

differences have been identified (lower in ethnic Chinese compared to Malays and Indians). Data estimating the prevalence of hearing loss in ageing Singaporeans is scant. Thresholds of >40 dB in the better ear were found in 54% and in at least one ear in 87%. Untreated hearing loss in the elderly results in significant decline in the quality of life of both the individual and their family. Self-perception of hearing loss is a very poor indicator of the presence of hearing loss. Between 20 and 33% of hearing impaired seniors were willing to consider a hearing aid; between 23 and 83% felt that it was unnecessary. Seniors who are independent in their activities of daily living (ADLs) are more likely to consider hearing aids than those who are ADL dependent and housebound.

*Conclusions:* Hearing loss and cognitive impairment will become increasing public health concerns. Further studies assessing whether the treatment of hearing loss can slow the rate of cognitive decline among older adults are required.

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## ID: IP056

### Transient hearing loss and objective tinnitus induced by mouth opening: a rare connection between the temporomandibular joint and middle ear space

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#### Learning Objectives:

*Objectives:* To describe objective tinnitus complicated with transient low-tone hearing loss coinciding with mouth opening, which was related to the connection between the mandibular fossa and middle ear space.

*Patients:* A 41-year-old man presented with tinnitus, ear fullness, and hearing loss in the left ear on mouth opening.

*Main Outcome Measures:* Clinical case records, audiological data, and radiological analyses including computed tomography (CT) and magnetic resonance imaging.

*Results:* Hearing thresholds on the ipsilateral side, which were evaluated with mouth opening, showed elevations of

approximately 20 dB in the frequencies below 1000 Hz. Again, peak pressure on the tympanogram deviated negatively to -220 mmH<sub>2</sub>O under mouth opening without changing peak amplitude. These results showed that the tensor tympani would not have contributed to movement of the ear drum in the present case. High-resolution CT with multi-planar reconstruction showed a connection between the mandibular fossa and middle ear space, as revealed by a gas collection around the joint capsule evaluated in 2 phases (with and without mouth closing). Ear symptoms resolved after myringotomy.

*Conclusions:* Although an influence of temporomandibular disorder (TMD) on tinnitus perception has been debated, whether this association is causal or fortuitous has remained contentious. The present case showed a unique feature of tinnitus attributed to a connection between the mandibular fossa and middle ear space. This connection might be related to the petrotympanic fissure (with or without variant course), which is a narrow slit allowing the TMJ and middle ear space to communicate. Radiological analysis including high-resolution CT with multi-planar reconstruction referring to the petrotympanic fissure would be helpful to clarify the pathogenesis of patients suffering from otological symptoms related to TMD.

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### The mastoid tegmen: A new clinical radiological classification

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*Learning Objectives:* Variations in normal tegmen and inner ear anatomy.

Surgical considerations when operating near the tegmen.

*Introduction:* The tegmen is a thin, variable plate of bone that separates the mastoid and middle ear cavity from the intracranial compartment. Serious complications such as cerebrospinal fluid leakage, neural tissue injury may arise when operating near the tegmen. One important risk factor for dural complications is the low placement of the tegmen. This study aims to determine the radiographic location of the tegmen tympani using the lateral semicircular canal (LSCC) as a landmark in adult patients with normal temporal bones.

*Methods:* 100 high resolution temporal bone CT scans from patients with hearing loss were examined retrospectively. We included scans from adult patients with normal temporal bone anatomy and no previous ear surgery. The distance between the LSCC and the lowest point of the tegmen tympani was measured in both the sagittal and coronal planes. 60 patients with cholesteatoma having undergone mastoidectomy procedures within the past 6 years were also analyzed retrospectively.

*Results:* The mean tegmen height was 4.1 mm in the coronal plane and 2.5 mm in the sagittal plane. The measured heights using the LSCC as our landmark demonstrated a unimodal distribution with some variance.

**Conclusions:** We propose a new, simple and clinically practical tegmen CT classification using the LSCC as our landmark. Tegmens below 4.5 mm on coronal measurement and 2.5 mm on sagittal measurement are considered “low” (type A) whereas tegmens above these parameters are considered “high” (type B). This classification system applied to preoperative temporal bone CT might influence planning of middle ear and mastoid surgery. Our retrospective analysis of recent mastoidectomy patients showed that “low” tegmens were more likely to require a canal wall down mastoidectomy whereas “high” tegmens were more likely to require a canal wall up mastoidectomy.

