

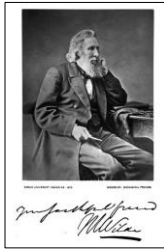
Challenges in Cholesteatoma Management



Stanford Ear Institute
MEDICINE Otolaryngology-Head & Neck Surgery



Sir William Wilde (1815 – 1876)
Passion for Ear > Eye
Fame far and wide
Many visitors from abroad



St. Mark's Hospital
for Diseases of the Eye and Ear
(founded by Sir William Wilde in 1844)

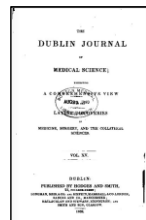


Sir William Wilde (1844 – Age 29) *Upon the causes and treatment of otorrhea*
The Dublin Journal of Medical Science. 1844; 24: 388.

ART. XII.—*Upon the Causes and Treatment of Otorrhea.*
By W. R. WILDE, M. R. I. A., Lecturer upon the Diseases of the Eye and Ear in the School of Medicine, Park-street; and Member of the learned Societies of Paris, Berlin, Vienna, and Athens, &c.

With regard to the first: our diagnosis should always be cautious, unless, indeed, we see our way very clearly through the case, and for this reason—that from what I have observed of this disease, *so long as otorrhea is present we never can tell how, when, or where it will end, or what it may lead to.* For this very cause, if no other or better existed, the old doctrine of “letting alone,” or “leaving to nature” such affections, should be exploded, and by every means in our power we should endeavour to heal them.

Wilde became Editor in 1845



Sir William Wilde (1844) *Upon the causes and treatment of otorrhea*
The Dublin Journal of Medical Science. 1844; 24: 388.

ART. XII.—*Upon the Causes and Treatment of Otorrhea.*
By W. R. WILDE, M. R. I. A., Lecturer upon the Diseases of the Eye and Ear in the School of Medicine, Park-street; and Member of the learned Societies of Paris, Berlin, Vienna, and Athens, &c.

With regard to the first: our diagnosis should always be cautious, unless, indeed, we see our way very clearly through the case, and for this reason—that from what I have observed of this disease, *so long as otorrhea is present we never can tell how, when, or where it will end, or what it may lead to.* For this very cause, if no other or better existed, the old doctrine of “letting alone,” or “leaving to nature” such affections, should be exploded, and by every means in our power we should endeavour to heal them.



Upon the causes and treatment of otorrhea

Wilde WR. The Dublin Journal of Medical Science. 1844; 24: 388.

friends will often have a large clove of garlic* forcibly thrust into the meatus, and a hot poultice of roasted onions applied to the auricle, or a piece of salt fat bacon is crammed into the meatus,—a very good remedy, by the way,



Upon the causes and treatment of otorrhea

Wilde WR. The Dublin Journal of Medical Science. 1844; 24: 388.

friends will often have a large clove of garlic* forcibly thrust into the meatus, and a hot poultice of roasted onions applied to the auricle, or a piece of salt fat bacon is crammed into the meatus,—a very good remedy, by the way,



Upon the causes and treatment of otorrhea

Wilde WR. The Dublin Journal of Medical Science. 1844; 24: 388.

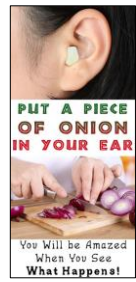
friends will often have a large clove of garlic* forcibly thrust into the meatus, and a hot poultice of roasted onions applied to the auricle, or a piece of salt fat bacon is crammed into the meatus,—a very good remedy, by the way,



175 years after Wilde (1844) - YouTube 2020



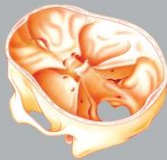
175 years after Wilde (1844)



<https://www.pinterest.com/pin/392516923768681676/>

Atlas of Skull Base Surgery and Neurotology

Robert K. Jackler
Second Edition

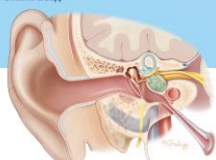


Thieme

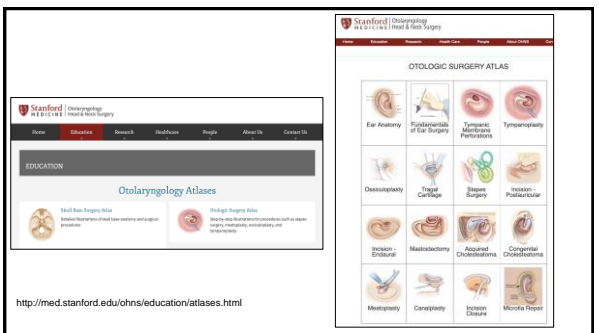
Ear Surgery Illustrated

A Comprehensive Atlas of Otolgic Microsurgical Techniques

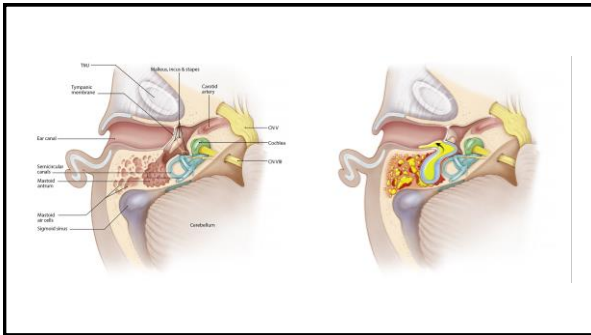
Robert K. Jackler
Illustrated by
Christine Galapp



Thieme

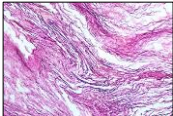

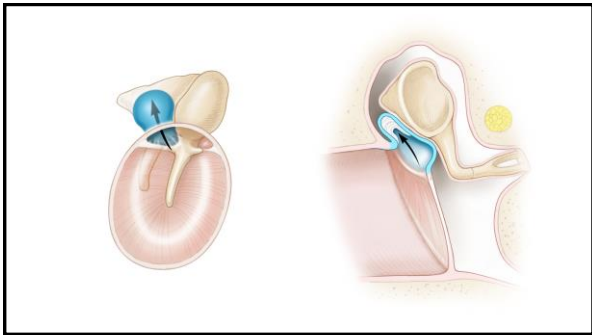
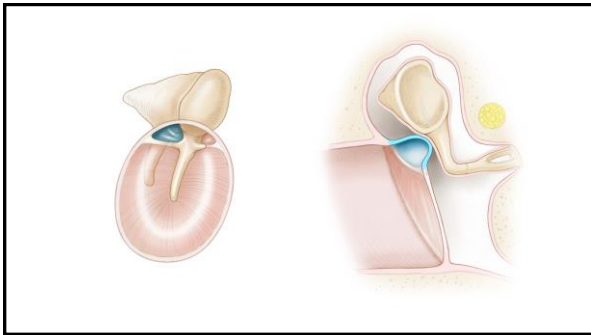
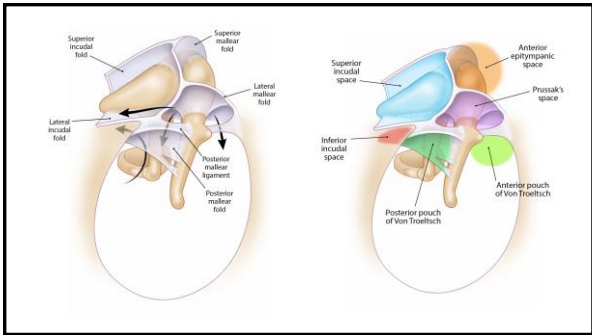
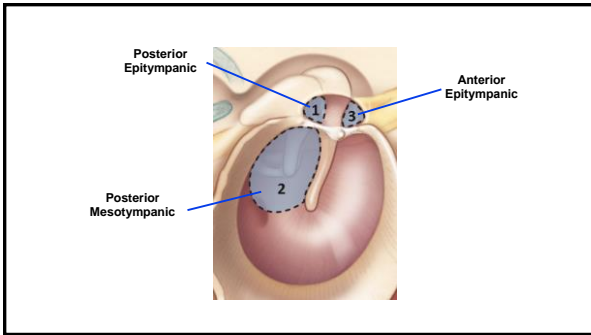


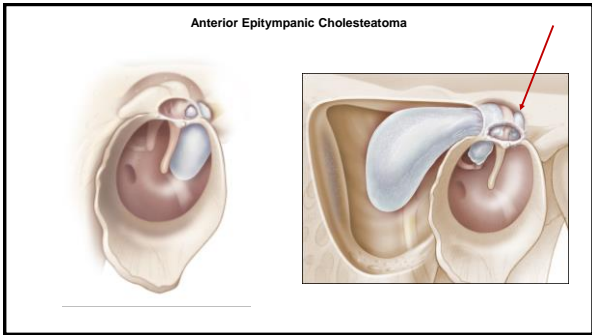
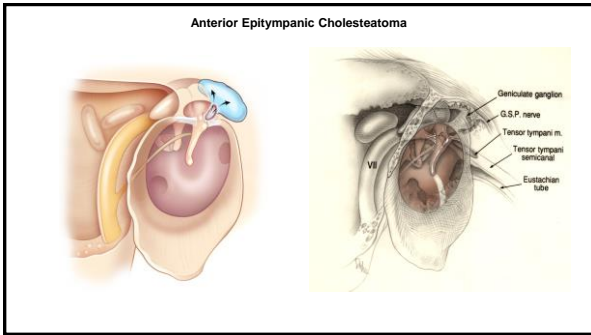
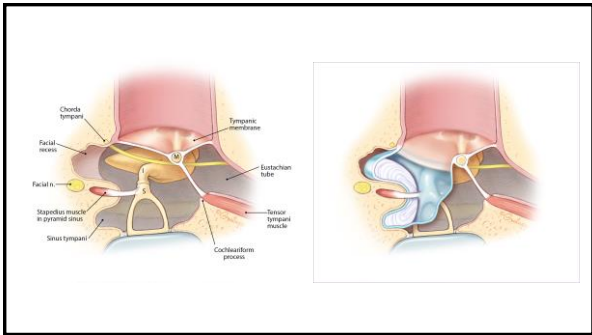
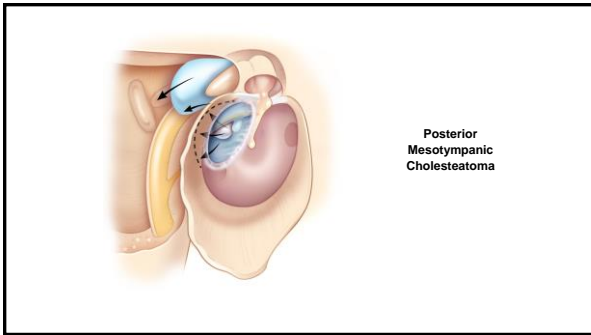
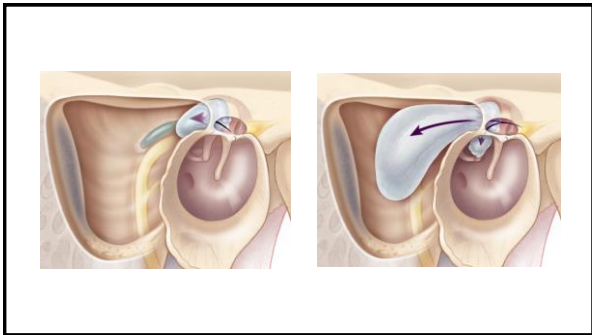
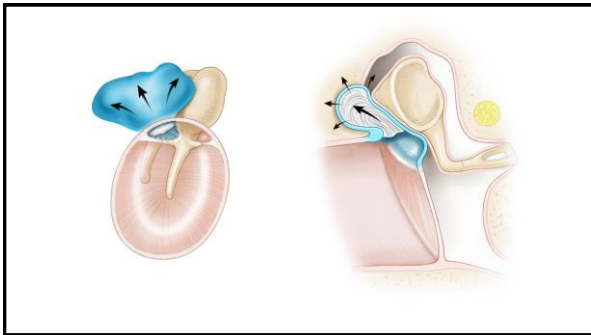
<http://med.stanford.edu/ohns/education/atlasses.html>



"Cholesteatoma" is a Misnomer
 It is keratin, not cholesterol
 -oma implies tumor
"Skin where skin shouldn't be"

1838
 Müller coined the term cholesteatoma
 Müller J. Ueber den feineren Bau und die Formen der krankhaften Geschwülste. Berlin, G. Reimer, 1838.



Conservative Management of Cholesteatoma

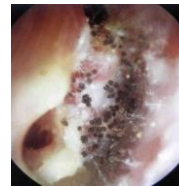
Medical Management?



Pseudomonas



Staphylococcus



Aspergillus Niger

Think Invasive disease
Aspergillus fumigatus
Aspergillus flavus



Candida



Alcohol & White Vinegar Douche



50%



50%



Conservative Surgery

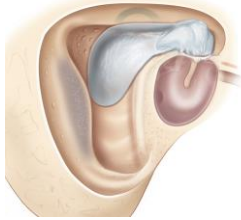
Atticotomy

Retrograde Technique

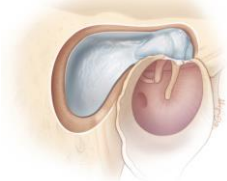
Atticotomy



Retrograde Technique



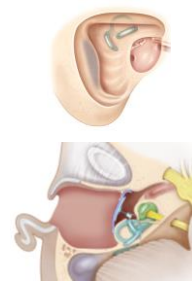
Bondy Modified Radical



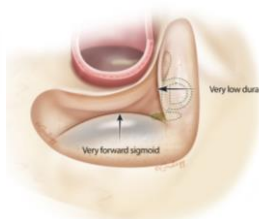
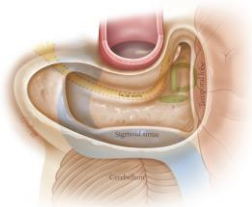
Inside Out Technique



Intact Canal Wall

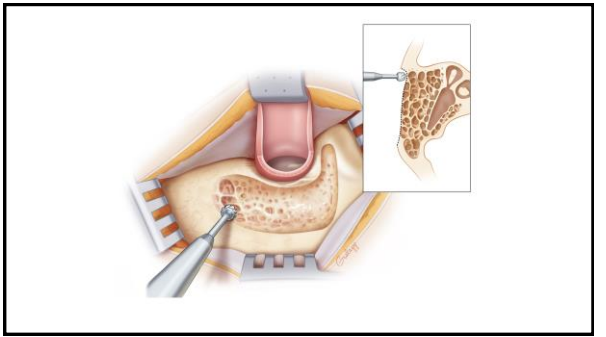
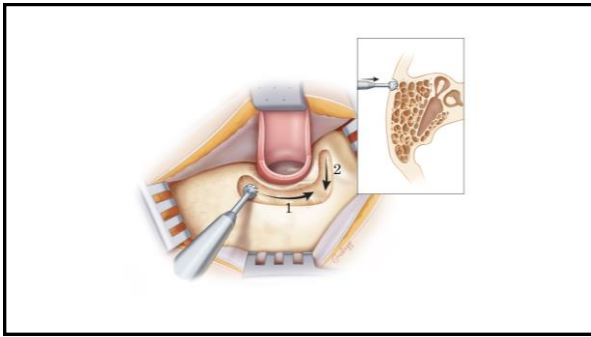
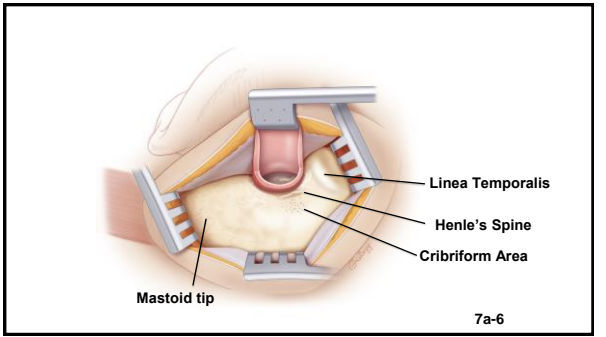
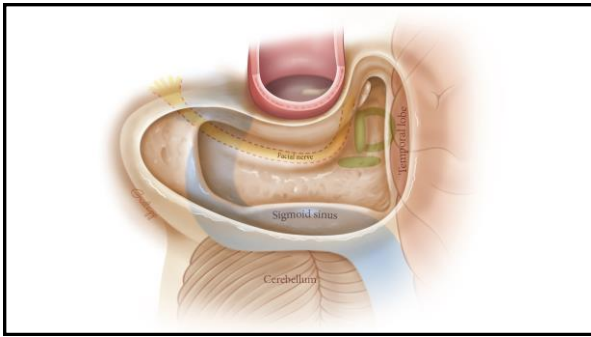
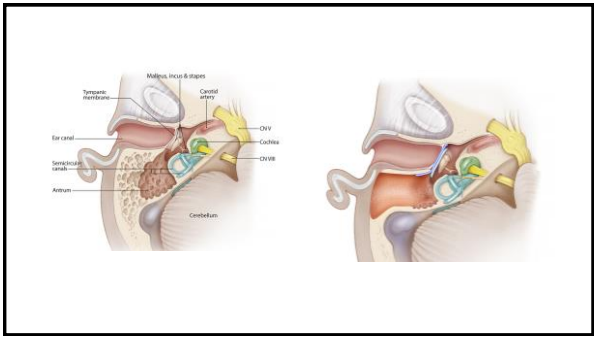
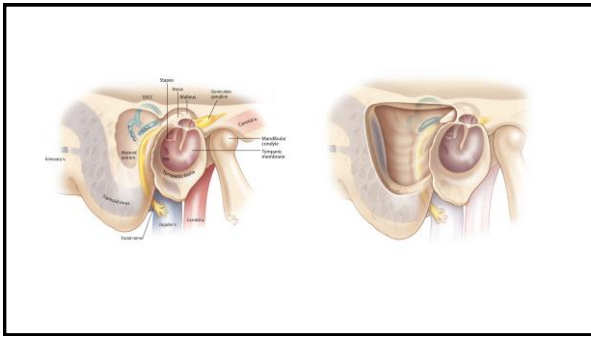


