# 基層診所
# 眩暈診療教戦手冊

安田耳鼻喉科診所 吳宜璋

# Etiology of dizziness

Brandt T (n=4790 patients in 1989-2003)

| | |
|---|---|
| Benign paroxysmal positional vertigo | 18.3% |
| Psychophysiologic dizziness | 15.9% |
| Central vestibular vertigo | 13.5% |
| Vestibular migraine | 9.6% |
| Vestibular neuritis | 7.9% |
| Meniere's disease | 7.8% |
| Bilateral vestibulopathy | 3.6% |
| Vestibular paroxysmia | 2.9% |
| Perilymphatic fistula | 0.4% |
| Various other disorders | 12.3% |
| Unknown etiology | 4.2% |

(18.3+15.9+9.6+7.9+7.8) % ≈ 50 %

中華民國八十九年十二月三十日 星期六

# 耳石免開刀 復位術療效佳

## 老人罹患率高且女多於男 新樓醫院提供良方 患者可不藥而癒

【記者林偉民／台南報導】大雨過後，山區的土石流令人憧目驚心，而耳朵內的「耳石流」氾濫，一樣會令人天旋地轉。台南市新樓基督教醫院耳鼻喉科醫師吳宜璋昨天表示，這種「良性陣發性姿勢性眩暈」，確實讓人苦不堪言，目前積極的耳石復位術，可以有效治療。

吳宜璋表示，「良性陣發性姿勢性眩暈」的患者，在轉頭或抬頭，特別在躺下或起床時，會有突發性的眩暈發作，有時患者在床上翻身後，也會有天旋地轉的情形，每次發生的時間大多不會超過四十秒，眩暈發作時，常有噁心、嘔吐和冒冷汗等自律神經症狀，而發作後，有時會有持續性的浮動感，但不會有聽力神經受損的徵象，如耳鳴、重聽等情形，其中以老人最容易罹患，且女多於男。

他指出，此症狀致病的機轉，被認為是頭部位置改變時，由於耳內的前庭半管中「耳石」作怪引發的症狀，在內耳前庭器官中，有一種成份含有碳酸鈣的「耳石」，正常時，耳石在內耳平衡囊中會代謝，但在不明原因下，造成半規管內耳石不當沈積，會影響半規管中內淋巴液的流動，形成「耳石流」，引發不正常的神經傳導，出現眩暈、噁心、不平衡等現象。

吳宜璋表示，此症狀會自然發生，也會在六至十二個月內自然痊癒，但有百分之廿至卅的病人，若不治療會持續存在，且若頻頻發作，病人也會有跌倒的危險，而「耳石復位術」可以有效治療此症狀，患者在一至二次復位術後，即可不藥而癒，也不用開刀，若再教導病人做刑疑復健，幾乎百分之九十以上患者可以得到很好的控制。

新樓醫院耳鼻喉科醫師吳宜璋介紹「耳石復位療法」過程。記者林偉民／攝影



## 以耳石復位術治療良性陣發性姿勢性眩暈結果之長期追蹤

## Long Term Treatment Outcomes for BPPV with Canalith Reponsitioning Procedure

陳中仁(Chung-Jen Chen) ； 黃國衛(Guo-Wei Huang) ； 吳宜璋(Yi-Zhang Wu) ； 呂宗禧(Tsung-His Lu)

臺灣耳鼻喉頭頸外科雜誌 ； 39卷1期 (2004 / 01 / 01) ， P6 - 11

繁體中文 DOI： 10.6286/2004.39.1.6

良性陣發性姿勢性眩暈 ； 耳石復位術 ； benign paroxysmal positional vertigo(BPPV) ； canalith reponsitioning procedure(CRP) ； side-lying test