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### ID: IP058

#### Factors Affecting Hearing Aid Satisfaction in a Singapore Population

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**Learning Objectives:** Hearing aids greatly improves the quality of life in patients with hearing loss. Elderly patients with severe hearing loss and those who are fitted with bilateral Hearing aids benefited the most from their usage.

**Introduction:** This study analyzes factors that affect severity of hearing loss (HL) at presentation and hearing aid usage pattern among the Singapore hearing aid users.

**Methods:** Retrospective study with 643 subjects identified from audiometric records. Demographics (age, gender, race), Pure Tone Audiometry average (PTA0.5, 1, 2, 4 kHz), HA laterality (unilateral, bilateral), HA type and daily usage duration (<4hours, 4–7hours, >7hours) were collected. Severity of HL was classified as mild HL (21–40db), moderate (41–70db), severe HL(>71db).

**Results:** Patients had a mean age of 73.1 years (range: 22–113 years old). Patients presenting with mild HL were significantly younger than those with moderate-severe HL (64.1years vs 73.5years,  $p < 0.001$ ). There were 327 males and 316 females, and gender did not influence severity of HL at presentation.

Race proportion was Chinese 87.9%, Malay 4.2%, Indian 5.8%, others 2.2%. Less Malay patients sought help for HL compared to the national racial composition.

Amongst the Malay patients, 48.1% of them had severe HL, which was the highest proportion within an ethnic group compared to 26.7% of Chinese 26.7%, 37.8% of Indian and 7.1% of other races;  $p = 0.001$ . This suggested that Malay patients usually presented late for their hearing problems. Mean age of Malay patients is younger than that of non-Malay patients (70.3years vs 73.2years,  $p = 0.235$ ).

Lastly the more severe the HL, the longer the duration of daily HA usage. Most (45.8%) of the patients with severe HL use HA for more than 7 hours daily (vs. 25.3% for 4–7hrs, 22.5% for <4hrs,  $p = 0.016$ ). Unilateral HA was more popular than bilateral HA in all degree of HL.

**Conclusion:** Younger patients presented with milder degree of hearing loss. Though less Malay patients sought treatment for HL, they mostly presented with greater hearing loss severity at a younger age. Severity of hearing loss led to longer daily usage of HA.

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### ID: IP059

#### Hearing impairment among Nasopharyngeal Cancer (NPC) survivors

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**Learning Objectives:** To evaluate hearing impairment and other otological symptoms in NPC survivors To evaluate hearing aid usage in this population of patients.

**Introduction:** As the treatment outcome for nasopharyngeal cancer (NPC) patients continues to improve, there is an increasing pool of survivors. The treatment is not without its costs and many survivors suffer from hearing impairment that can lead to deterioration in quality of life. Hearing aids may help but uptake is generally low. We seek to investigate hearing and ear problems as well as acceptance of hearing aids among NPC survivors.

**Methods:** A cross-sectional survey was conducted among 35 NPC survivors who attended 2 NPC educational talks.

**Results:** Among the 35 patients recruited, 77% have hearing problems with 5 having both ears affected. The mean duration to onset of hearing loss post treatment is 3.08 years. Treatment modality (Chemoradiotherapy vs Radiotherapy only) did not affect prevalence and degree of hearing loss. Among those with self-reported hearing problems, 43% thinks that the hearing loss is moderate to severe, and more than 50% feels that it has caused them disability; a common reason cited was difficulty in communication. However, only 30% of patients are currently using hearing aids. Severity of hearing loss and hearing aid usage were correlated with  $r = 8.563$ ,  $p\text{-value} = 0.003$ . Interestingly, 47% of the patients with hearing problems were never offered hearing aids during the follow-ups. Among those who are currently wearing hearing aids, only 63% wear it for more than 8 hours per day. Besides hearing impairment, 14% have recurrent ear infections and 26% needs to have their ears cleaned regularly. 87% of the patients suffers from other otological symptoms, the most common being tinnitus and sensation of blocked ears.

**Conclusion:** Hearing impairment is a common problem, causing significant disability among NPC survivors. However, usage of hearing aids is low. Our results suggest that beyond the surveillance of cancer recurrence, physicians should take an active role in assessing patient’s hearing impairment and suitability of hearing aids.