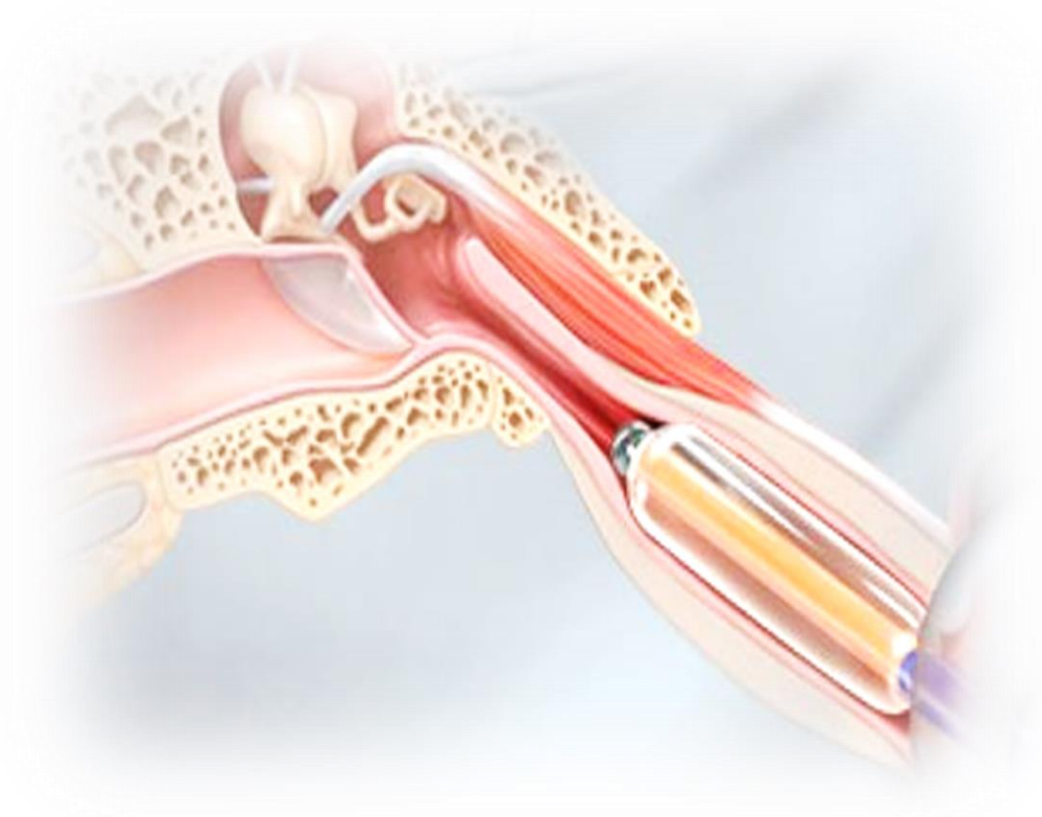


E-tube dysfunction: diagnosis and treatment

台中慈濟 謝承祐醫師

耳咽管功能障礙:診斷與治療



目錄

1

耳咽管功能與
分類

2

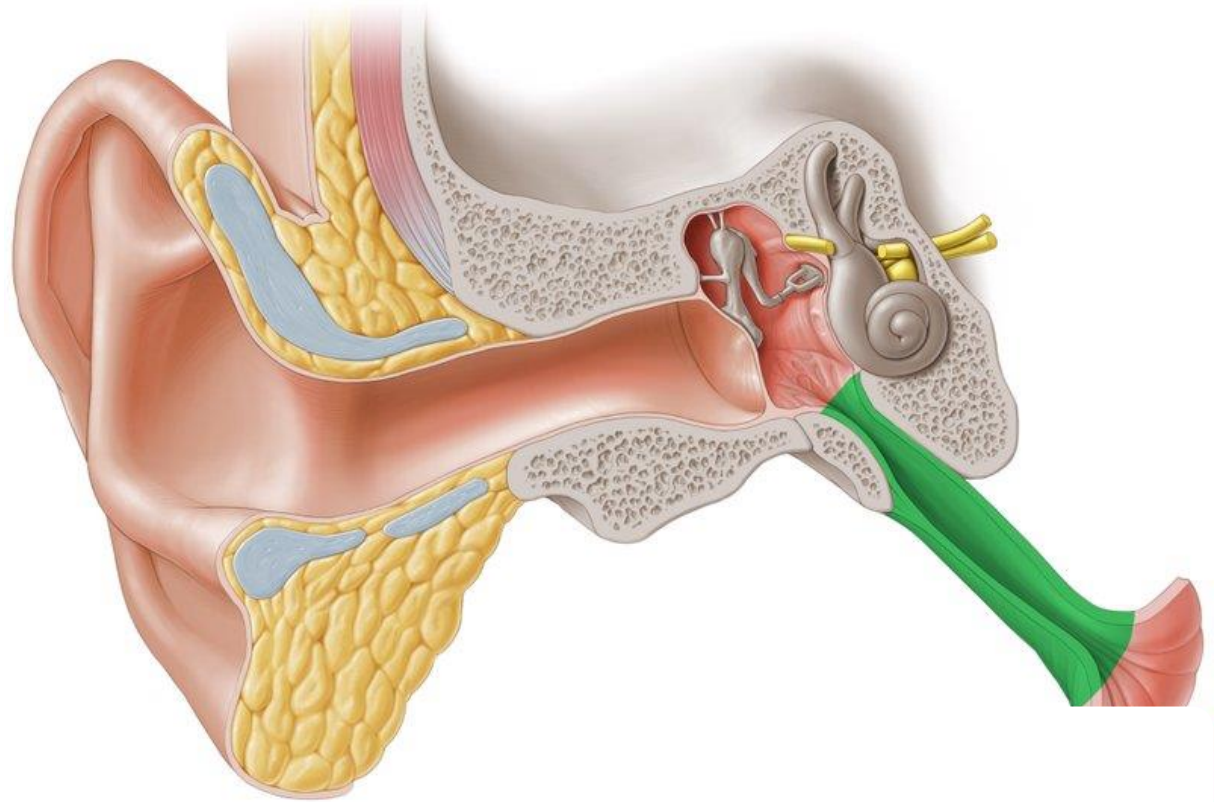
阻塞型耳咽管
功能障礙

3

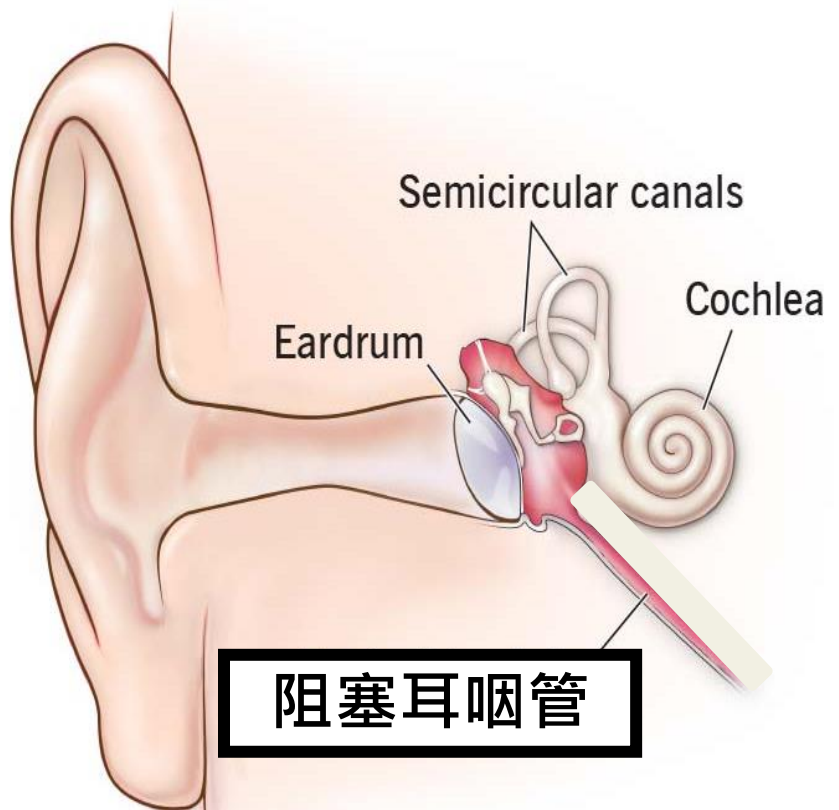
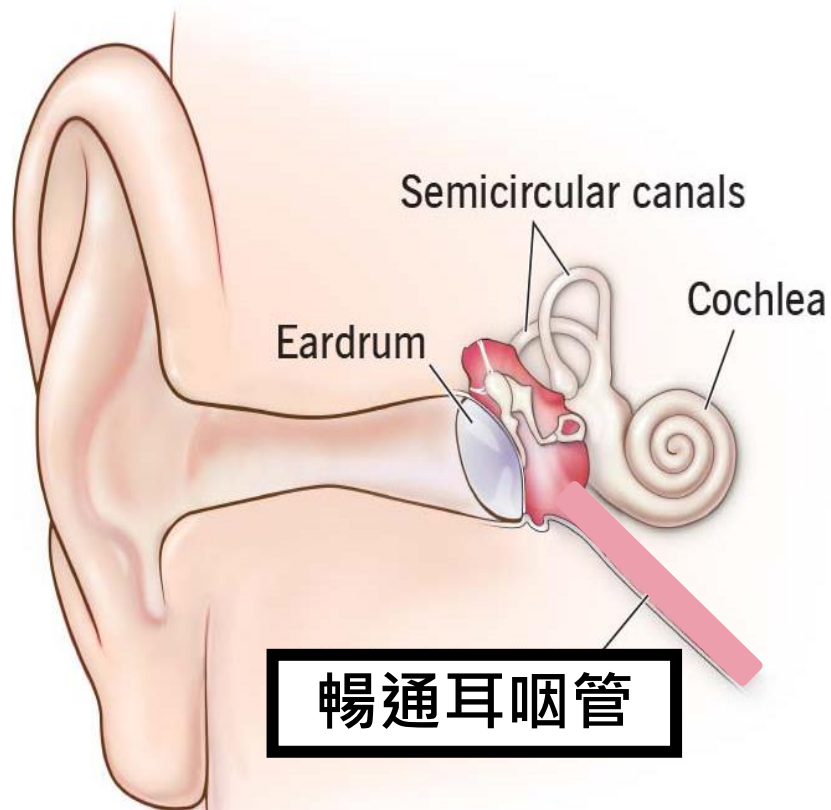
開放型耳咽管
功能障礙

