CSOM Long Case

Understanding Chronic Suppurative Otitis Media (CSOM) – An Overview.

Chronic Suppurative Otitis Media (CSOM), also referred to as Chronic Otitis Media (COM), is a persistent infection affecting a part or whole of the middle ear cleft, characterised by ear discharge lasting at least **two weeks and a permanent tympanic membrane (TM) perforation**. This condition is a significant cause of hearing impairment and can lead to serious intracranial and extracranial complications if not managed appropriately. Therefore, understanding CSOM comprehensively is paramount for all medical students and aspiring ENT specialists. This chapter provides a detailed, exam-focused approach to CSOM, covering history taking, examination, diagnosis, and management, along with high-yield points and practice questions.

Types of CSOM:

1. **Tubotympanic (Safe) CSOM:** This type remains localised to the mucosa of the anteroinferior part of the middle ear cleft, involving the eustachian tube and mesotympanum, and is associated with a **central perforation**. It is considered "safe" because it generally does not involve bone erosion and thus has a lower risk of serious complications. However, it can still cause significant hearing loss.
2. **Atticoantral (Unsafe) CSOM:** This more aggressive form involves the posterosuperior part of the middle ear cleft (attic, antrum, posterior tympanum, and mastoid). It involves the pars flaccida or posterior-superior quadrant of the pars tensa, often leading to a **marginal or attic perforation**. Atticoantral disease (AAD) is characterised by bone erosion caused by cholesteatoma, granulations, or osteitis. AAD type is often termed "unsafe" or "dangerous" due to its high risk of complications, including hearing loss, vestibular dysfunction, facial paralysis, and intracranial infections.

Understanding the distinctions between these two types is crucial for accurate diagnosis and effective management, both of which are essential for achieving optimal patient outcomes.

Table: Differentiation between Safe and Unsafe CSOM

Feature	Tubotympanic (Safe) CSOM	Atticoantral (Unsafe) CSOM
Pathology	Mucosal disease, inflammation of mucoperiosteum	Cholesteatoma (epidermal cyst), bone erosion, granulations
Perforation	Central	Marginal, attic (pars flaccida)
Discharge	Mucoid/mucopurulent, non-foul smelling, profuse, intermittent	Purulent, foul smelling (fetid), scanty, often continuous
Hearing Loss	Conductive (often mild to moderate)	Conductive (often moderate to severe), mixed if labyrinth involved
Ossicular Chain	Intact or partially eroded	Often eroded, especially long process of incus and stapes suprastructure
Granulations/ Polyps	Less common, usually indicate secondary infection	Common, often indicative of cholesteatoma
Complications	Less common, mainly hearing loss, occasional facial palsy	Very common, high risk of intracranial and extracranial complications
Treatment	Primarily medical, surgery (tympanoplasty) for chronic cases/hearing improvement	Primarily surgical (mastoidectomy) to eradicate disease and prevent complications

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Basic Scheme of History Taking of CSOM Long Case

1. Personal particulars
2. Chief complaints with duration
3. History of present illness
4. Past history
5. Drug history
6. Personal history
7. Family history

1. Personal Particulars

- **Significance of Name:** Essential for patient identification, maintaining records, and forming a rapport with the patient.
- **Significance of Age:** Certain diseases are more commonly found in certain age groups; therefore, it is useful to make a differential diagnosis. For instance, *Younger age:* AOM, Foreign Bodies, Epistaxis due to nose picking. *Adolescent age:* JNA; *Older age:* Presbycusis, carcinomas.
- **Significance of Sex:** Some conditions have a gender predilection; therefore useful to make a differential diagnosis. For example, otosclerosis is more common in females, whereas juvenile nasopharyngeal angiofibroma (JNA) primarily affects males.
- **Significance of Religion:** Relevant for understanding dietary habits or cultural practices that might influence health or treatment choices (e.g., consanguineous marriages increasing the risk of congenital sensorineural hearing loss).
- **Significance of Occupation:** Certain diseases are more commonly found in certain occupations. *Noise-induced hearing loss* is found more commonly in construction workers and workplaces with loud noises. *Vocal nodules* due to voice abuse are more commonly found in professions such as teaching, singing, and hawking.
- **Significance of Address:** Geographic location can sometimes correlate with certain endemic diseases, such as rhinosporidiosis is more common in Jharkhand, Chhattisgarh, Madhya Pradesh and West Bengal.