### Abstract 〈TOP〉

背景: 良性陣發性姿勢性眩暈（Benign paroxysmal positional vertigo, 以下簡稱BPPV）是耳鼻喉科最常見的內耳疾病之一，其治療方式包括藥物或物理治療，但療效均不佳。而本篇研究的目的，乃將本科疑似良性陣發性姿勢性眩暈之病人，除了用Dix-Hallpike test來診斷外，並加入side-lying test, 來作為BPPV診斷之可能性，以耳石復位術來治療（Canalith repositioning procedure以下簡稱CRP），並且追蹤短期及長期治療效果。

方法: 本資料乃收集2000年5月至2001年3月，於本院求診之眩暈患者中，自訴有姿勢性眩暈病史，並疑似BPPV的病人，總共88名，分別接受問卷調查，Dix-Hallpike test, side-lying test及rolling test後，確定診斷為良性陣發性眩暈症患者，以耳石復位術治療，且利用眩暈症狀指數（patient symptom score），評估患者治療效果。

結果: 依Dix-Hallpike test 確定並診斷為BPPV患者共29名（32%），其結果與side-lying test 之診斷結果完全相同，29名之中，男生10名，女生19名，性別比率約為1比2，年齡層以中老年人居多，接受CRP治療後，1週控制率為73%，1個月的控制率為86%，18個月後有24%復發。

結論: 對於BPPV的診斷，side-lying test是種較容易施行的診斷法，耳石復位術是一種簡單，安全而有效的治療方式，但耳石復位術後，仍有復發的可能性。

# My experience : How to work up vertigo

Diagnostic Strategy

1. History
2. Tests

Bayesian process

Case Discussion

太極者，無極而生，陰陽之母也，動之則分，靜之則合

# Diagnostic strategy 1

## History History History !!

1. Course ( duration , frequency , vomiting , nausea , walk , postion related )
2. Pattern ( vertigo , dizziness , disequilibrium , syncope , lightheadedness , head heaviness, osillopsia, extremity weakness , speech )
3. Provocation factor (head injury , menstrual cycle , barotrauma , weather ,mood , stress food ,nasal allergy , …..)
4. Other ; hosipitalizaion, inner ear or mid ear surgery histroy,…)

虛領頂勁，氣沉丹田。不偏不倚，忽隱忽現。

Diagnostic strategy 2

# Tests --> Prove

1. Gait , Posture
2. Eye movement nystagmus , prusuit , saccade , other abnormal eye movemets ( gazed evoked nys · skew deviation)...
3. HIT ( head impulse test )
4. SVV ( subjective visual vertical )
5. NE (neurological examination) : FNF (finger-nose-finger test) visual field, etc.