4

國考題分析



耳咽管功能



三大功能: 1. 通氣平衡 2. 保護中耳 3. 清除黏液

耳咽管功能障礙(ETD)定義

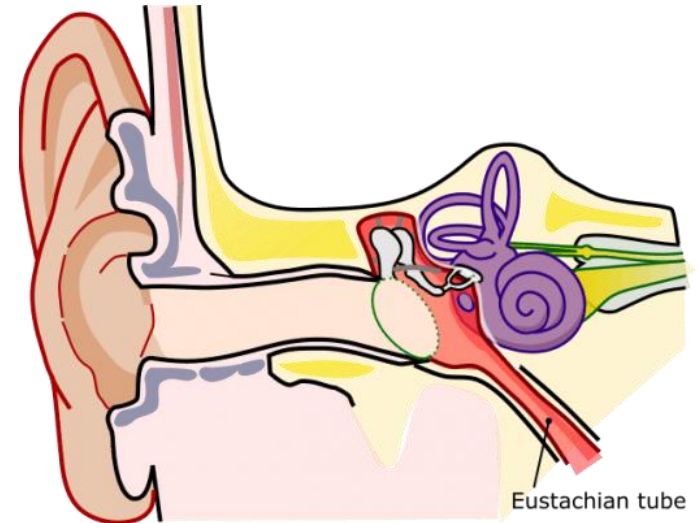
- Symptoms and signs of **pressure dysregulation in the middle ear**
- Subtype
 - Dilatory(obstructive)
 - baro-challenge
 - Patulous
- Acute ETD : < 3 months
- Chronic ETD: > 3 months

耳咽管功能障礙(ETD)診斷

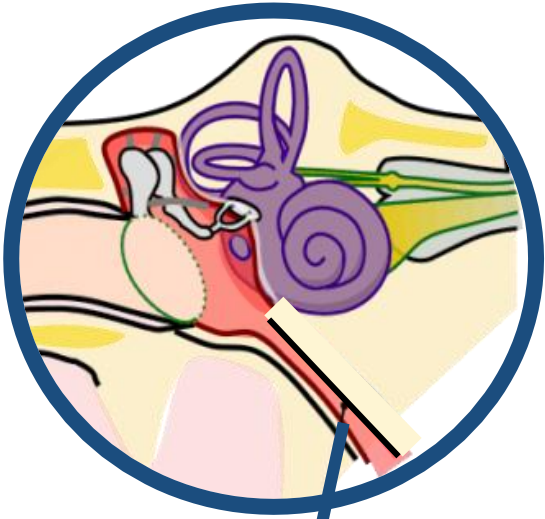
- **Lack of golden standard** for diagnosis of ETD
- Poor understanding of E-tube function
- Poor efficacy of intervention

Consensus:

Subjective symptoms + objective tests



ETD分類



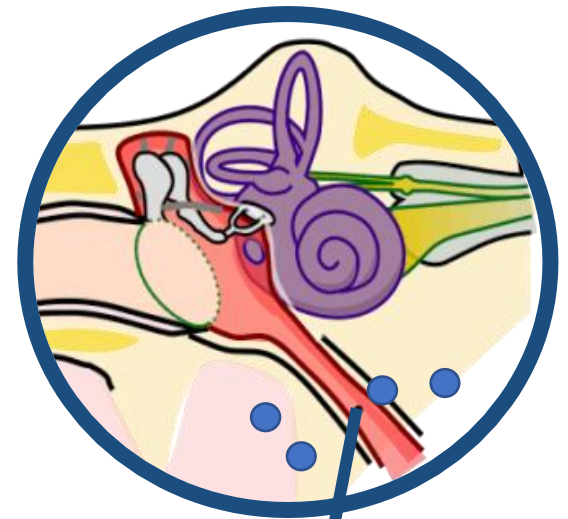
Obstructive

- Most common
- URI
- Inflammation of E-tube mucosa



Patulous

- Weight loss
- Autophony



Baro-challenge

- Change in pressure
- Flying or diving

主觀症狀 ETDQ-7

標準化嚴重度: 確認診斷 > 14.5

過去幾個月, 是否有下列症狀困擾 著你	無或輕度		中度			重度	
	1	2	3	4	5	6	7
耳內有壓力感	1	2	3	4	5	6	7
耳內有疼痛感	1	2	3	4	5	6	7
耳內有悶塞感或置身水下之感覺	1	2	3	4	5	6	7
鼻炎或感冒時 耳朵有不適症狀	1	2	3	4	5	6	7
耳內有喀拉聲或水泡破裂聲	1	2	3	4	5	6	7
耳內嗡嗡聲	1	2	3	4	5	6	7
聽力感覺悶脹或含混不清	1	2	3	4	5	6	7

治療

Obstruction ETD

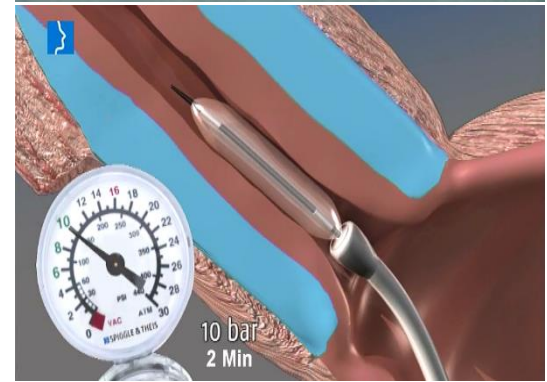
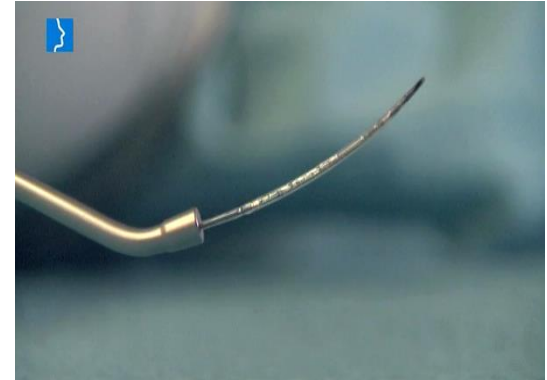
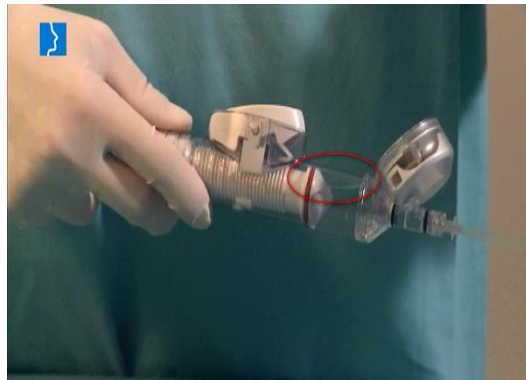
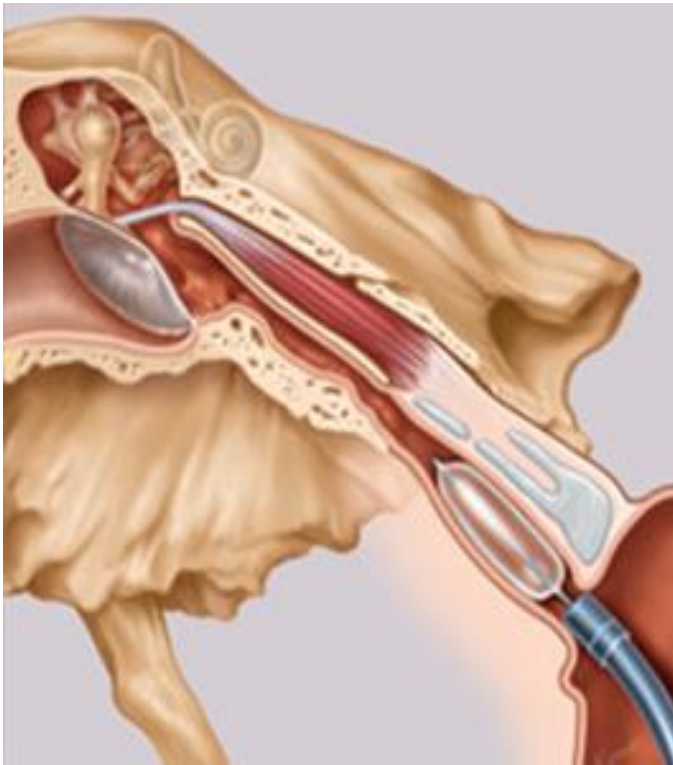
```
graph TD; A[Obstruction ETD] --> B[Balloon dilation tuboplasty]; A --> C[Laser tuboplasty];
```