2. Chief Complaints with Duration: Chief complaints should be in chronological order, i.e. the complaints that came first will be written first. This approach helps in understanding the progression of the disease.

Example:

- Right ear discharge for 5 years
- Decreased hearing for 1 year

3. History of Present Illness (HPI): This is the most critical part of the history, detailing the evolution of each chief complaint. Elicit precise characteristics of each symptom to differentiate between types of CSOM and potential complications.

A. Ear Discharge (Otorrhea): Inquire about the following characteristics:

- **Onset:** *Gradual*: CSOM; *Sudden*: AOM or a ruptured tympanic membrane from trauma.
- **Duration:** *Acute* – <3 weeks; *Subacute* – >3 weeks to <3 months; *Chronic* >3 months.
- **Progression:** *Progressive* in CSOM; *Non-progressive* in ASOM
- **Nature/Consistency:** *Watery*: CSF otorrhoea or otitis externa; *Mucoid/Sticky white*: Safe CSOM; *Mucopurulent/Sticky yellowish:* AOM or safe CSOM with secondary infection; *Purulent/Yellow, non-sticky frank discharge:* Unsafe CSOM or malignant otitis externa; *Cheesy/Foul-smelling:* Highly suggestive of cholesteatoma (unsafe CSOM).
- **Colour:** *White:* Fungal infection; *Yellow:* Bacterial infection; *Green:* Pseudomonas infection; *Blood-stained:* Granulation tissue or polyps, often seen in unsafe CSOM, or trauma.
- **Amount:** *Profuse:* Safe CSOM, when it is coming out of the ear; *Scanty:* Unsafe CSOM, where drainage might be obstructed by cholesteatoma or granulations, or when discharge is seen only upon cleaning the ear.
- **Smell:** *Non-foul smelling:* Safe CSOM; *Foul-smelling (fetid/putrid):* A hallmark of unsafe CSOM (cholesteatoma) due to bone erosion and later on putrifaction of the bone. This is a very significant differentiating factor.
- **Aggravating/Relieving Factors:** *Aggravated by URTI:* Common in CSOM, as infection can spread from the nasopharynx via the Eustachian tube; *Relieved with medication:* Safe CSOM usually gets relieved with medication, while Unsafe CSOM is usually not relieved with medication
- **Associated Symptoms:** Any preceding events, trauma, or treatment taken for the discharge.

B. Decreased Hearing (Hearing Loss): A detailed inquiry into hearing loss is crucial for assessing its type, degree, and impact on the patient's life.

- **Onset:** *Gradual:* Common in CSOM, presbycusis, or otosclerosis; *Sudden:* May indicate viral infection, ototoxic drug exposure, or temporal bone fracture.
- **Duration:** How long has the patient noticed a hearing impairment?
- **Progression:** Is the hearing loss progressive (e.g., CSOM, presbycusis, Meniere's disease)?

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- **Unilateral/Bilateral:** *Unilateral:* Suggests CSOM, acoustic neuroma, or herpes zoster oticus; *Bilateral:* Points towards presbycusis, Meniere's disease, or otosclerosis.
- **Effect of Discharge:** *Increased hearing loss with discharge:* Indicates active inflammation or flaring up of the disease; *Decreased hearing loss with discharge:* Suggests ossicular discontinuity, where the discharge might act as a conductive medium, improving sound transmission. This is an important historical clue.
- **Paracusis Willisii:** Does the patient hear better in noisy environments? This is a classic symptom of otosclerosis, where competing background noise makes the speaker raise their voice, effectively improving the patient's hearing. This is not typically seen in CSOM.
- **Aggravating/Relieving Factors:** Any factors that seem to worsen or improve hearing.
- **Impact on Daily Life:** How does the hearing loss affect communication, work, and social interactions

4. **Negative History:** This section is vital for ruling out potential complications of CSOM. Always ask specifically about symptoms that might indicate intracranial or extracranial spread of infection. This is a **high-yield** area for **viva questions**.

