

# Back to School Hearing Screening

Norberto V. Martinez, MD, FPSOHNS

Professor & Chair, Department of ORL-HNS  
University of Santo Tomas  
Faculty of Medicine and Surgery

Head, Hearing & Balance Disorders Laboratory  
Department of ORL-HNS  
St. Luke's Medical Center, BGC

Chair, Philippine Academy of Neuro-Otology, Otology and Related  
Sciences



# A.J., 12 year old, Female in 7<sup>th</sup> Grade

## CC: Hearing Loss, Both Ears

12yrsPTA

10.5yrs  
PTA

newborn hearing screening = Pass

1 year and 6 months old

- Started walking
- Mother suspected hearing loss (only had about 10 words)
- Evaluated for possible developmental delay
- No hearing test done
- Underwent occupational, physical and speech therapist until 3 years old.



# Role of Pediatricians



- ▶ First health care provider to whom parents turn when they have concerns about their child's hearing
- ▶ By virtue of their regular contact with children throughout the first years of life, play a central role in directing families through the diagnostic and intervention process

## CONSEQUENCES, IF NOT ADDRESSED

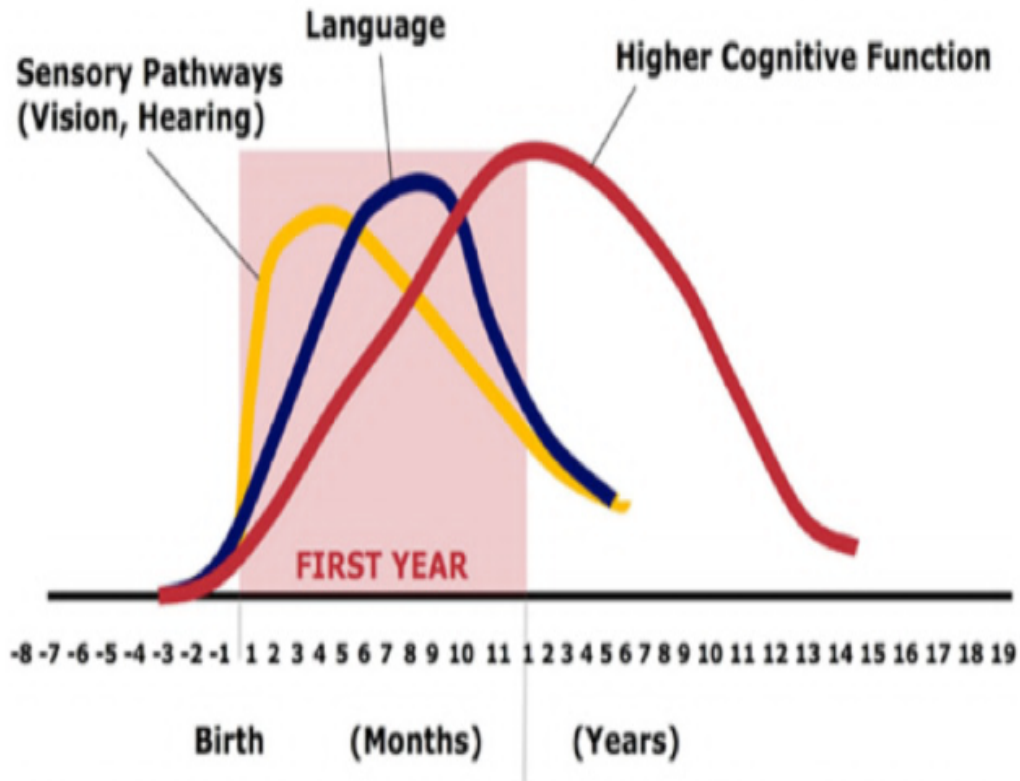


## CHILDHOOD HEARING LOSS

ACT NOW, HERE'S HOW!

## Human Brain Development

Neural Connections for Different Functions Develop Sequentially



Source: In Brief: The Science of Early Childhood Development. Center on the Developing Child, Harvard University.