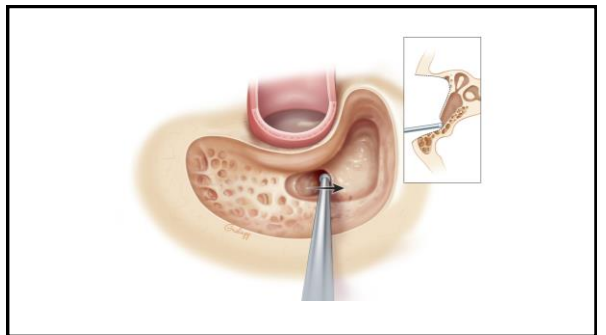
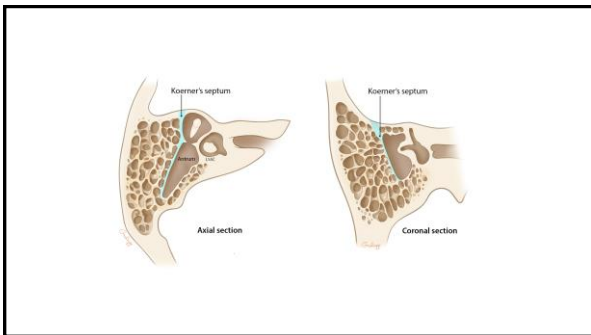
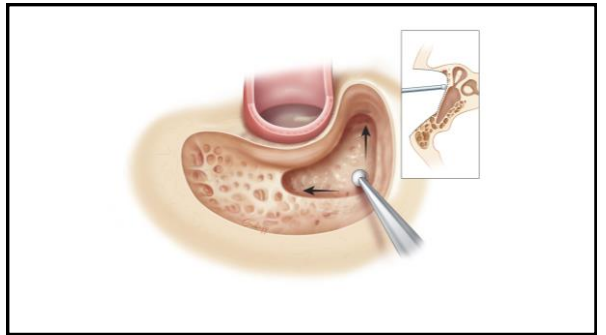
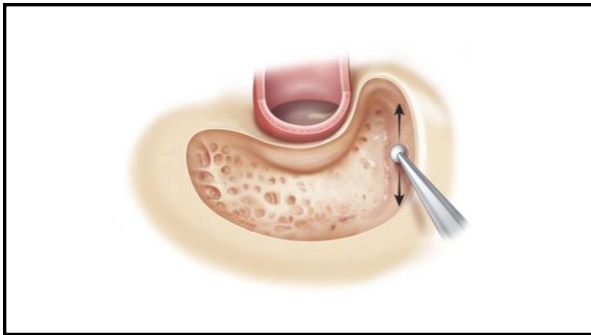
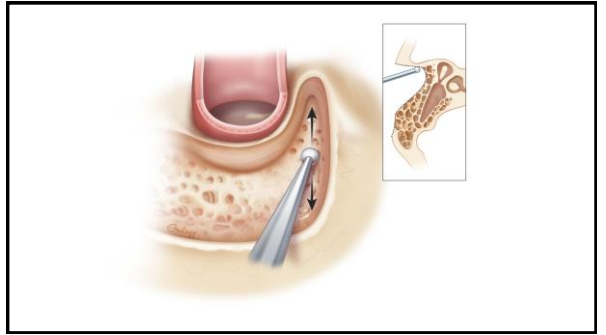
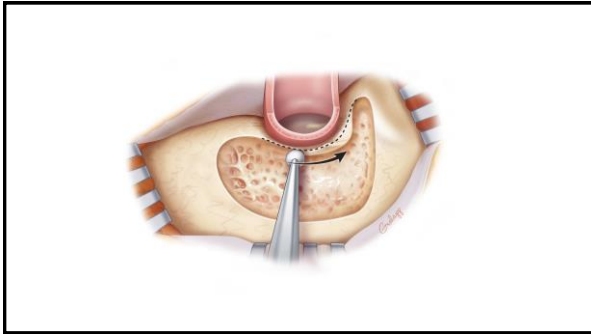
Canal Wall Down

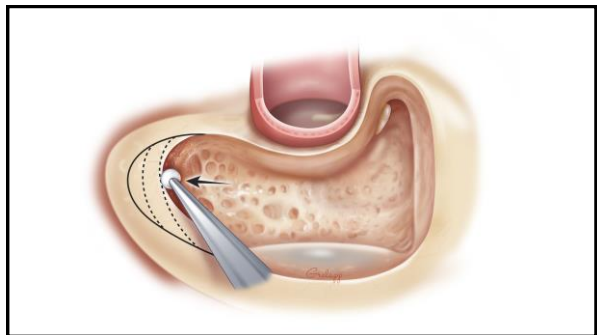
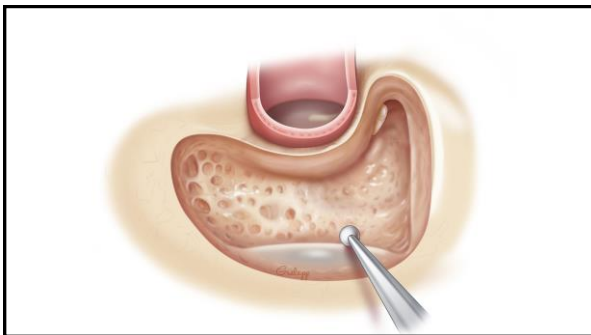
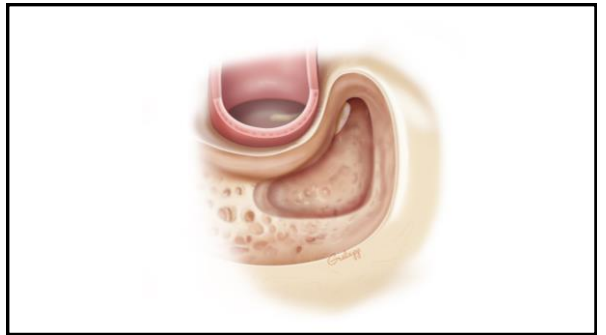
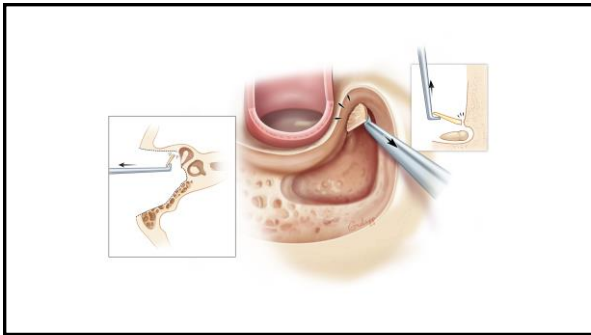
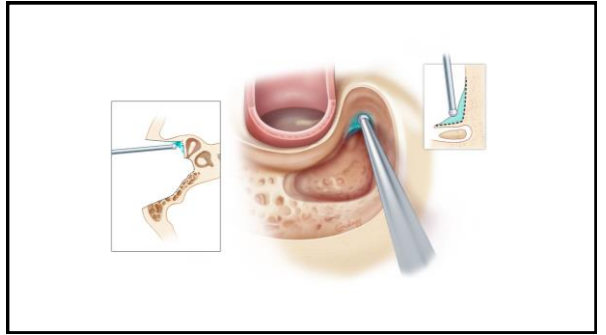
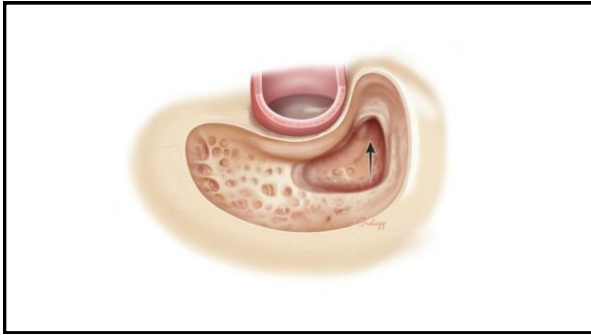


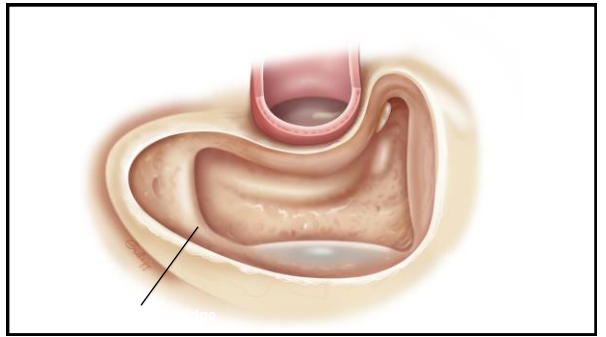
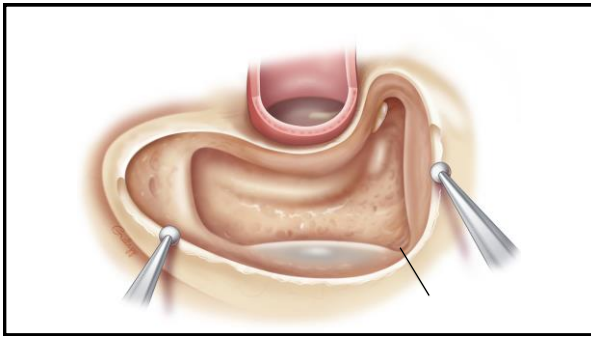
What fraction of primary cholesteatoma surgery CWU vs CWD?

Mastoidectomy basics

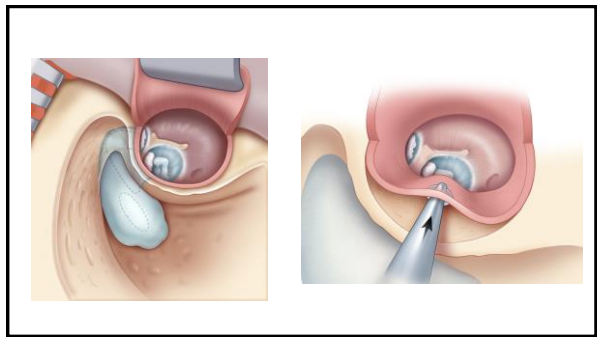
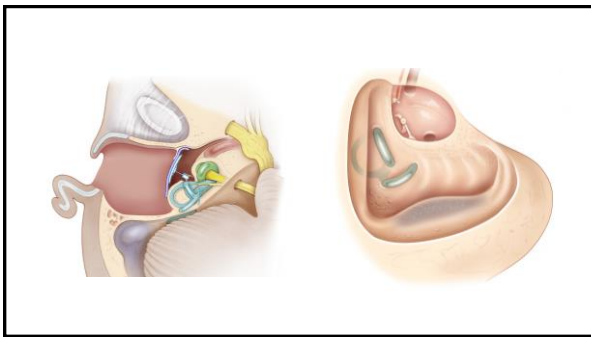
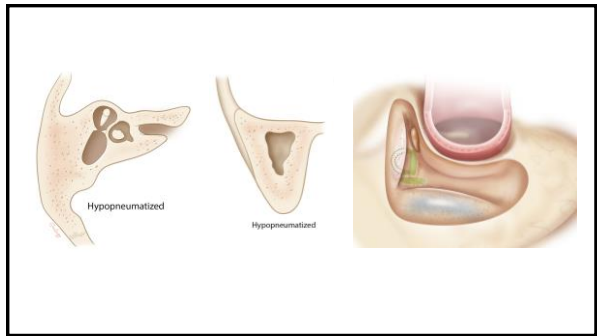


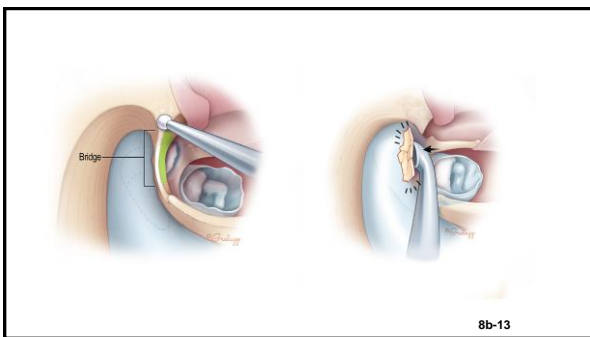
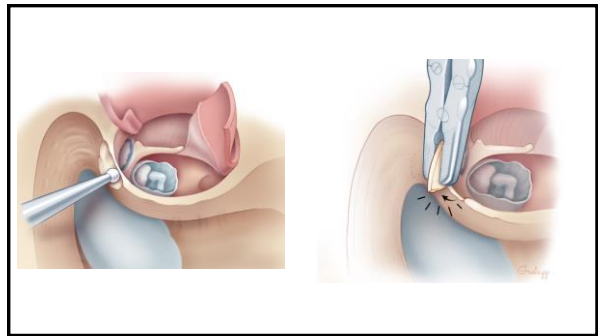
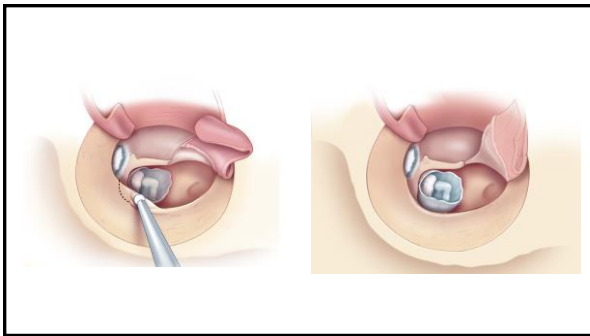
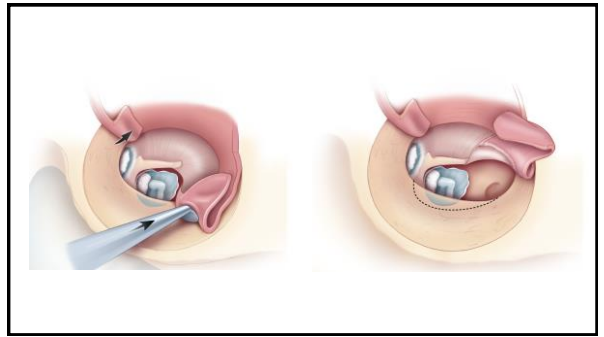
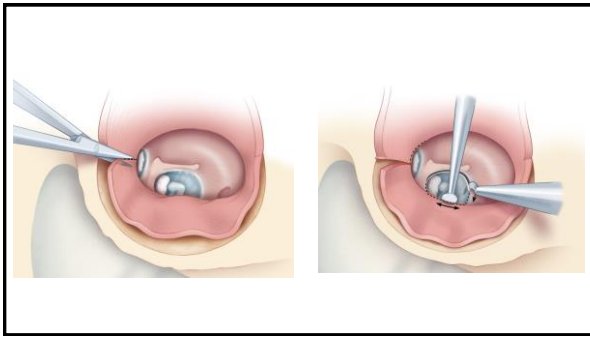




