

# VHIT 實作案例與經驗 分享

高雄醫學大學 耳鼻喉頭頸外科部

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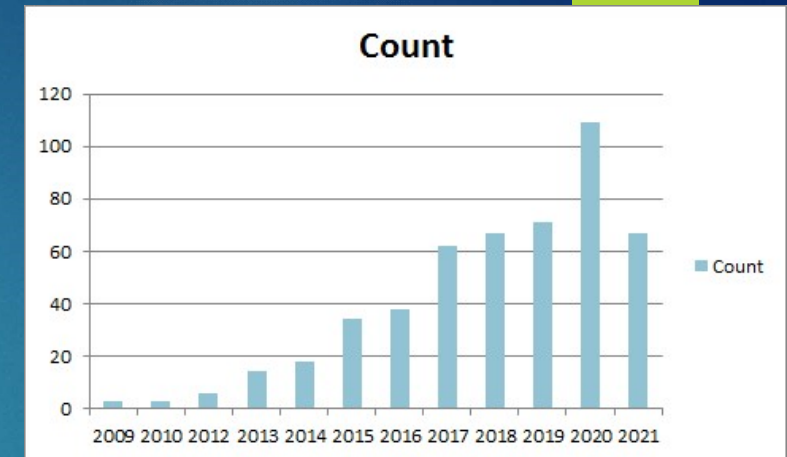
# vHIT

- ▶ Video Head Impulse Test

- ▶ vHIT

- ▶ Acknowledge of vHIT

- ▶ 28<sup>th</sup> Politzer Society Meeting, 2011, Authen, Greece – prototype of vHIT by Dr. Halmagyi
  - ▶ 29<sup>th</sup> Barany Society Meeting, 2016, Seoul, Korea – reports of vHIT in variety of vertiginous disease (Symposium: 6; Oral: 24; Poster: 28; Total: 58 issues)
  - ▶ IFOS 2017, Paris, France – even more vHIT reports (31 issues)
  - ▶ 30<sup>th</sup> Barany Society Meeting, 2018, Uppsala, Sweden – reports of vHIT (but decreased in number: 15)

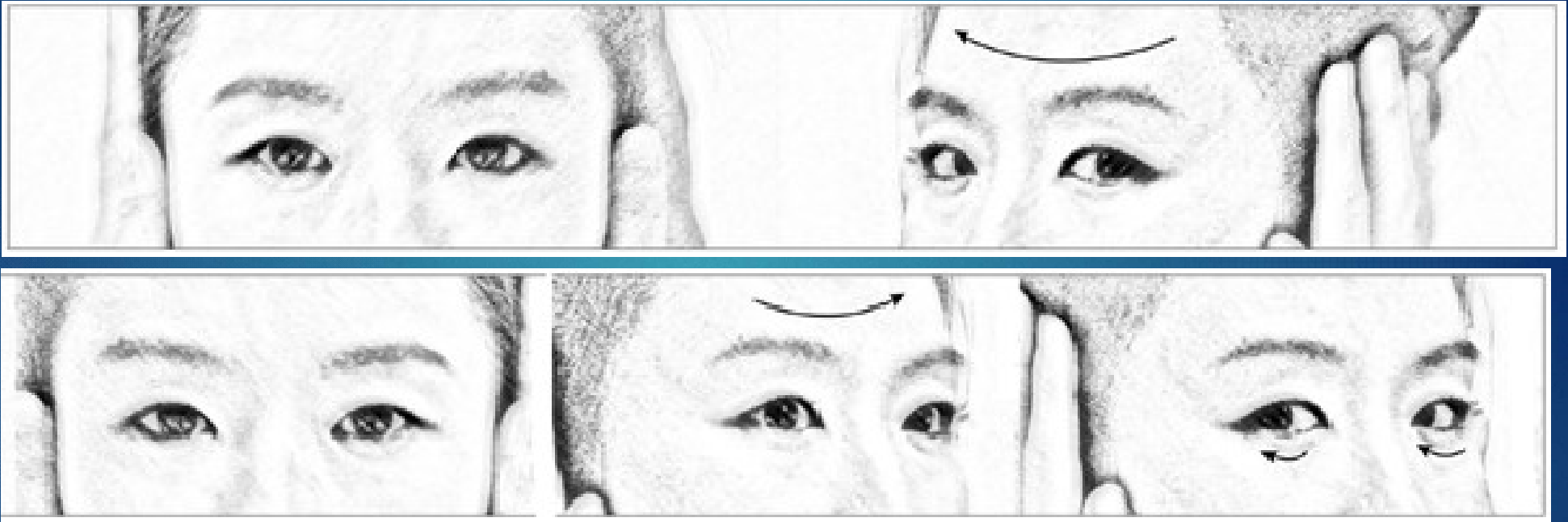




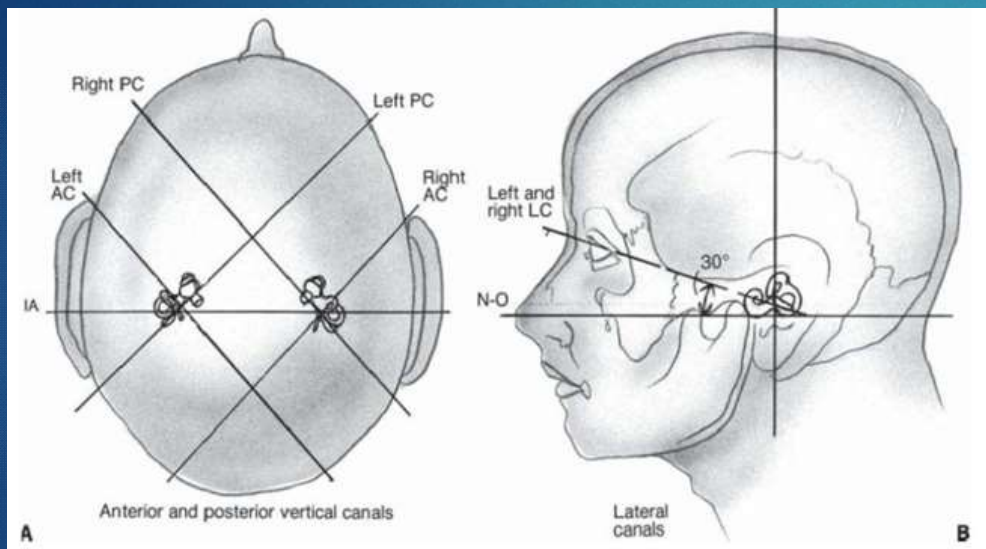
# Application of vHIT

- ▶ Head Impulse test
  - ▶ For horizontal canals only
  - ▶ Judged by examiner
  - ▶ Less accurate
- ▶ vHIT
  - ▶ For 3 pairs of semicircular canals
  - ▶ Computerized trace of head movements and eye movements
  - ▶ More accurate