Balloon dilation tuboplasty

Laser tuboplasty

耳咽管氣球擴張術

引進最新手術: 氣球擴張術



BET (Balloon Eustachian Tuboplasty) 耳咽管氣球擴張術

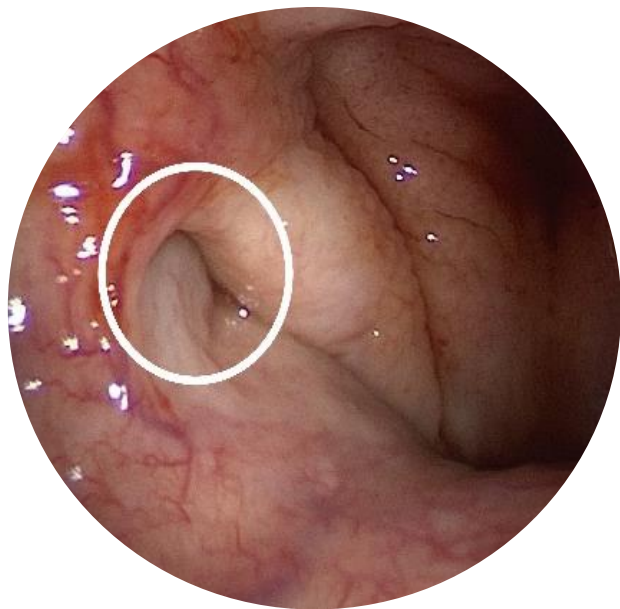
耳咽管氣球擴張術

引進最新手術: 氣球擴張術

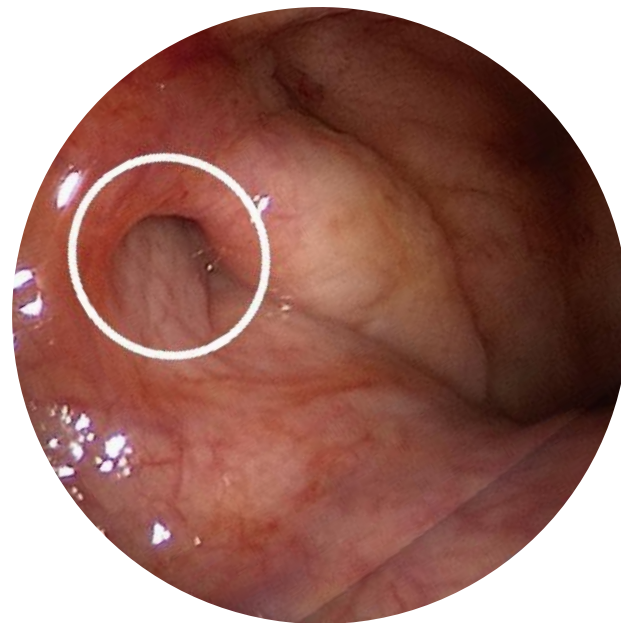


手術前後

手術經驗: 突破600次!



