with water in ears
- Hearing loss
- Otalgia
- Temporal bone osteomyelitis
- Injury to ear canal
 - Laceration
 - Bleeding
 - Pain
- Tinnitus
- Otitis externa
- Otitis media
- Vertigo

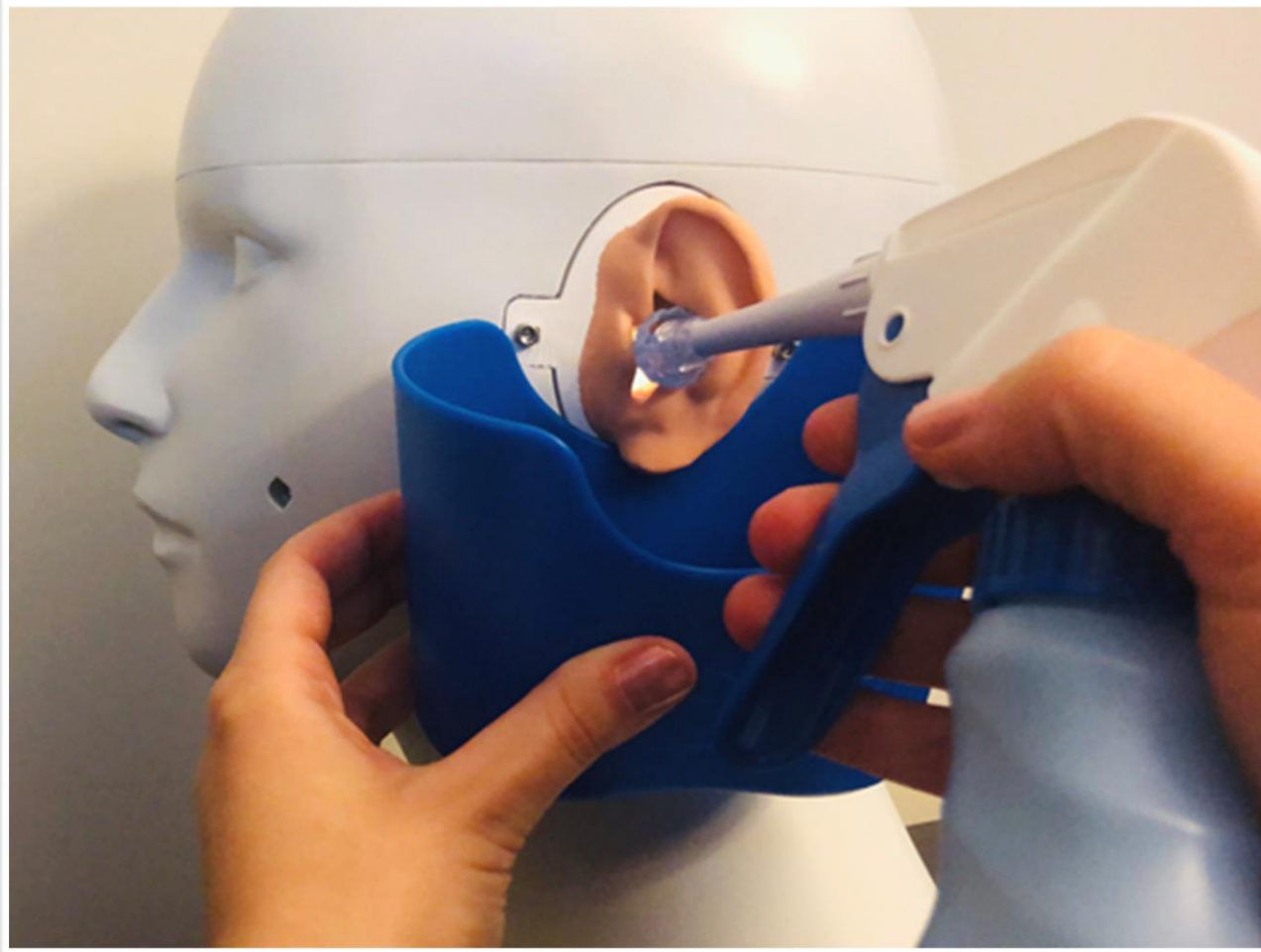
Irrigation

Procedure

- **Before you begin**, run water in CARL's ear to ensure there are no punctures from other exercises
- Provide instructions for CARL
- Place towel under emesis basin
- Basin should be placed directly under ear and against head
- Place tip of irrigation tool in the ear and gently irrigate using warm water to prevent caloric-reflex

Procedure Continued

- Do not insert too far so that the water will be able to drain out and to avoid pressure from building up
- Do not direct stream at the eardrum
- Check progress every 20-30 seconds using otoscopy (Wilson, 1997), continue to assess whether an alternative technique is required



Bionix Otoclear Spray Wash with Basin

Exercises

Exercises

- Experiment with different light sources when using manual techniques and reflect on cost, ease of use, brightness, magnification, and clarity.
- Evaluate and rank different aural irrigators. Consider: Ease of use, cost, patient comfort, potential risk of harm.
- Try various curettes, forceps, and hooks. Reflect on whether certain instruments were preferable.
- Thoroughly document session in CARL patient chart

Evaluating Competencies

At the end of this lesson, professionals and student clinicians should be able to:

- Examine the external auditory canal before, during, and after intervention
- Effectively use bracing techniques during otoscopy and cerumen removal
- Know the different types of cerumen management techniques
- Distinguish between the different types of equipment
- Use critical thinking to determine best/safest technique
- Understand how to operate different equipment

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