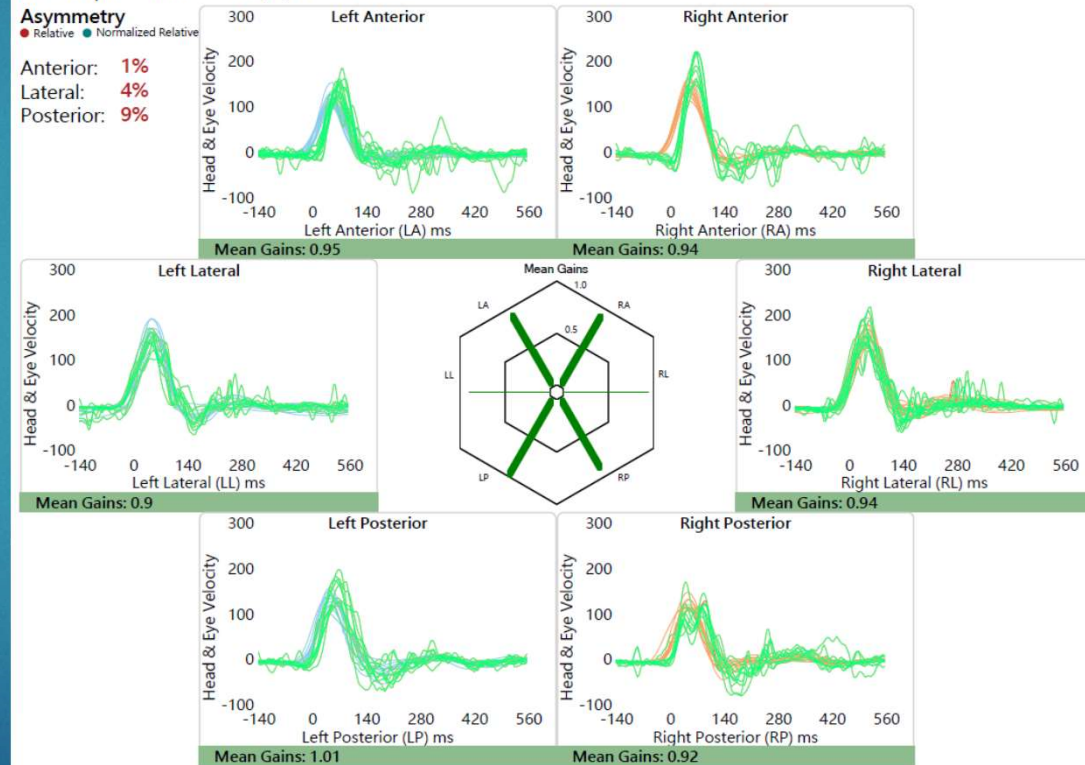
# Head Impulse Test



# vHIT



Lateral Impulse Test: 2021/3/17 下午 03:40:36  
 LARP Impulse Test: 2021/3/17 下午 03:46:17  
 RALP Impulse Test: 2021/3/17 下午 03:48:35





# Applications of vHIT

- ▶ Evaluation of semicircular canal function
- ▶ Vestibulo-ocular reflex (VOR)
- ▶ Substitute caloric test (except Meniere's disease)
  - ▶ Inter-aural asymmetry (canalopalsy)
    - ▶ Caloric test: 25%
    - ▶ vHIT: 13.5% (?)

# Reliability of vHIT

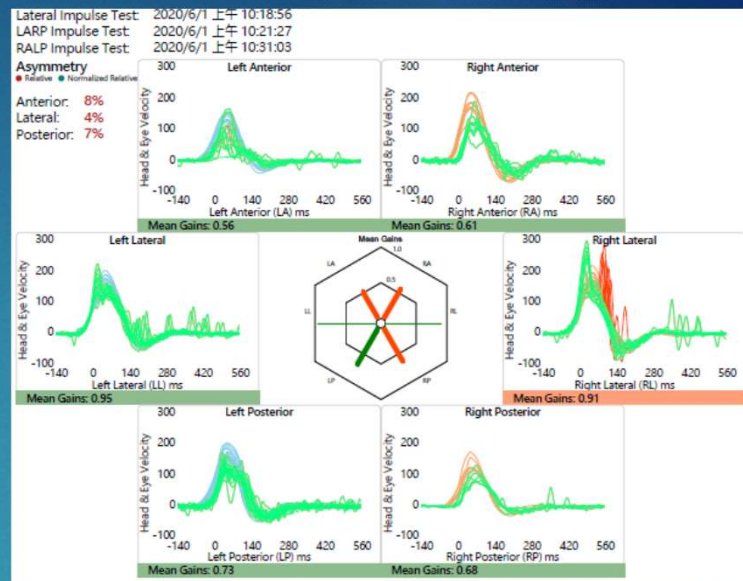
- ▶ Sensitivity and Specificity
  - ▶ Sensitivity = 1.0
  - ▶ Specificity = 1.0
- ▶ Examiner bias?
- ▶ Examinee condition change?

(Curthoys and Manzari, 2017)

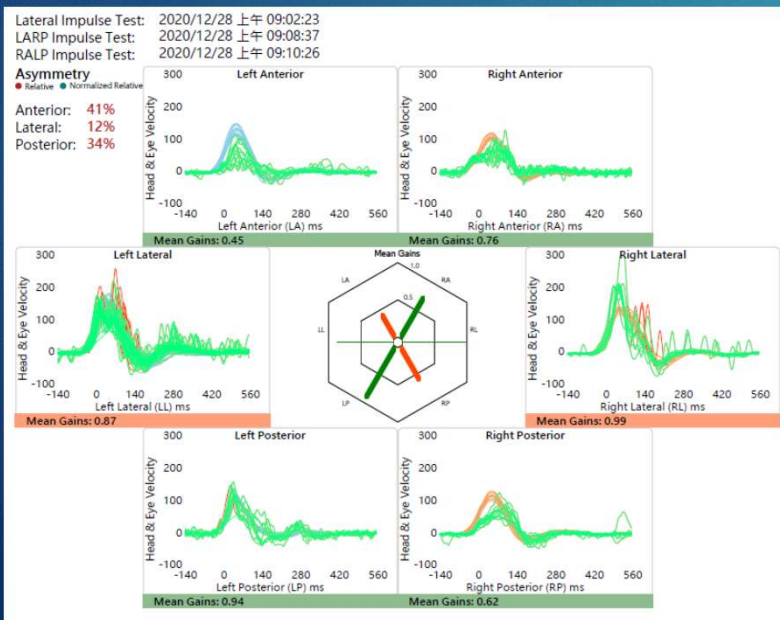


# Non-vertiginous Case

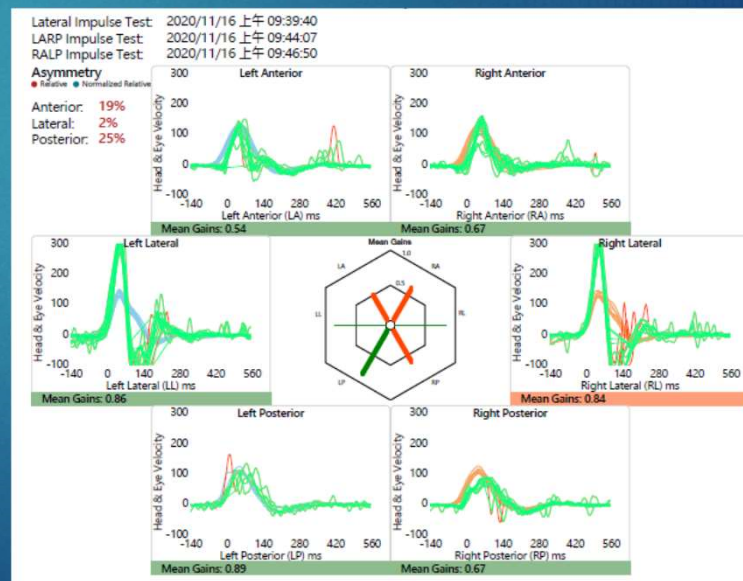
- ▶ 48 y/o male
- ▶ No vertiginous complaint
- ▶ History of migraine without aura