- **Earache/Otalgia:** To rule out acute otitis externa, AOM, or mastoiditis.
- **Pain behind the ear/Postauricular pain:** To rule out mastoiditis.
- **Vertigo/Dizziness:** To rule out labyrinthitis
- **Nausea/Vomiting:** Can be associated with labyrinthitis or more severe intracranial complications.
- **Blurred vision/Diplopia/Retro-orbital pain:** To rule out Petrositis (Gradenigo's syndrome).
- **Fever:** Indicates active infection, potentially suggesting mastoiditis, meningitis, brain abscess, or lateral sinus thrombophlebitis.
- **Headache:** To rule out meningitis, brain abscess, or lateral sinus thrombophlebitis.
- **Facial asymmetry/Weakness:** To rule out Facial palsy.
- **Neck rigidity:** Rules out meningitis.
- **Delirium, convulsions, projectile vomiting:** Highly concerning for brain abscess.

Mnemonics for Negative History (Complications):

- **"FEMALE"** for common complications: **F**acial palsy, **E**xtradural abscess, **M**astoiditis, **A**bscess (Brain), **L**abyrinthitis, **E**xcellent (no complications).
- **"HEADACHE "**for intracranial complications: **H**eadache, **E**mesis (vomiting), **A**ltered sensorium, **D**iplopia, **A**bscess, **C**onvulsions, **H**ydrocephalus, **E**xtra dural/Subdural abscess.

5. **Past History:** A thorough past medical history provides context for the current presentation.

- **Similar complaints in the past:** Recurrent ear infections or discharge.
- **Treatment taken for past complaints:** Efficacy and nature of previous interventions.
- **History of Surgeries/Accidents/Radiations:** Any previous ear surgeries (e.g., tympanoplasty, mastoidectomy) or head trauma.
- **Complications from previous illnesses:** Any long-term issues.
- **Systemic Diseases:** Inquire about Tuberculosis, Hypertension, Diabetes Mellitus, Thyroid disease, Coronary Artery Disease, Liver/Kidney disease, HIV/AIDS, any known allergies, or bleeding disorders. These conditions can impact healing, immune response, and suitability for surgery.

6. **Drug History:** Document all medications the patient is currently taking or has recently taken. This includes:

- **Steroids:** Can mask infection symptoms.
- **Chemotherapy:** May cause immunosuppression.
- **Insulin/Antihypertensives:** Important for managing systemic conditions.
- **Ototoxic drugs:** Aminoglycosides (e.g., gentamicin), loop diuretics, aspirin in high doses, and some chemotherapeutic agents can cause hearing loss.
- **Allergy to medications:** Crucial for safe prescribing.

7. **Personal History:** Provides insight into lifestyle and social factors impacting health.

- **Diet:** Vegetarian/non-vegetarian.
- **Bowel/Bladder habits:** General health indicator.
- **Personal habits:** Smoking, tobacco chewing, alcohol intake, chewing of paan/supari. These can influence general health and healing.
- **Lifestyle:** Sedentary or active.
- **Marital Status:**
- **Menstrual/Obstetric history (for women):** Includes menarche, cycle regularity, number of pregnancies, and miscarriages.

8. **Family History:** Genetic predispositions or infectious diseases within the family can be relevant.

- **Hearing loss in the family:** Suggests genetic conditions like otosclerosis or certain types of sensorineural hearing loss.

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- **Consanguinity:** Increases the risk of congenital sensorineural hearing loss.
- **Malignancies/Autoimmune disorders:** Some have familial tendencies.
- **Infectious diseases:** Tuberculosis, mumps, diphtheria, and STDs can affect multiple family members.

Clinical Examination in CSOM

1. **General Physical Examination:** Note if the patient is comfortable, well-oriented to time, place, and person. Check vitals (Pulse, BP, Respiratory Rate). Look for pallor, icterus, cyanosis, clubbing, generalised lymphadenopathy, and oedema.

Facial Nerve Examination (Motor Function): Assess the integrity of the facial nerve (Cranial Nerve VII) as it is susceptible to damage in CSOM, especially with cholesteatoma. Test both sides symmetrically:

- **Raising eyebrows:** Frontalis muscle.
- **Closing eyes tightly:** Orbicularis oculi.
- **Blowing out cheeks:** Orbicularis oris and buccinator.
- **Blowing whistle:** Orbicularis oris.
- **Showing teeth/Grimacing:** Zygomaticus major/minor, levator labii superioris.