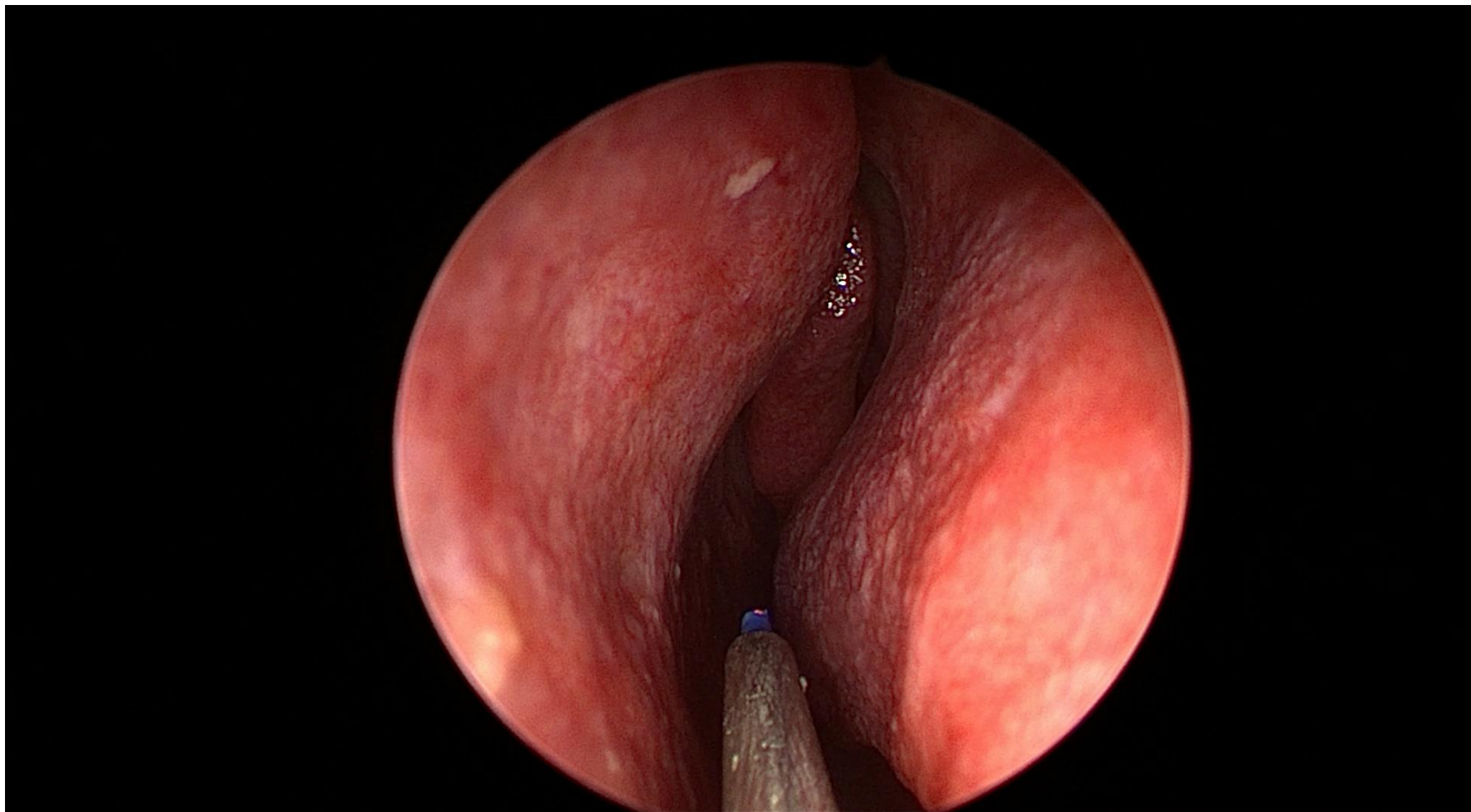
治療前: 耳咽管閉鎖



治療後: 耳咽管暢通

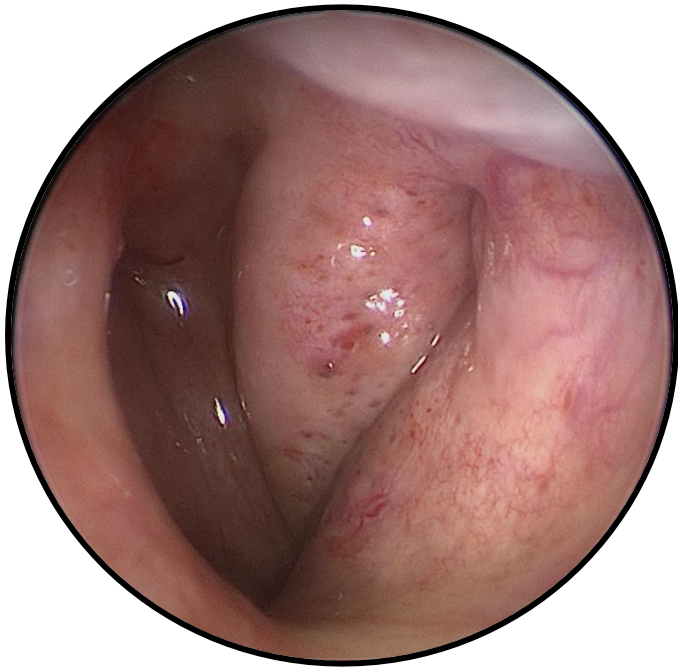
結合雷射

結合雷射: 加強效果

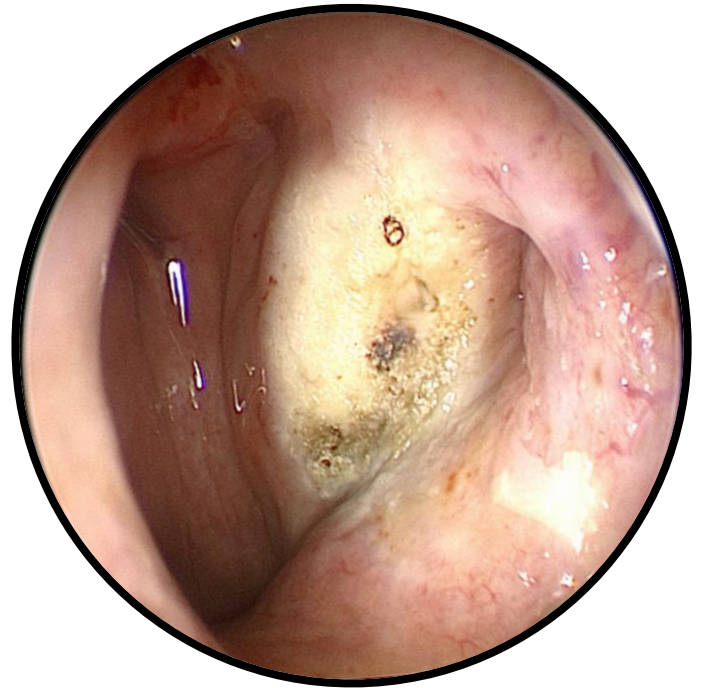


結合雷射

結合雷射: 加強效果



雷射前



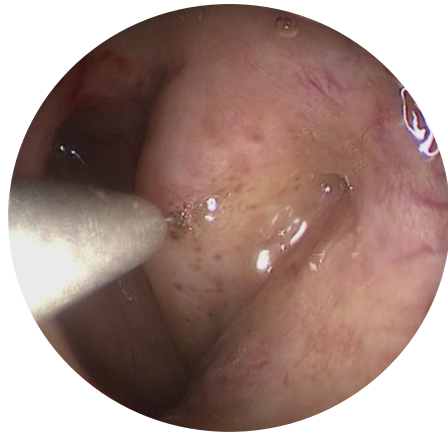
雷射後

治療

Patulous ETD

HA/ fat augmentation

Transcanal cartilage insertion

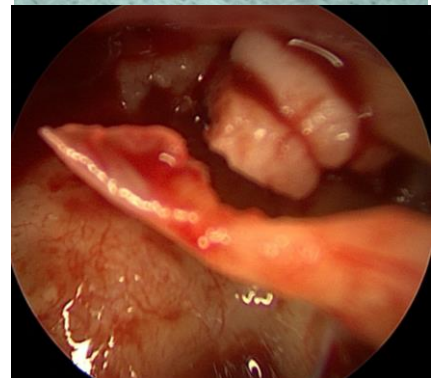
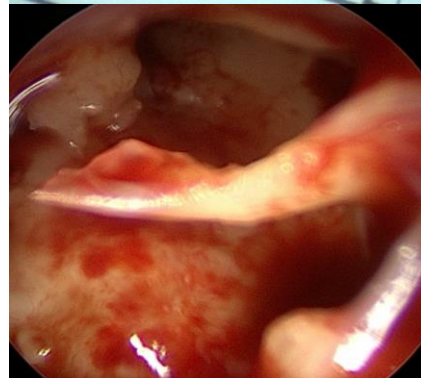
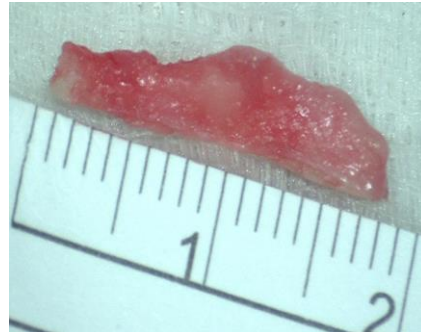


治療

Patulous ETD

HA/ fat augmentation

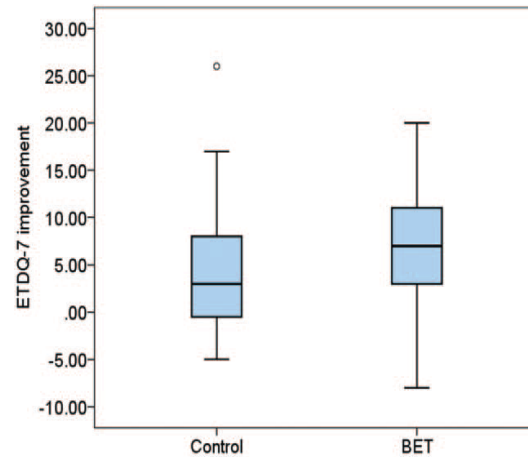
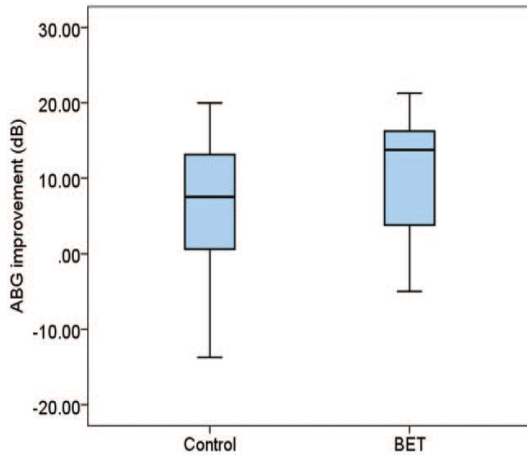
Transcanal cartilage insertion



研究論文

研究發表權威期刊

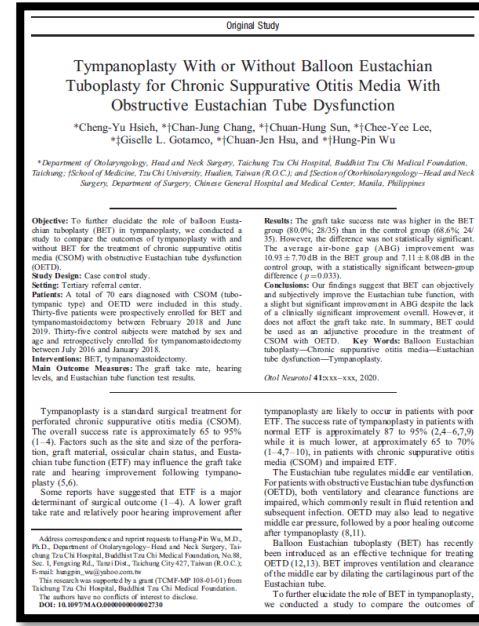
結合鼓膜成行與耳咽管氣球擴張術



手術成功率

耳咽管功能

聽力改善



耳咽管障礙診斷流程

耳悶塞 耳部症狀

> 3 個月, 排除因氣壓改變造成的耳咽管障礙與鼻部問題

疑似阻塞型耳咽管障礙

問卷 > 14.5, 鼓室圖壓力 < -50

+

+

阻塞型

-

充氣-減壓法
Objective Valsalva
音響檢查法
內視鏡

主動
被動
主動

疑似阻塞型

-

無

疑似開放型耳咽管障礙

1. 姿勢改變 2. 耳膜震動

+(1/2)

氣流動態檢查法
Ohta method
內視鏡

+(1+2)