2020/06/01



2020/12/28

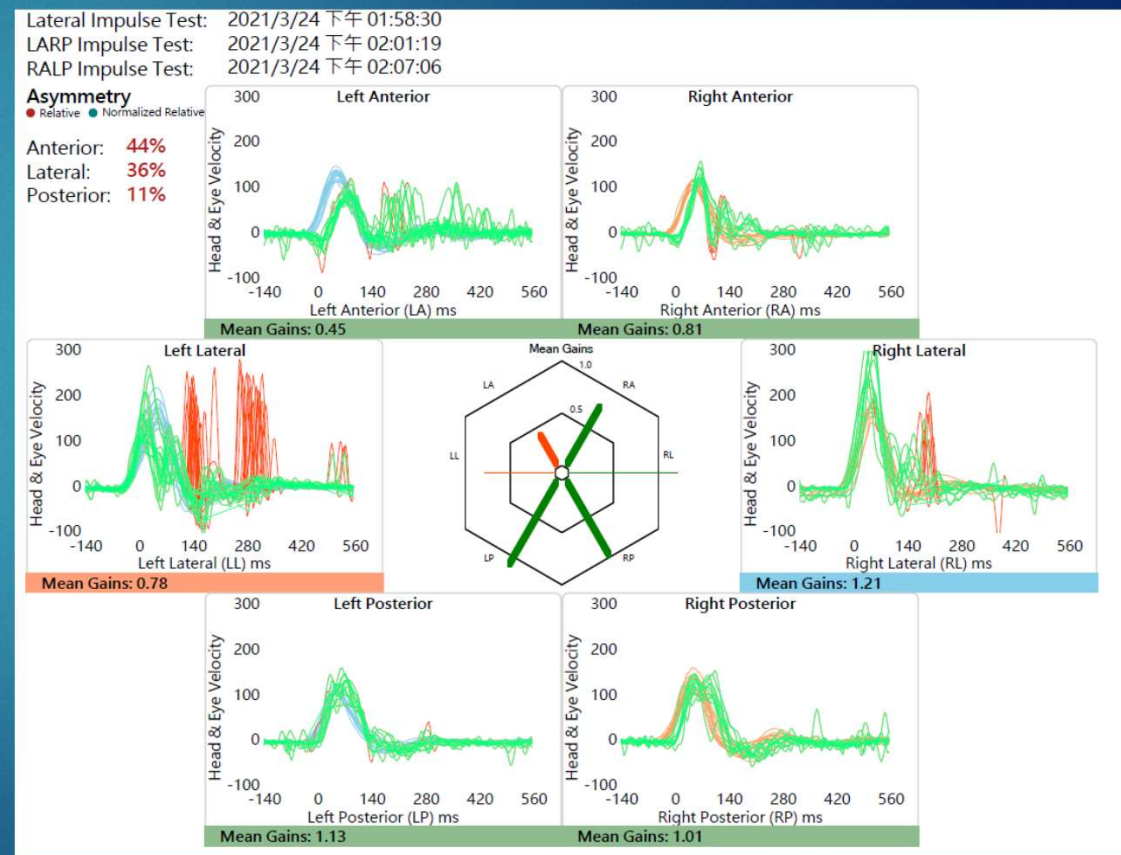


2020/11/16



# Vestibular Neuritis

- ▶ 55 y/o female
- ▶ Vertigo for 10 days
- ▶ Spontaneous nystagmus to right
- ▶ Scheduled following up vHIT 2 months after treatment
  - ▶ Loss of follow up due to COVID-19

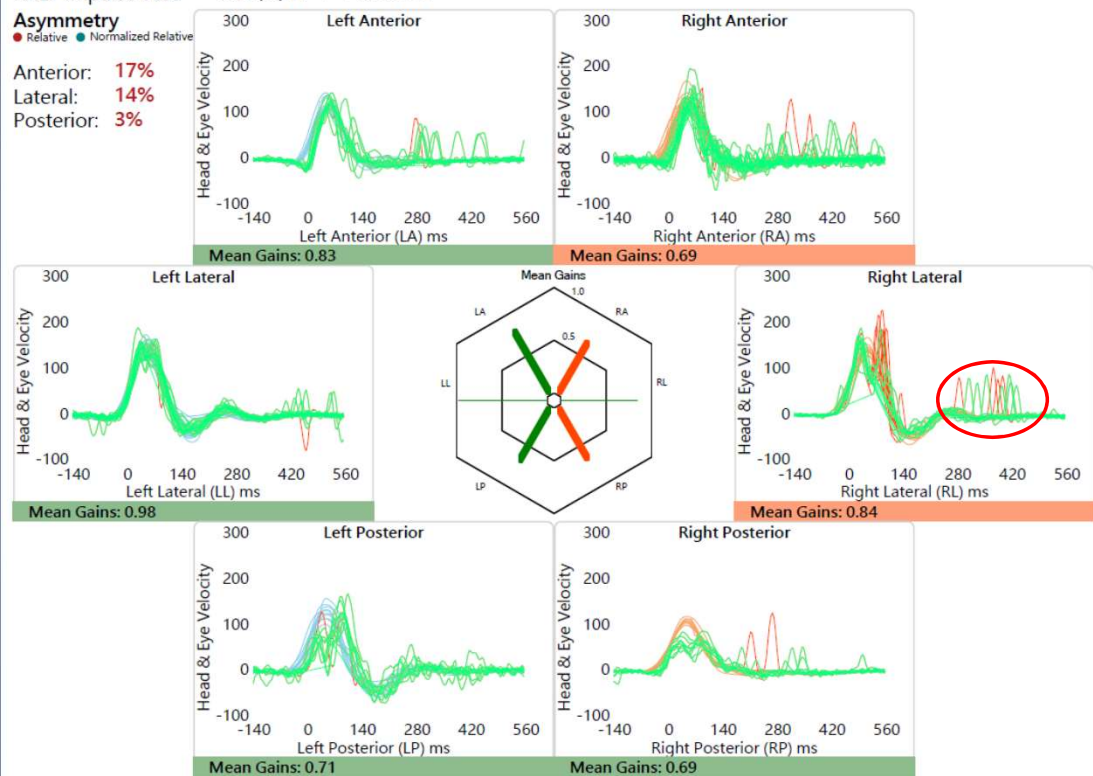


# Vestibular Neuritis with follow up

- ▶ 28 y/o male
- ▶ (2021/02/17): Vertigo when turning to right for 4 days
  - ▶ No spontaneous nystagmus observed
  - ▶ Head Impulse test
    - ▶ Trivial compensatory saccade when turning to right
  - ▶ Stenger's positioning test
    - ▶ Horizontal nystagmus to left
  - ▶ Dix-Hallpike test
    - ▶ Negative
  - ▶ Supine roll test
    - ▶ Not performed
- ▶ (2021/02/24)(after 1 week steroid treatment) : No more vertigo
  - ▶ Dix-Hallpike test
    - ▶ Right counter-clockwise rotational nystagmus; left apogeotropic nystagmus
- ▶ Follow up vHIT 1 month later

