Case presentation

32 year old Female with right hearing loss Ossicular chain disruption

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Presenter: PGY1 朱奕鴻

Dec 24, 2025

Outline

1.Case presentation

2.Operation record

3.Discussion

Basic profile

32 year-old female
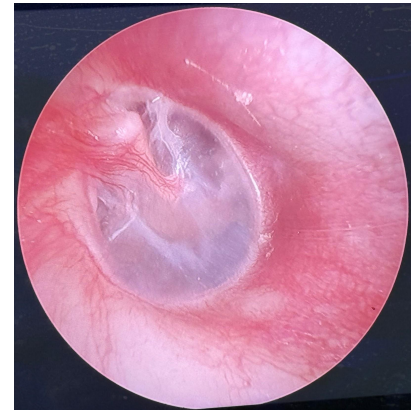
Chief complaint:

Right hearing loss for yrs and intermittent aural fullness

Underlying disease:(-)

Trauma history: Head trauma 17 yrs ago

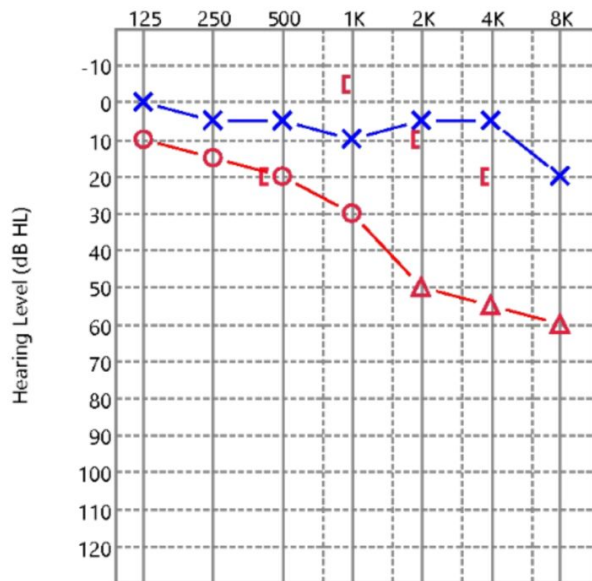vertigo(-), tinnitus(-), autophony(-)

bilateral eardrum intact

Right eardrum
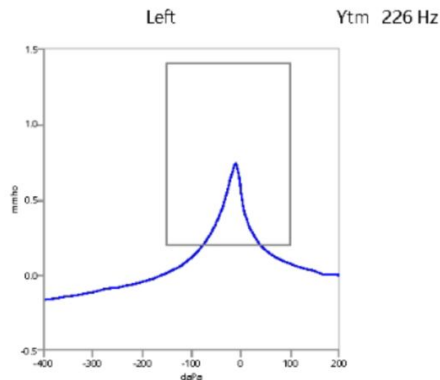
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PTA on 10/8

Right ear:Air-Bone Gap(28db)

Tympanometry showed Ad type->ear drum intact

Suspect ossicular chain dislocation, arrange temoral CT

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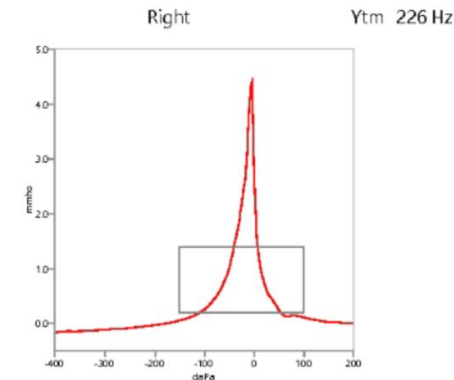
Temporal bone CT-F09976(Pacs)

NORMAL

ice cream

bone
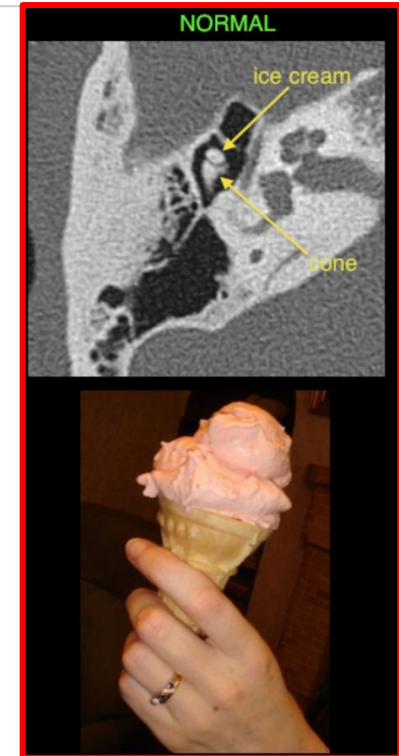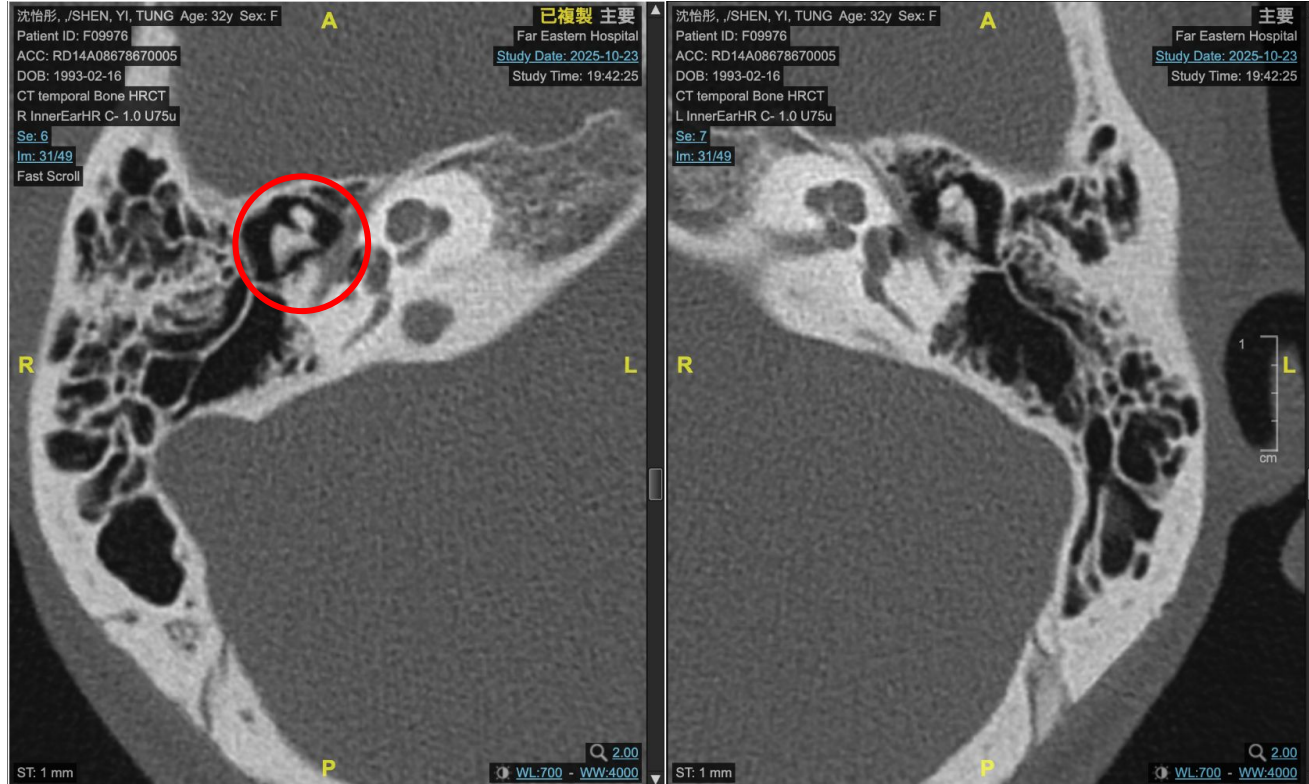
https://radiopaedia.org/articles/ossicular-chain-disruption