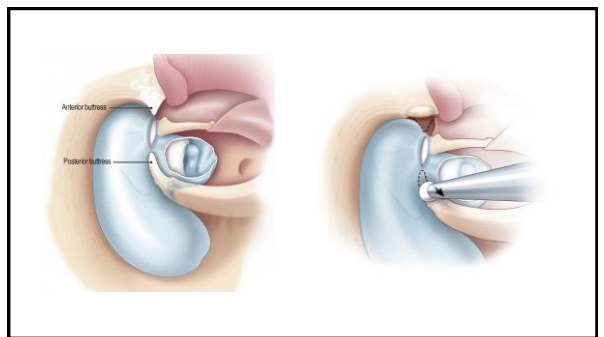


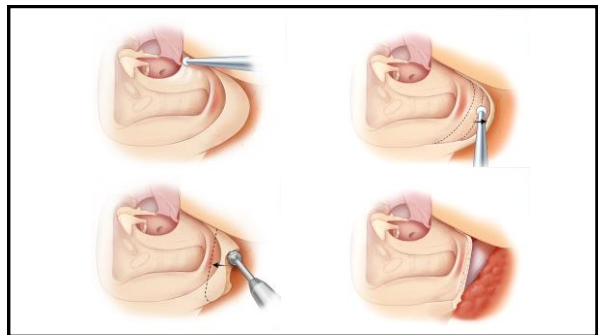
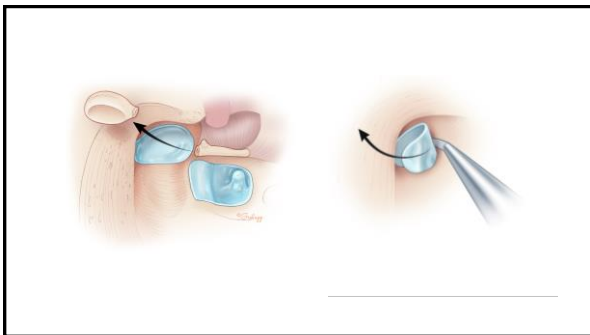
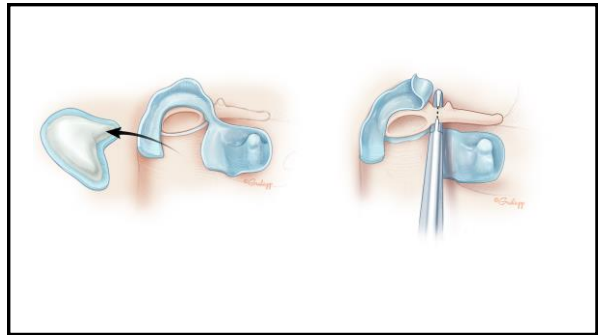
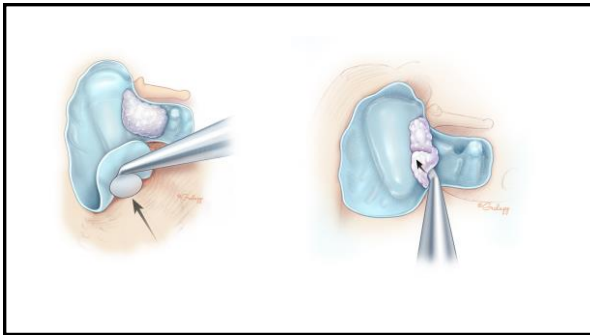
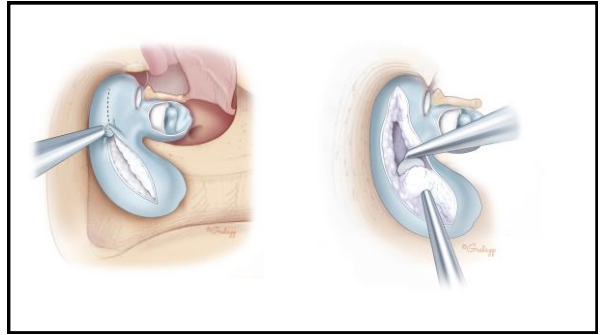
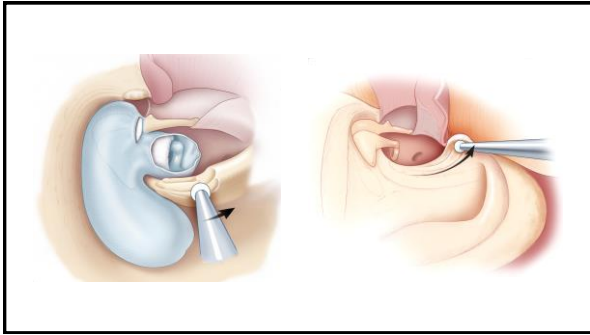
**Canal Wall Down
Mastoidectomy**

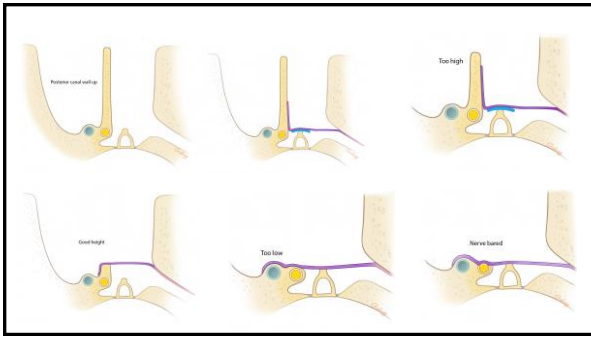
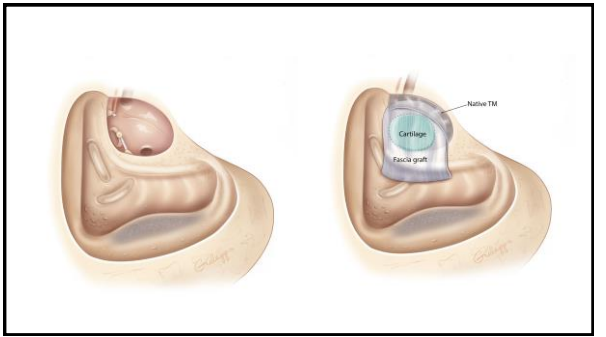
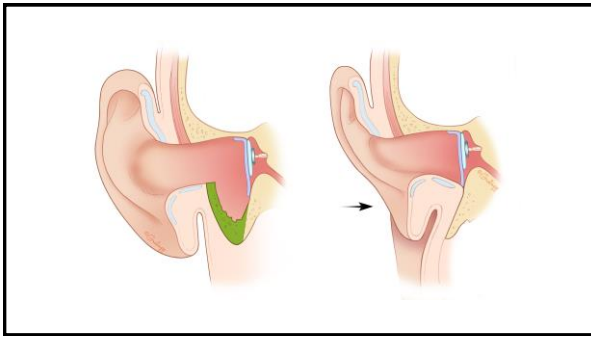




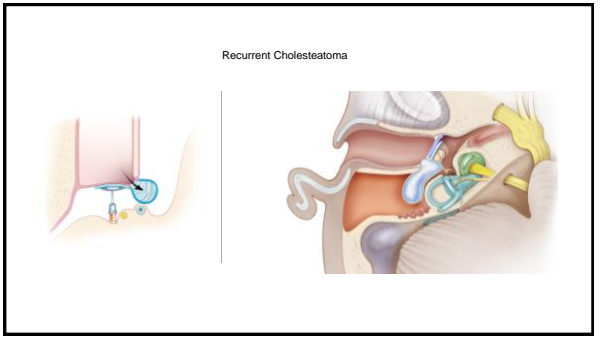
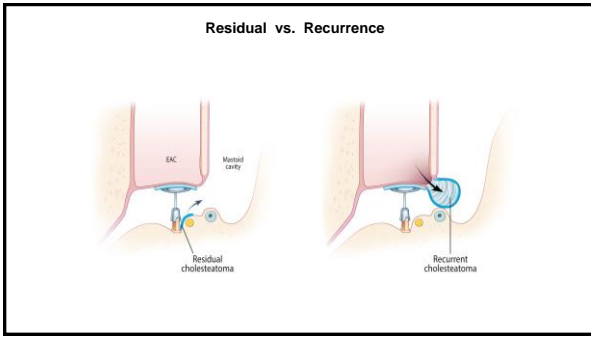
8b-13

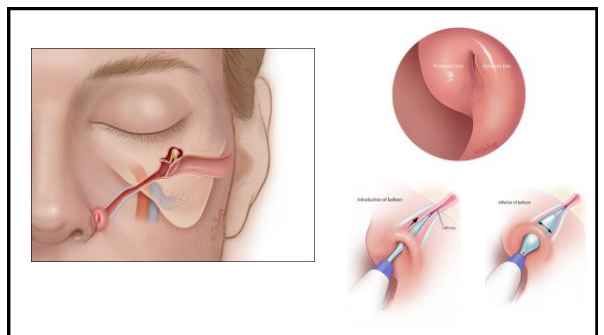
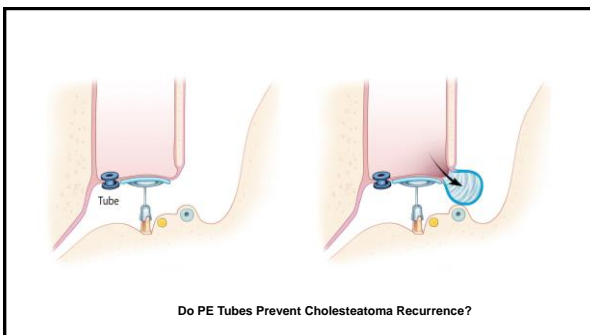
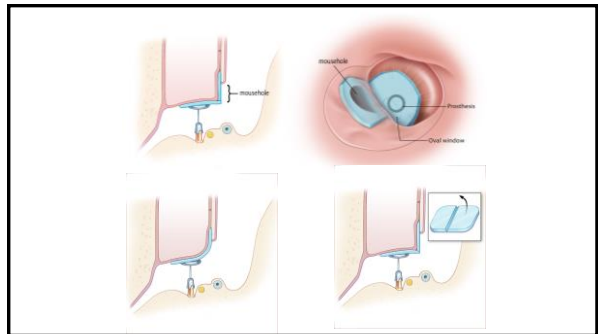
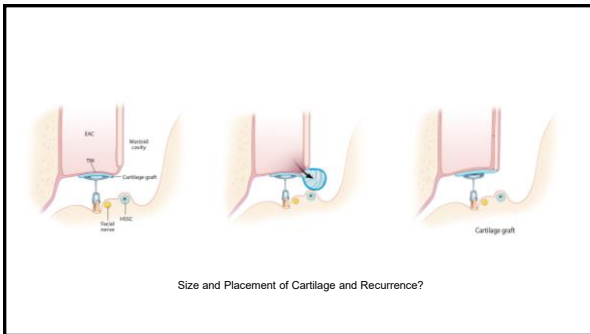
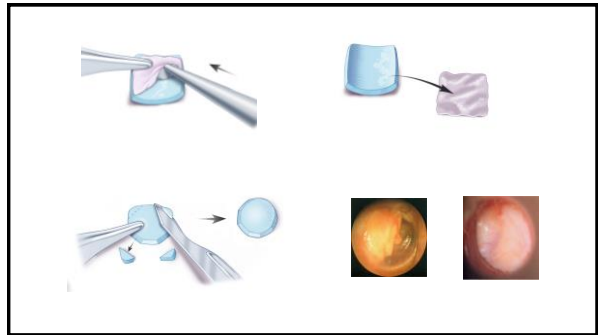
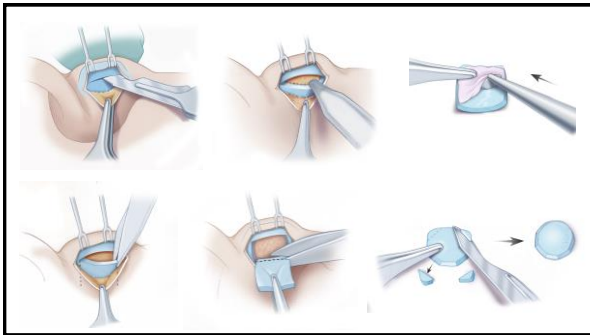






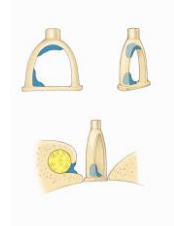
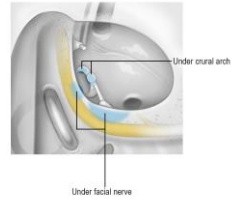
Recurrent Cholesteatoma



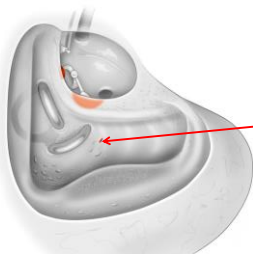


Residual Cholesteatoma

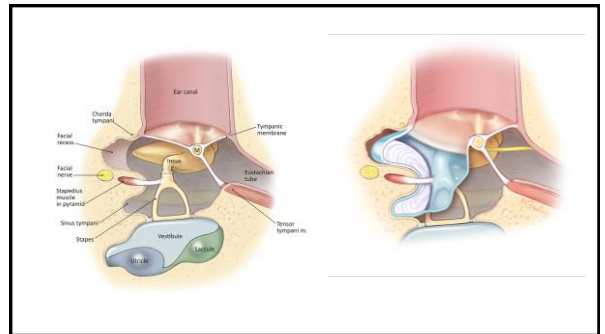
Residual Cholesteatoma Sites



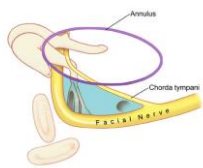
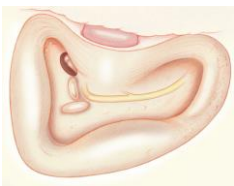
Residual Cholesteatoma Sites



Mastoid Residual Uncommon



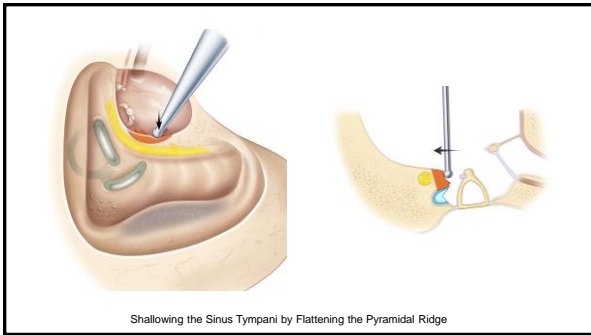
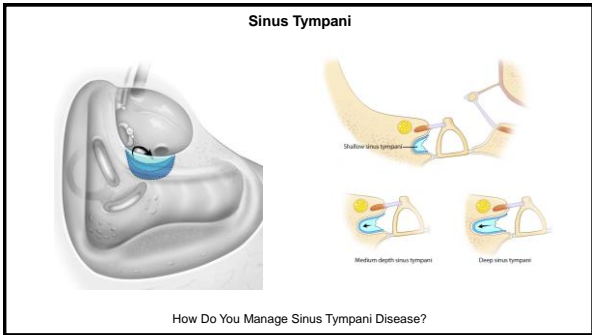
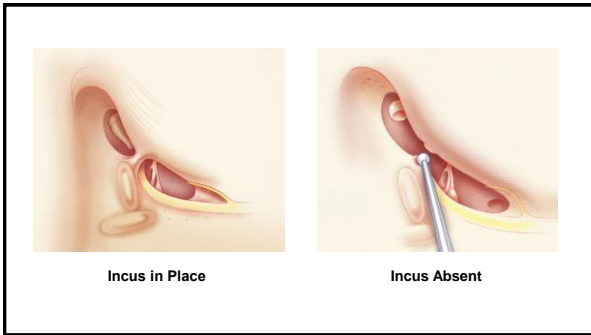
Facial Recess Approach