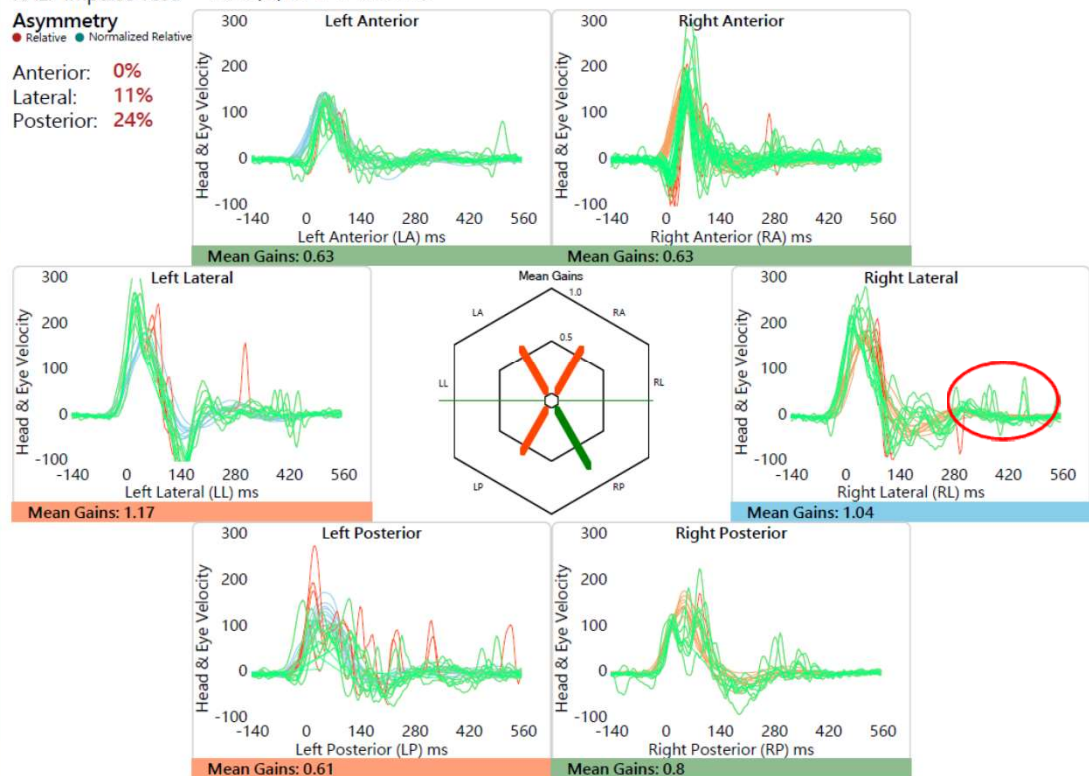


Lateral Impulse Test: 2021/2/17 下午 04:02:55  
 LARP Impulse Test: 2021/2/17 下午 04:05:02  
 RALP Impulse Test: 2021/2/17 下午 04:06:24



4 days after vertigo attacked

Lateral Impulse Test: 2021/3/24 下午 02:45:37  
 LARP Impulse Test: 2021/3/24 下午 02:47:13  
 RALP Impulse Test: 2021/3/24 下午 02:51:45



Follow up 40 days after vertigo attack

# Recovered Ancient Vestibular Neuritis

- ▶ 34 y/o male
- ▶ Right Vestibular Neuritis noted on 2016/10/10
- ▶ Right PC BPPV noted several days later
  - ▶ Epley maneuver performed several times
  - ▶ Remission in 1.5 months
- ▶ Occasionally vertigo/dizziness since then
- ▶ vHIT performed on 2020/6/10



Lateral Impulse Test: 2020/6/10 下午 02:13:17  
 LARP Impulse Test: 2020/6/10 下午 02:21:13  
 RALP Impulse Test: 2020/6/10 下午 02:24:33

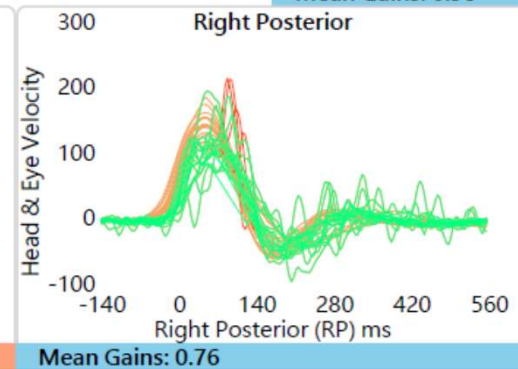
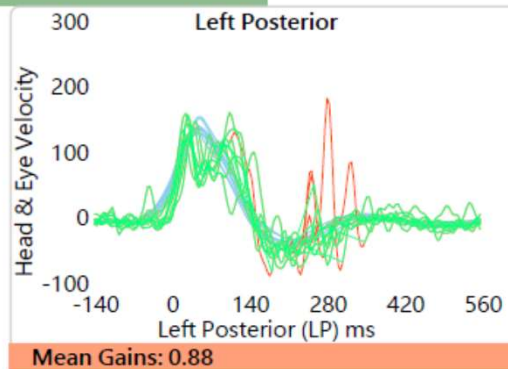
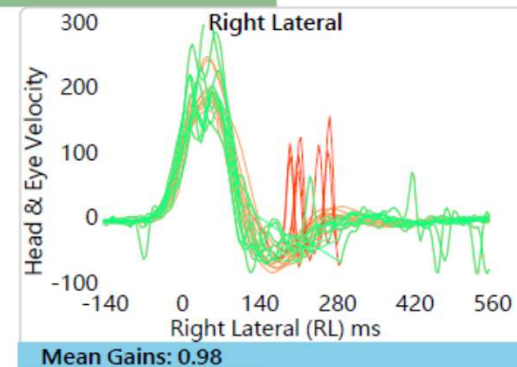
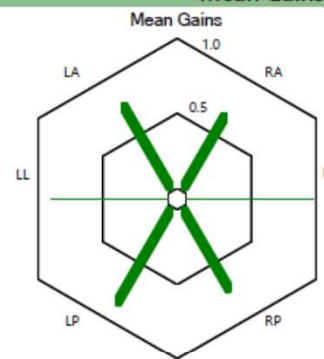
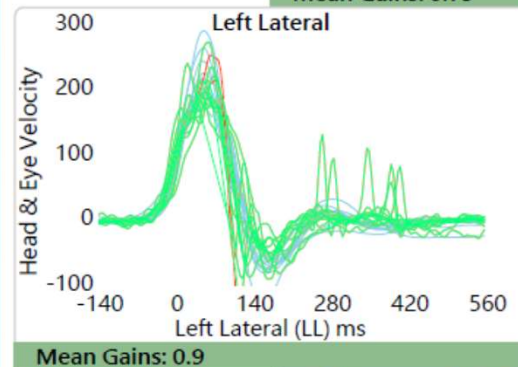
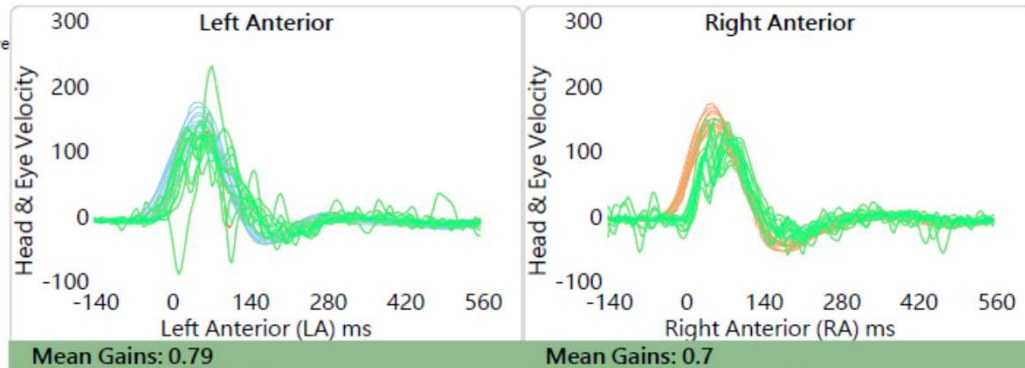
**Asymmetry**