# Late-Onset Hearing Loss

## Newborn Hearing Screening Alone May Not Be Reliable

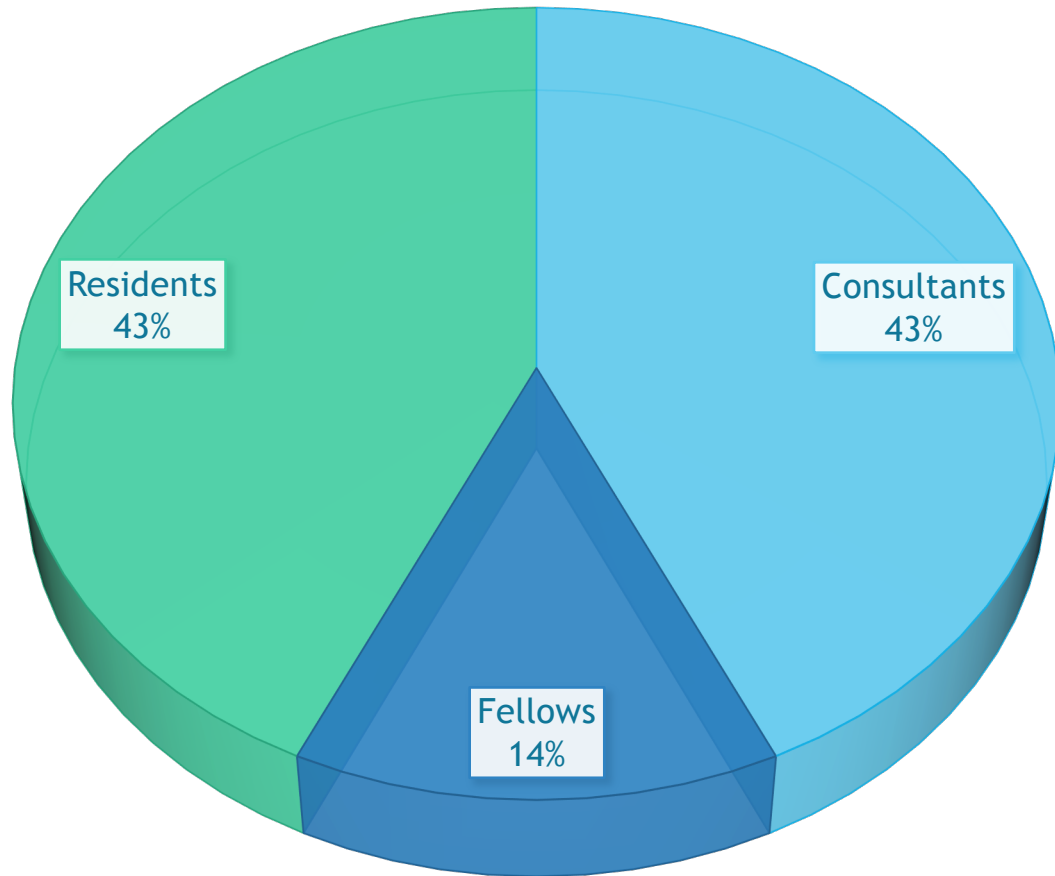


- ▶ 2.2 children per thousand (49.2% male) were found to be affected by significant bilateral hearing loss at school age <sup>1</sup>
- ▶ Hearing loss in school-age children was twice the rate found in newborns. <sup>1</sup>
- ▶ 4%-30% of children have progressive or late onset Hearing Loss <sup>2</sup>

<sup>1</sup> Annette Weishaupt c, Paul Fellingner a, Christoph Beitel a, Johannes Fellingner (2016) Prevalence of 2.2 per mille of significant hearing loss at school age suggests rescreening after NHS Daniel Holzinger Journal of Pediatric Otorhinolaryngology 87 (2016) 121e125

<sup>2</sup> Box2.p991.OCNA48(2015) Risk Indicators associated with permanent congenital delayed onset or progressive hearing loss in childhood mild hearing loss 983-99-4

# Total Number of Respondents from a Private Tertiary Hospital (n=65)



---

No. of Respondents	
Residents	28
Fellows	9
Consultants	28
Total	65

---

Do you routinely request for hearing screening among patients with the following conditions?

	YES	NO
APGAR score < 5 in 5 mins.	53	12
Bacterial meningitis	47	18
Maternal infections (TORCH)	55	10
Defects of head and neck	48	17
Elevated bilirubin level	30	35
Family Hx of hearing loss	55	10
Very low birth weight	56	9

	YES	NO
Hx of NICU enrollment	55	10
Mechanical Ventilation	46	19
Ototoxic drugs	52	13
Prematurity	58	8
Syndrome asstd. w/ hearing loss	51	14
Head Trauma	27	38

# Do you assess the following items routinely on your patients during a well baby visit?

Survey September 2018 n = 65

12months	Obeys simple commands without gesture	61	4	12months	Speaks few words	61	4
16months	Obeys simple commands without gesture	60	5	16months	3 words other than "papa" and "mama"	59	6
18months	Points to body parts	61	4	18months	10 word vocabulary	61	4
					Names pictures		
24months	Points to 5 body parts	56	9	24months	Combines 2-3 words in sentences	59	6
30months	Refers to Self as "I"	57	8	30months	Speech half understandable	56	9
	Names 1 color						
	Knows full name						



# To whom do you refer patients when you see the following conditions?

	ENT	Developmental - Pedia	Pedia Neuro	Rehab Med	Psychologist	Audiologist
Speech delay	35	62	16	3		1
Intellectual delay	9	64	17	2	1	
Poor school performance	8	63	11	2		
Poor attention span	7	63	11	1		
Poor social skills	5	63	9	3	1	

# A.J., 12 year old, Female in 7<sup>th</sup> Grade

## CC: Hearing Loss, Both Ears



3-7 years old

- passed two hearing screens (clapping and toy drop test) at the pediatrician's office
- no major issues with speech were identified

**flat handclap**

- large proportion of radiated sound in the frequency range 1-10 kHz

**cupped handclap**

- maximum in the range 0.1-2 kHz,

# Whisper test

- ▶ At the end of deep inspiration, whisper a combination of letters and numbers, one meter away from the test ear
- ▶ The sensitivity in the four childhood studies ranged from 80% to 96% and specificity ranged from 90% to 98%.<sup>1,2</sup>
- ▶ The whispered voice test is a simple and accurate test for detecting hearing impairment.<sup>1,2</sup>

1 Sandi Pirozzo, Tracey Papinczak, and Paul Glasziou (2003) *Whispered voice test for screening for hearing impairment in adults and children: systematic review* *BMJ*. 2003 Oct 25; 327(7421): 967. doi: [10.1136/bmj.327.7421.967](https://doi.org/10.1136/bmj.327.7421.967)

2 Pirozzo S, Papinczak T, Glasziou P. *Whispered voice test for screening for hearing impairment in adults and children: systematic review*. *BMJ* 2003;327:967