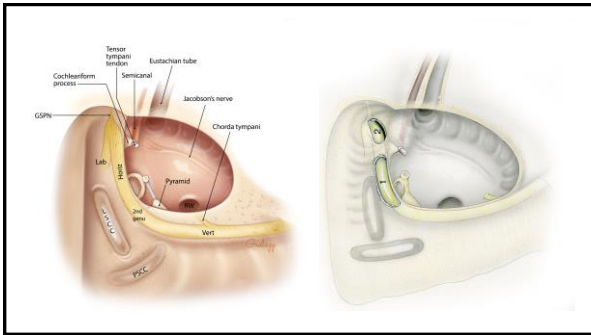
Correct



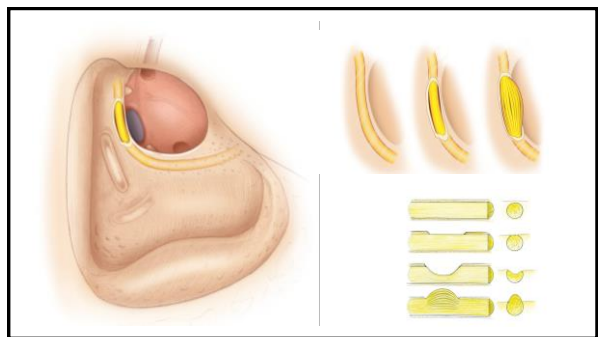
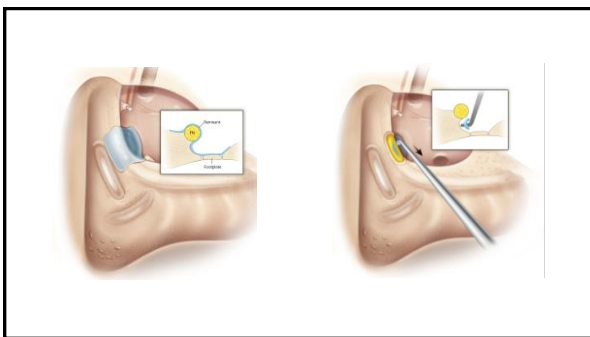
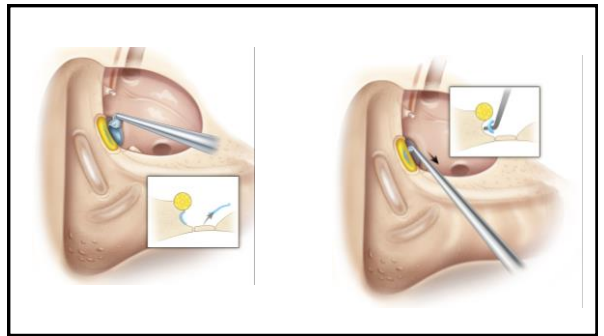
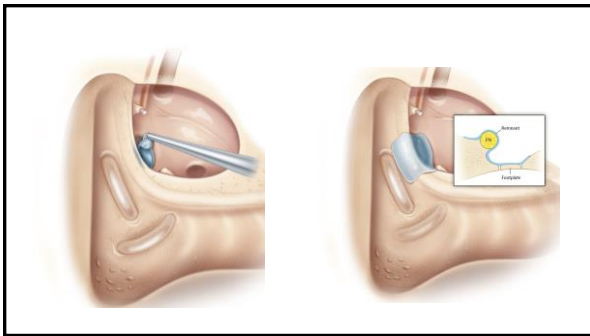
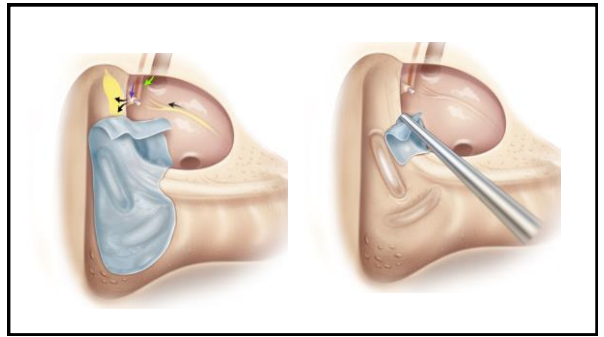
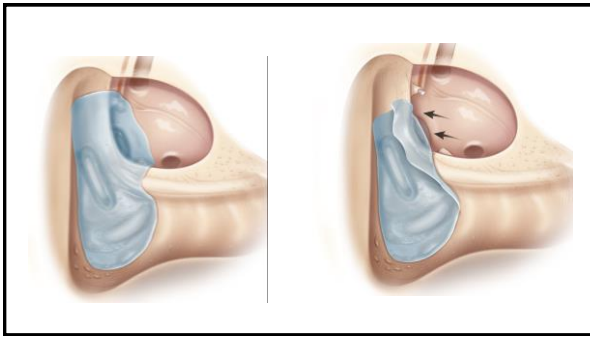
Incorrect

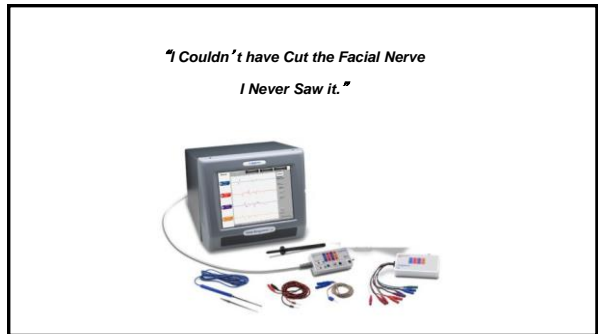
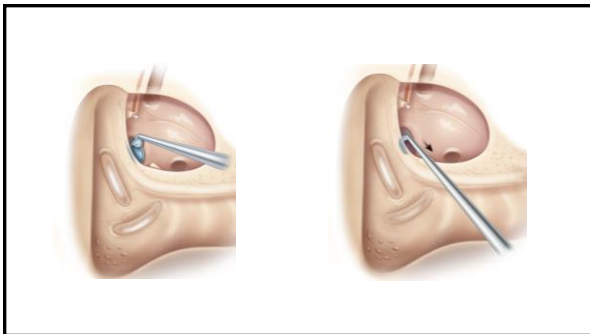
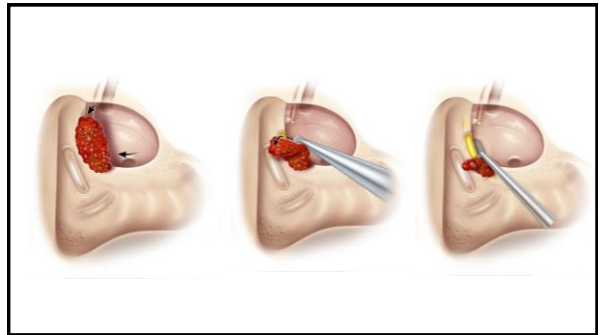
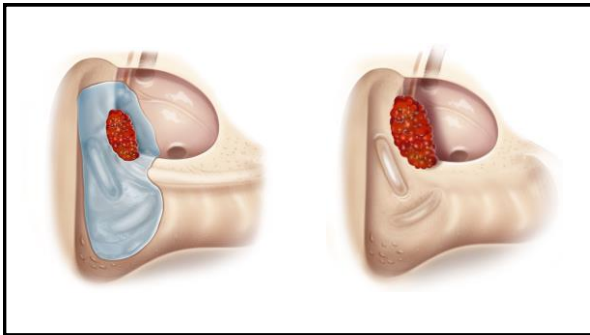


**Facial Nerve
Cholesteatoma**

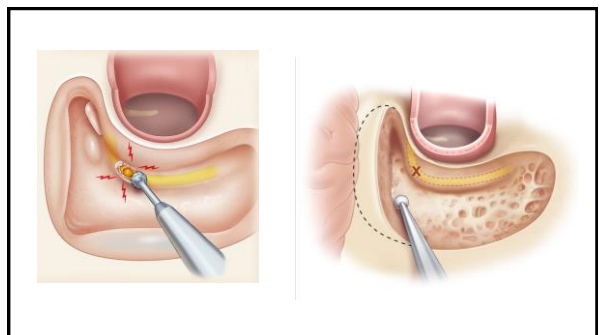


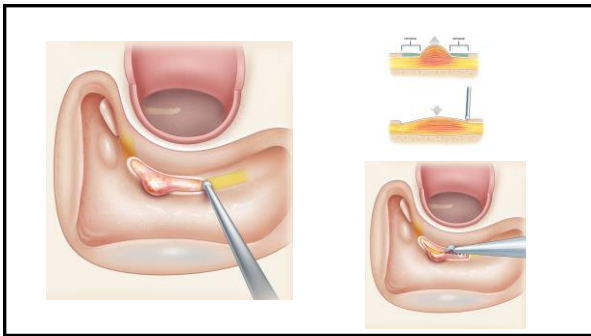
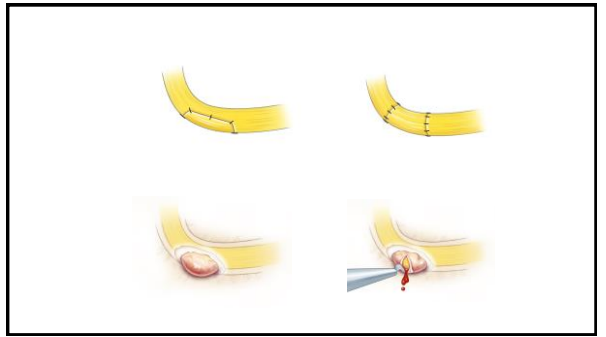
**God put the Facial Nerve in the Mastoid
To Keep the Damn General Surgeons Out**



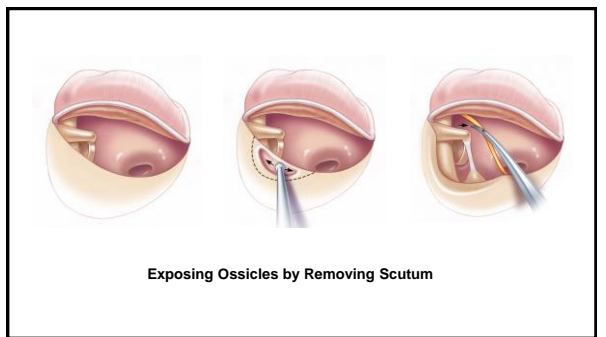
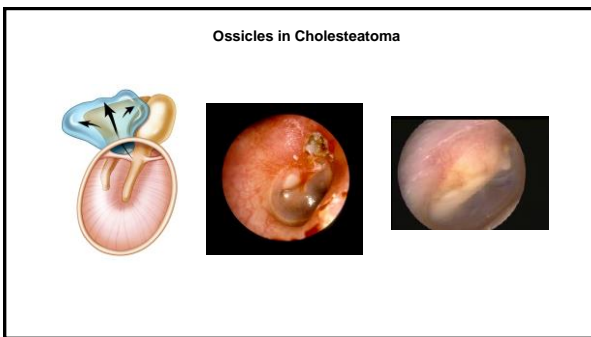


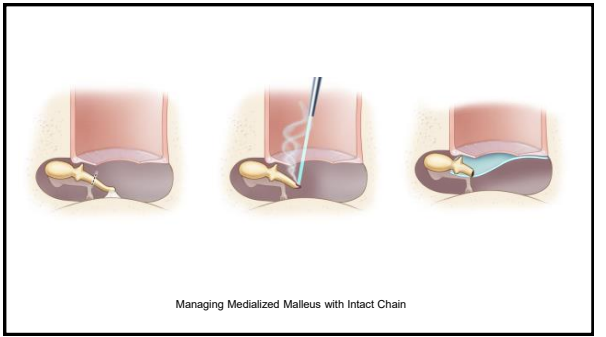
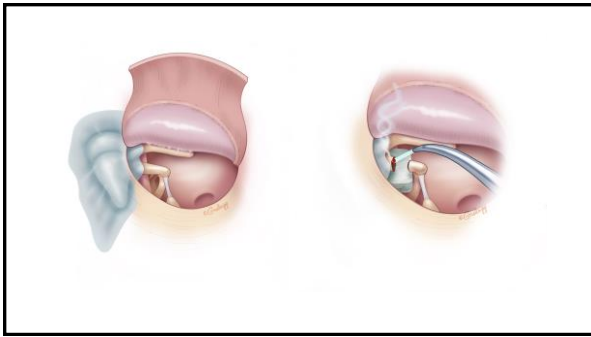
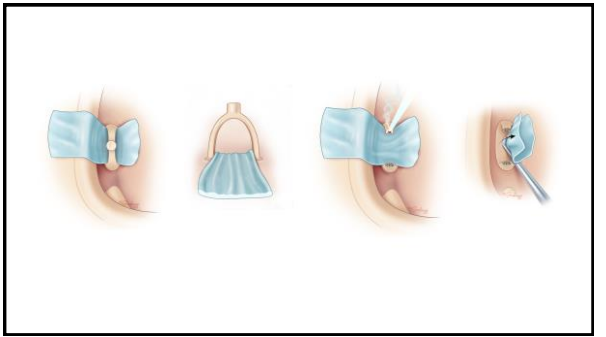
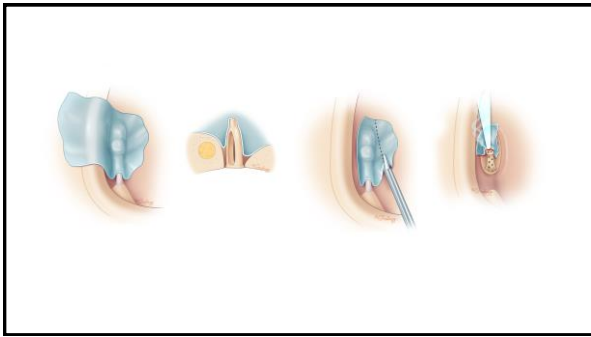
**Facial Nerve Injury
Mastoidectomy**





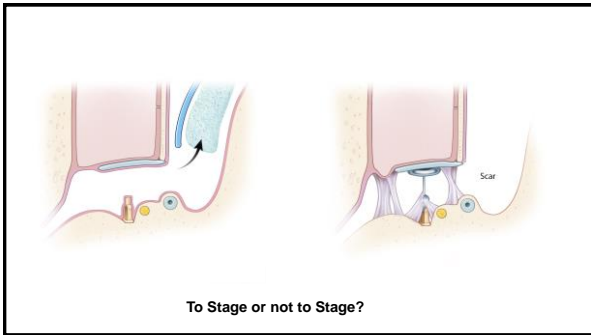
Ossicles in Cholesteatoma



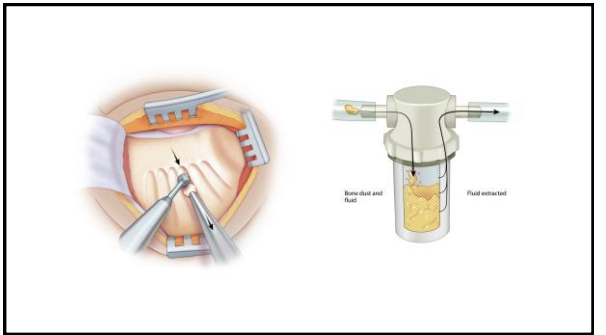
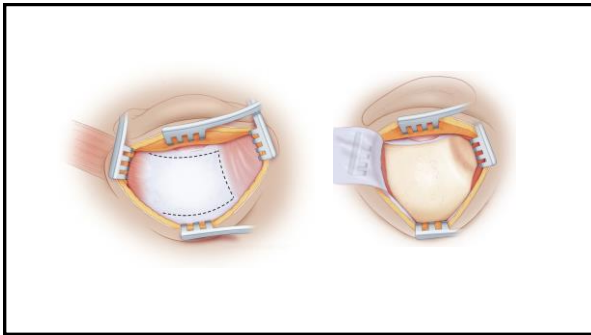
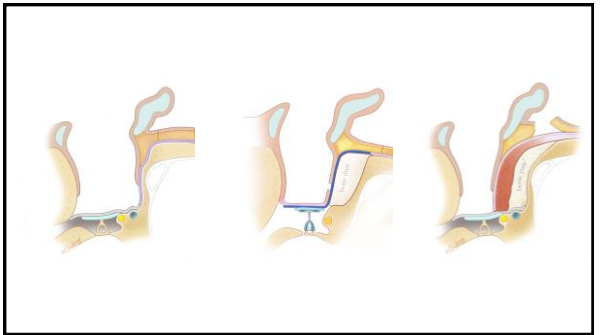
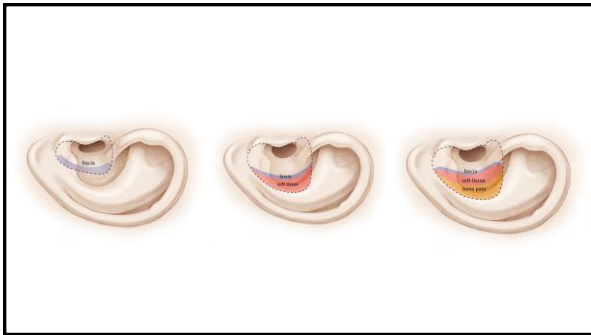