● Relative ● Normalized Relative

Anterior: 11%

Lateral: 8%

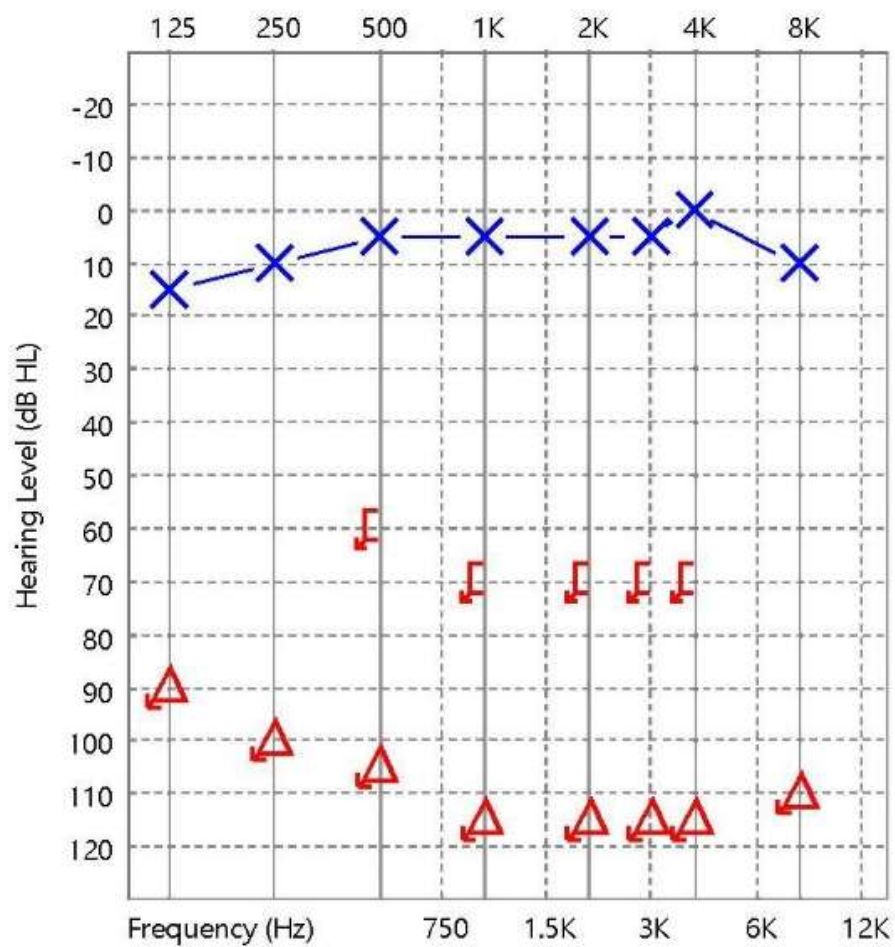
Posterior: 14%



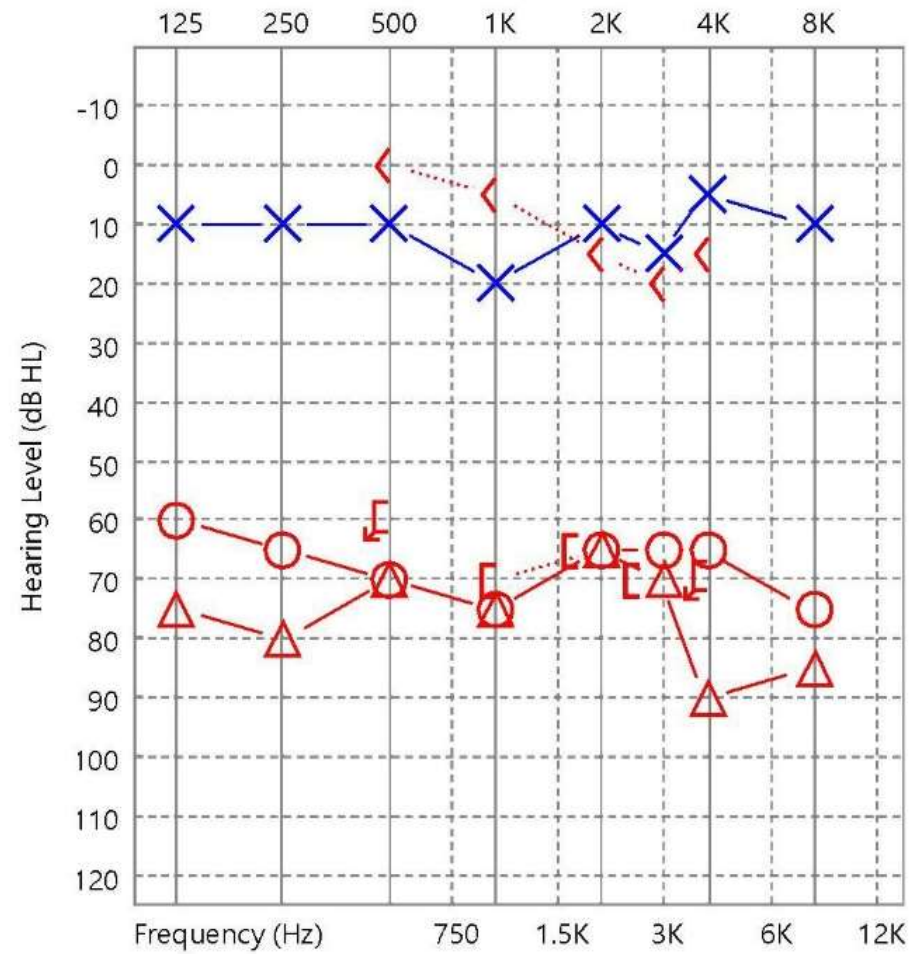
# Acute labyrinthitis

- ▶ 30 y/o male
- ▶ Complained of sudden onset of right hearing loss with severe vertigo
- ▶ Spontaneous nystagmus to left
- ▶ Stenger's positioning test
  - ▶ Strong clockwise nystagmus
- ▶ Dix-Hallpike test and supine roll test
  - ▶ Not performed due to unbearable vertigo
- ▶ Hospitalized for sudden hearing loss management
  - ▶ VEMPs: right ear abnormal
  - ▶ oVEMP IAD ratio: 0.87
  - ▶ cVEMP IAD ratio: 0.47