Diagnostic strategy 1 , 2

# Bayesian process

在問診，檢查的過程中，收集到更多病史和疾病證據時，隨時更新自己對特定診斷的預測。

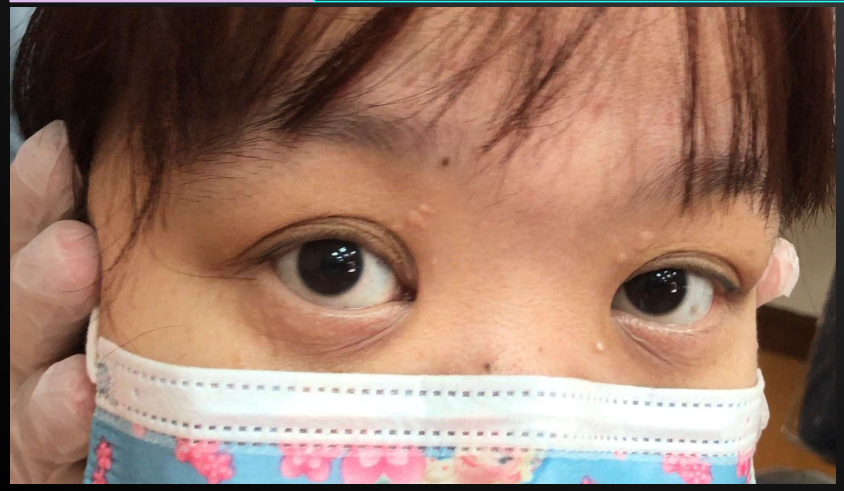
懂勁後，愈練愈精，默識揣摩，漸至從心所欲

# Bayesian process

| Gait | History ! History ! History ! |
|---|---|

| | | | |
|---|---|---|---|
| Walk asisted | 2 days ago. 1st suddenly attack ,vomiting cant stand ,2nd day vomtig +,3rd vomiting+- | Aura: Tinnitus + right,, vomiting +-,, | Swing walk and seens asisted , |

| | | | |
|---|---|---|---|
| Acute vertigo ?<br>Central ? | Vestibular neuritis ?<br>Vestibular migrane ?<br>Meniere's disease ? | Meniere's diease ?<br>Vestibular migrane?<br>Vestibar neuritis ? | Vestibular neruitis ? |



Head impulse test + ,right
spontaneous nystagmus ,left

## Dx : Vestibular neuritis ,right

懂勁後，愈練愈精，默識揣摩，
漸至從心所欲

*Test 1*

# Gait , Posture ,Head position

stand alone ? walk unassisted ? walk unusual slowly?
head tilted ?