Diagnosis

1. Right ossicular chain disruption, including incudomalleolar and incudostapedial joint, suspected trauma related
2. Right conductive hearing loss

Ossiculoplasty on 2025/12/12

1.transcanal incision, Tympanomeatal flap-> access the middle ear.
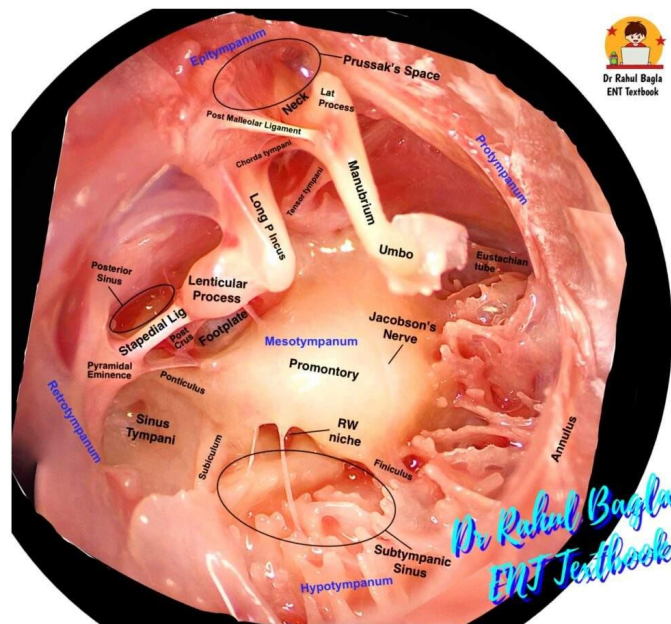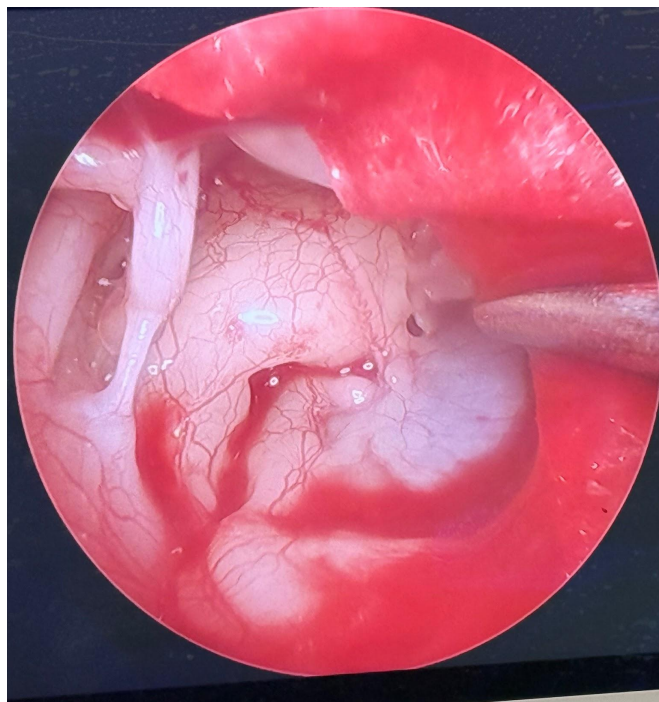
Endoscopic picture showing important stuructures of middle ear after removal of tympanic membrane

Right incudostapedial joint dislocation

Arrow showed movable long process
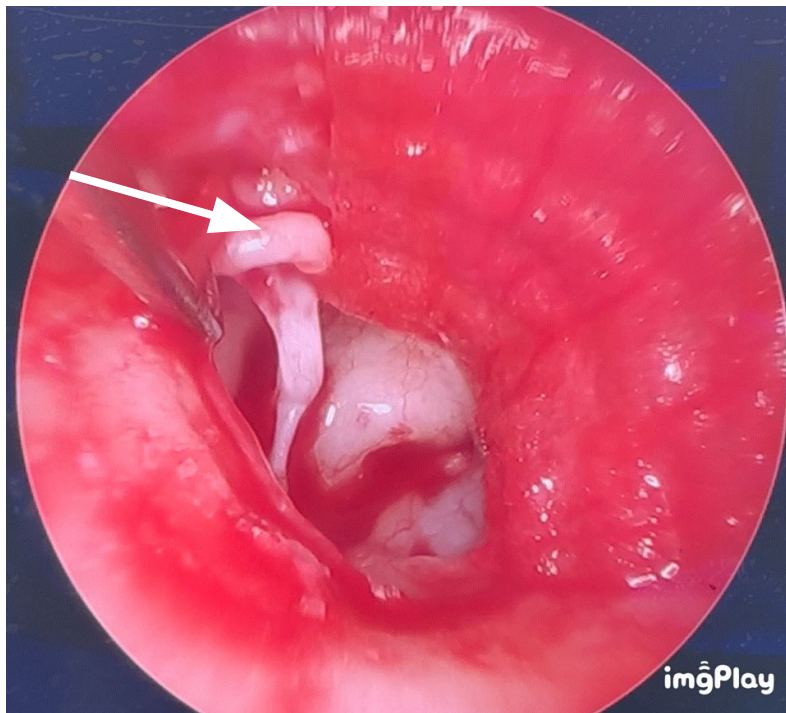
Remove of incus