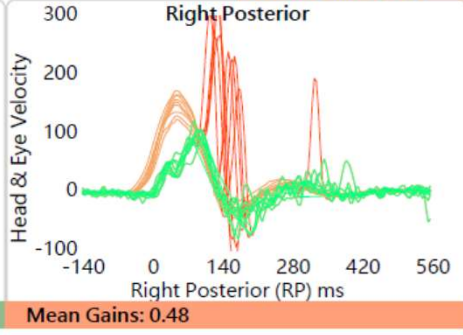
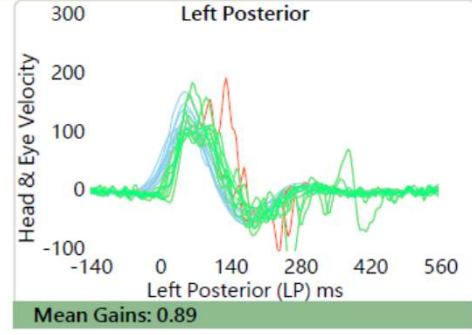
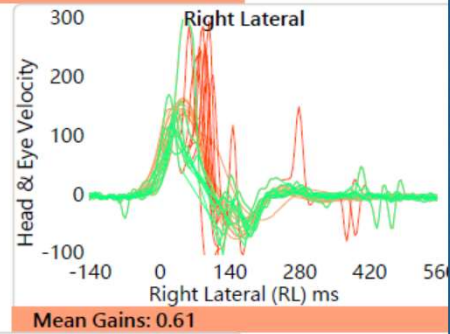
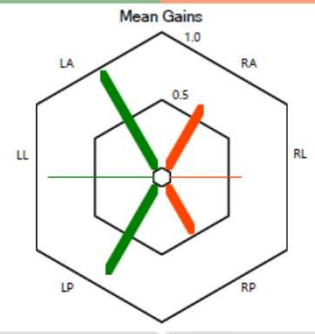
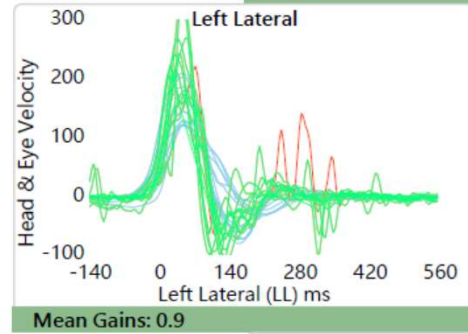
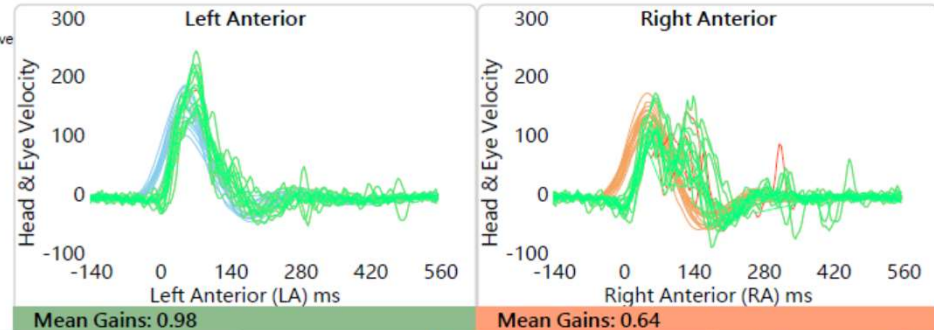
2020/11/02



2020/11/18 (After IT steroid)

Lateral Impulse Test: 2020/11/20 下午 05:19:31  
 LARP Impulse Test: 2020/11/20 下午 05:23:53  
 RALP Impulse Test: 2020/11/20 下午 05:26:42

**Asymmetry**  
 ● Relative ● Normalized Relative  
 Anterior: 35%  
 Lateral: 32%  
 Posterior: 46%





# Vestibular Migraine

- ▶ 58 y/o female
- ▶ Dizziness noted for 1 week
  - ▶ Spinning sensation esp. when head moves
- ▶ Headache occasionally
  - ▶ Migraine-like
  - ▶ Relationship to dizziness: unclear
- ▶ Posturography, VEMPs, ECoChG, PTA and ABR are all normal