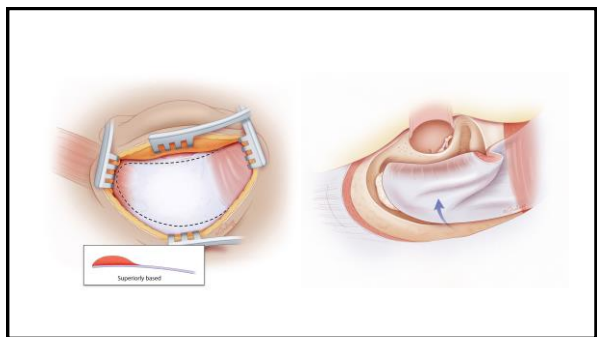
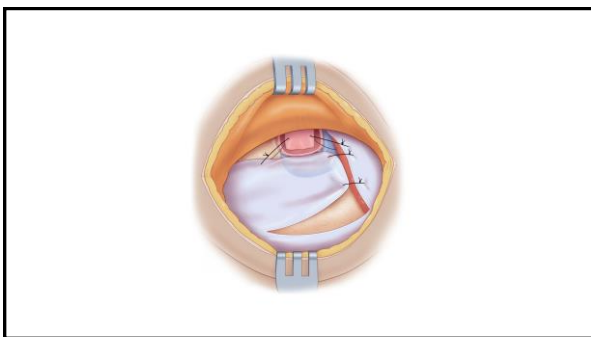
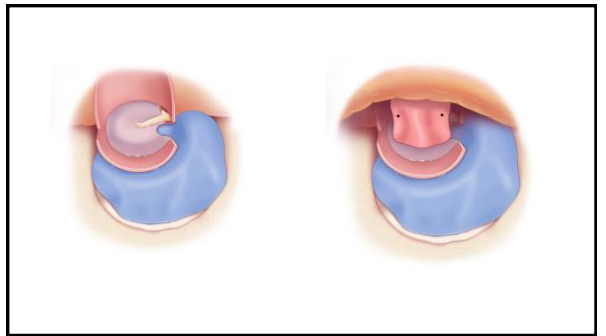
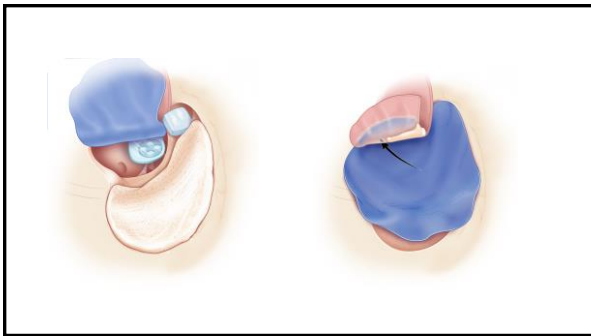
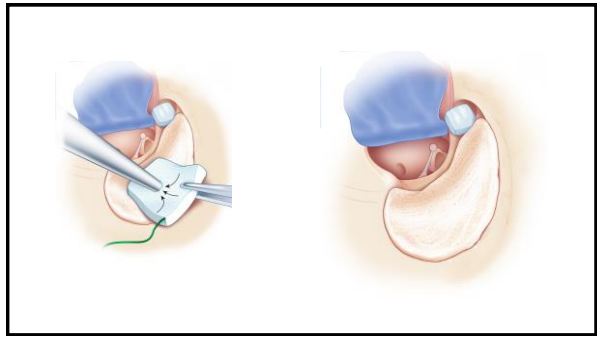
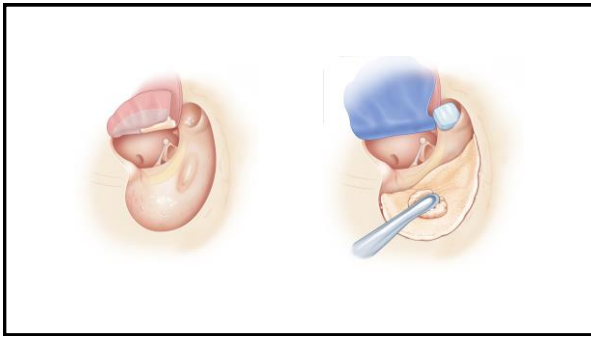
Staging

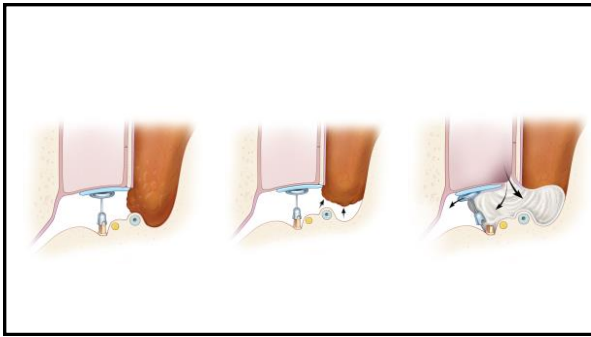
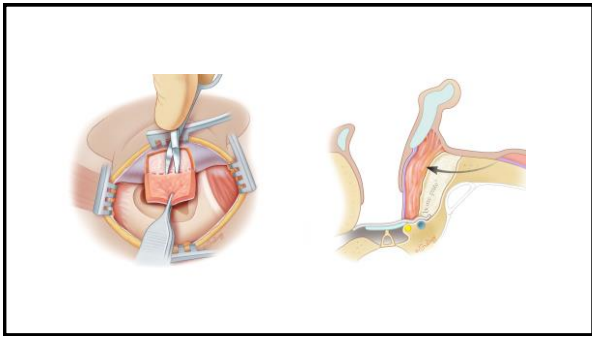
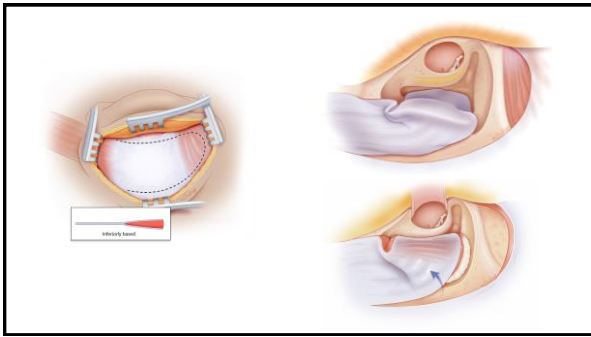
To Stage or not to Stage?



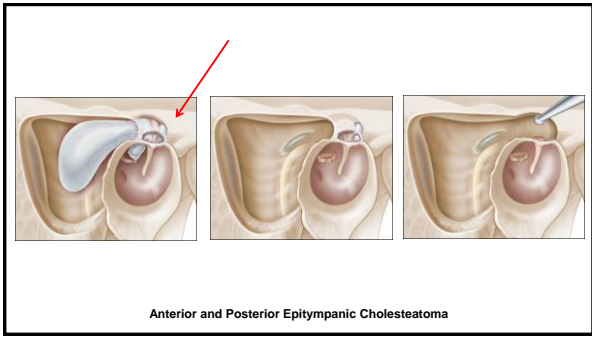
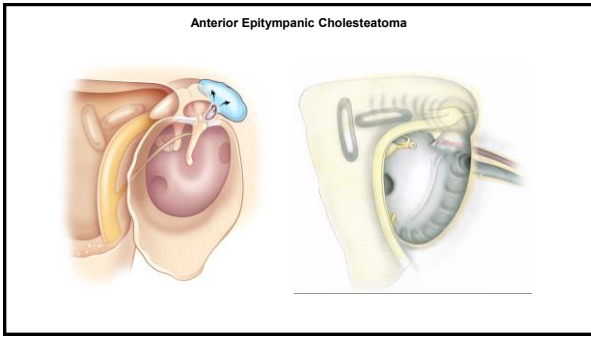
Mastoid Obliteration



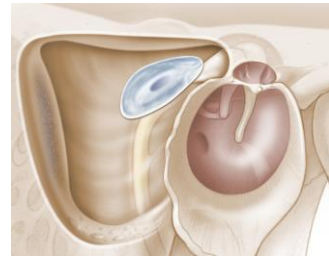




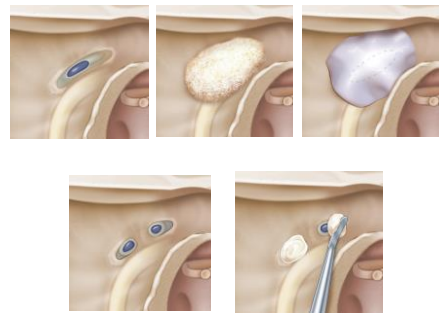
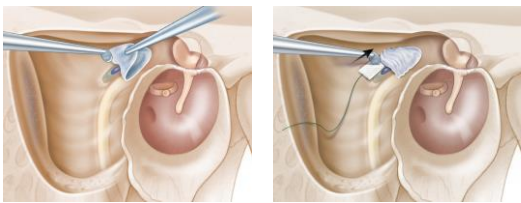
Anterior Epitympanic Cholesteatoma



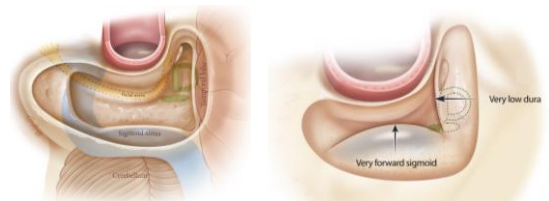
Semicircular Canal Fistula

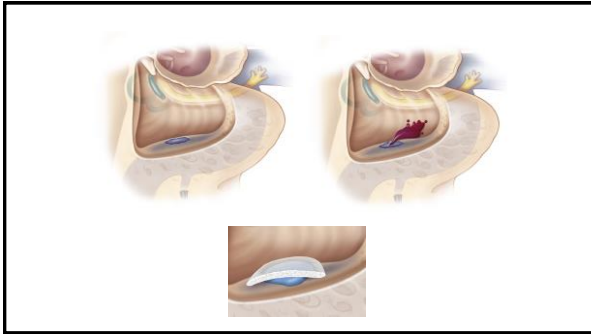


Lateral Semicircular Canal Fistula

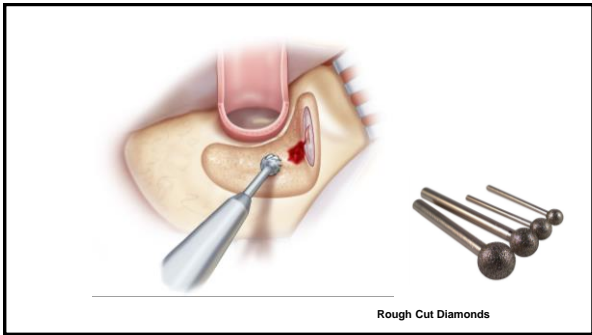
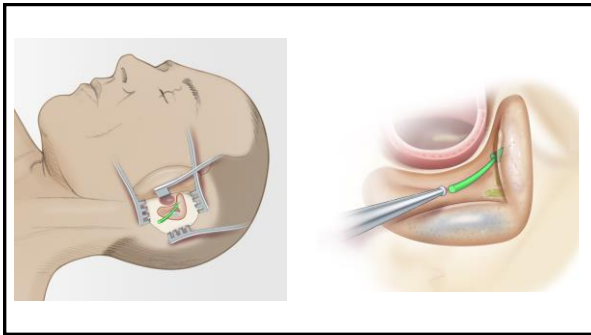
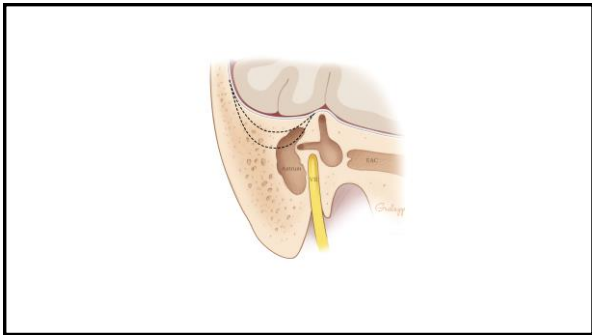
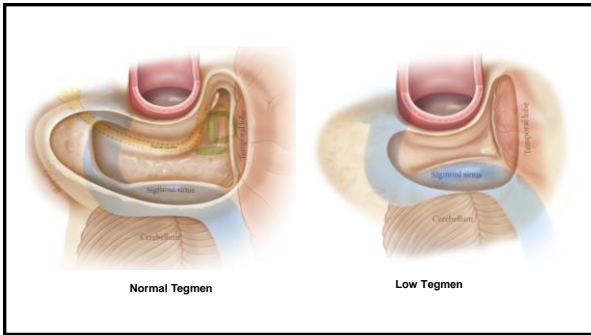


Sigmoid Sinus

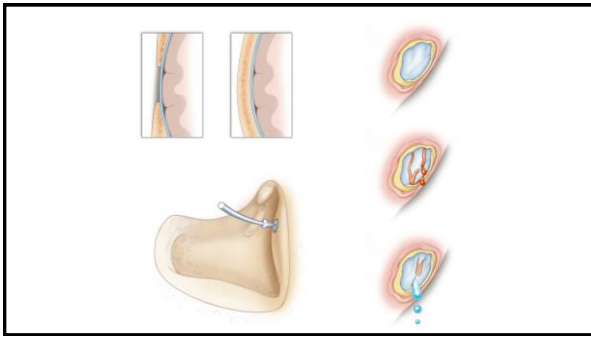




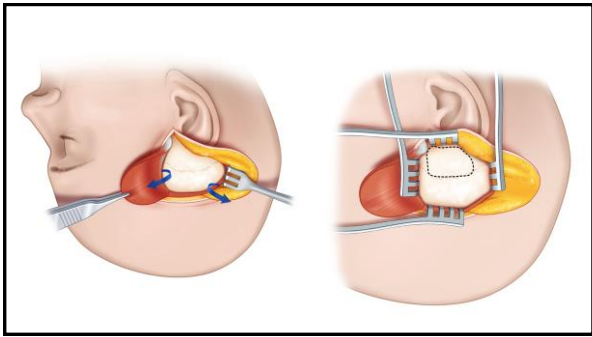
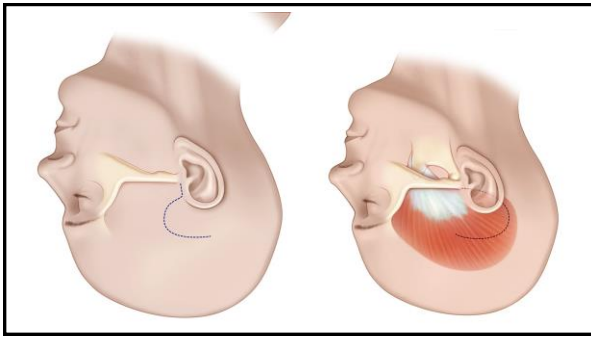
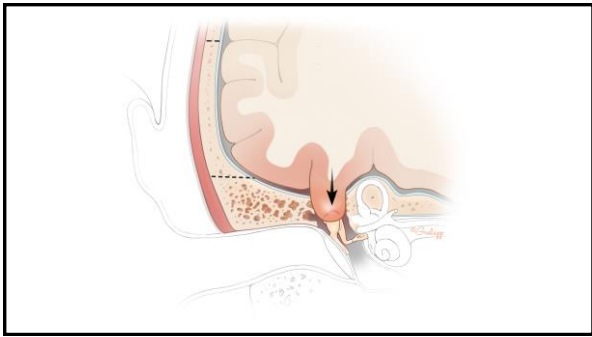
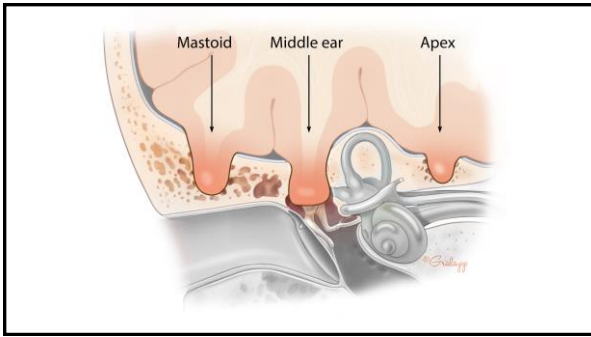
Tegmen

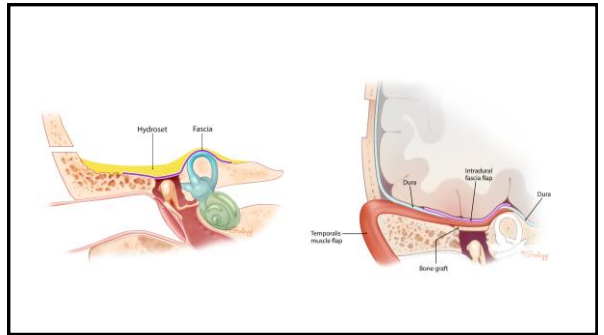
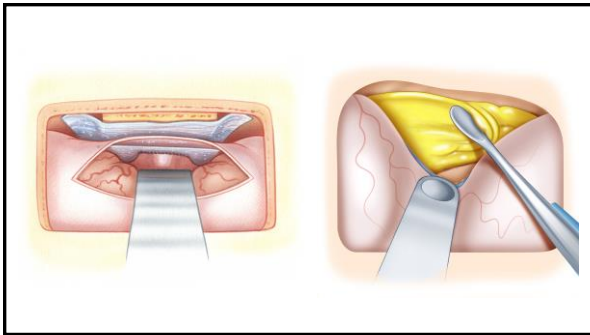
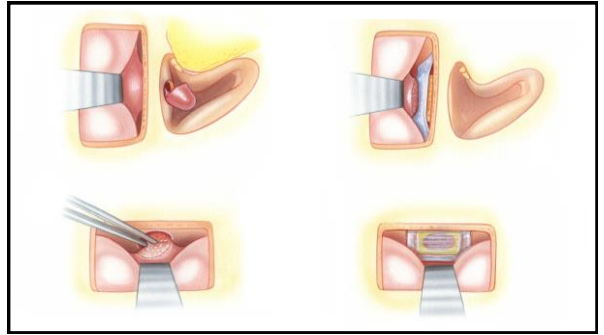
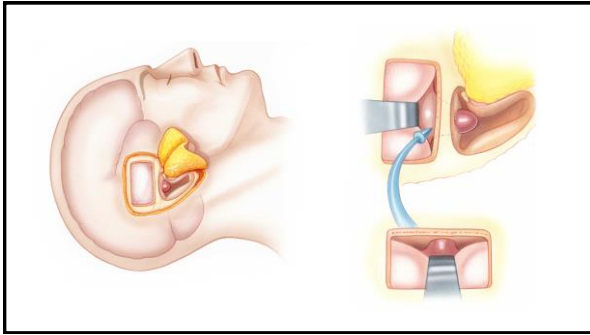