# A.J., 12 year old, Female in 7<sup>th</sup> Grade

## CC: Hearing Loss, Both Ears



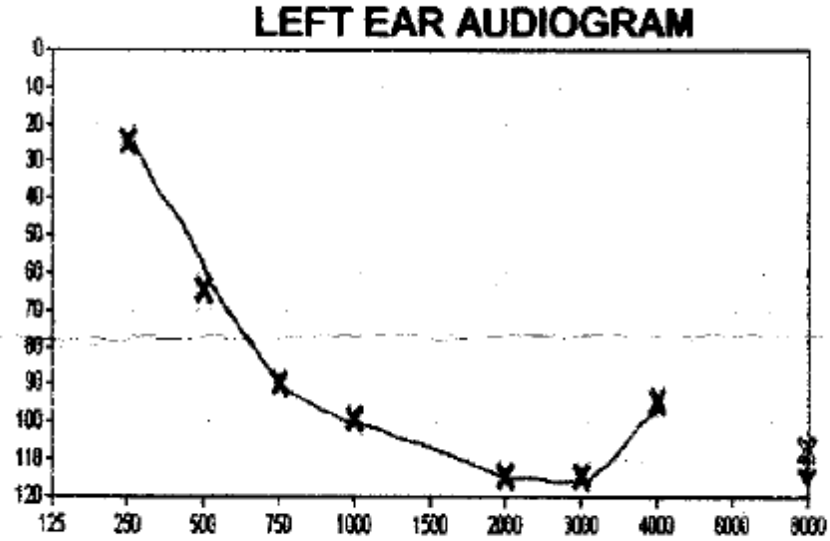
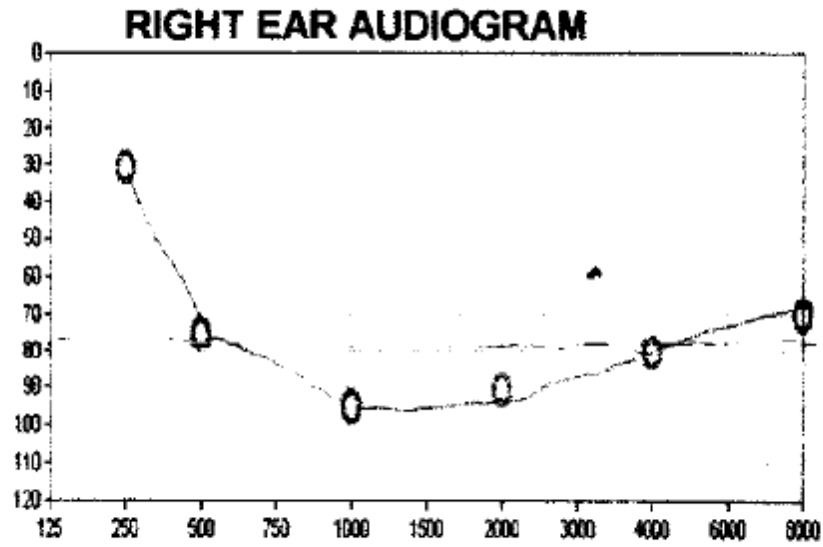
7-8 years old

- Teacher noted difficulty in school, often “daydreaming”
- Consult with pediatrician
  - referred to an ENT
- ABR testing followed by behavioral audiometry
  - severe to profound hearing loss
- Hearing aid fitting done

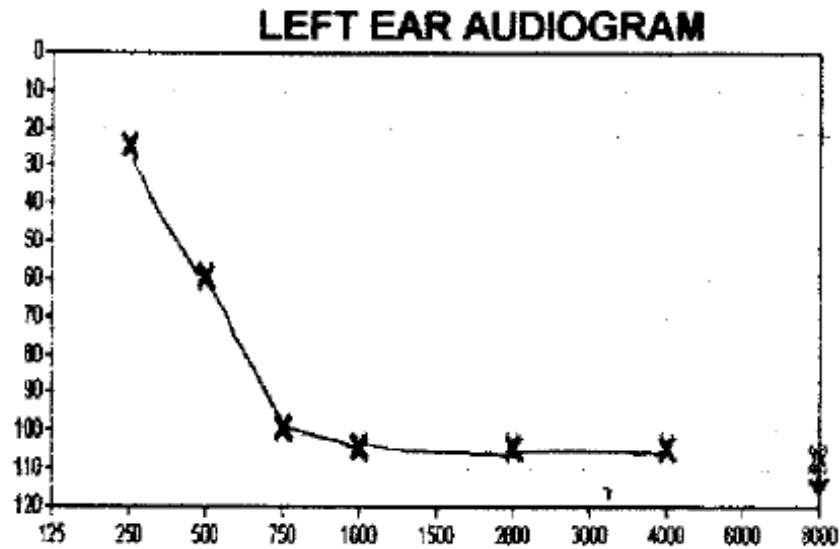
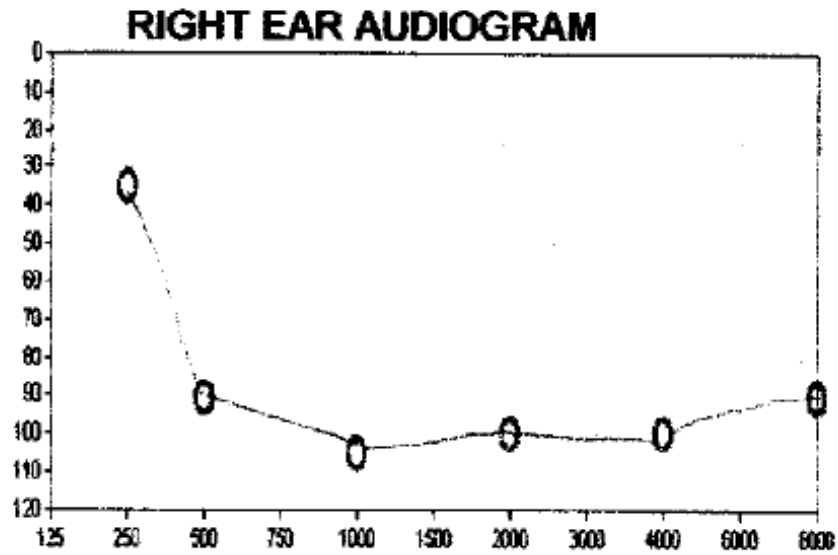
# Parental/ Teacher Concerns that may indicate hearing loss