+

確診開放型

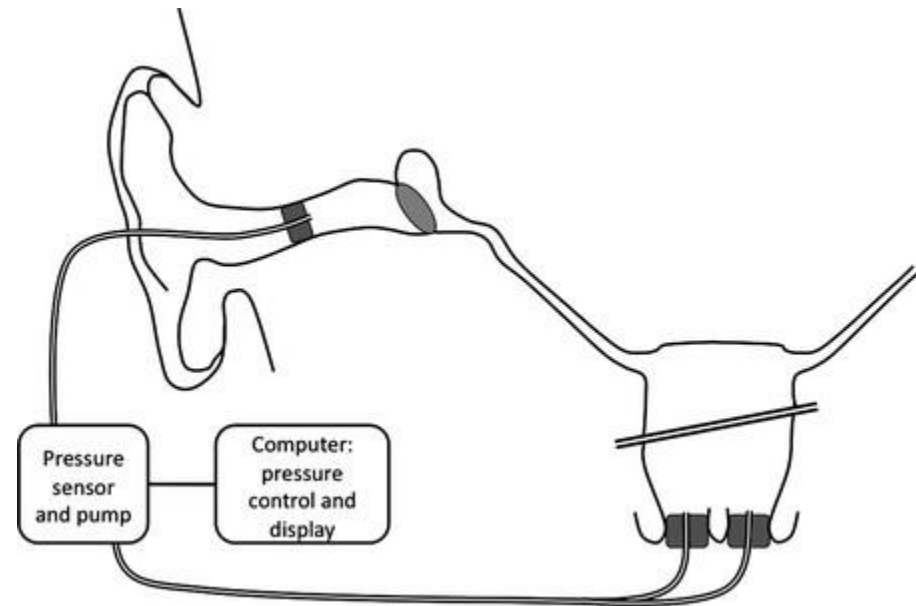
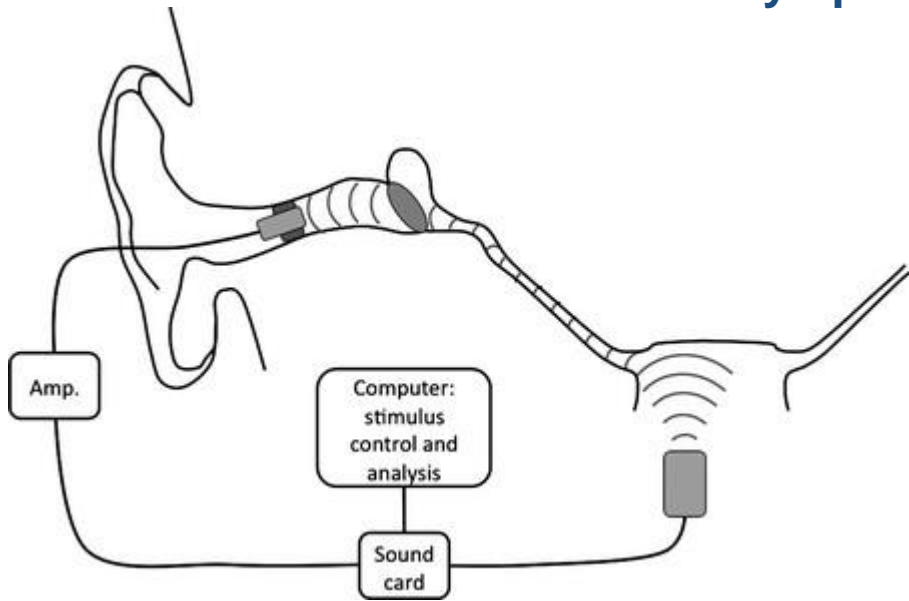
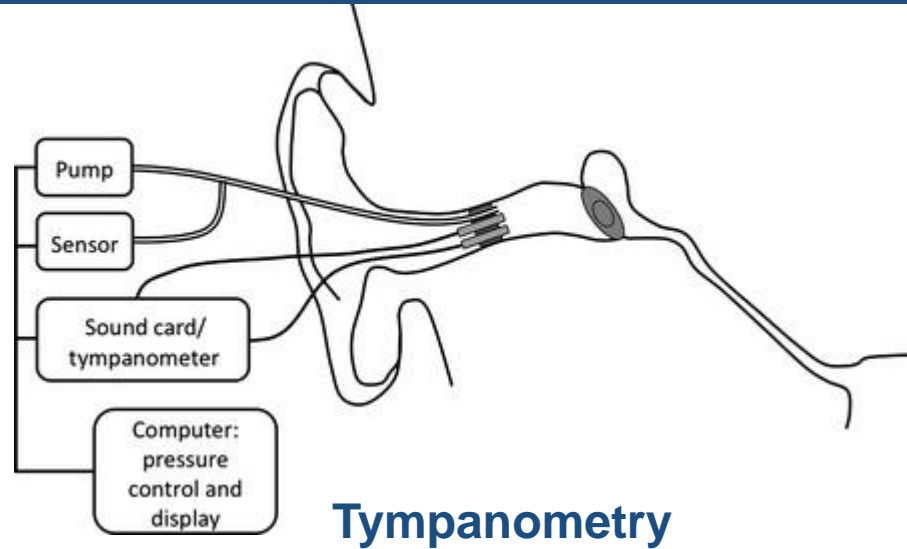
-

疑似開放型

-

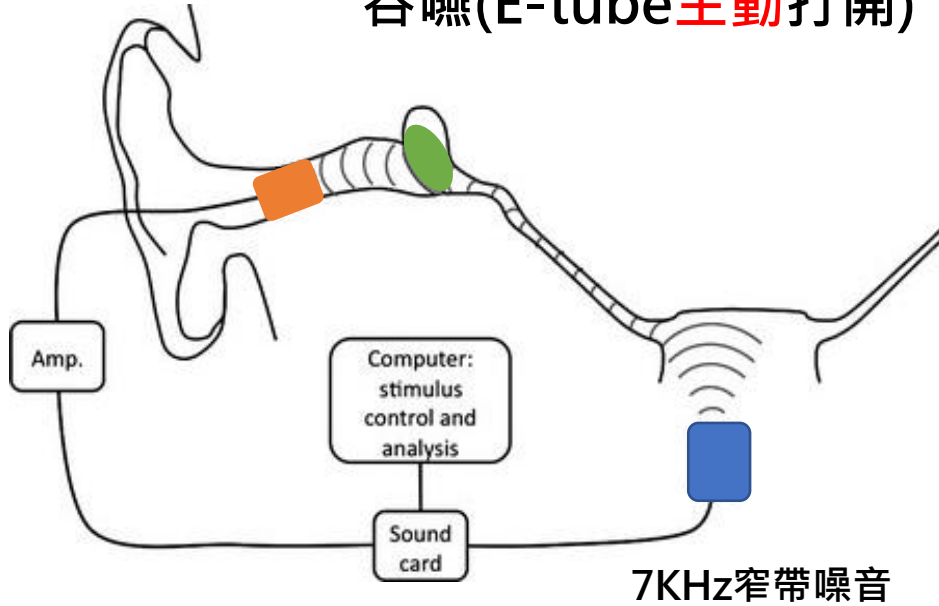
無

診斷儀器



Sonotubometry

吞嚥(E-tube主動打開)



EAC sound pressure

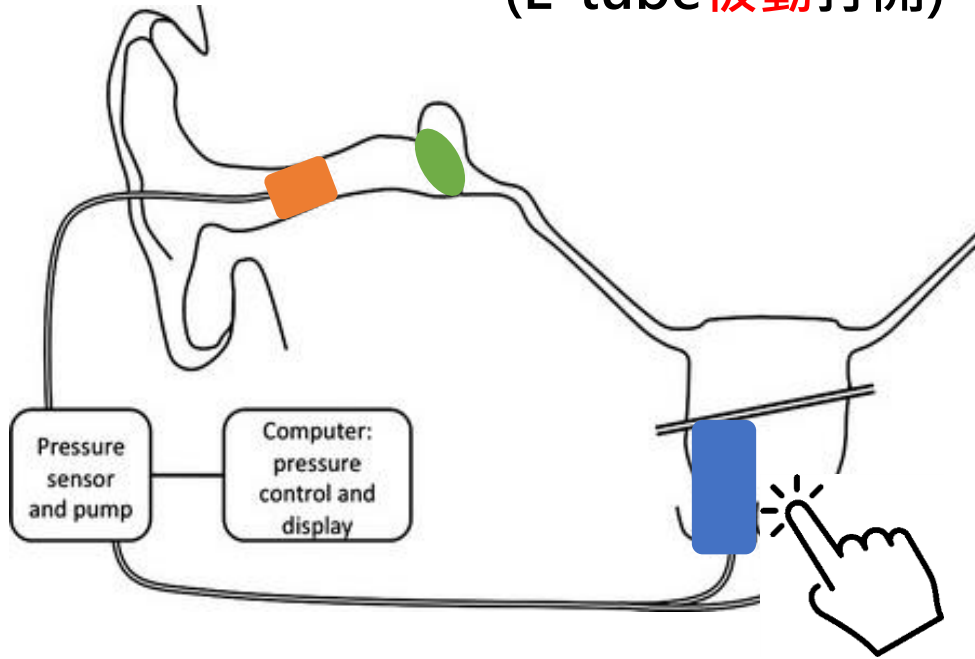
Speaker sound



聲音 → 吞嚥 (打開E-tube) → EAC 接收

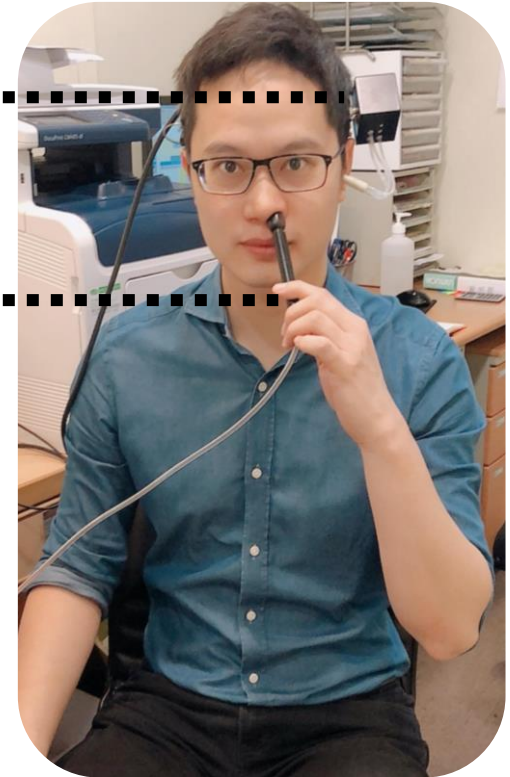
Tubotympano-aerodynamic graphy (TTAG)

(E-tube 被動打開)



EAC
pressure

Nasopharynx
pressure



NP → Valsalva / Heavy Breathing → EAC

Patulous ETD criteria

1. Symptoms : voice / breathing autophony, aural fullness

2. Tubal obstruction procedures:

- positional change: sitting/forward bending
- direct closure(Gel)