Diseased incus removed and preserved for graft preparation
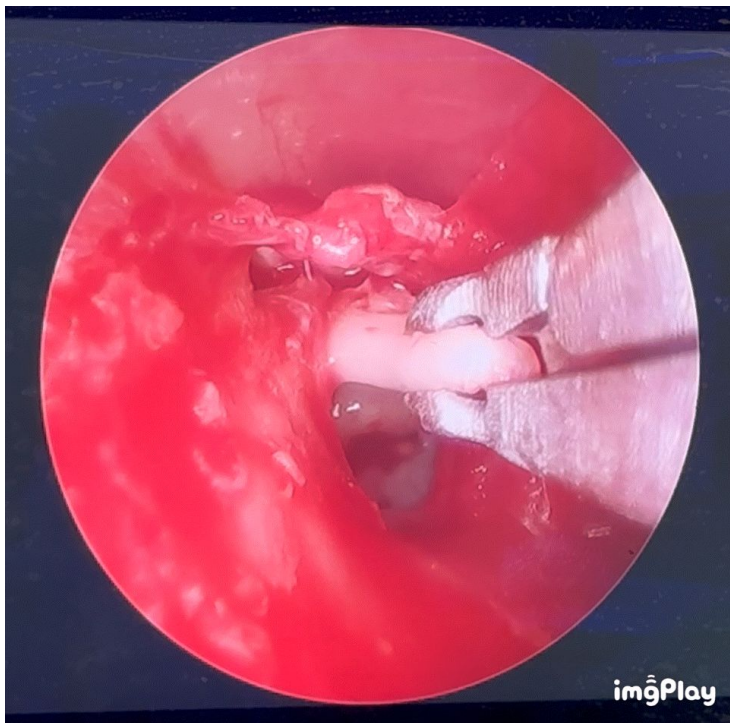
Sculpting incus for Autologous graft

Incus sculpted into appropriate shape for interposition between the malleus and stapes .(Incus interposition graft.)
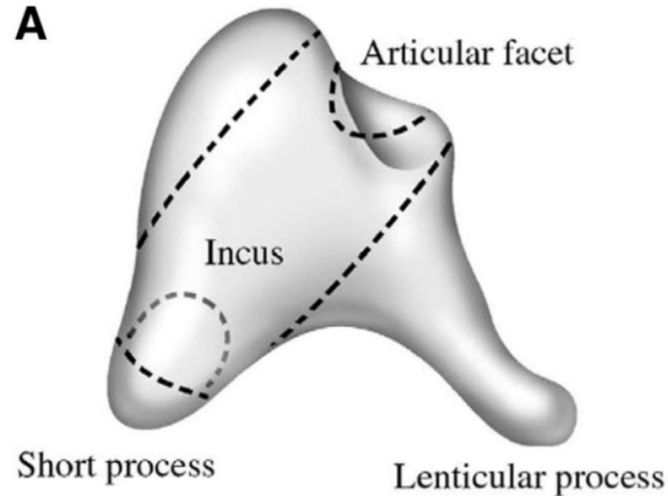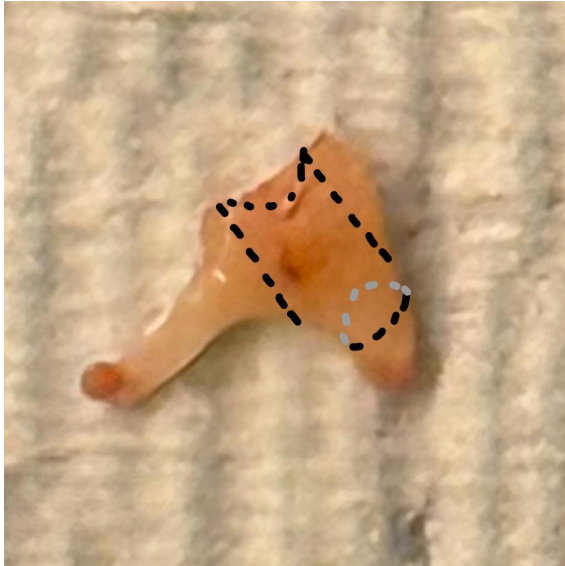
Autologous graft of incus, interposition graft.

Amy C. Brenski, Brandson Isaacson,Reconstruction of the ossicular chain in children,Operative Techniques in Otolaryngology-Head and Neck Surgery, Volume 20, Issue 3,2009,Pages 187-196,
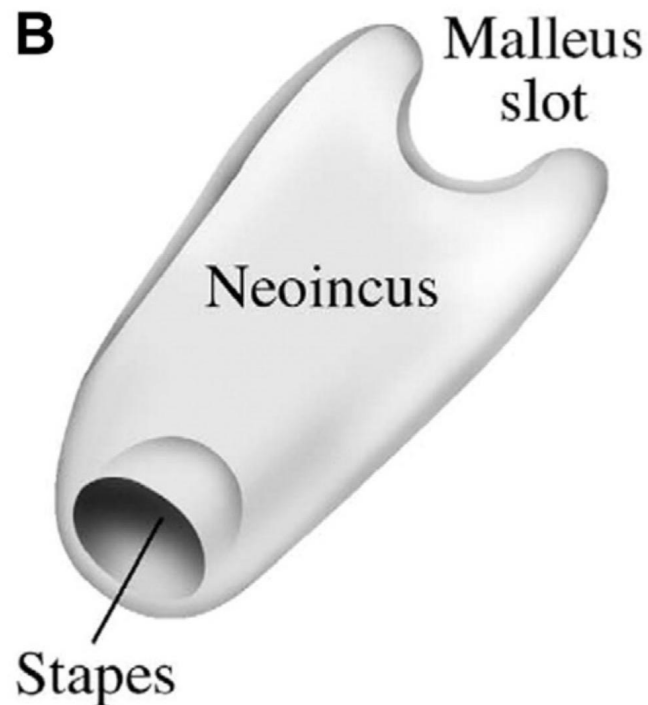
Placing neoincus into middle ear

Autologous incus graft placed securely to re-establish ossicular continuity.