進

*Test 2*

譬如動目，能搖湛水。又如定眼，由迴轉火。雲駛月運，
舟行岸移，亦復如是。

--- 圓覺經

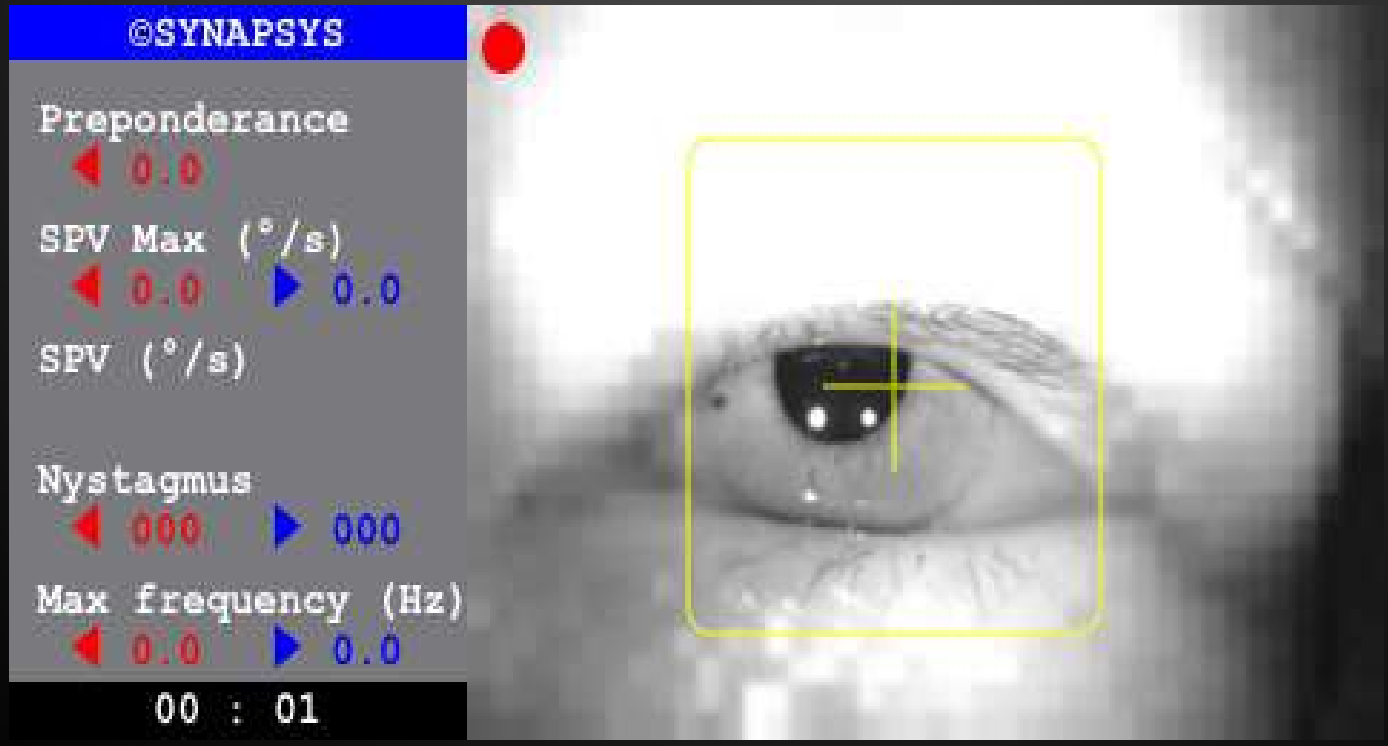
# Eye Movement

nystagmus , prusuit , saccade , other abnormal eye movemets

退

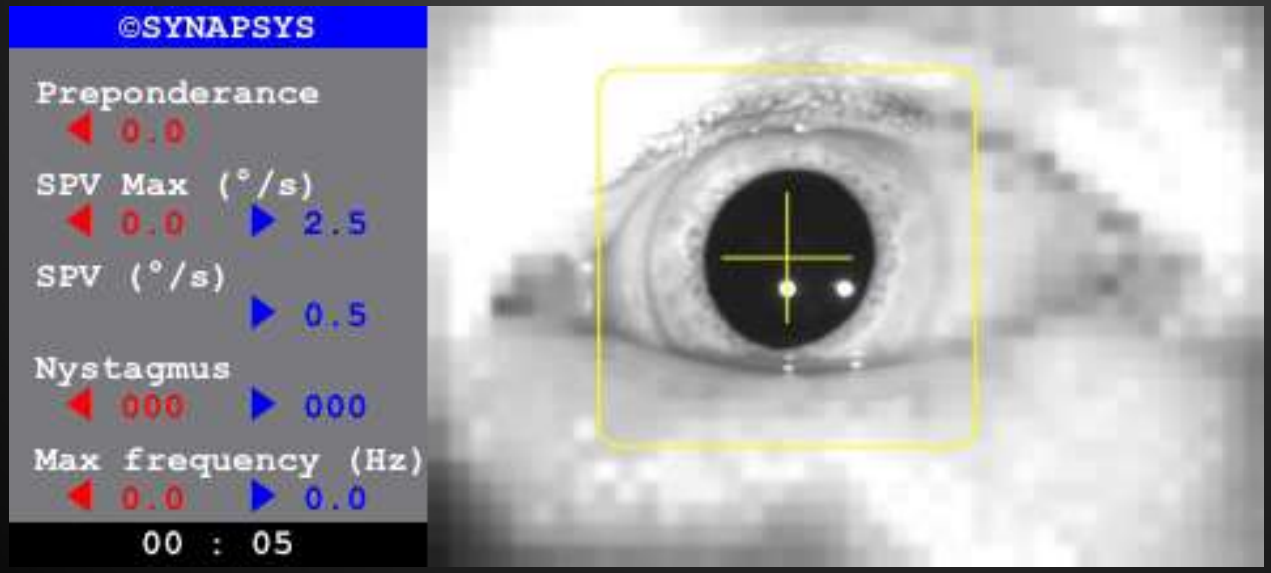
# *Test 2 : nystagmus*

## PC BPPV



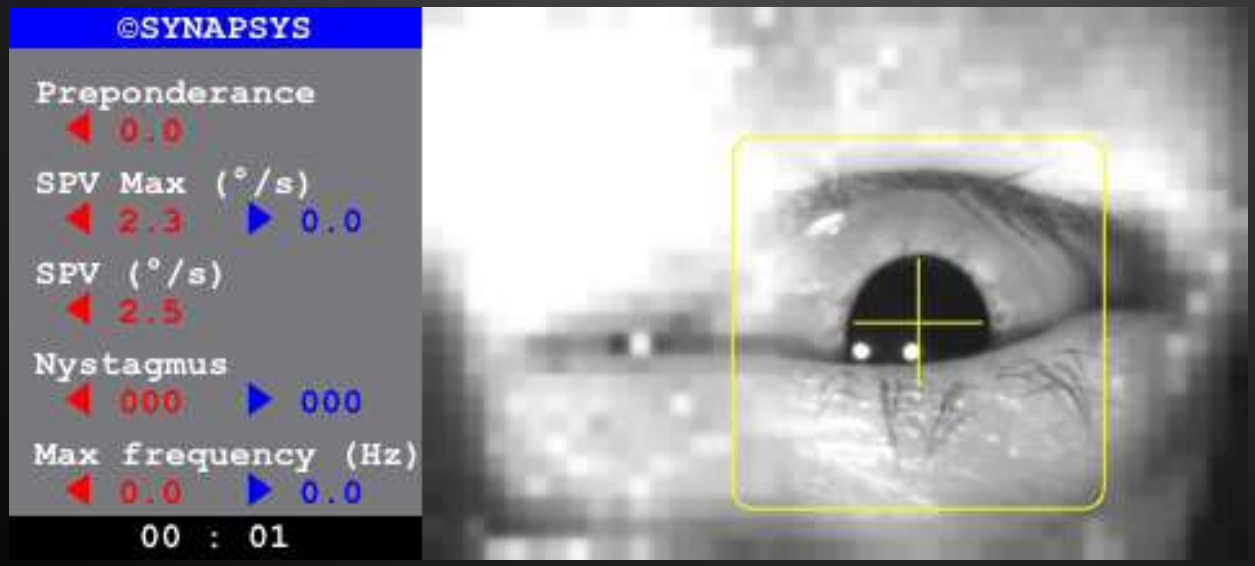
# *Test 2 : nystagmus*

## HC BPPV



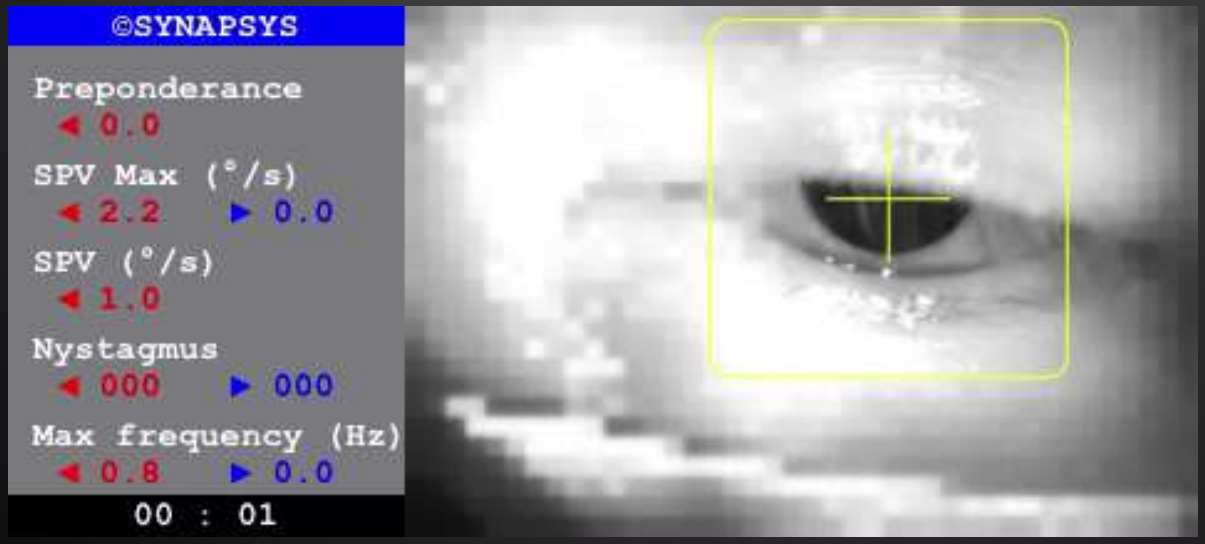
# *Test 2 : nystagmus*

Meniere’ s disease, L