Rough Cut Diamonds

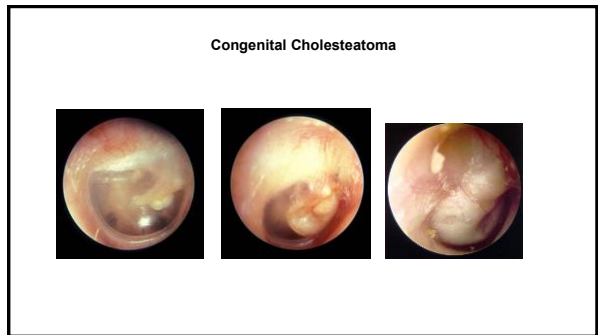


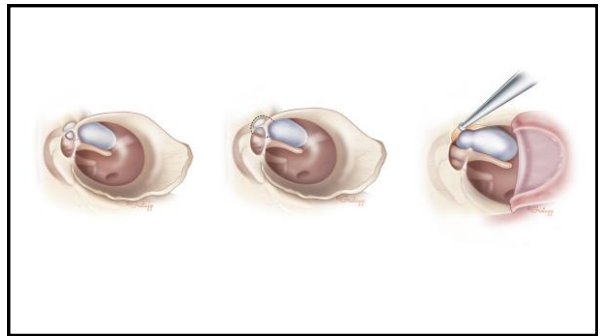
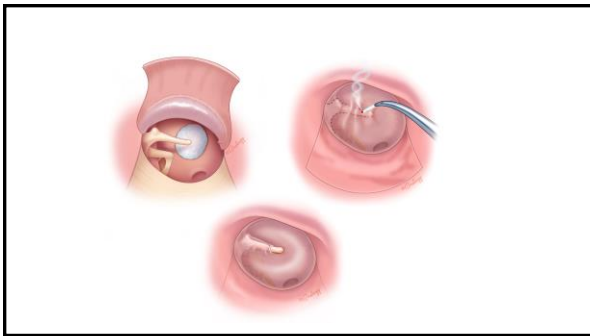
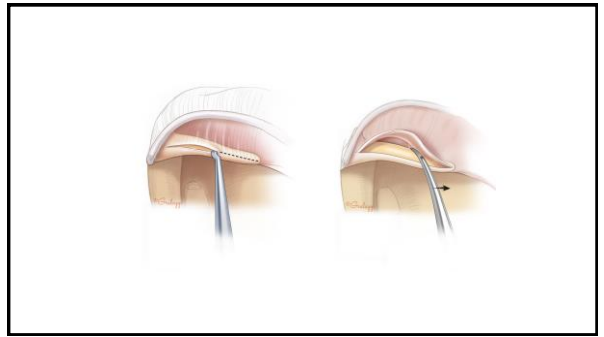
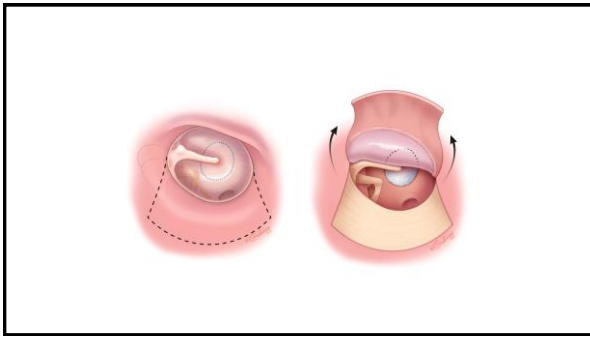
Encephalocele



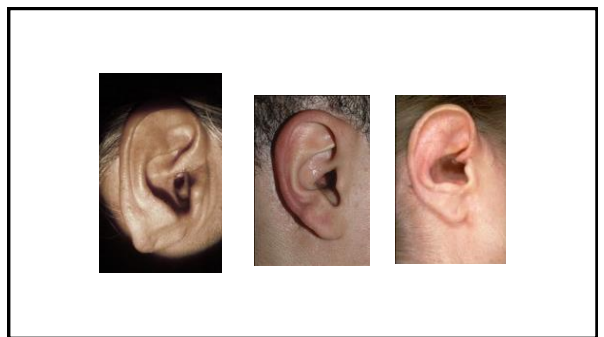


Congenital Cholesteatoma

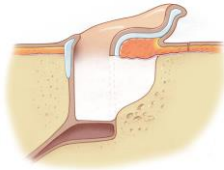




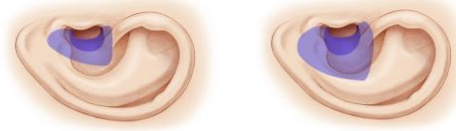
Postauricular Meatoplasty



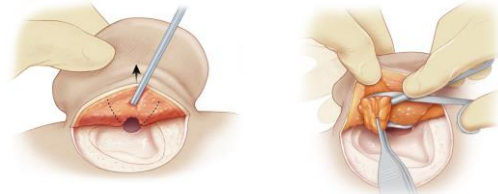
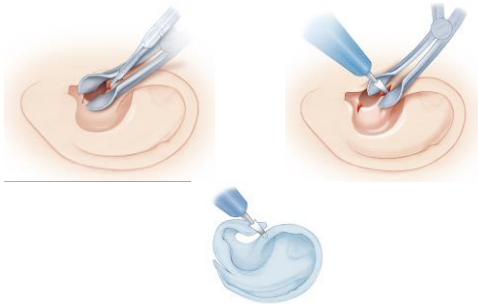
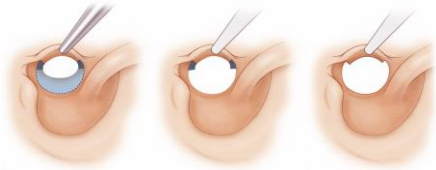
The Need for Meatoplasty

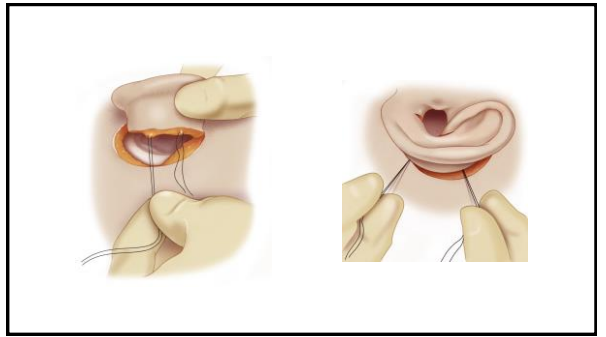
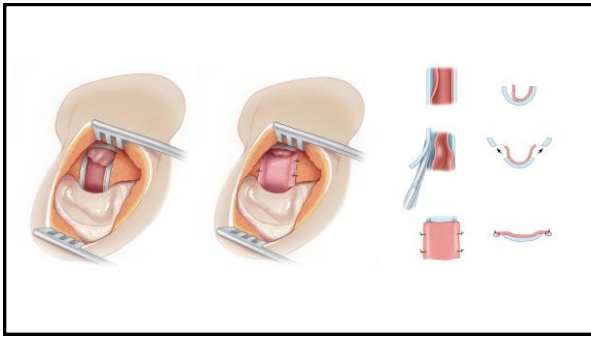
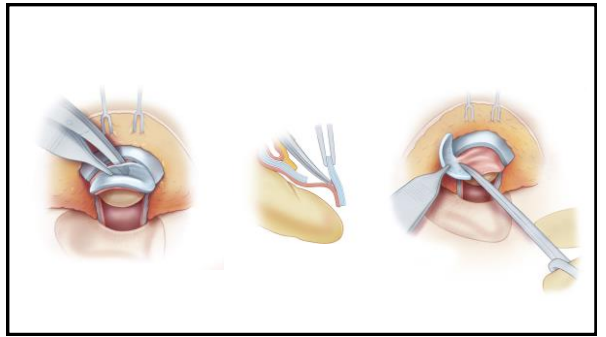
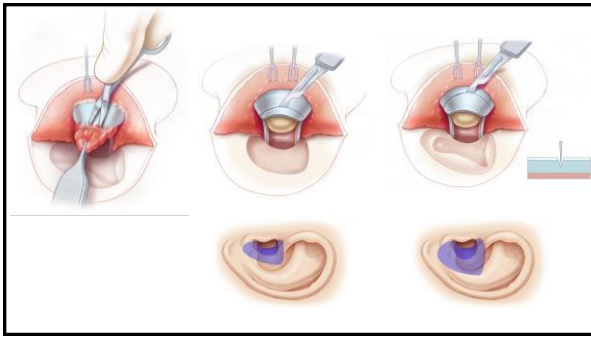
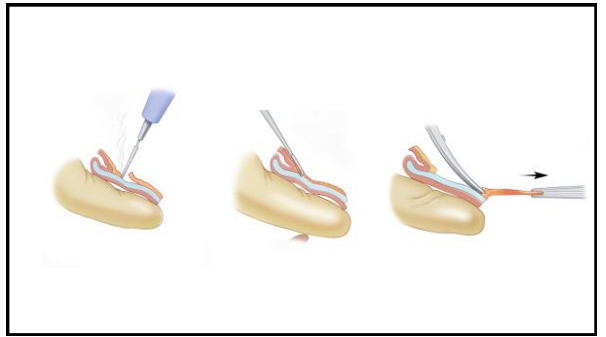
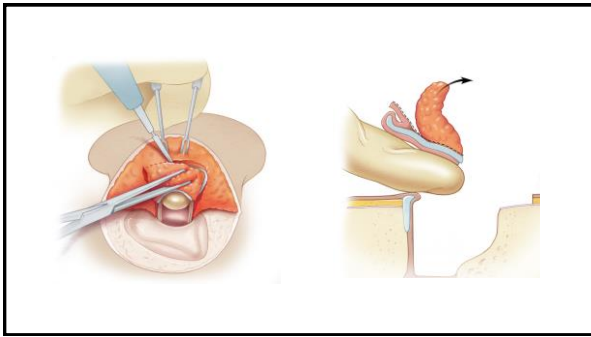


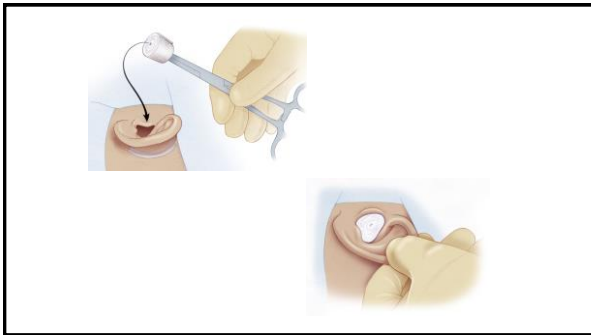
Tailoring Meatoplasty Size



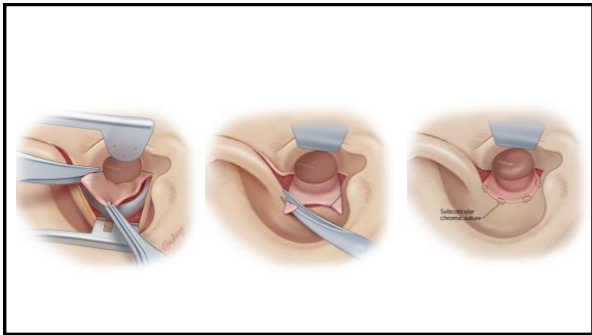
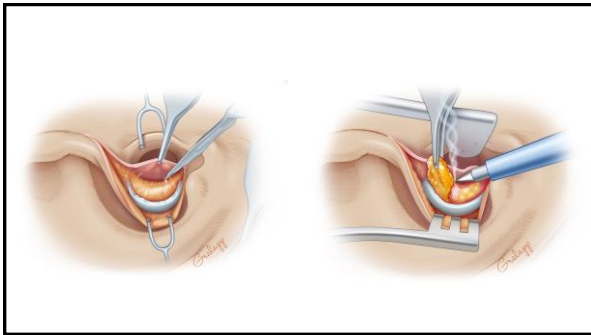
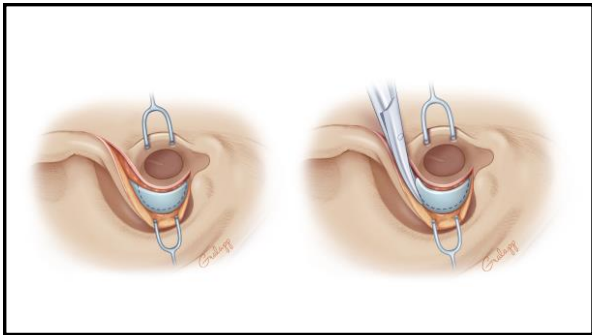
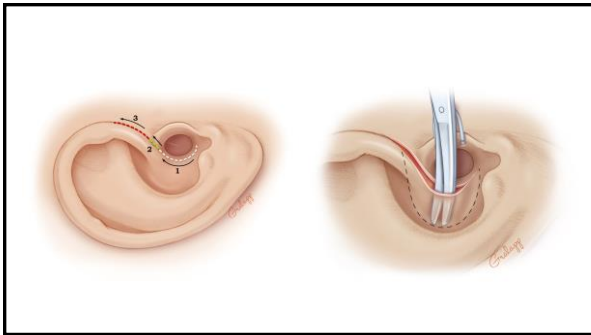
Posterior & Anterior Meatoplasty



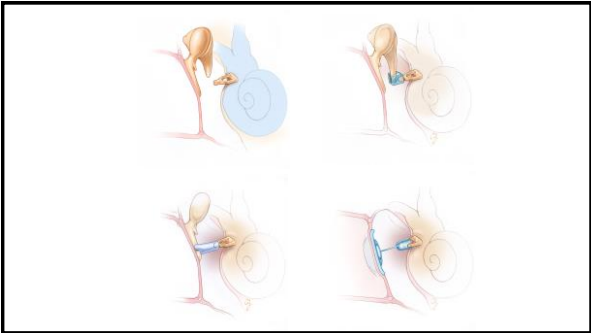




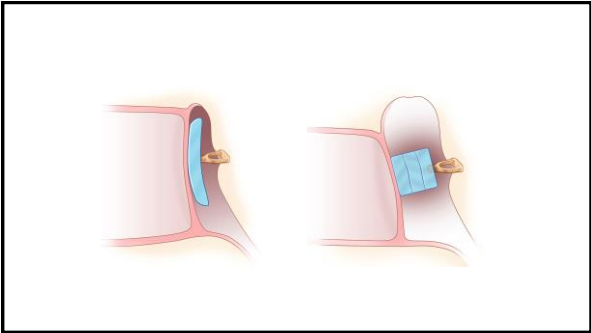
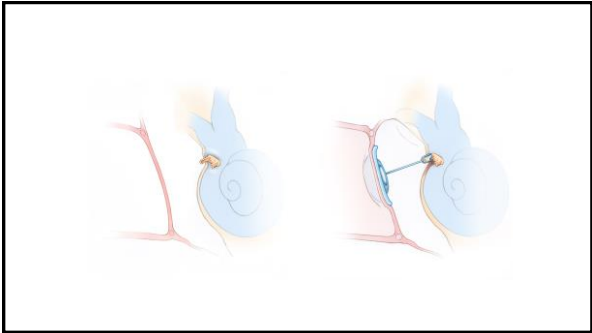
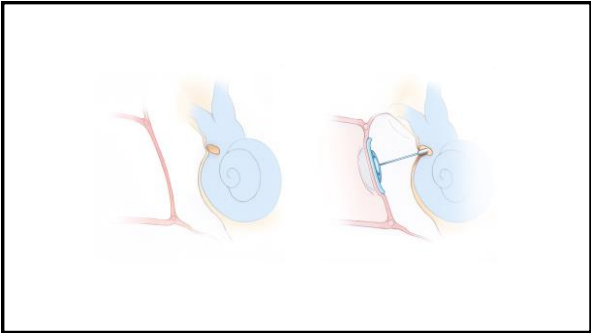
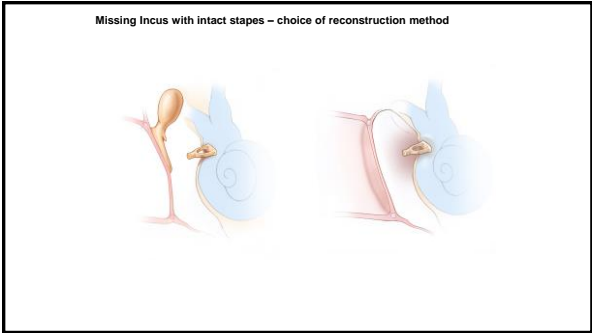
Enaural Meatoplasty