2. **Local Examination of the Ear:** Always offer to examine the **better ear first** to gain the patient's cooperation and establish a baseline.

Inspection:

- **Preauricular Area:** Look for scars (e.g., post-endomeatal tympanoplasty), sinuses (preauricular sinus), or accessory tragus (due to improper fusion of Hillocks of His).
- **Pinna (Auricle) Size and Shape:** Normal, or anomalies like microtia (small), macrotia (large), anotia (absent), or prominent Darwin's tubercle. Bat ear due to the absence of the antihelix.
- **Postauricular Area:** Inspect for scars (e.g., mastoidectomy scar), swelling (mastoiditis, postauricular abscess), erythema, or fistula.
- **External Auditory Canal (EAC):**
- **Without speculum (using Bull's eye lamp/head mirror):** Observe any obvious discharge, its character (thick, profuse, purulent), or foreign bodies.
- **With speculum:** Note the discharge character more precisely.

3. **Otoscopy (Visualisation of Tympanic Membrane – TM):** This is a crucial step. Always suction clear any discharge to visualise the TM properly. Always draw a diagram of both TM.

Tympanic Membrane (TM):

- **Perforation:**
- **Site:** Central (safe CSOM), marginal (unsafe), attic (unsafe).
- **Size:** Small, moderate, large, subtotal.
- **Shape:** Irregular, kidney-shaped.
- **Margins:** Smooth, regular, inverted, everted.
- **Involving Quadrants:** Note which quadrants are involved (e.g., anterosuperior, anteroinferior).
- **Middle Ear Mucosa:** Observe if it is inflamed, pale, or shows granulations or polyps.
- **Ossicles:** Can the ossicular chain (malleus, incus, stapes) be visualised? Is there any evidence of ossicular erosion?
- **Discharge:** Note its presence and character within the middle ear.
- **Cholesteatoma:** Look for pearly white flakes, keratin debris, or a retraction pocket in the attic or posterosuperior quadrant. This is a definitive sign of unsafe CSOM.

Contralateral Ear: Always examine the opposite ear for comparison, noting its TM appearance (e.g., cone of light, normal mobility, shadow of the incudostapedial joint).

4. **Palpation and Special Tests:**

- **Tragal Sign:** Pain upon pressing the tragus. Positive in otitis externa, usually absent in CSOM.
- **Mastoid Tenderness:** Tenderness over the mastoid process. Positive for mastoiditis. Perform the three-finger test: press over the mastoid tip, suprameatal triangle (Macewen's triangle), and along the posterior wall of the external auditory canal.
- **Fistula Test:** Pressing the tragus or using a Siegle's speculum to create pressure changes in the EAC.
- **Positive:** Induces vertigo, nystagmus, or a sense of falling, indicating a **labyrinthine fistula** (often due to bone erosion by cholesteatoma). This is a very significant sign of a complicated, unsafe CSOM.
- **Negative:** Normal ears or "dead ears" (where the labyrinth is non-functional) will show no response.

5. **Tuning Fork Tests** Tuning fork tests (using a **512 Hz tuning fork**) are essential for quickly assessing the type and approximate degree of hearing loss.

6. **Vestibular Function Tests** While not always indicative of labyrinthine involvement in all CSOM cases, these tests help rule out vestibular complications, especially in unsafe CSOM.

Diagnosis of CSOM

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Based on the comprehensive history and examination findings, a precise diagnosis can be formulated.

Example of Diagnosis: Right ear Chronic Suppurative Otitis Media, Active Safe Type, with moderate conductive hearing loss, without any complications.

Key Elements of Diagnosis:

- **Ear Involved:** Specify right or left ear.
- **Type of CSOM:**
- **Safe (Tubotympanic):** Indicated by central perforation, mucoid/mucopurulent non-foul-smelling discharge, and absence of bone erosion signs.
- **Unsafe (Atticoantral):** Indicated by marginal/attic perforation, foul-smelling discharge, presence of cholesteatoma (pearly white flakes/retraction pocket), granulation tissue, or polyps.
- **Activity:**
- **Active:** Presence of current ear discharge.
- **Inactive/Quiescent:** No discharge for at least 6 months, but a perforation is present.
- **Hearing Loss:** Specify type (conductive, sensorineural, mixed) and degree (mild, moderate, severe, profound) based on tuning fork tests and later confirmed by audiometry.
- **Complications:** Explicitly state if any intracranial or extracranial complications are present or ruled out. For example, "with facial palsy" or "without any complications."