1. Inattentiveness
2. Frequent requests for repetition
3. Inappropriate responses to instructions
4. Confusion of similar sounding words
5. Talk too loud or too soft
6. Act out in class

PTA (12/3/2014)

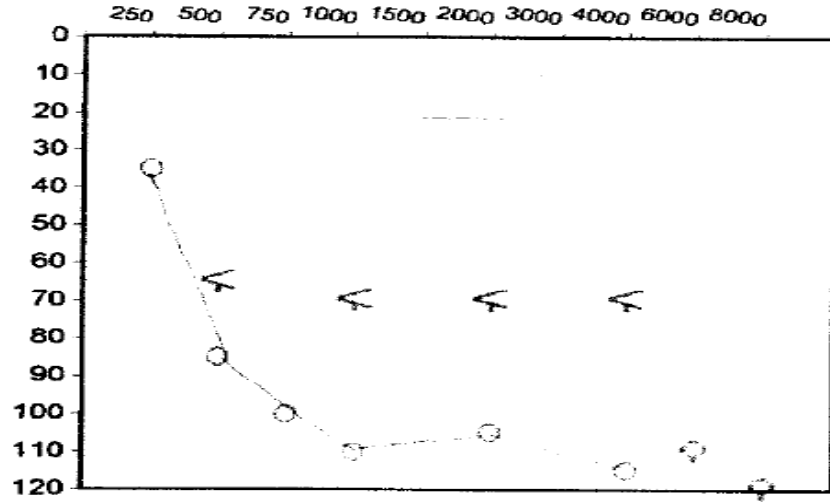


PTA (4/29/2015)



PTA (3/1/2016)

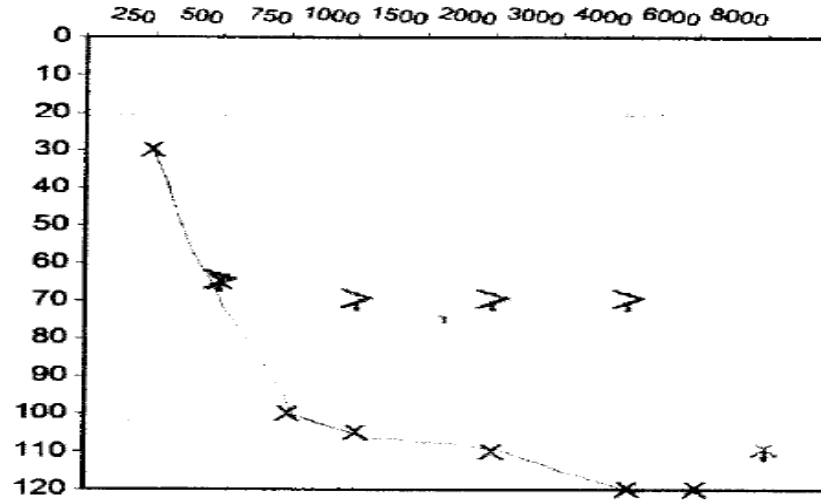
RIGHT EAR AUDIOGRAM



Speech Audiometry

LEFT EAR AUDIOGRAM

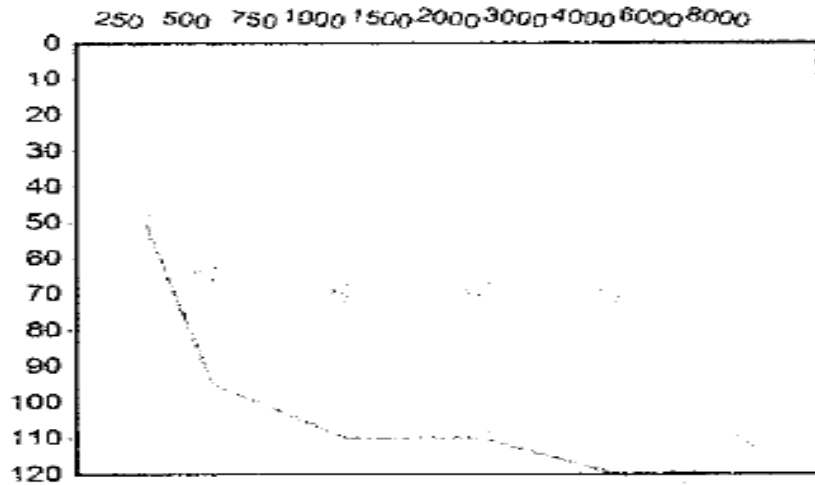
RELIABILITY  
Fair



Tympanometry Test

PTA(3/5/2018)