Amy C. Brenski, Brandson Isaacson,Reconstruction of the ossicular chain in children,Operative Techniques in Otolaryngology-Head and Neck Surgery, Volume 20, Issue 3,2009,Pages 187-196,
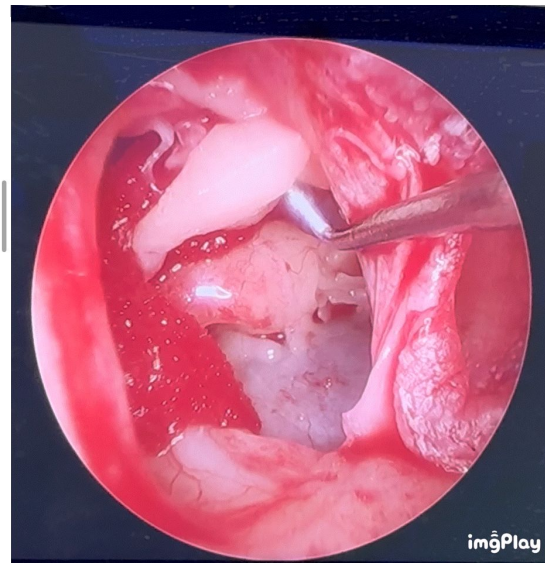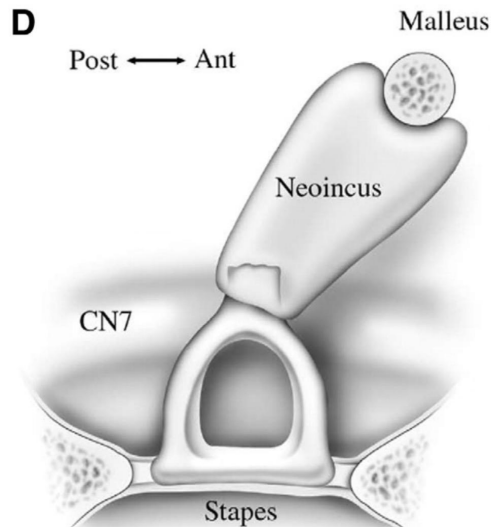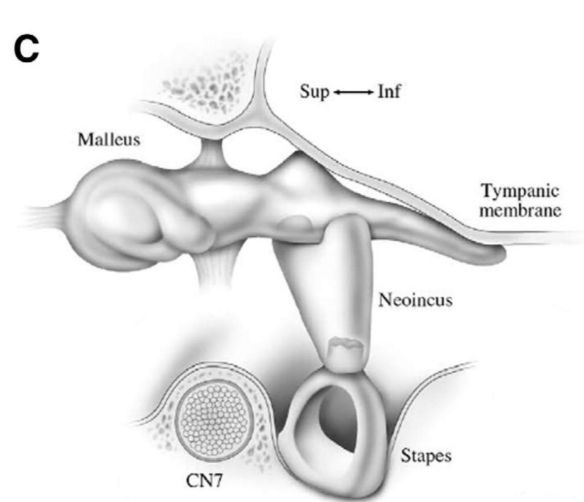
Review of Ossicular Chain Disruption

Disruption of the connection ossicle chain

Conductive hearing loss (CHL), typically around 50-60 dB

Loss function of ossicle chain-> ↓ sound transmission and amplification.
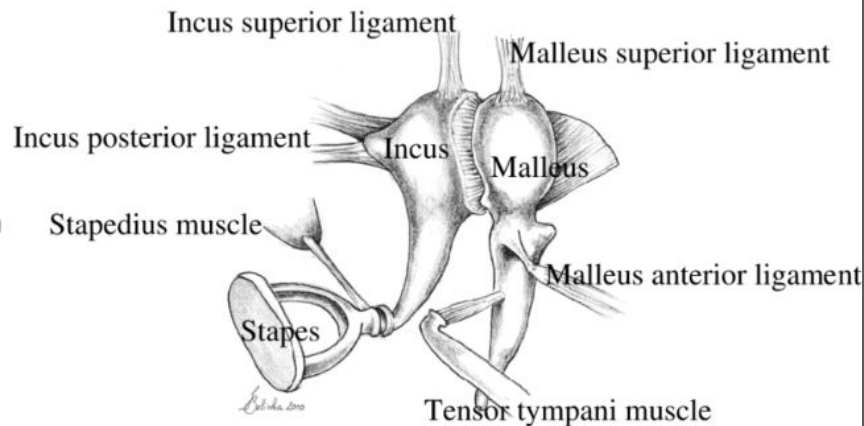
Injury site:

1.Incudostapedial dislocation (most common in surgery, 67%)

2.Incudomallear dislocation(most in CT finding)

others:Stapediovestibular subluxation, Luxation of the incus, Incudomallear subluxation

Cause: head trauma, particularly **temporal bone trauma**.

Ossicular-Chain Dislocation, Statpearls, Elaine Campbell; Neil C. Tan.

Gentil, F., et al, The influence of muscles activation on the dynamical behaviour of the tympano-ossicular system of the middle ear. Computer Methods in Biomechanics and Biomedical Engineering, (2013). 16(4), 392–402.

13

Differential diagnosis of middle ear trauma

Conductive hearing loss:

    Hemotympanum

    Tympanic membrane perforation

    Ossicular chain dislocation
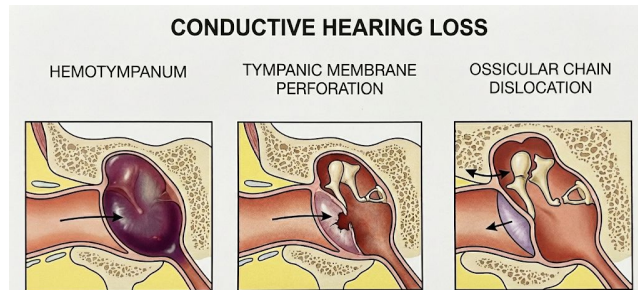
Sensorineural hearing loss:

    Post-traumatic inner ear hemorrhage

    Perilymphatic fistula

    Endolymphatic hydrops

    Stapediovestibular subluxation
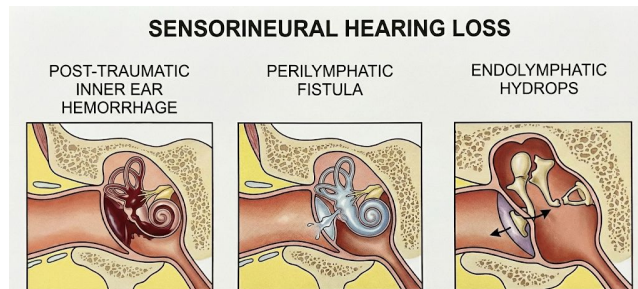
Ossicular-Chain Dislocation, Statpearls, Elaine Campbell; Neil C. Tan.

CONDUCTIVE HEARING LOSS

HEMOTYMPANUM   TYMPANIC MEMBRANE PERFORATION   OSSICULAR CHAIN DISLOCATION

SENSORINEURAL HEARING LOSS

POST-TRAUMATIC INNER EAR HEMORRHAGE   PERILYMPHATIC FISTULA   ENDOLYMPHATIC HYDROPS

Clinical Evaluation & Management Strategies

Symptoms:

Hearing loss, associated symptoms may include facial palsy, tinnitus, and vertigo.

Physical Exam:

Otoscopy may reveal hemotympanum (blood in the middle ear) or tympanic membrane perforation.

The **"6-Week Rule"**: Conductive hearing loss persisting more than 6 weeks post-injury (after hemotympanum resolves)-> ossicular dislocation.

Imaging:

High-resolution CT scan of the temporal bone, though it may not reveal all dislocations; surgical exploration is sometimes required for definitive diagnosis.

Ossicular-Chain Dislocation, Statpearls, Elaine Campbell; Neil C. Tan.

Management

Conservative:

Observation or hearing aids if the patient is unfit for surgery or prefers non-surgical management.

Surgical (Ossiculoplasty):

Indicated for persistent conductive hearing loss (>6 months).

Contraindication: if the affected ear is the patient's only hearing ear.

Timing: **Reconstruction is often delayed** (average interval >5 years)
rather than performed acutely.

Prognosis

Surgical outcomes are generally favorable.