3. Objective findings:

- TM movement
- TTAG: synchronous
- Sonotubometry: 1. <100dB 2. plateau

1+2+3: Definite

1+2 or 1+3: Possible

Patulous ETD criteria

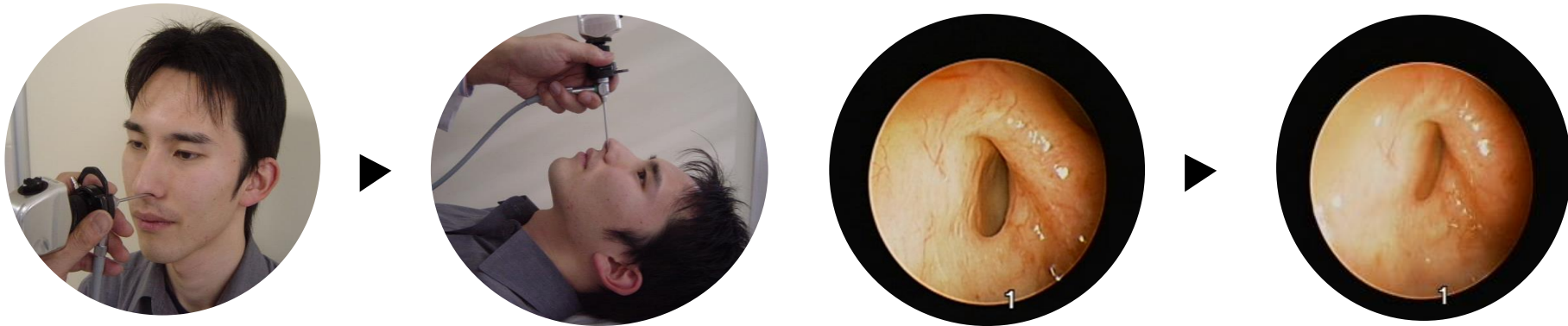
- 1. Symptoms :** voice / breathing autophony, aural fullness, Habitual Sniffing

Patulous ETD criteria

1. Symptoms : voice / breathing autophony, aural fullness

2. Tubal obstruction procedures:

- positional change: sitting/forward bending
- direct closure(Gel)

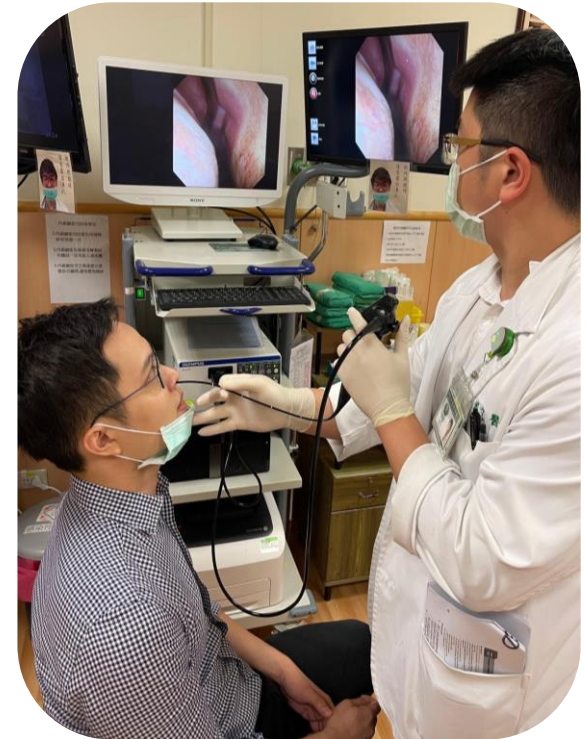
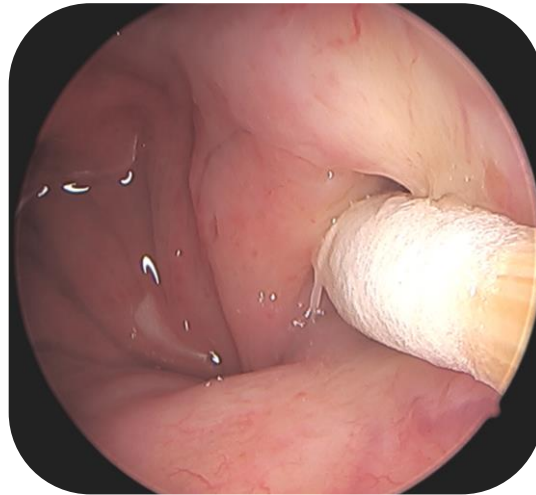


Patulous ETD criteria

1. Symptoms : voice / breathing autophony, aural fullness

2. Tubal obstruction procedures:

- positional change: sitting/forward bending
- direct closure(Gel)



Patulous ETD criteria

3. Objective findings:

- TM movement :respiratory fluctuation

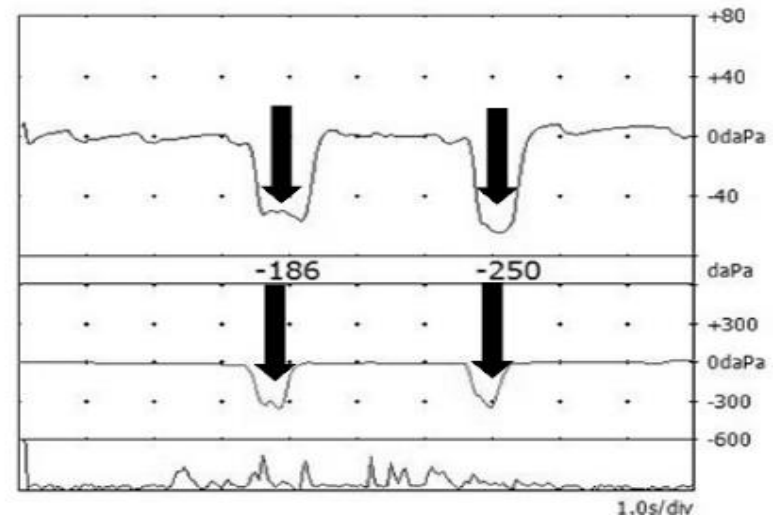
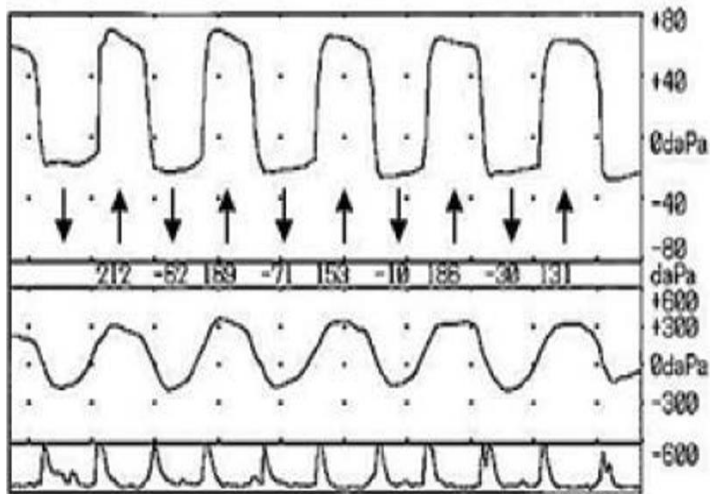




Patulous ETD criteria

3. Objective findings:

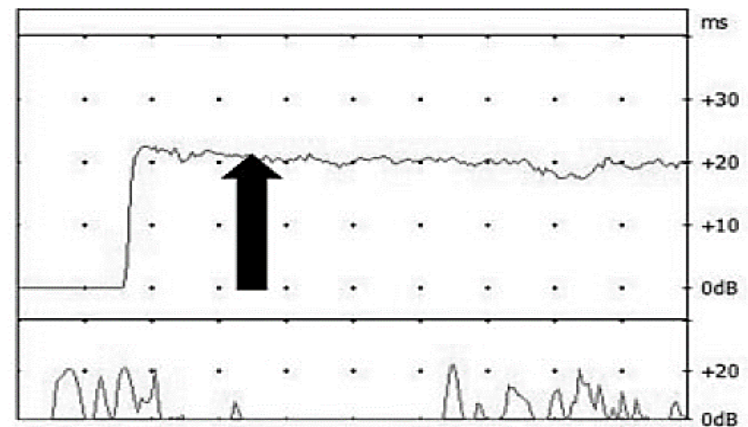
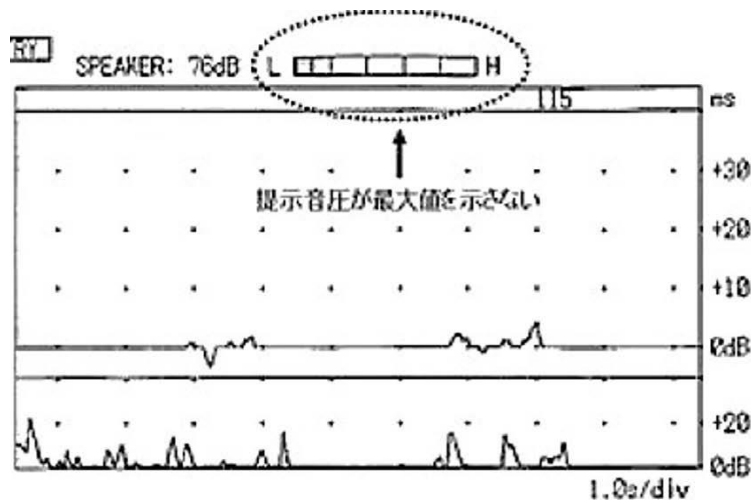
- TM movement
- TTAG: synchronous