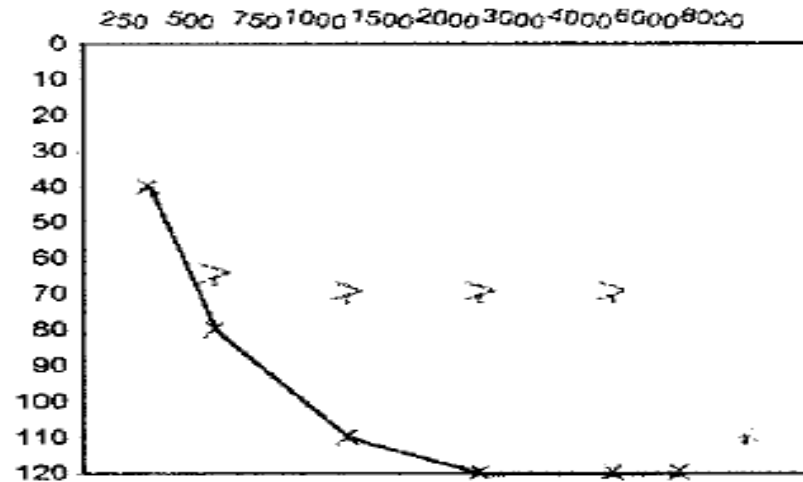
RIGHT EAR AUDIOGRAM



Speech Audiometry