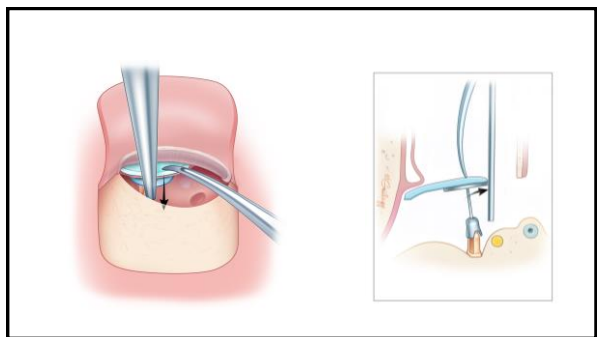
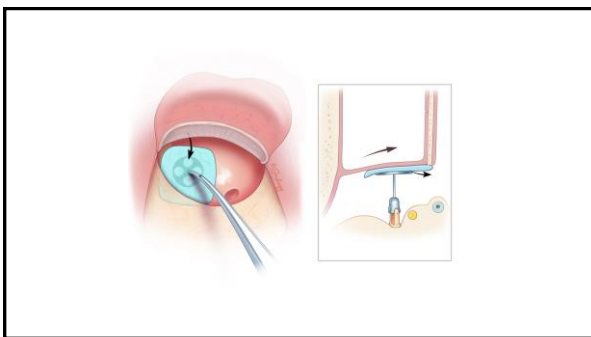
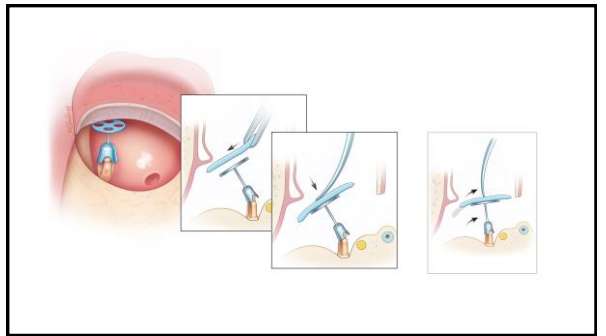
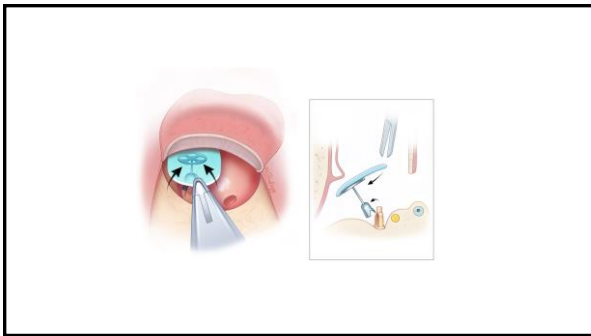
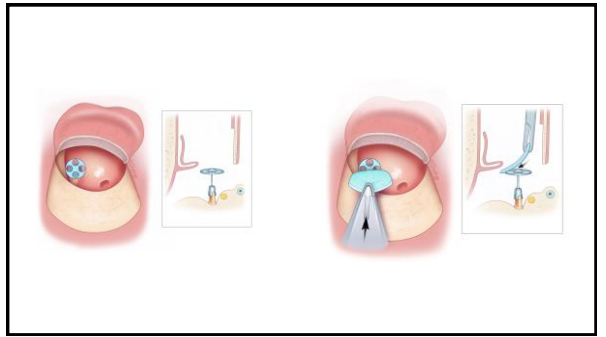
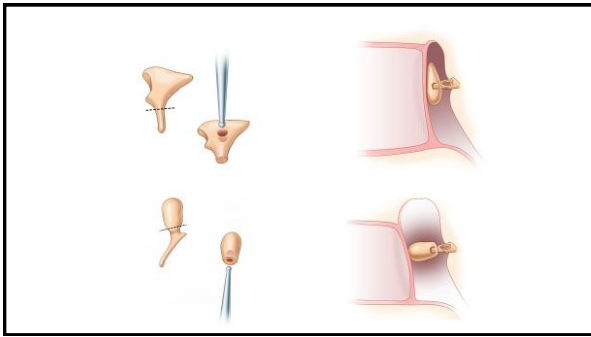


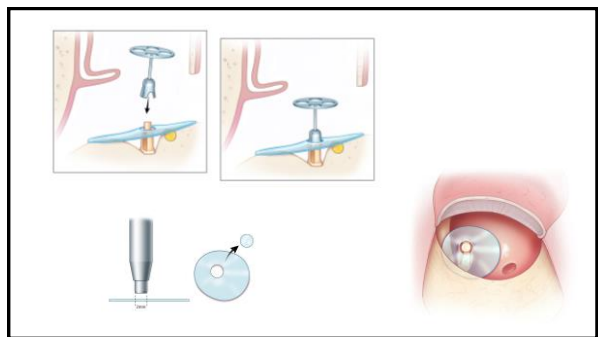
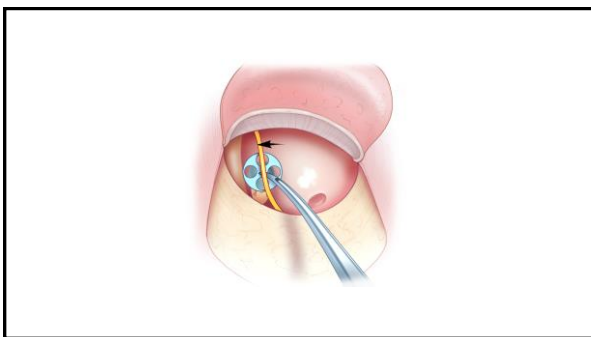
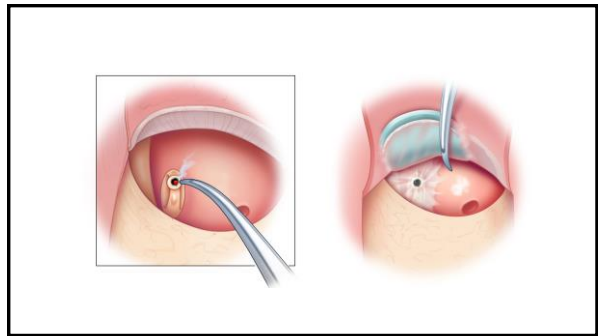
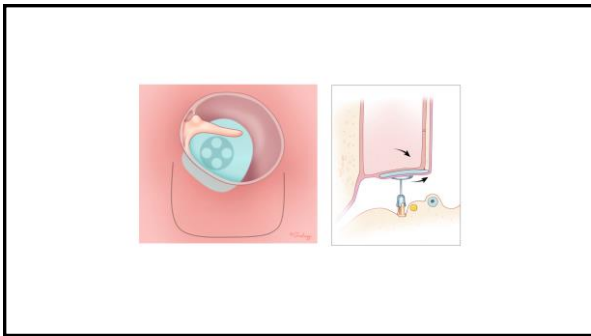
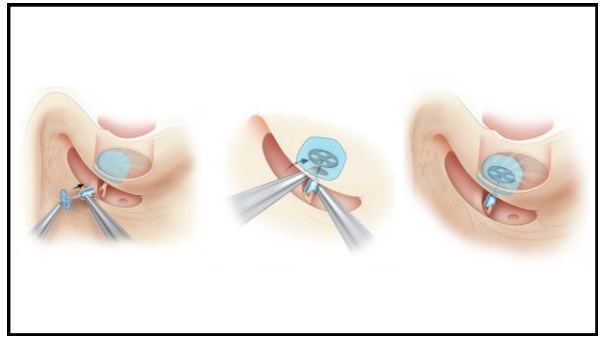
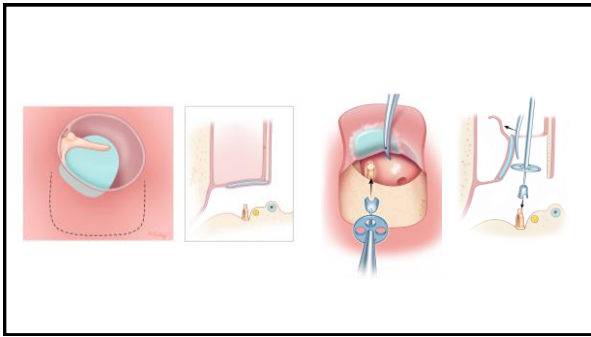
Ossiculoplasty technique

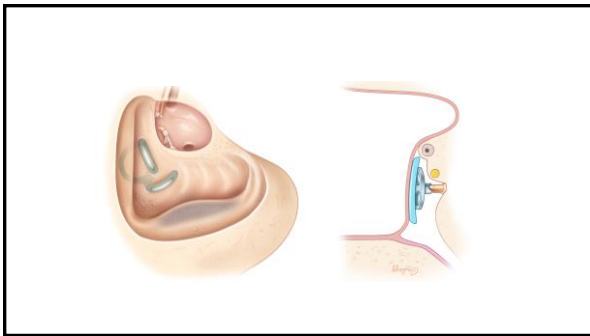
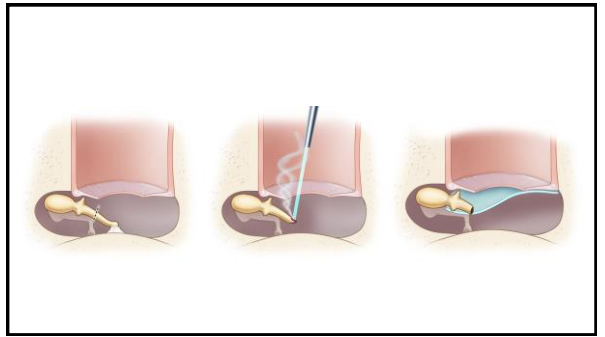
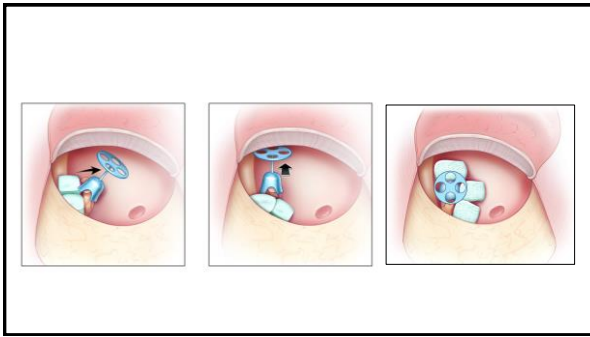


Missing Incus with intact stapes – choice of reconstruction method

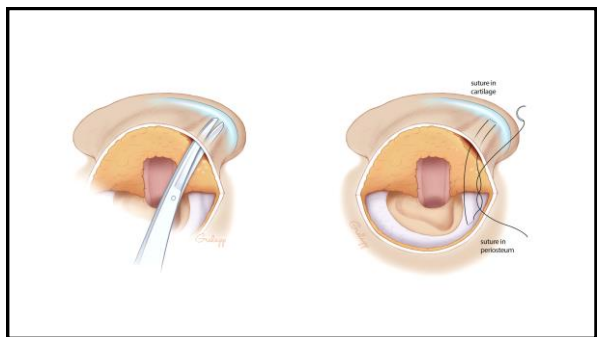
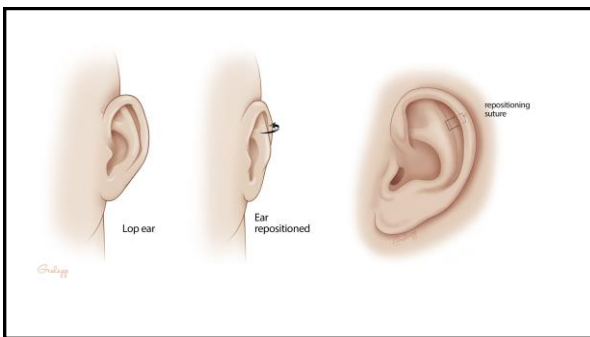




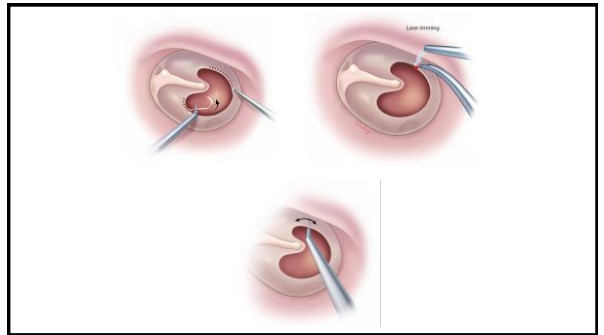




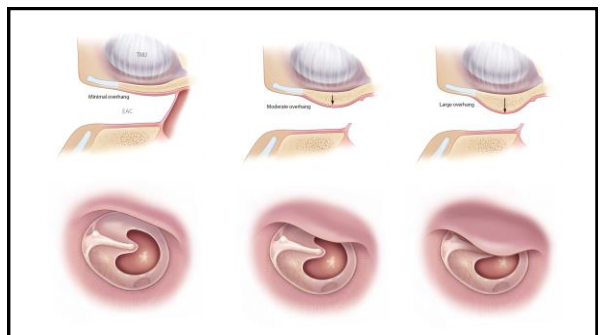
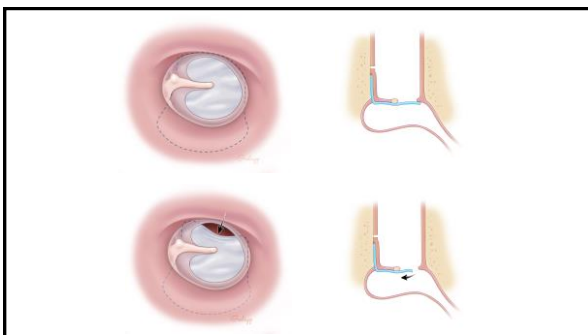
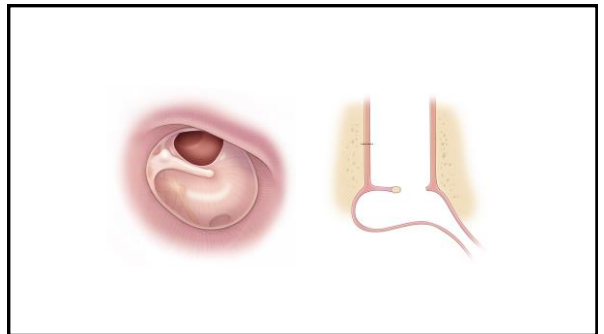
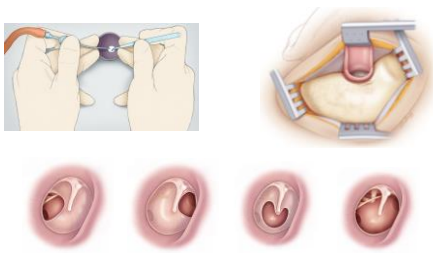
Avoiding Lop Ears