Over 70% of patients achieve an air-bone gap closure to within 20 dB.

Traumatic ossicular chain disruption

Research Paper

Innovative Categorization and Operative Management of Auditory Ossicle Disruption Following Trauma: Therapeutic Efficacy and Interventional Paradigms

Yajing Wang[1], Wenjun Chen[1], Jiahao Liu[1], Guowang Wang[2], Yongkang Ou[1,✉]

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2.   Department of Otolaryngology, Head and Neck Surgery, ShenShan Medical Center, Memorial Hospital of Sun Yat-sen University, Shanwei 516400, P.R. China.

✉ Corresponding author: Yongkang Ou, Ouyk@mail.sysu.edu.cn.

17

Ossicle disruption after trauma

Design: Retrospective analysis of 15 patients (2015–2023).
Basis: Classified by intraoperative findings of trauma location.

Type I: Ossicular Trauma without Stapediovestibular Dislocation (SVD)

Type II: Stapediovestibular Dislocation (SVD)
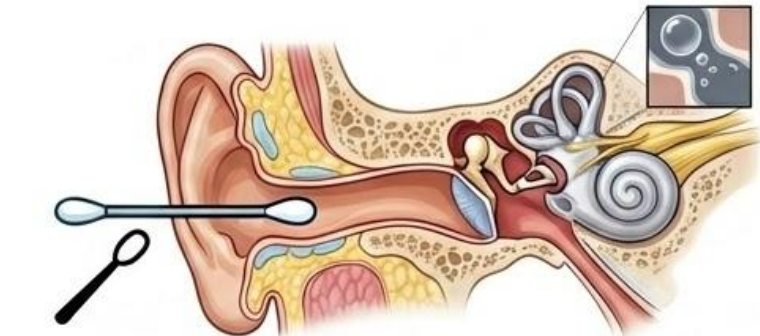
Type I: Ossicular Trauma without Stapediovestibular Dislocation (SVD)

Dislocation of malleus/incus but the **stapes footplate remains intact**.

Predominantly **Head Trauma (90%)**

Mainly Conductive or mixed hearing Loss.

Longer treatment delay(6 weeks) as patients primary healing and improvement of hearing

Discussion

Type II: Stapediovestibular Dislocation (SVD)

Stapes displacement into the vestibule (with or without incus dislocation).
Penetrating Injury to the external auditory canal
      (100%, e.g., ear picks, chopsticks).
Severe Vertigo, Tinnitus, and varying hearing loss (Mixed to Profound SNHL).
Pneumolabyrinth (air in the vestibule) in HRCT.
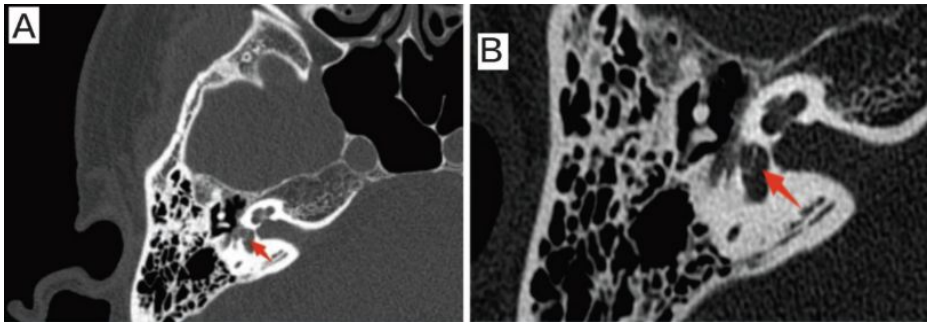
A and B: Stapediovestibular dislocation can be seen in the HRCT.

pneumolabyrinth.

20
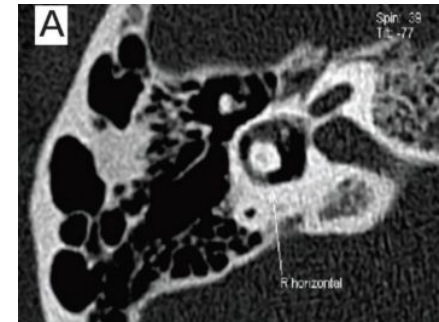
Management-Type I

Type I: Ossicular Trauma without SVD-Hearing Restoration Focus:

Procedure:

>Ossiculoplasty using Partial (PORP) or Total (TORP) Ossicular Replacement Prostheses. Reconstruct the ossicular chain to restore sound conduction.

Outcomes:

>Hearing: **Significant postoperative improvement** in Air Conduction (AC) thresholds and Air-Bone Gap (ABG) for all patients (100%).

Prognosis: Excellent hearing restoration.

Management-Type II

Type II: Stapediovestibular Dislocation -Vestibular Repair Focus:

Procedure: Exploratory tympanotomy.

Removal or repositioning of the depressed stapes.

Sealing the Oval Window with fat tissue to treat perilymphatic fistula/pneumolabyrinth.

Ossicular reconstruction (e.g., Piston) if viable.

Primary goal: resolve vertigo; secondary is hearing preservation.

Outcomes:

Vertigo: Resolved in all patients post-surgery.

Hearing: Variable results, depends on the extent of inner ear damage.

Ossiculoplasty hearing outcomes

The Laryngoscope, IF 2.0(2024)

Otolaryngology-Head and Neck Surgery, University of Chicago (M.B.G.), Chicago, Illinois, U.S.A

A Multi-Center Study of Ossiculoplasty Hearing Outcomes and a Grading Scale of Ear Environment Risk

Michael B. Gluth, MD; Ryan T. Judd, MD; Richard K. Gurgel, MD; John L. Dornhoffer, MD;
Walter Kutz, MD; Matthew L. Carlson, MD; Jafri Kuthubutheen, MBBS, PhD; Ryan D. Anderson, MD;
Daniel E. Killeen, MD; Jason H. Barnes, MD; Wanda L. Fussell, MD; Chaithanya Jeganathan, MD

Introduction

1.Synthetic materials and risks

      Foreign body reaction, demineralization of adjacent native ossicles, resorption, and extrusion->material improve or autograft

2.Reducing extrusion rates (10%–30%)->cartilage tympanoplasty

3.Dominant prothesis materials:

      Hydroxyapatite (HA) and titanium

      extrusion rate under 5%
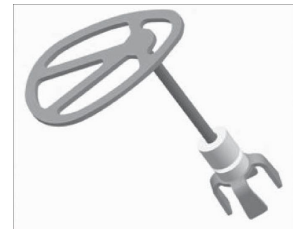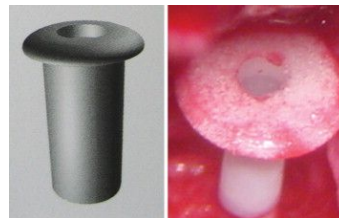
4.Chronic middle ear disease affect outcomes

      Hearing outcomes is worsen in middle ear affected by chronic disease

      ->patient-specific ear risk and outcome prediction

Current risk evaluation tools-Limitation

data from a single surgeon, not based on actual surgical outcomes

Middle ear risk index (MERI)

Risk factor	Value-assigned risk
Otorrhea (belluci)	
I) Dry	0
II) Occasionally wet	1
III) Persistently wet	2
IV) Wet, cleft palate	3
Perforation	
Absent	0
Present	1
Cholesteatoma	
Absent	0
Present	2
Ossicular status (Austin/Kartush)	
0) M+I+S+	0
A) M+S+	1
B) M+S-	2
C) M-S+	3
D) M-S-	4
E) Ossicle head fixation	2
F) Stapes fixation	3
Middle ear: granulations or effusion	
No	0
Yes	2
Previous surgery	
None	0
Staged	1
Revision	2
Smoker	
No	0
Yes	2

*A value is assigned for each risk factor, and then the values are added to determine the MERI. (M-malleus, I-incus, S-stapes).