Investigations for CSOM

Investigations are crucial for confirming the diagnosis, assessing the extent of the disease, and planning management, especially surgical interventions.

Ear-Specific Investigations:

1. **Examination Under Operating Microscope (EUM):** Provides a magnified view of the external ear canal and tympanic membrane. It allows **confirmation of the otoscopic findings** by precise assessment of the perforation, middle ear mucosa, ossicular chain, and detection of subtle cholesteatoma or granulations. It is also useful for performing **aural toilet** (suction clearance) and taking **samples for culture**.
2. **Ear Discharge Pus Culture and Sensitivity (C/S):** Identifies the causative bacteria (common organisms: Pseudomonas aeruginosa, Staphylococcus aureus, Proteus species) and determines their sensitivity to various antibiotics. This helps in guiding appropriate antimicrobial therapy and preventing antibiotic resistance.
3. **Pure Tone Audiometry (PTA):** This is the gold standard for assessing hearing loss. It objectively measures the patient's hearing thresholds for air conduction and bone conduction across different frequencies.
   - **Type of hearing loss:** Conductive, sensorineural, or mixed.
   - **Degree of hearing loss:** Mild, moderate, moderately severe, severe, profound.
   - **Configuration of hearing loss:** Specific pattern across frequencies.
   - **Importance:** Guides management, especially surgical planning for hearing improvement.
4. **Impedance Audiometry (Tympanometry and Acoustic Reflexes):** Evaluates the middle ear function, tympanic membrane mobility, and Eustachian tube function.
   - **Tympanometry:** In CSOM with perforation, a flat tympanogram (Type B) with large ear canal volume is expected.
   - **Acoustic Reflexes:** Absent in conductive hearing loss.
5. **X-ray Mastoid (Schuller's and Towne's Views):** Primarily done in unsafe CSOM or long-standing safe CSOM to assess mastoid pneumatization.
   - **Schuller's View:** Shows the mastoid air cell system, tegmen mastoideum (roof of mastoid), sigmoid sinus plate, and temporomandibular joint. Useful for assessing pneumatization of air cells, extent of disease, low lying dura and anteposed sigmoid sinus.
   - **Towne's View:** Best for visualising the petrous apex and internal auditory canal.
   - **Findings in CSOM:** May show sclerotic mastoid (poor pneumatization) or haziness due to inflammation/pus.
6. **High-Resolution Computed Tomography (HRCT) Temporal Bone:** The imaging modality of choice for CSOM, particularly in unsafe CSOM or suspected complications. It provides excellent bony detail.
   - Detailed anatomy of the middle ear and mastoid.
   - Evidence of ossicular erosion, bony dehiscence (e.g., facial canal, lateral semicircular canal).
   - Presence and extent of cholesteatoma, granulations, or fluid.
   - Evaluation of the integrity of the tegmen tympani and mastoideum (to rule out intracranial extension).
7. **Magnetic Resonance Imaging (MRI):** Useful in specific situations, such as:
   - Diagnosing soft tissue pathology (e.g., differentiating cholesteatoma from granulation tissue, especially in recurrent cases).

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- Detecting intracranial complications (e.g., brain abscess, meningitis, lateral sinus thrombophlebitis).
- Evaluating the extent of intralabyrinthine spread.
- **Diffusion-weighted imaging (DWI) sequence:** Highly sensitive for detecting residual or recurrent cholesteatoma, as cholesteatoma shows restricted diffusion.

Basic Routine Investigations (Pre-Operative):

- **Complete Blood Count (CBC):** Check for anaemia, leukocytosis (infection).
- **Blood Grouping and Cross-matching.**
- **Renal Function Tests (RFTs):** Urea, Creatinine.
- **Liver Function Tests (LFTs):** Bilirubin, AST, ALT, ALP.
- **Blood Sugar (Fasting and Post-prandial/Random):** To rule out or manage diabetes.
- **Viral Markers:** HIV, HBsAg, HCV.
- **Electrocardiogram (ECG):** For cardiac assessment.
- **Chest X-ray:** For pulmonary status.
- **Urine Analysis:** For infection or other abnormalities.