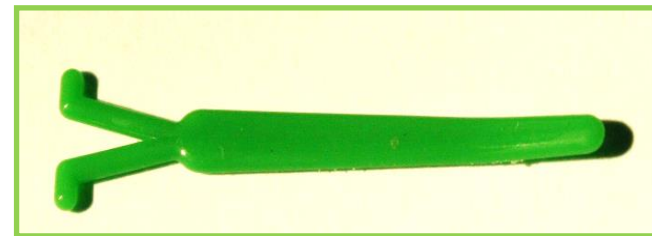
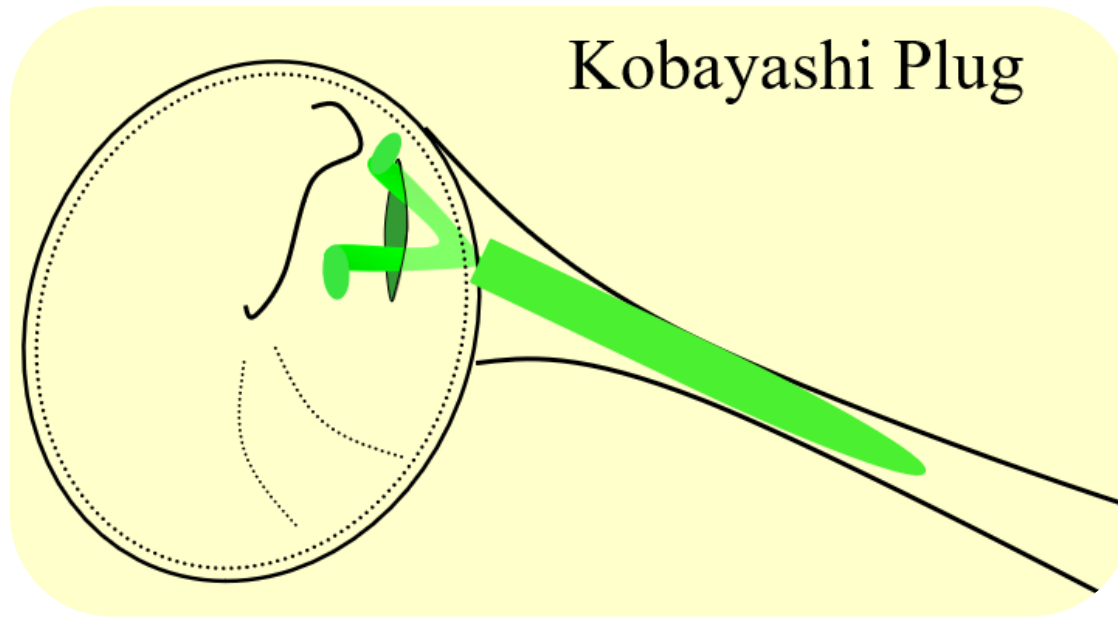
Patulous ETD criteria

3. Objective findings:

- TM movement
- TTAG: synchronous
- Sonotubometry: 1. <100dB 2. plateau



Patulous ETD treatment



23mm

E-tube dysfunction

Patulous type

Obstruction type



Obstructive

Patulous

Obstructive

Patulous

Aural fullness/Muffled/Pressure/Popping

Voice /Breath autophony/Aural fullness

Obstructive

Patulous

Aural fullness/Muffled/Pressure/Popping

Voice /Breath autophony/Aural fullness

ETDQ-7

PHI-10 , BBK score

過去幾個月, 是否有下列症狀困擾著你	無或輕度		中度			重度	
	1	2	3	4	5	6	7
耳內有壓力感	1	2	3	4	5	6	7
耳內有疼痛感	1	2	3	4	5	6	7
耳內有悶塞感或置身水下之感覺	1	2	3	4	5	6	7
鼻炎或感冒時 耳朵有不適症狀	1	2	3	4	5	6	7
耳內有喀拉聲或水泡破裂聲	1	2	3	4	5	6	7
耳內嗡嗡聲	1	2	3	4	5	6	7
聽力感覺悶脹或含混不清	1	2	3	4	5	6	7