Lateral Impulse Test: 2021/2/17 下午 02:04:00

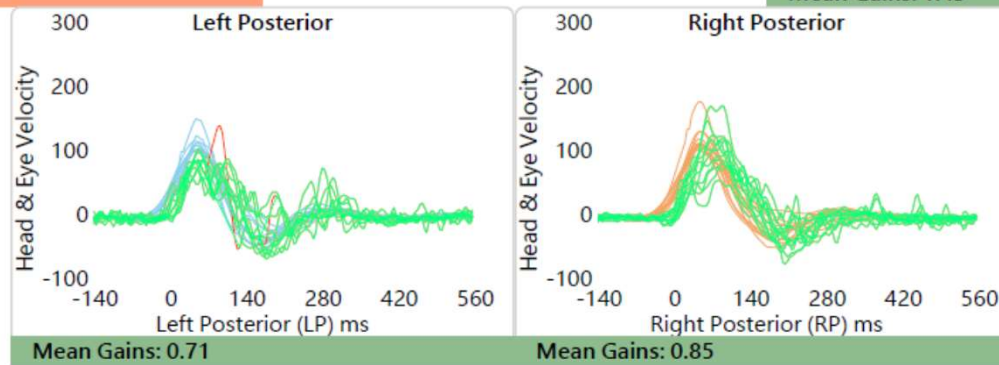
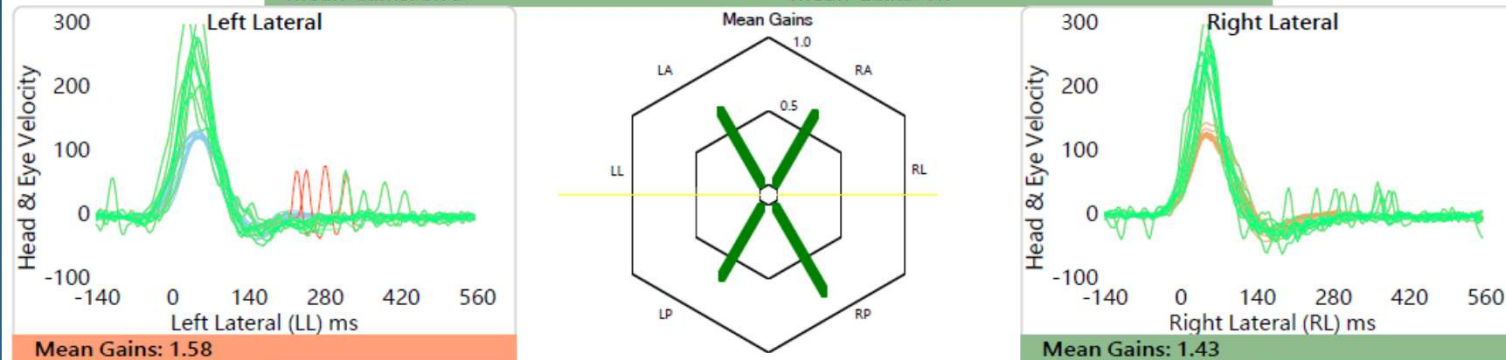
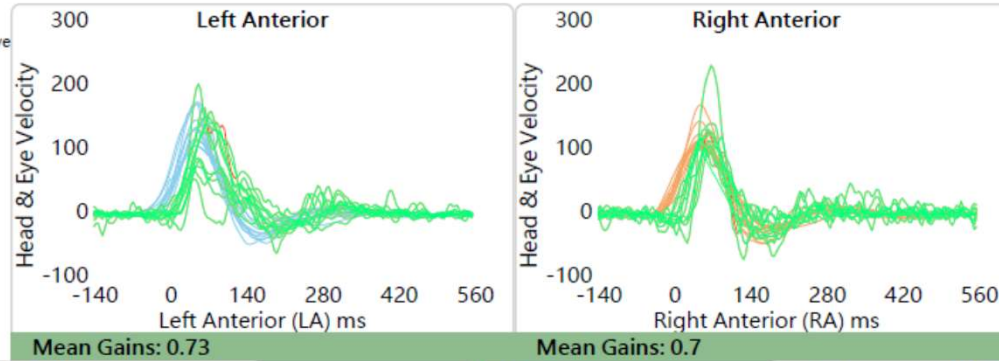
LARP Impulse Test: 2021/2/17 下午 02:10:09

RALP Impulse Test: 2021/2/17 下午 02:13:53

### Asymmetry

● Relative ● Normalized Relative

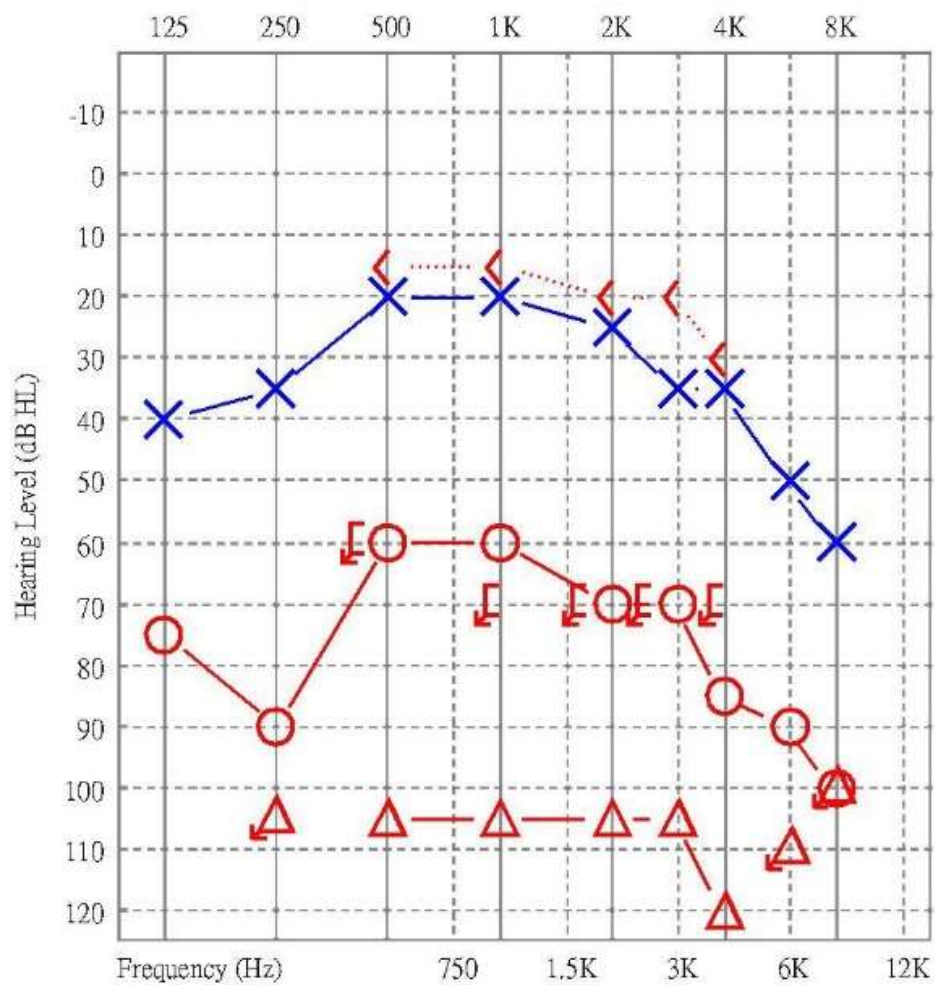
Anterior: 4%  
Lateral: 9%  
Posterior: 16%