# *Test 2 : nystagmus*

## Vestibular neuritis, right



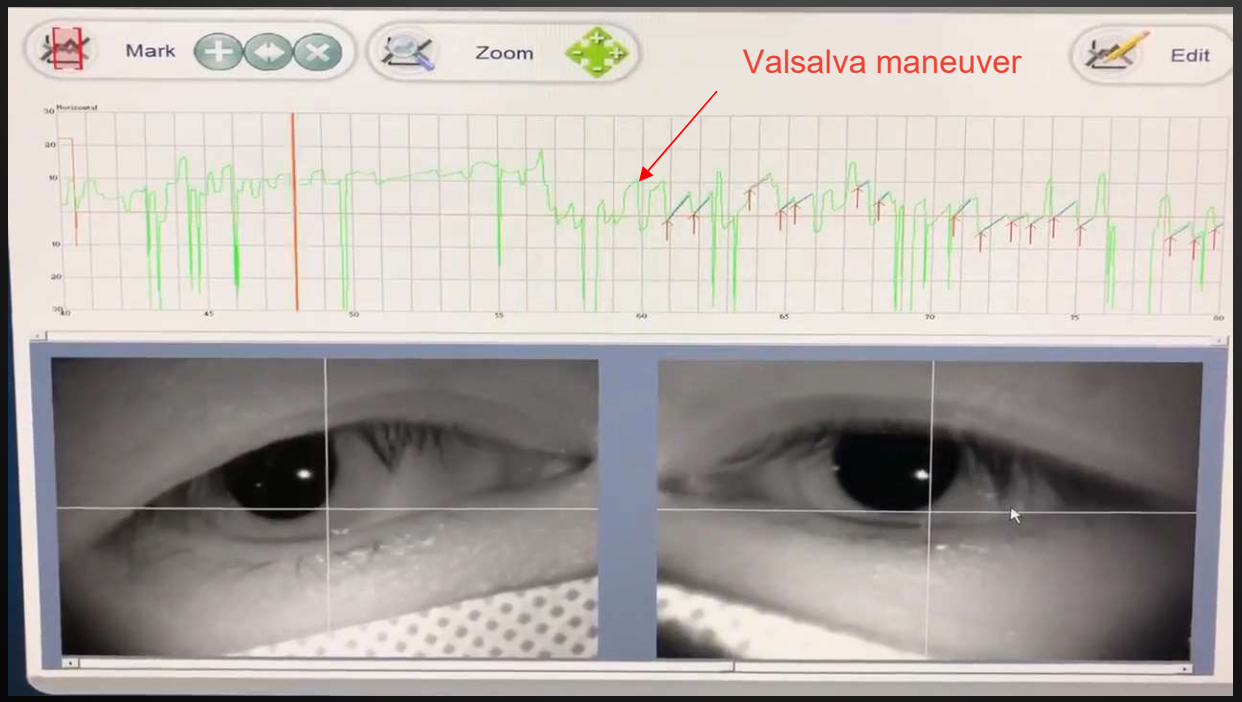

退

## *Test 2 : nystagmus*

# Vestibular neuritis

# *Test 2 : nystagmus*

## Perilymph fistula, left



# Test 2 : nystagmus

## Central

**Table. Clinical and Neuro-Otologic Findings in the Patients**

| Pt | Age/Sex | Lesion | SN | HSN | GEN | HIT | Caloric Paresis (%) | Progression (d)* |
|---|---|---|---|---|---|---|---|---|
| VN type | | | | | | | | |
| 1 | M/67 | R | L, U, CCW | L | + | B† | R (81) | Ataxia, dysarthria (1) |