Ossiculoplasty outcome scoring parameter (OOPS)

Risk factor		Risk value
Drainage	None	0
	Present > 50% of the time	1
Mucosa	Normal	0
	Fibrotic	2
Ossicular chain	Normal	0
	Malleus +	1
	Malleus -	2
Type of surgery	No mastoidectomy	0
	Intact canal wall mastoideectomy	1
	Canal wall down mastoidectomy	2
Revision surgery	No	0
	Yes	2

25

Study objective
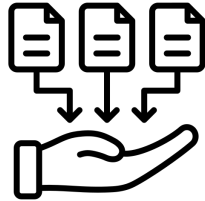
1.Using **large dataset** ossiculoplasty outcomes multi-center effort involving numerous otologic surgeons.

2.Using modern ossiculoplasty techniques and analysing long-term hearing outcomes
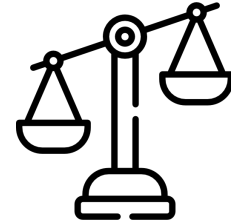
3.Develop a novel statistically-based ear risk grading scale
-> allows simple quantification of ear risk in scoring
-> Ear Environment Risk (EER) grading system.

Methods

Design: Retrospective, Multi-Center Study.

Scope

    Timeline: 2011 – 2019.

    Participants: 6 tertiary-care academic centers, 11 otologic surgeons.

    Sample Size: 1,679 eligible ossiculoplasty cases.

Primary Outcome Measure:

    Postoperative Pure Tone Average Air-Bone Gap (PTA-ABG).

    preoperative and post-op(4 month) audiogram

    air and bone conduction thresholds at 500, 1000, 2000, 3000, and 4000 Hz

    word recognition score (WRS).

Methods

Including these procedures :

1. synthetic ossicular replacement prostheses
2. autograft ossicular replacement prostheses
3. incudostapedial joint prosthesis
4. ossicular repair via bone cement
5. ossicular mobilization procedures for malleus head fixation

Exclusion criteria:

1.cases of classic type III stapes columella tympanoplasty

(the tympanic membrane graft is applied directly onto the stapes capitulum.)

2.stapedotomy or stapedectomy for stapes footplate fixation

Methods

Analysis:

   Multivariable linear regression to identify independent risk factors.

   Kendall's tau correlation to create EER model, and compare with existing scales

   PTA- ABG between EER risk groupings was compared using t-test.

Basic data collection:

   demographics, preoperative medical conditions, preoperative otologic history and exam,

   intraoperative findings, and postoperative follow-up information.

Data analysis:

   All statistical analyses were complected using Stata 15 (StataCorp, College Station, TX).

   p-values < 0.05 were considered statistically significant.

Results

Overall hearing outcomes:

Success Rates:

Mean Post-operative PTA-ABG: 21.2 dB (SD 12.8).

Mean Improvement: 12.1 dB.

Closure Rates:

Excellent (0–10 dB): 15.0%

Good (10–20 dB): 38.4%

Total ≤ 20 dB: 53.4%.

Safety:

Prosthesis extrusion rate: Low (2.1%).

Cartilage cap usage: High (93.1%), contributing to stability

Table I: Ossiculoplasty case profile

A. Ossiculoplasty

	N (%*)
Ossiculoplasty type	
Major and minor columella reconstruction with autograft or synthetic PORP (Osm & Ost)	984 (58.6)
Major and minor columella reconstruction with autograft or synthetic TORP (Ofm & Oft)	609 (36.3)
IS joint reconstruction (Osi)	39 (2.3)
Ossicular mobilization (On)	47 (2.8)
PORP ($n = 967$)	
Autograft	101 (10.4)
Titanium only	390 (40.3)
Titanium + hydroxyapatite	217 (22.4)
Polyethylene	247 (25.5)
Other[b]	12 (1.2)
TORP ($n = 604$)	
Autograft	3 (0.5)
Titanium only	274 (45.3)
Titanium + hydroxyapatite	163 (27.0)
Polyethylene	159 (26.3)
Other[b]	5 (0.8)
Cartilage in tympanoplasty ($n = 1623$)	
Yes	1511 (93.1)
No	112 (6.9)

Revision ($n = 1661$)	
Yes	527 (31.7)
No	1134 (68.3)
Revision number ($n = 510$)	
First	392 (76.9)
Second	89 (17.5)
Third	29 (5.7)
Status of past prosthesis at time of surgery ($n = 419$)	
Displaced	273 (65.1)
Fixed	85 (20.3)
Extruded	61 (14.6)

B. Concurrent surgery

	N (%*)
Tympanic membrane perforation	
Repaired at time of ossiculoplasty	857 (51.8)
Repaired in past (staged)	291 (17.6)
Never required repair	507 (30.6)
Cholesteatoma	
Never	631 (38.2)
In the past (not current)	368 (22.3)
Concurrent removal	652 (39.5)
Mastoidectomy	
Never (Mx)	674 (40.8)
In the past (not current)	736 (44.5)
Concurrent	243 (14.7)
Mastoidectomy type ($n = 965$)	
Intact canal wall (M1a/M1b)	681 (70.6)
Canal wall down (M2c)	284 (29.4)

B. Concurrent surgery

	N (%*)
Canalplasty	
Yes	229 (13.8)
No	1430 (86.2)
Epitympanectomy	
Yes (M2a/M2b)	215 (13.0)
No	1442 (87.0)

31

Discussion

Table II: Univariate Associations between Patient and Middle Ear Risk Factors and Most Recent Postoperative PTA-ABG.