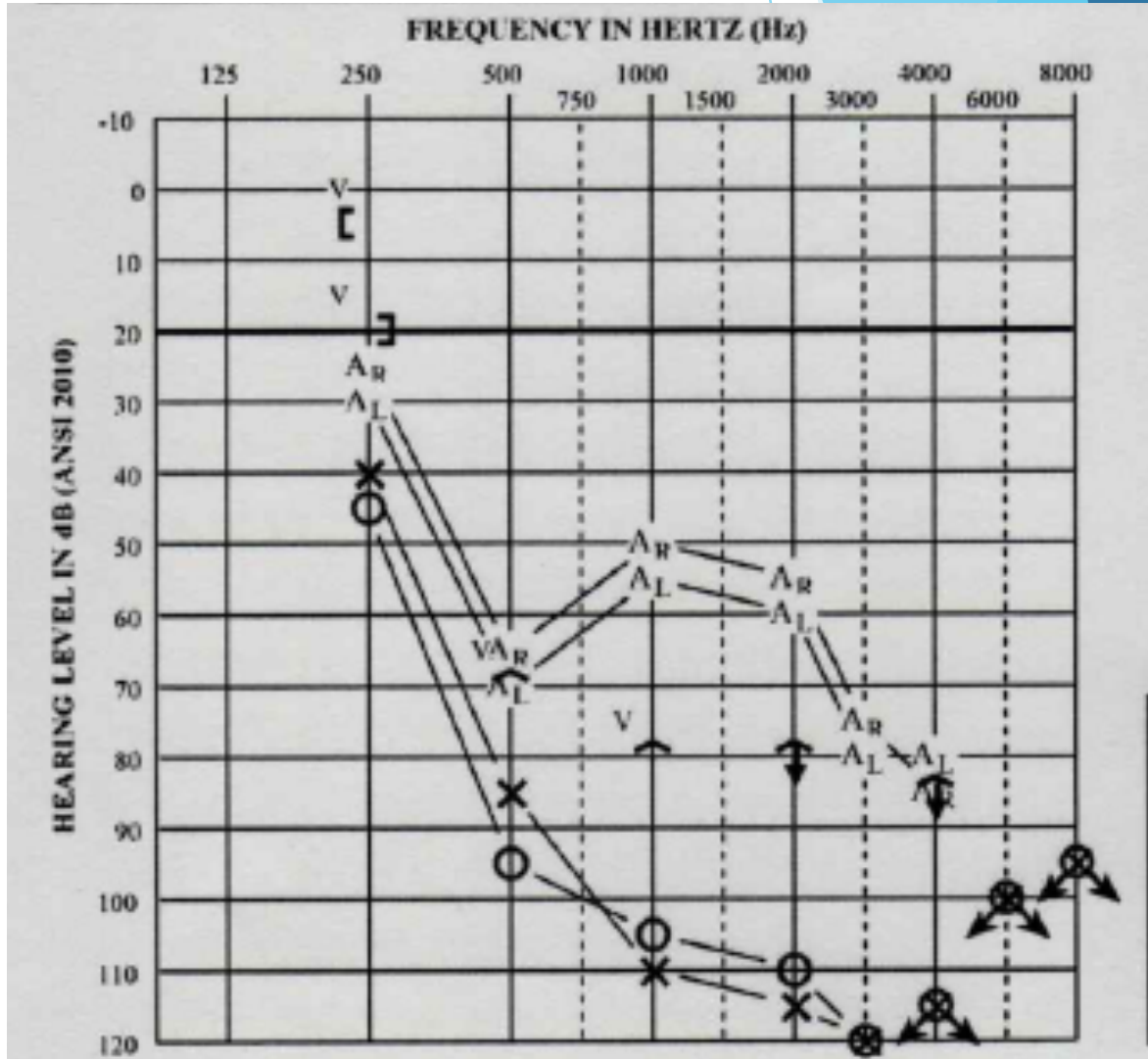
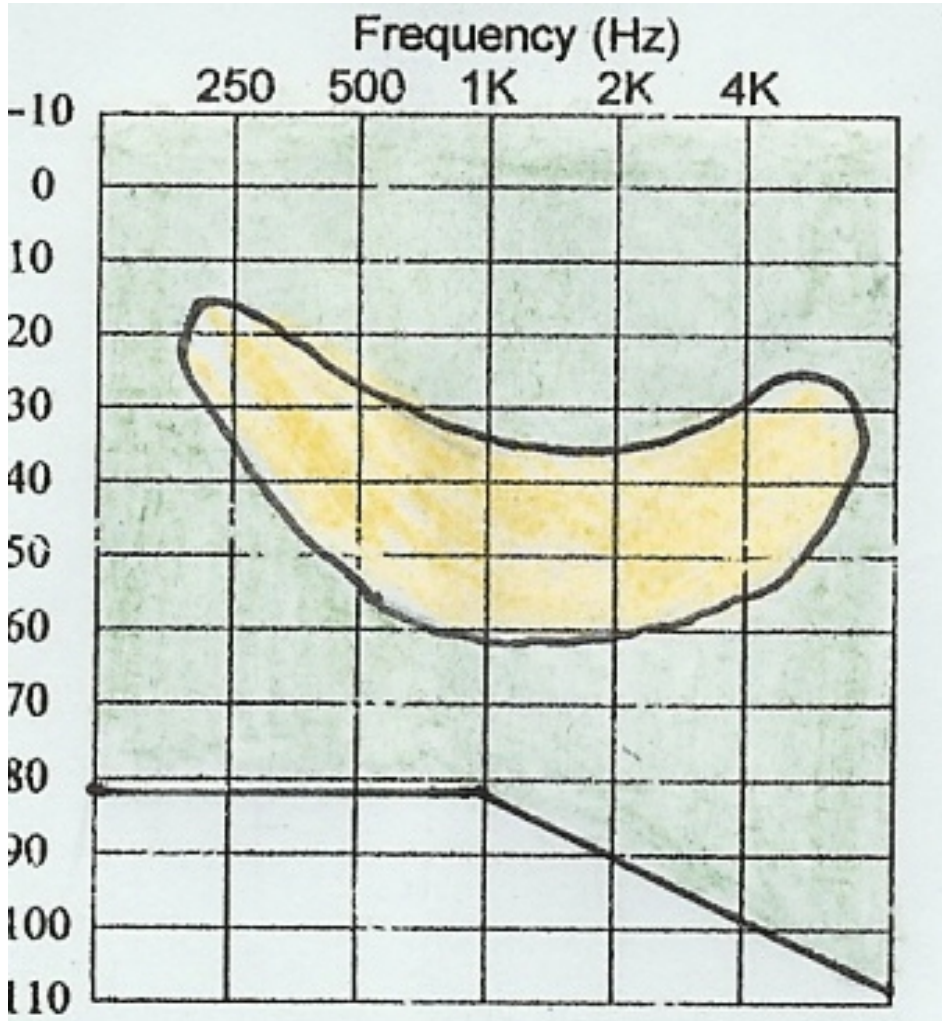
LEFT EAR AUDIOGRAM