Obstructive

Patulous

Aural fullness/Muffled/Pressure/Popping

Voice /Breath autophony/Aural fullness

ETDQ-7

PHI-10 , BBK score

Valsalva maueuver

Positional change, TM movement

Obstructive

Patulous

Aural fullness/Muffled/Pressure/Popping

Voice /Breath autophony/Aural fullness

ETDQ-7

PHI-10 , BBK score

Valsalva maueuver

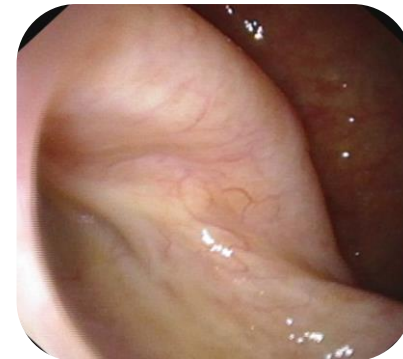
Positional change, TM movement

**Inflation-deflation Tympanogram
 Endoscopy (orifice)**

**Tympanogram Obstruction test
Endoscopy (orifice)**

Sonotubometry: 1. No change 2. < 5 dB

**Sonotubometry: 1. <100 dB 2. Plateau
TTAG: synchronous**

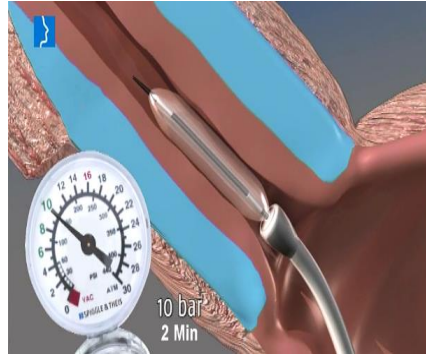


Treatment

Obstruction ETD

Balloon dilation tuboplasty

Laser tuboplasty



Treatment

Obstruction ETD

Balloon dilation tuboplasty

Laser tuboplasty

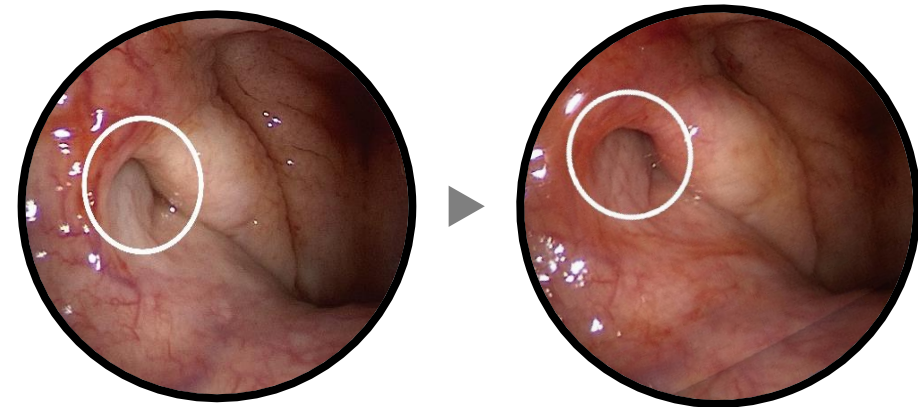


Treatment

Obstruction ETD

Balloon dilation tuboplasty

Laser tuboplasty



Pre-op

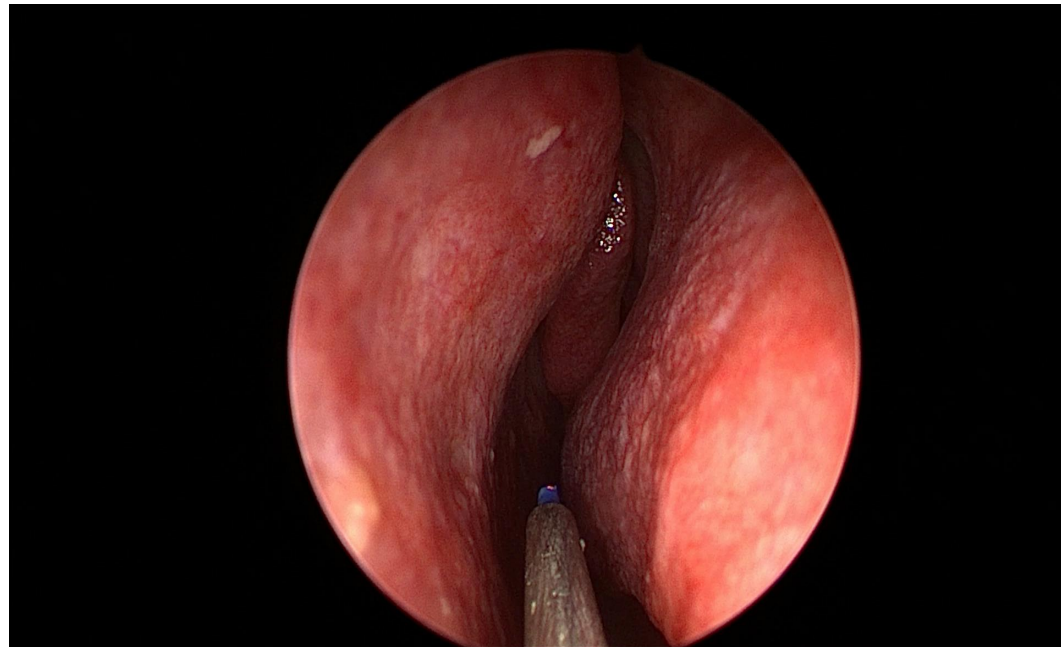
Post-op

Treatment

Obstruction ETD

Balloon dilation tuboplasty

Laser tuboplasty

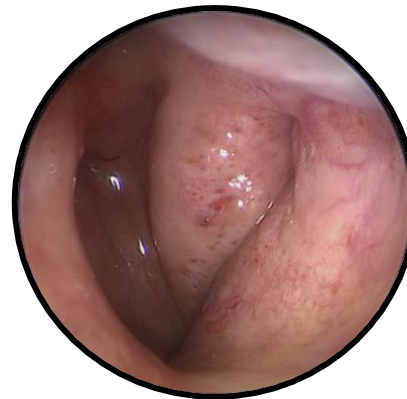


Treatment

Obstruction ETD

Balloon dilation tuboplasty

Laser tuboplasty



Pre-op



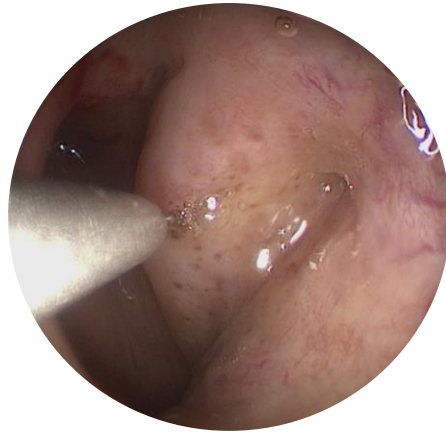
Post-op

Treatment

Patulous ETD

HA/ fat augmentation

Transcanal cartilage insertion

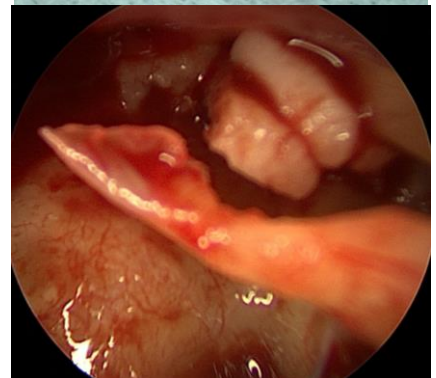
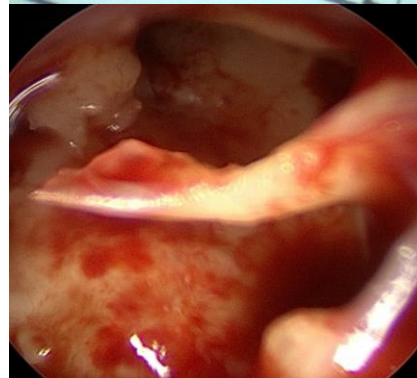
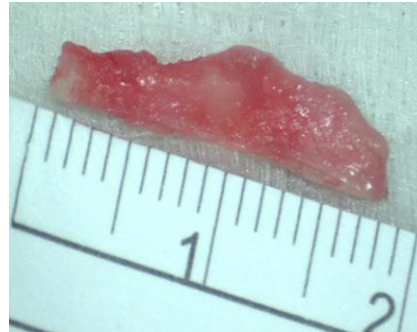


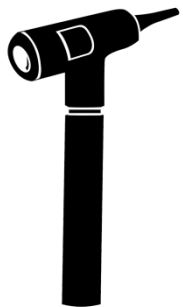
Treatment

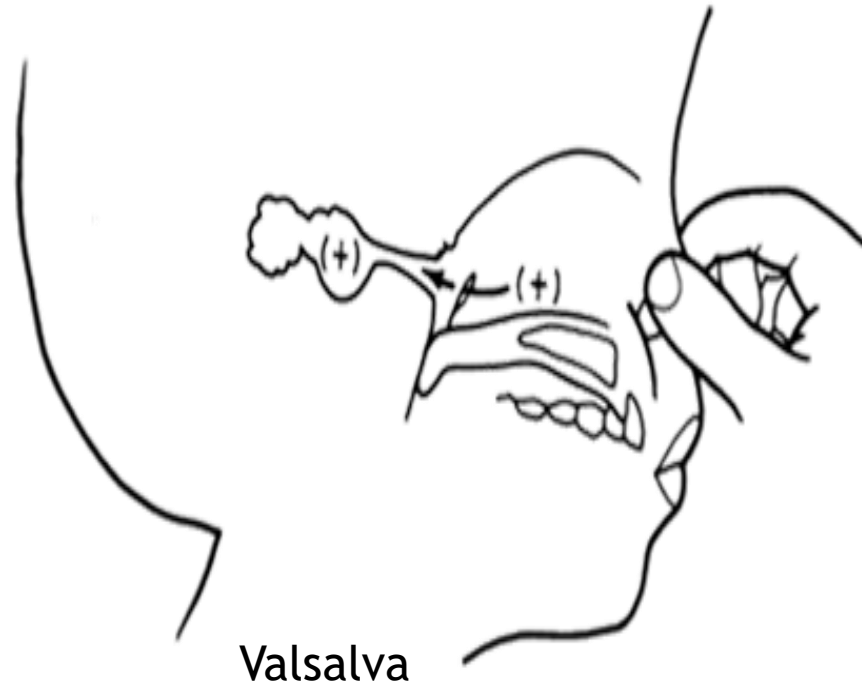
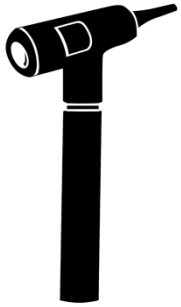
Patulous ETD

HA/ fat augmentation

Transcanal cartilage insertion







Valsalva test

(+) → Good tympanoplasty outcome

Toynbee test

→ Patent tube!! ; BUT not an overall normal function

Tool



2080-2000

Typ Eicken (45°), steril, 10 Stück/Box, lange Biegung /
Type Eicken, sterile, 10 pieces/box, long curve

2080-2070

Typ 70°, steril, 10 Stück/Box /
Type 70°, sterile, 10 pieces/box

2080-2045

Typ 45°, steril, 10 Stück/Box, kurze Biegung /
Type 45°, sterile, 10 pieces/box, short curve

2080-2010

Typ Ulm (60°), steril, 10 Stück/Box /
Type Ulm, sterile, 10 pieces/box

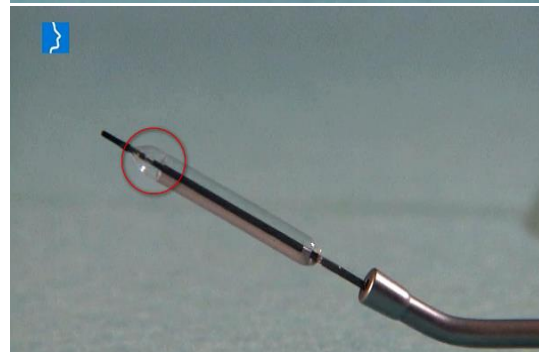
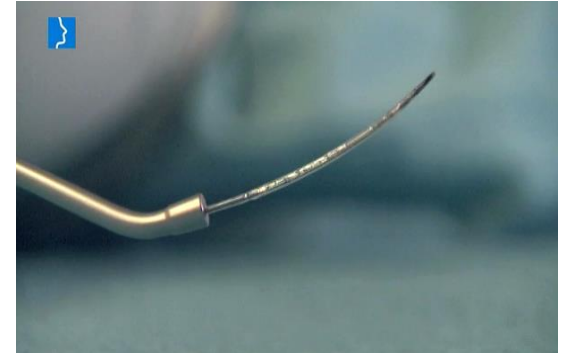
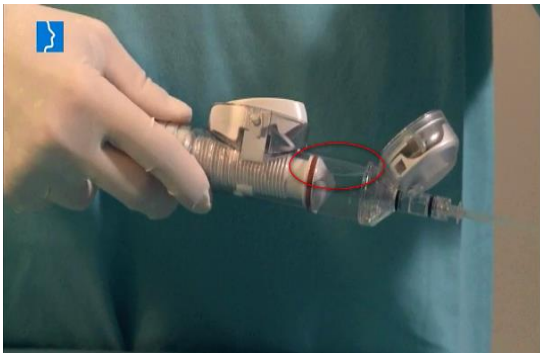


rip, pressure



Step

- General anesthesia
- Balloon inflated
 - saline to 10 bars for 2 mins
 - 2 cm in length
 - In cartilaginous part of ET





耳咽管氣球擴張術

耳咽管是什麼？

為連接鼻咽部與中耳之間的構造，其功能有三種

通氣：平衡耳膜內外側的壓力、保護：避免鼻涕逆流或鼻部感染傳至中耳、清除：中耳腔黏膜的分泌物。

耳咽管功能障礙的原因。

發炎：最常見的病因為鼻部或耳部的慢性疾病，例如過敏性鼻炎、中耳炎、感冒及鼻竇炎、鼻涕倒流等，均會造成耳咽管開口周圍的黏膜發炎腫脹，進而造成耳咽管功能障礙。

有那些症狀呢？

感覺部分 - 耳內有壓力感，悶塞感，疼痛感，或置身水下之感覺。

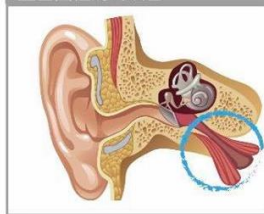
聲音部分 - 耳內有喀拉聲或嗡嗡聲，聽力感覺悶脹或含混不清。

新治療 - 氣球擴張術

台中慈濟醫院為全台灣第一間引進最新治療方式 - 耳咽管氣球擴張術。

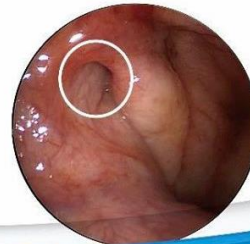
在內視鏡導引下，將裝有氣球的導管深入耳咽管，給予一定壓力使氣球擴張撐開閉鎖的耳咽管，使其通暢恢復功能。

藍色圓框為耳咽管



治療前：耳咽管閉鎖

氣球導管深入耳咽管



治療後：耳咽管通暢