A. Patient factors

	N (%*)	Mean PTA-ABG (SD)	p-Value
Age category			
Pediatric (<18 years old)	459 (27.4)	23.7 (14.6)	<0.001
Adult	1214 (72.6)	20.3 (11.9)	
Sex			
Male	854 (50.9)	21.8 (12.9)	0.052
Female	825 (49.1)	20.6 (12.7)	
History of bilateral middle ear disease			
Yes	622 (38.2)	22.5 (13.0)	0.005
No	1007 (61.8)	20.7 (12.7)	
BMI category (pediatric cases excluded) (n = 853)			
Obese (BMI > 30)	278 (32.6)	20.0 (12.2)	0.481
Non-obese	575 (67.4)	20.6 (12.1)	
Smoking status			
Never smoker	792 (64.8)	21.4 (12.6)	0.310
Former smoker	218 (17.8)	20.0 (11.7)	
Current, active smoker	213 (17.4)	20.5 (11.4)	
Diabetes			
Yes	90 (5.4)	19.8 (9.8)	0.155
No	1577 (94.6)	21.3 (12.9)	
Major immunosuppression			
Yes	13 (0.8)	25.5 (13.0)	0.261
No	1649 (99.2)	21.2 (12.8)	
History of radiation therapy			
Yes	16 (1.0)	20.3 (11.9)	0.749
No	1640 (99.0)	21.3 (12.8)	
Middle ear tumor[†]			
Yes	95 (5.7)	19.2 (12.2)	0.089
No	1563 (94.3)	21.4 (12.8)	

Intracranial complication			
Yes	31 (1.9)	20.0 (11.7)	0.571
No	1627 (98.1)	21.3 (12.8)	

B. Ossicular status

	N (%*)	Mean PTA-ABG (SD)	p-Value
Ossicular status			
M + I + S+	155 (9.3)	18.7 (12.5)	<0.001
M + I − S+	515 (31.0)	18.7 (11.0)	
M − I − S+	311 (18.7)	20.6 (12.5)	
M + I − S−	378 (22.8)	21.8 (12.9)	
M − I − S−	301 (18.1)	27.0 (14.0)	
Stapes			
Present	1000 (59.5)	19.8 (12.0)	<0.001
Absent	679 (40.4)	23.7 (13.6)	
Malleus			
Present	1067 (63.5)	19.4 (11.8)	<0.001
Absent	612 (36.5)	14.2 (13.6)	

(Continues)

TABLE II. Continued

B. Ossicular status

	N (%*)	Mean PTA-ABG (SD)	p-Value
Stapes footplate fixation			
Yes	73 (4.4)	25.7 (14.7)	0.009
No	1576 (95.6)	21.0 (12.6)	
Lateral chain fixation			
Yes	188 (11.3)	19.8 (12.0)	0.093
No	1469 (88.7)	21.4 (12.8)	

C. Middle ear envelope

	N (%*)	Mean PTA-ABG (SD)	p-Value
Bellucci score			
Dry (I)	785 (48.2)	20.2 (13.0)	<0.001
Occasionally wet (<50%) (II)	538 (33.0)	20.8 (11.9)	
Usually wet (>50%) or wet with cleft palate (III or IV)	306 (18.7)	24.8 (13.3)	
Mucosa severely diseased			
Yes	636 (38.3)	22.1 (12.7)	0.025
No	1023 (61.7)	20.7 (12.8)	
Cholesteatoma			
Yes	1023 (61.9)	21.6 (12.4)	0.111
No	631 (38.1)	20.6 (13.2)	
Granulation tissue present			
Yes	183 (11.0)	22.0 (11.4)	0.384
No	1476 (89.0)	21.2 (12.9)	
Middle ear effusion			
Yes	89 (5.4)	21.0 (12.1)	0.830
No	1570 (94.6)	21.3 (12.8)	
Tympanic membrane lateralized/blunted			
Yes	102 (6.2)	26.7 (15.5)	<0.001
No	1556 (93.8)	20.9 (12.5)	
Myringitis			
Yes	44 (2.6)	21.5 (11.7)	0.895
No	1619 (97.4)	21.2 (12.8)	
Revision surgery			
No	1134 (69.0)	20.0 (12.3)	<0.001
First	392 (23.8)	22.9 (12.7)	
Second or greater	118 (7.2)	27.8 (15.2)	
Mastoidectomy			
Never (Mx)	674 (41.1)	19.6 (12.7)	<0.001
Intact canal wall (M1a/M1b)	681 (41.5)	21.5 (12.5)	
Canal wall down (M2c)	284 (17.3)	24.6 (13.4)	

Identified Risk Factors (Multivariate Analysis)

The following factors were independently associated with worse hearing outcomes (higher PTA-ABG):

1. Revision Surgery: Especially multiple revisions (strongest negative impact).
2. Tympanic Membrane Status: Lateralized or Blunted TM.
3. Mastoid Status: Canal Wall Down (CWD) cavity.
4. Ossicular Status: Absent Malleus or Absent Stapes Superstructure.
5. Infection: Frequent otorrhea (Bellucci III/IV).
6. Age: Pediatric patients (<18 years).

Table IV. Multivariable linear regression

TABLE IV.
Multivariable Linear Regression Analysis (n = 1,547).

	Correlation coefficient (Standard Error)	p-Value
Revision		
First (vs none)	2.25 (0.77)	0.004
Multiple (vs none)	6.03 (1.28)	<0.001
Mastoidectomy		
Intact canal wall (M1a/M1b) (vs never [Mx])	−0.20 (0.75)	0.792
Canal wall down (M2c) (vs never [Mx])	2.30 (0.99)	0.020
Adult (vs pediatric)	−2.85 (0.72)	<0.001
History of bilateral middle ear disease	1.05 (0.66)	0.110
Stapes footplate fixation	2.01 (1.55)	0.193
Bellucci score		
II (vs I)	0.15 (0.73)	0.840
III or IV (vs I)	2.49 (0.94)	0.008
Severely diseased mucosa	0.95 (0.66)	0.152
Tympanic membrane lateralization	3.84 (1.30)	0.003
Malleus absent	2.99 (0.70)	<0.001
Stapes absent	1.67 (0.70)	0.016

Ossiculoplasty and mastoidectomy/epitympanectomy type depicted in parentheses according to IOOG SAMEO-ATO framework (www.ioog.net).

34

The EER Scoring System (0-16 Points) and Table V

Weighted Scoring based on statistical impact:

    Revision Status:

        Multiple revisions: 5 pts

        First revision: 1 pt

    Tympanic Membrane: Lateralized/Blunted: 4 pts

    Mastoid: Canal Wall Down (CWD): 2 pts

    Malleus: Missing/Damaged: 2 pts

    Stapes Superstructure: Missing/Damaged: 1 pt

    Drainage: Wet >50% time / Cleft Palate: 1 pt

    Age: Pediatric: 1 pt

TABLE V.
Ear Environment Risk (EER) Scoring System.

Risk Factor	Point(s)
Revision	
No	0
Yes, first	1
Yes, multiple	5
Canal wall down mastoid cavity present	
Yes	2
No	0
Age	
Pediatric	1
Adult	0
Malleus	
Present	0
Missing or damaged	2
Stapes superstructure	
Present	0
Missing or damaged	1
Drainage (Bellucci classification)	
Dry or occasional otorrhea	0
Wet >50% of the time or wet with cleft palate	1
Tympanic membrane	
Lateralized or blunted	4

Fig. 2.