RELIABILITY  
Good



Tympanometry Test

12 years old  
(6/5/2018)





# A.J., 12 year old, Female in 7<sup>th</sup> Grade

## CC: Hearing Loss, Both Ears

4mosPTA

12 years old

Seen by ENT

Candidate for cochlear implant surgery

Plain CT scan of the temporal bone was normal

Referred to Audiologist

Consider cochlear implantation from audiology standpoint

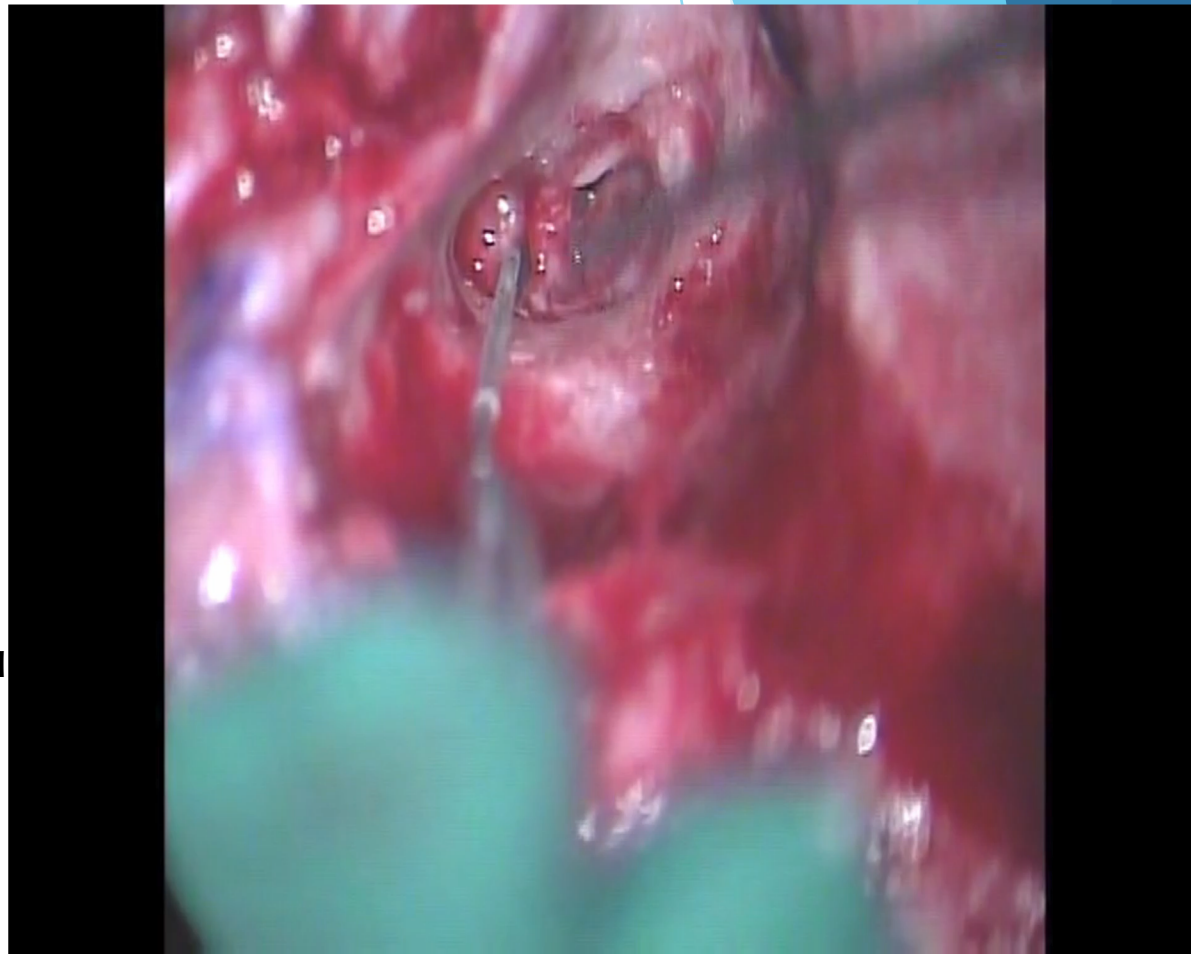
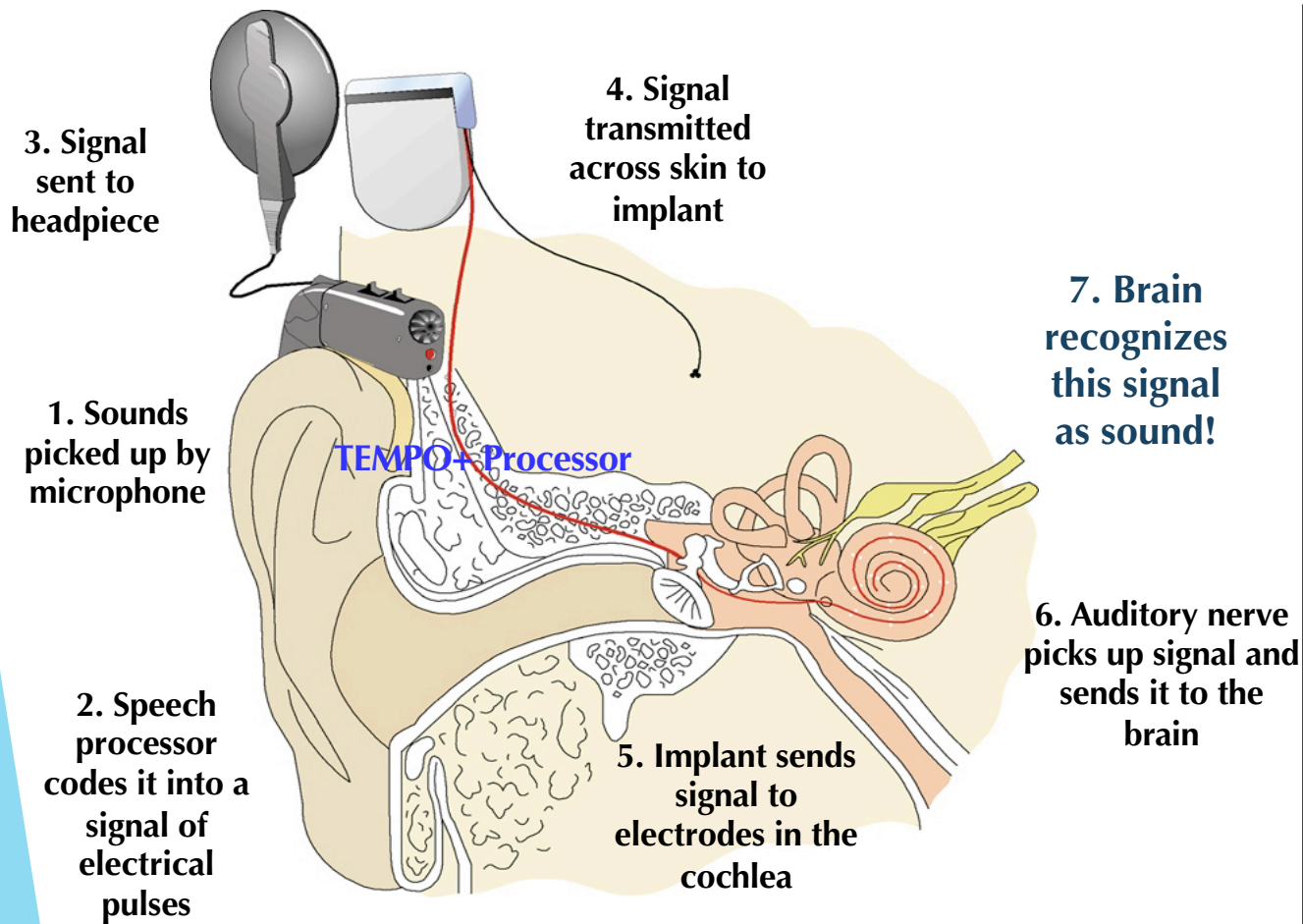
Referred to Speech Pathologist