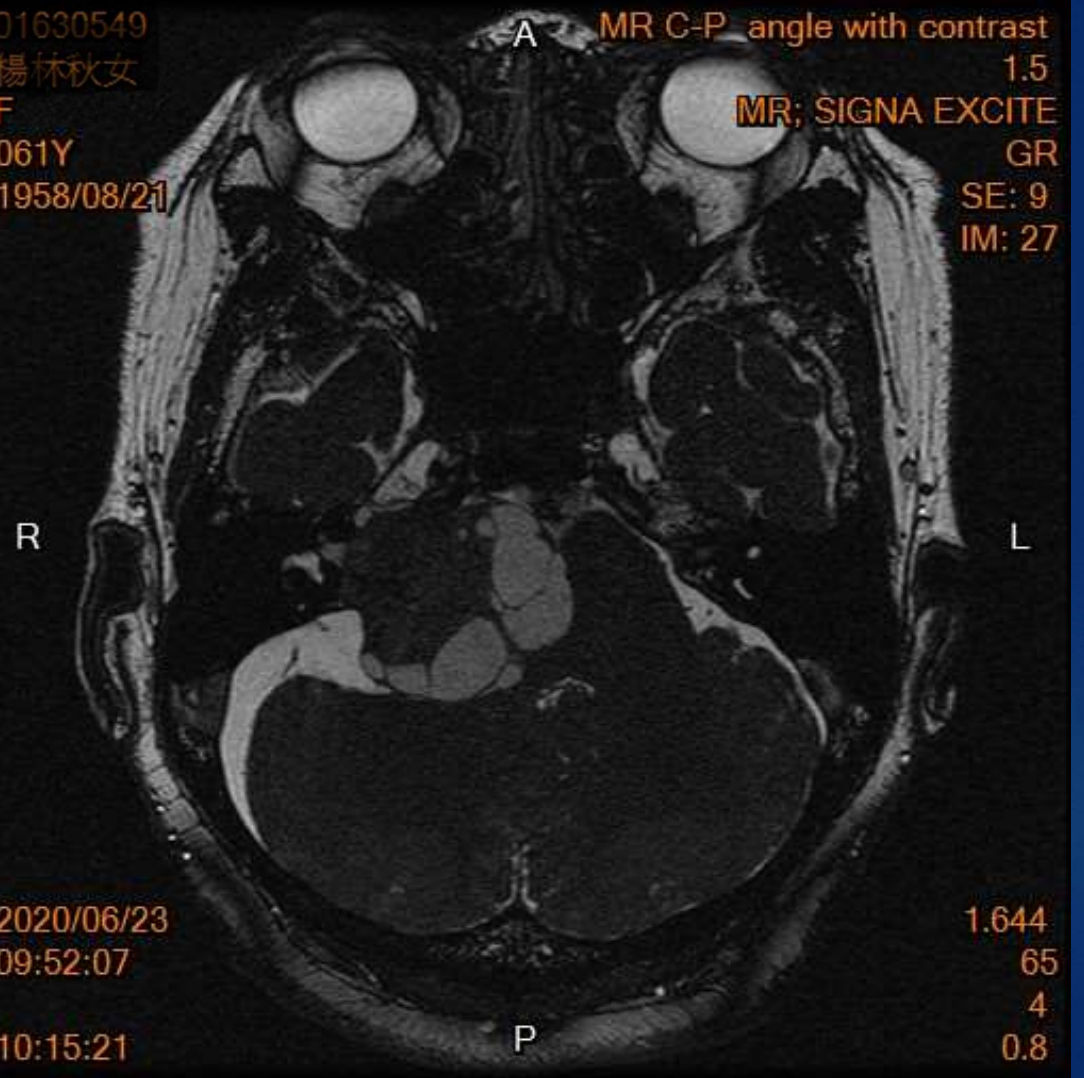


# Vestibular Schwannoma

- ▶ 61 y/o female
- ▶ Right hearing loss for 2 months
- ▶ Right facial paresthesia noted for several years
- ▶ Chronic dizziness without spinning sensation



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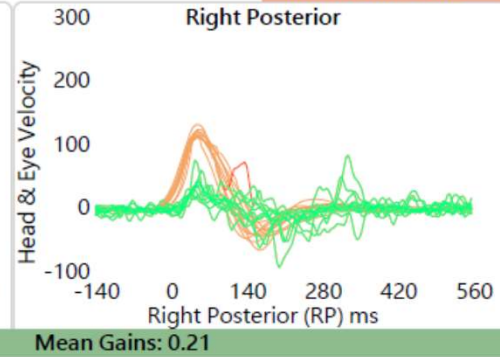
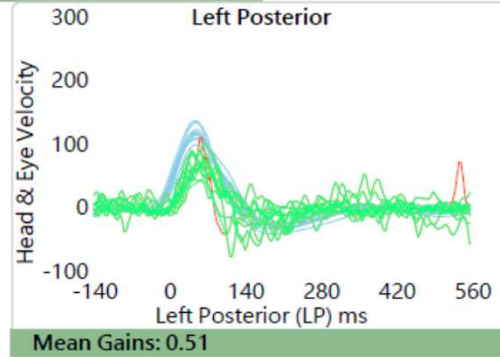
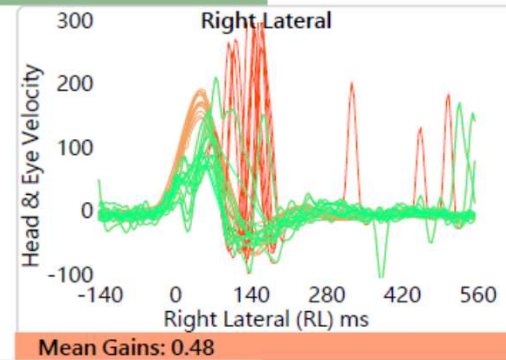
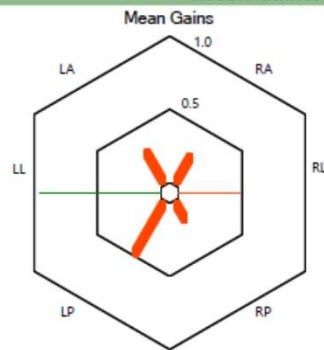
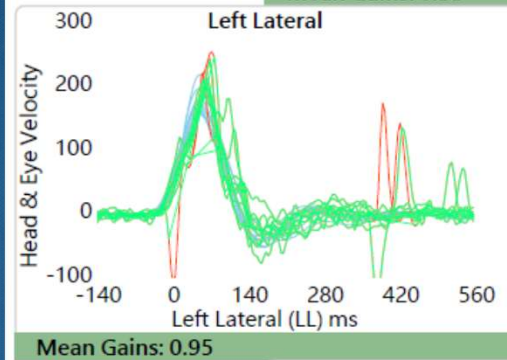
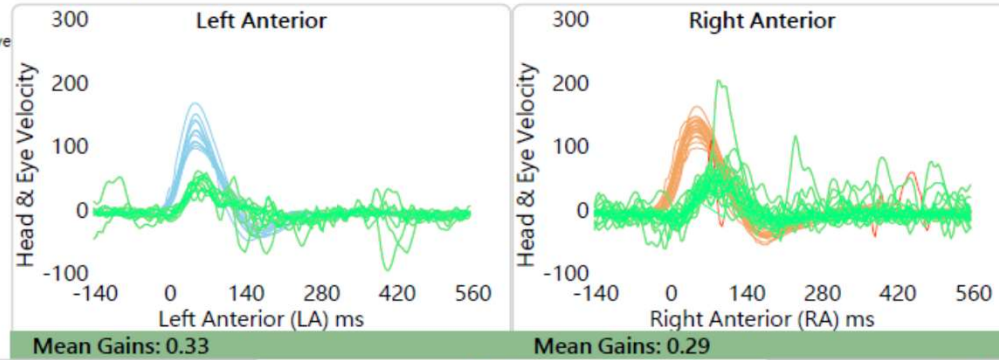


Lateral Impulse Test: 2020/6/17 下午 01:46:47  
 LARP Impulse Test: 2020/6/17 下午 01:48:50  
 RALP Impulse Test: 2020/6/17 下午 01:50:27

**Asymmetry**

● Relative ● Normalized Relative

Anterior: 12%  
 Lateral: 49%  
 Posterior: 59%



# Summary

- ▶ vHIT may be used as a tool to evaluate semicircular canal/vestibular nerve function
  - ▶ For vertiginous disease differential diagnosis
- ▶ May substitute caloric test in most circumstance
- ▶ Presume efferent part of VOR is intact
- ▶ More applications await for investigation