Postoperative pure tone average air-bone gap versus EER score
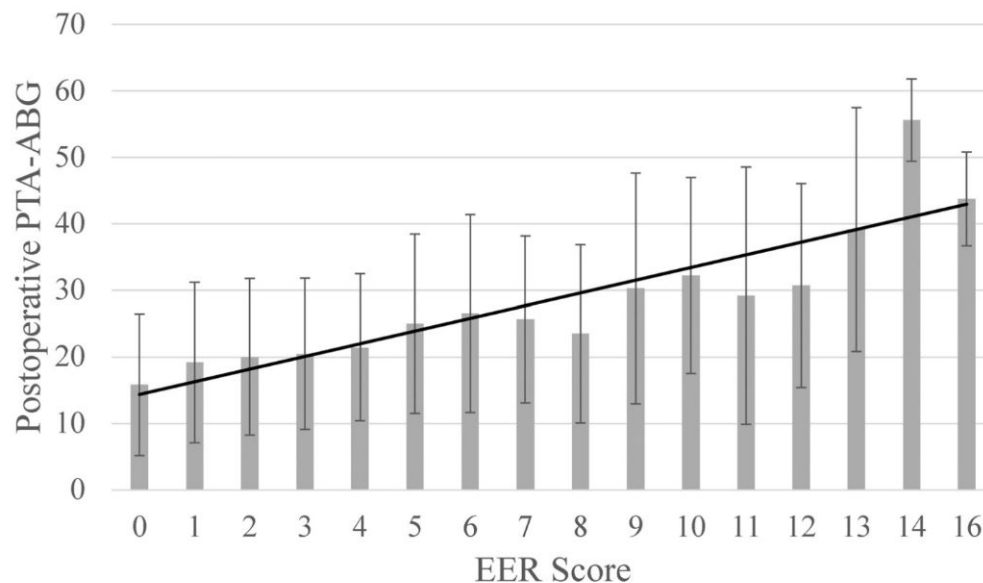
(brackets depicting standard deviation)

36

Table VI-VIII

EER risk grouping and Post-op PTA-ABG

TABLE VI.
EER Risk Groupings According to Postoperative PTA-ABG.

EER score	N (%)	Postoperative PTA-ABG (SD)
0	220	15.8 (10.6)
1	323	19.2 (12.0)
2	267	20.0 (11.7)
3	241	20.5 (11.4)
4	205	21.5 (11.0)
5	172	25.0 (13.5)
6	78	26.6 (14.9)
7	50	25.7 (12.5)
8	36	23.5 (13.4)
9	45	30.3 (17.3)
10	17	32.3 (14.7)
11	8	29.2 (19.3)
12	10	30.8 (15.3)
13	3	39.2 (18.3)
14	2	55.6 (6.2)
15	0	–
16	2	43.8 (7.1)

EER = Ear Environment Risk; PTA-ABG = pure tone average air-bone gap; SD = standard deviation.

TABLE VII.
Association between EER Risk Grouping and Postoperative PTA-ABG.

EER risk group	N (%)	Mean postoperative PTA-ABG (SD)	Kendall's τ
Favorable (0)	220 (13.1)	15.8 (10.6)	0.193
Low risk (1–4)	1036 (61.7)	20.2 (11.6)	
Intermediate risk (5–8)	336 (20.0)	25.3 (13.6)	
High risk (9+)	87 (5.2)	31.8 (16.7)	

PTA-ABG = pure tone average air-bone gap; SD = standard deviation; EER = Ear Environment Risk.

TABLE VIII.
Postoperative ABG Mean and Median Quartile Ranges by EER Risk Group.

EER risk	N	Mean	SD	Median	Q1	Q3
Favorable	220	15.8	10.6	13.8	8.8	20.0
Low	1036	20.2	11.6	18.1	11.9	26.3
Intermediate	336	25.3	13.6	22.5	15.0	32.5
High	87	31.8	16.7	29.4	18.1	42.2

SD = standard deviation; Q1 = first quartile; Q3 = third quartile.

Risk Stratification & Expected Outcomes

Patients are stratified into 4 groups based on Total EER Score:

Group 1: Favorable (Score 0)-Expected Post-op ABG: 15.8 dB

Group 2: Low Risk (Score 1–4)-Expected Post-op ABG: 20.2 dB

Group 3: Intermediate Risk (Score 5–8)-Expected Post-op ABG: 25.3 dB

Group 4: High Risk (Score 9+)-Expected Post-op ABG: 31.8 dB

Higher scores significantly correlate with poorer hearing outcomes
 ($p < 0.001$)

EER vs. Existing Scales:

The study compared EER against MERI and OOPS using Kendall's tau correlation coefficient.

> Correlation with Hearing Outcomes, N=1679
>
> **EER: τ = 0.193—**(Weak association range 0.1~0.3)
>
> OOPS: τ = 0.164
>
> MERI: τ = 0.149

Other factors may impact outcomes.

> surgical technique, surgeon experience, prosthesis characteristics

Conclusion: The EER system is **statistically superior to previous systems** in predicting ossiculoplasty outcomes.

Long term follow-up

Follow-up: Mean follow-up time was 33.6 months.

Stability over time:

   Comparison of short-term (<4 months) vs. long-term results showed
   no significant difference in mean PTA-ABG (21.2 dB vs 21.6 dB).
   Individual Variation: While averages were stable, 29.9% of cases saw
   hearing worsen (>5dB) over time, while 26% improved.

Implication: Modern ossiculoplasty results are generally durable.

Conclusions & Clinical Implications

1.Ossiculoplasty is effective and safe (low extrusion rates).

2.Multiple revisions and Lateralized Tympanic membranes are the most severe risk factors.

3.Clinical Value of EER:

Pre-operative Counseling: Helps set realistic expectations for patients (especially High Risk group).

Allows surgeons to compare their results against a risk-adjusted standard.

Research: Provides a standardized framework for future studies

Back to our patient

Ossicular chain disruption, right side
suspected trauma related
Right ear AC(39db), BC(11db), air-bone gap 28db
Ear drum intact

Type I: Ossicular Trauma without
Stapediovestibular Dislocation (SVD)
->Delay surgery, better hearing outcome
EER Total score:0->Group 1: Favorable
->Expected Post-op ABG: 15.8 dB

TABLE V.
Ear Environment Risk (EER) Scoring System.

Risk Factor	Point(s)
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No	0
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Canal wall down mastoid cavity present	
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Present	0
Missing or damaged	2
Stapes superstructure	
Present	0
Missing or damaged	1
Drainage (Bellucci classification)	
Dry or occasional otorrhea	0
Wet >50% of the time or wet with cleft palate	1
Tympanic membrane	
Lateralized or blunted	4

Question

Thanks for your attention!