Candidate for cochlear implantation from a speech and language standpoint.

Hence Admission

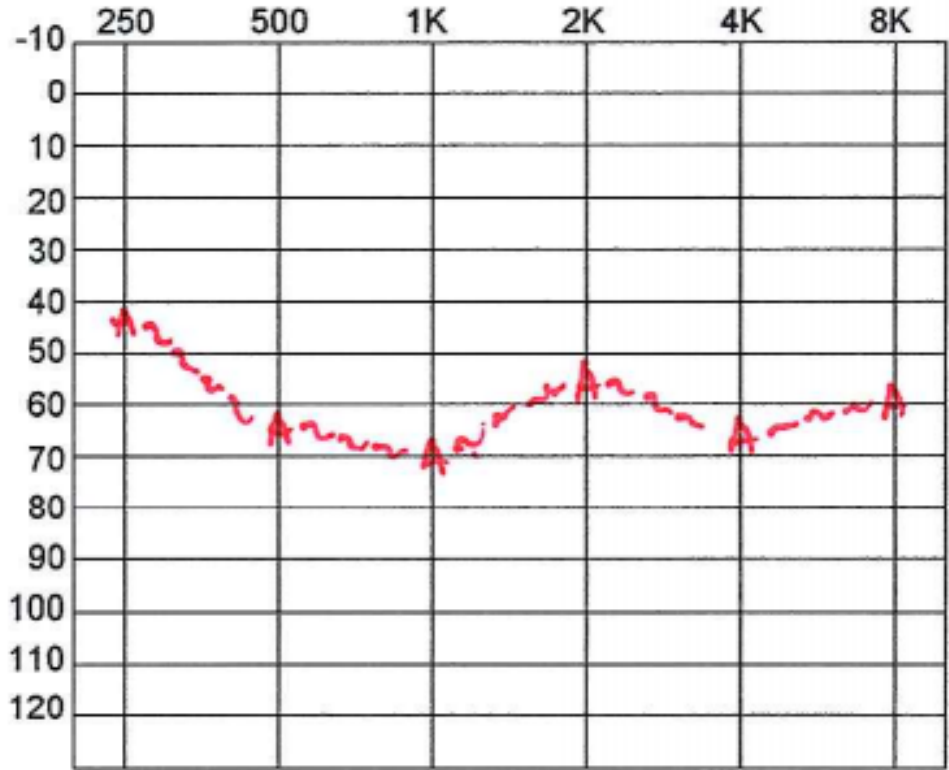
8/18/2018

# Patient Underwent Cochlear Implant Surgery



# Implant Aided Thresholds

**RIGHT EAR**



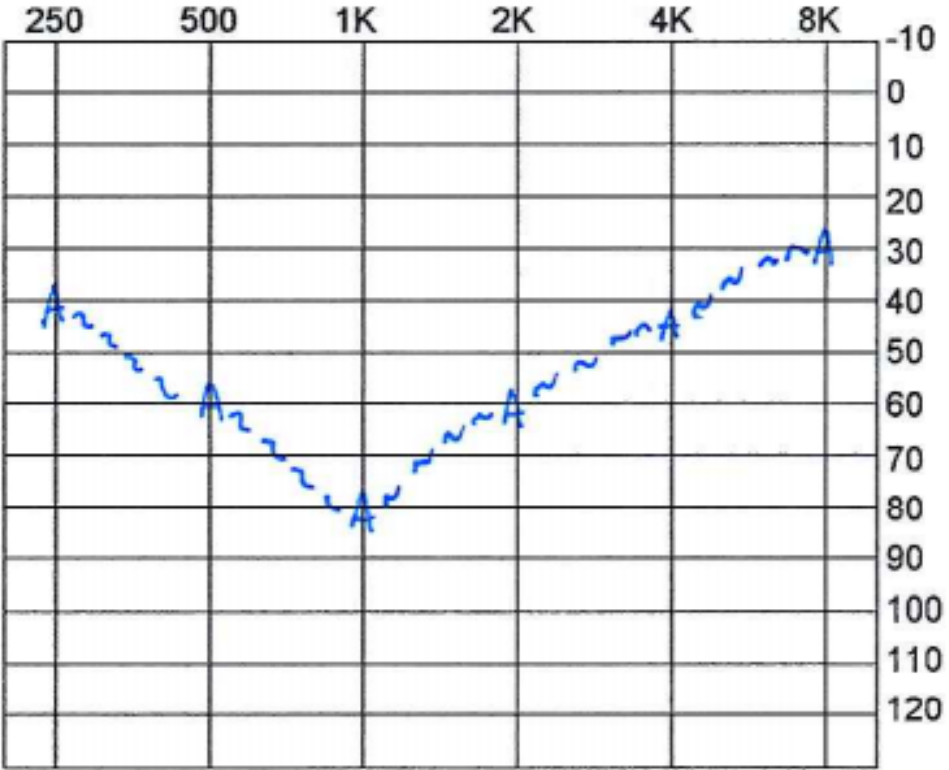
**Transducer**

- Insertphone
- Headphone
- 90° SF
- 0° SF

**Reliability**

- Very Good
- Good
- Fair
- Low

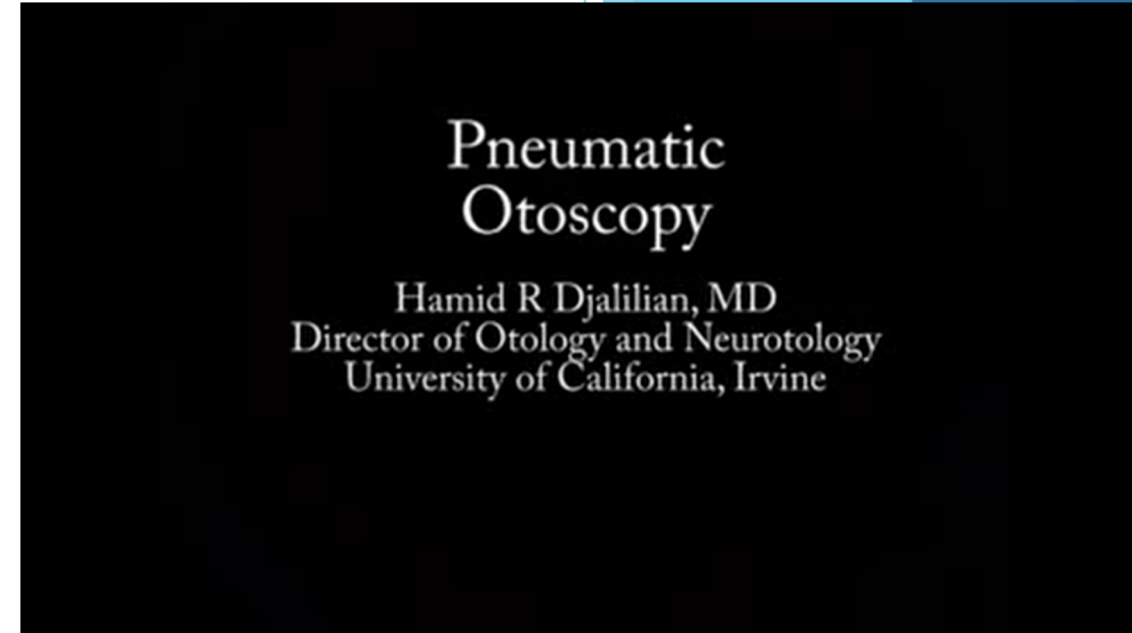
**LEFT EAR**



# Joint Committee on Infant Hearing (JCIH) Recommendation for Surveillance

1. Monitor auditory skills, middle ear status and developmental milestones at 9, 18, and 24 months
2. Significant family concerns
3. Middle ear status assessed using pneumatic otoscopy or tympanometry at all well baby visits
4. Children with persistent OME >3months should be referred for otologic evaluation

*Table 1 p. 992 OCNA 48 (2015) 983-994*



THANK YOU! 😊