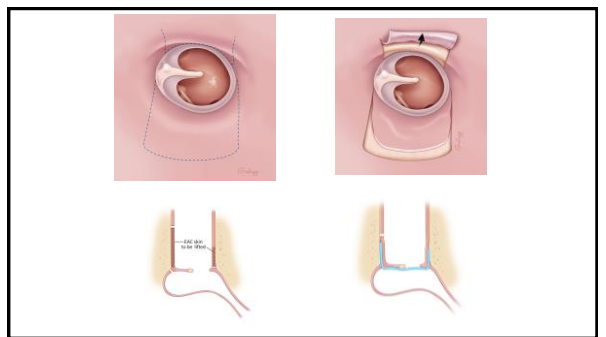
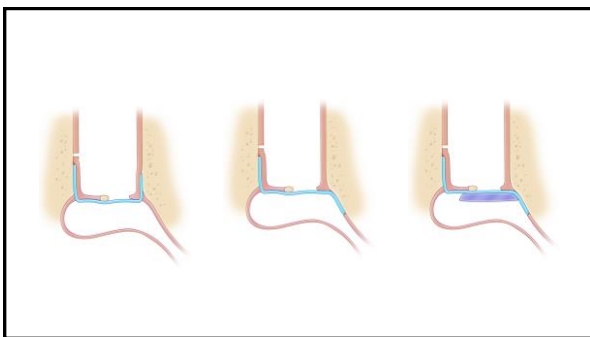
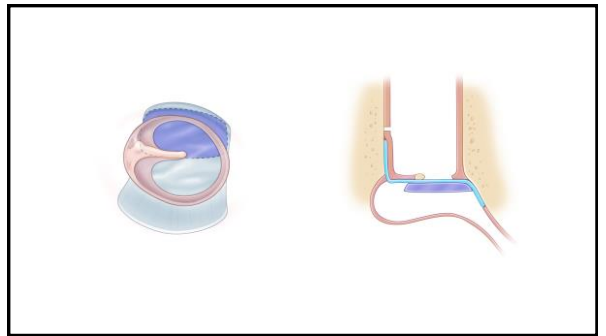
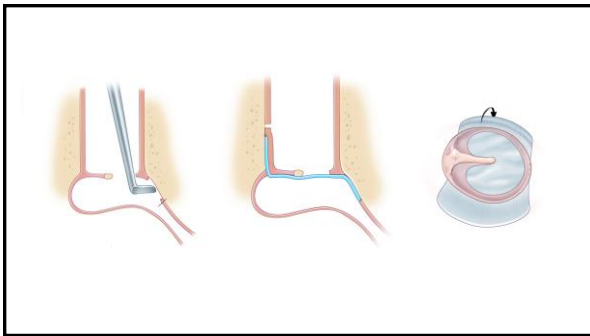
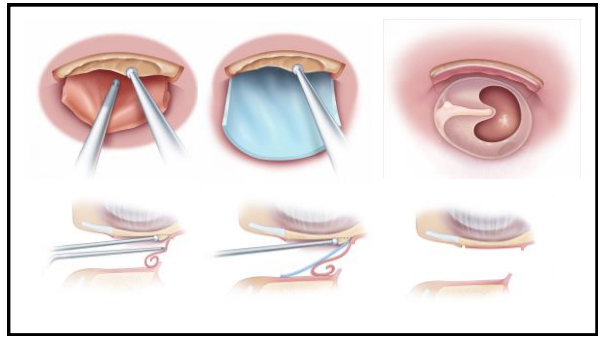
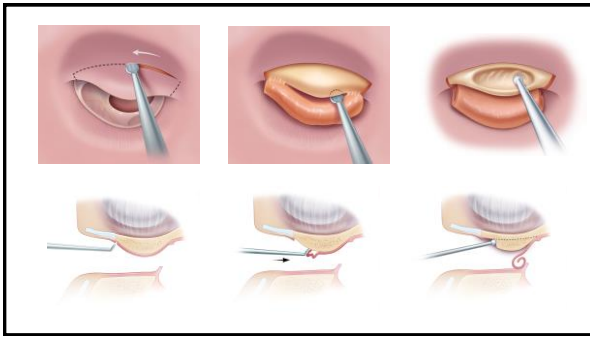


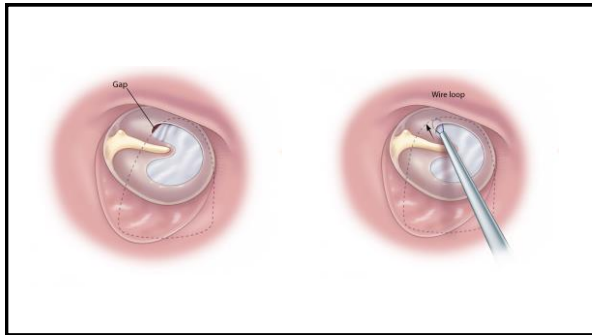
Anterior TM Perforation



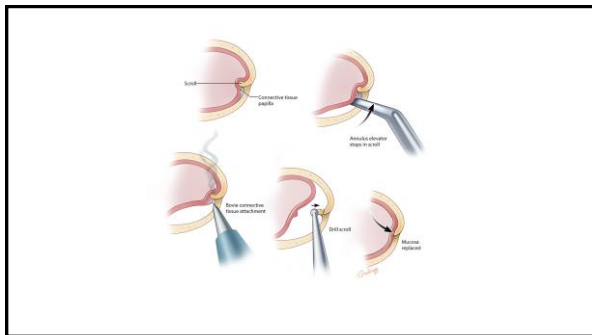
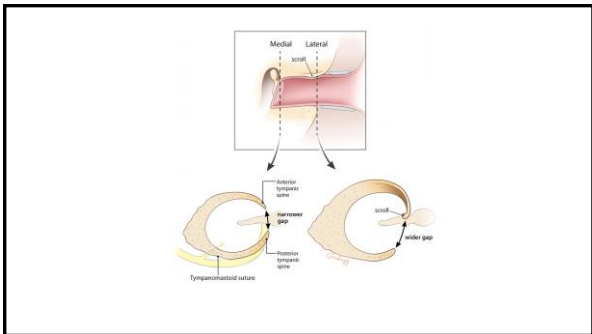
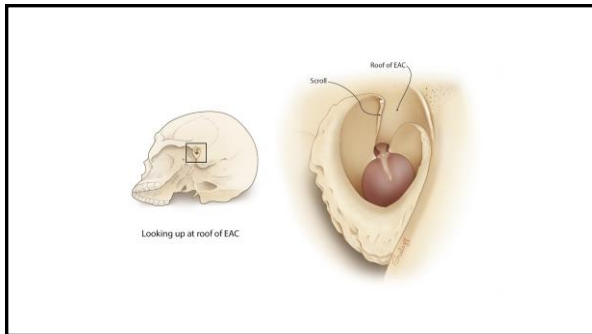
Transcanal vs Postauricular Tympanoplasty



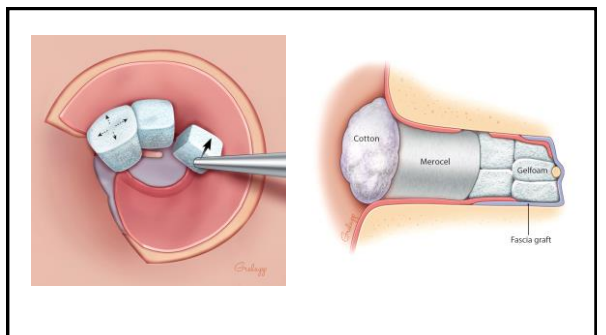
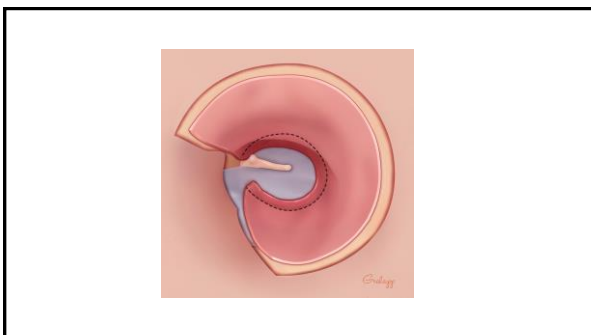
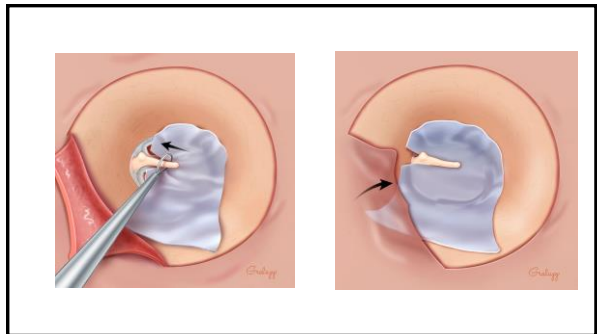
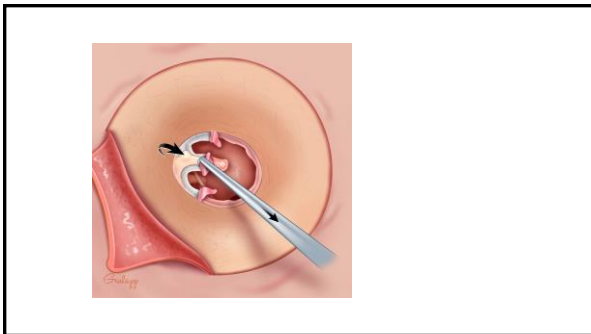
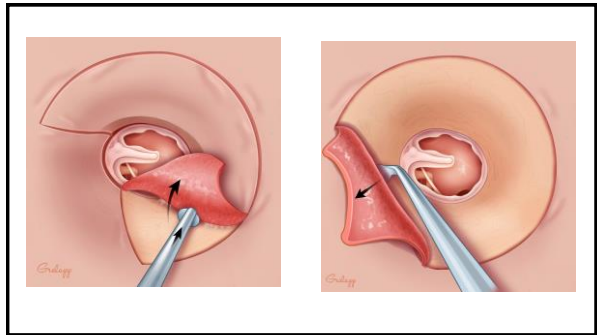
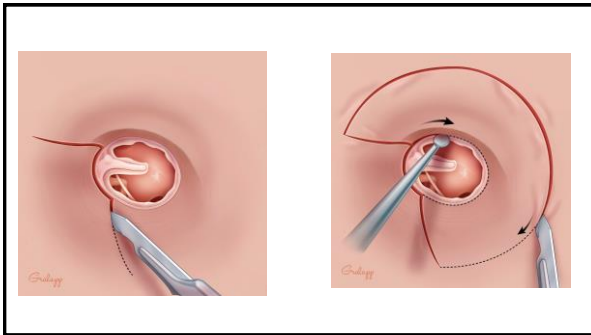


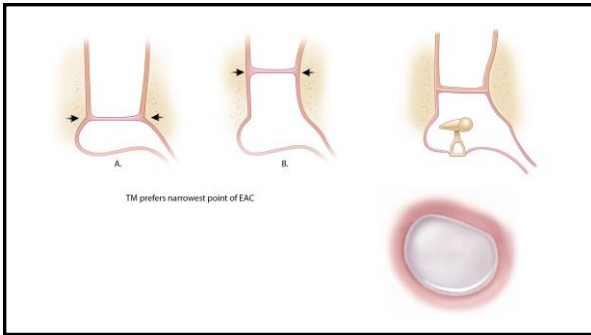
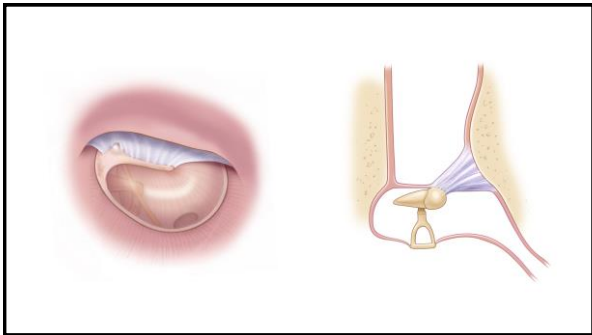
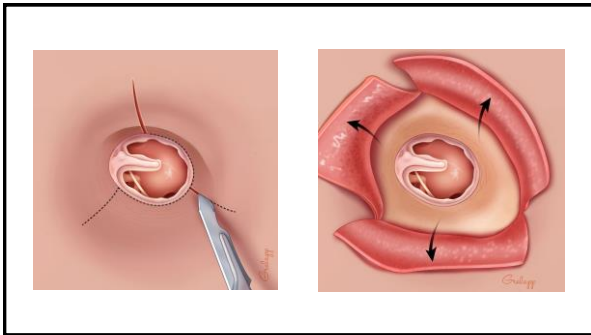


The Scroll

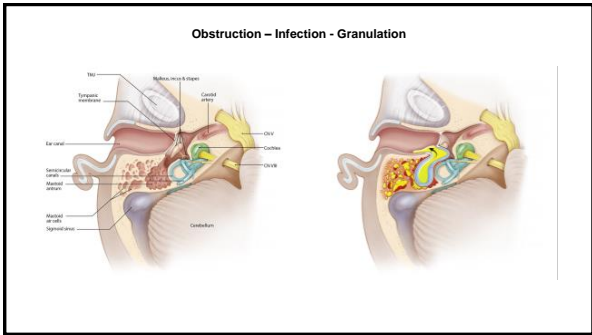
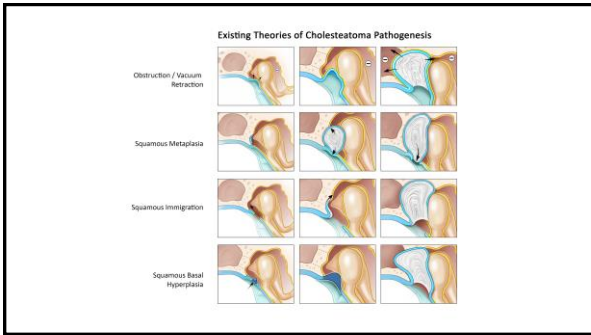


Lateral Graft technique





Pathophysiology of Cholesteatoma



Widely Accepted Theory of Cholesteatoma Genesis
Obstruction, Vacuum, Retraction
 The Central Dogma Most of Us Have Long Accepted

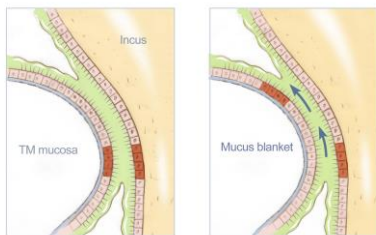
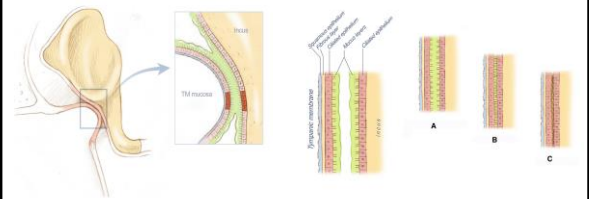
- Eustachian tube dysfunction
- Trapped gas is absorbed by middle ear mucosa lead generating vacuum
- Upper flaccid part of drum draws inward forming pouch in epitympanum
- Keratin debris accumulates and plug narrow orifice
- Keratin plug expands and erodes bone



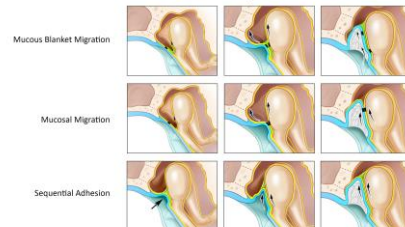
- As the epitympanum and mastoid in the cholesteatoma ear rapidly fill with fluid, mucous, and granulation tissue no gas is present. Thus, vacuum cannot be the driving force except at initiation.
- The mesotympanum and eustachian tube often are aerated and have good mucosa in cholesteatoma ears. ET endoscopy looks good.
- Ventilating tubes do not stop cholesteatomatous recurrence: We frequently see recurrence even with a patent tube in place
- Patients with anatomical obstruction of the ET (Eg ITF tumor, NPH SCC, surgical closure in SB surgery) rarely evolve cholesteatoma

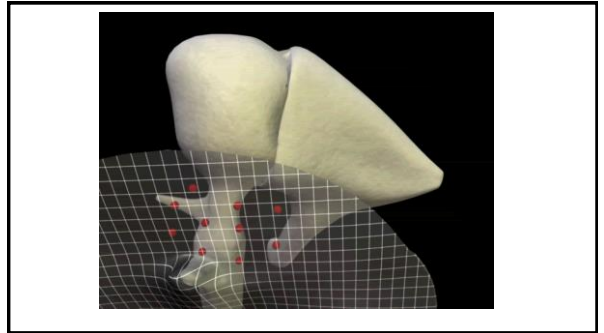
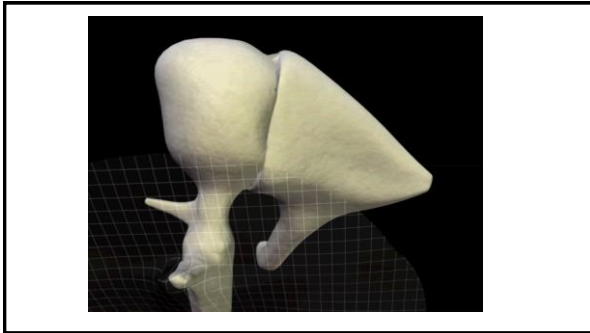


- How are cholesteatomas are drawn in by a mechanism if not by vacuum?
- Why do they only arise in the epitympanum and posterior mesotympanum but not anteriorly or inferiorly?
- Why do some patients get TM atelectasis without pocketing while other develop a pouch without atelectasis?
- Why is their a predisposition to bilateral and familial disease?
- Association with hypopneumatization?



Mucosal Traction Theory





Primary Conclusions:

Cholesteatoma is Fundamentally a Mucosal Disease
Proximity of the Ossicles is Essential, Not Incidental

The Mucosal Traction Theory Explains:

- How cholesteatoma growth can be driven into non-aerated mucosal spaces such as the epitympanum and antrum
- Why functioning PE tubes do not prevent cholesteatoma recurrence
- Why cholesteatomas are limited to the posterior and superior quadrants
- Why some patients get simple atelectasis with collapse of the tympanum while others develop epitympanic pockets without ME atelectasis
- Why anatomical obstruction of the Eustachian tube does not routinely lead to cholesteatoma formation