Management of CSOM

The management of CSOM depends primarily on its type (safe vs. unsafe), activity, and presence of complications. The goal is to achieve a safe, dry ear, and secondarily, to improve hearing.

Management of Tubotympanic (Safe) CSOM:

This type is usually managed medically first, with surgery considered for persistent discharge or hearing improvement.

1. Conservative / Medical Management:

- **Aural Toilet:** Regular cleaning of the ear canal and middle ear of discharge and debris using suction, cotton swabs, or dry mopping. This is fundamental for topical medication efficacy.
- **Systemic Antibiotics:** Prescribed based on culture and sensitivity reports, especially during acute exacerbations or persistent discharge. Common choices include quinolones (e.g., ciprofloxacin) due to their good penetration into middle ear fluid and activity against common pathogens like Pseudomonas.
- **Local (Topical) Antibiotics:** Ear drops (e.g., ciprofloxacin, ofloxacin) are highly effective in reaching the site of infection directly. They are often combined with steroids (e.g., dexamethasone) to reduce inflammation.
- **Systemic Antihistamines:** May be used if there's associated allergic rhinitis or Eustachian tube dysfunction.
- **Local Decongestant Nasal Drops:** (e.g., xylometazoline) Can help improve Eustachian tube function, especially if there's associated rhinitis or sinusitis.
- **Protection of the Ear from Water:** Crucial advice for all CSOM patients. Patients should keep the ear dry and avoid water entering the ear during bathing, swimming, or hair washing (e.g., by using earplugs or cotton wool with petroleum jelly). Water introduces bacteria and can trigger acute exacerbations.

2. Surgical Management. Surgery is considered when medical management fails, for recurrent disease, or to improve hearing.

Tympanoplasty:

- **Goal:** To achieve a **safe, dry and stable ear** by repairing the tympanic membrane perforation (myringoplasty) and, if necessary, reconstructing the ossicular chain (ossiculoplasty). The secondary aim is to improve hearing.

Types:

- **Myringoplasty:** Repair of the TM perforation using a graft (e.g., temporalis fascia, tragal perichondrium).
- **Tympanoplasty Type I:** Myringoplasty alone.
- **Tympanoplasty Type II-V:** Involve ossicular chain reconstruction along with myringoplasty, depending on the extent of ossicular damage.

- **Timing:** Usually performed when the ear has been dry for at least 2 weeks.

2. Management of Atticoantral (Unsafe) CSOM:

Unsafe CSOM, due to the presence of cholesteatoma and the high risk of complications, primarily requires **surgical management**. Medical treatment is only a temporary measure to control acute infection.

Conservative Treatment: Similar to safe CSOM, medical management with aural toilet and antibiotics can be used to control acute exacerbations, but it is **not curative** for cholesteatoma.

Surgical Management: Mastoid exploration under General Anaesthesia:

- **Goal:** To completely eradicate the disease (cholesteatoma and associated pathology) and create a safe, dry ear, and prevent complications. Hearing improvement is a secondary goal.

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Types of Mastoidectomy:

- **Cortical Mastoidectomy (Schwartze's Operation):** Removal of mastoid air cells but preserving the posterior and superior canal walls. Typically performed in early cholesteatoma without extensive bone erosion, or for mastoid abscess.
- **Canal Wall Up (CWU) Mastoidectomy (Intact Canal Wall Mastoidectomy):** Preserves the posterior and superior bony external auditory canal wall. Offers better hearing potential and avoids the creation of a mastoid cavity. However, it requires a "second look" surgery to check for residual cholesteatoma.
- **Canal Wall Down (CWD) Mastoidectomy (Radical Mastoidectomy, Modified Radical Mastoidectomy):** Involves removal of the posterior and superior bony external auditory canal wall, thereby exteriorising the mastoid cavity and middle ear space into a single common cavity with the external auditory canal. This creates a larger, self-cleaning cavity, allowing for complete eradication of cholesteatoma and easier follow-up. It is typically performed for extensive cholesteatoma or complications. It often results in a larger mastoid cavity that may require lifelong maintenance.

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