| 2 | M/33 | R | L, U, CCW | – | + | B† | R (57) | – |
| 3 | M/73 | R | L | L | + | – | R (41) | Horner syndrome, ataxia, hiccup (3) |
| 4 | M/70 | L | R, CW | L | + | L | – | Ataxia, Horner syndrome, sensory change, dysphagia (0) |
| 5 | M/60 | R | L, CCW | – | + | R | R (41) | Ataxia, Horner syndrome, sensory change, facial palsy (1) |
| NPH type | | | | | | | | |
| 6 | M/71 | R | R | – | + | L | – | – |
| 7 | F/59 | L | L, U, CW | – | + | R | – | – |
| 8 | F/63 | L | L | – | + | R | – | Ataxia, sensory change, dysphagia (1) |
| ICP type | | | | | | | | |
| 9 | M/64 | L | L | L, D | – | – | ND | Ataxia, limb weakness (6) |
| Mixed | | | | | | | | |

Stroke Nov 2015 Dorsal medullary infarction Lee et al

# *Test 2 : nystagmus*

## Central

## Lateral medullary syndrome


Nystagmus : Left-beating nystagmus

*Test 2 : nystagmus*

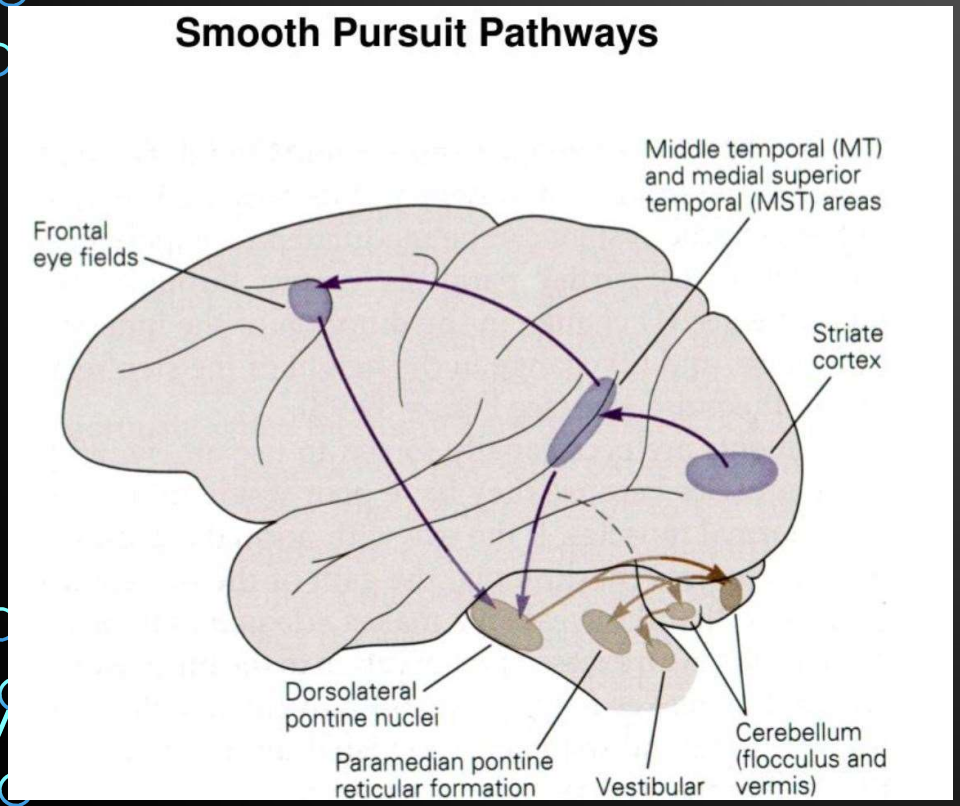
Central

Brain tumor

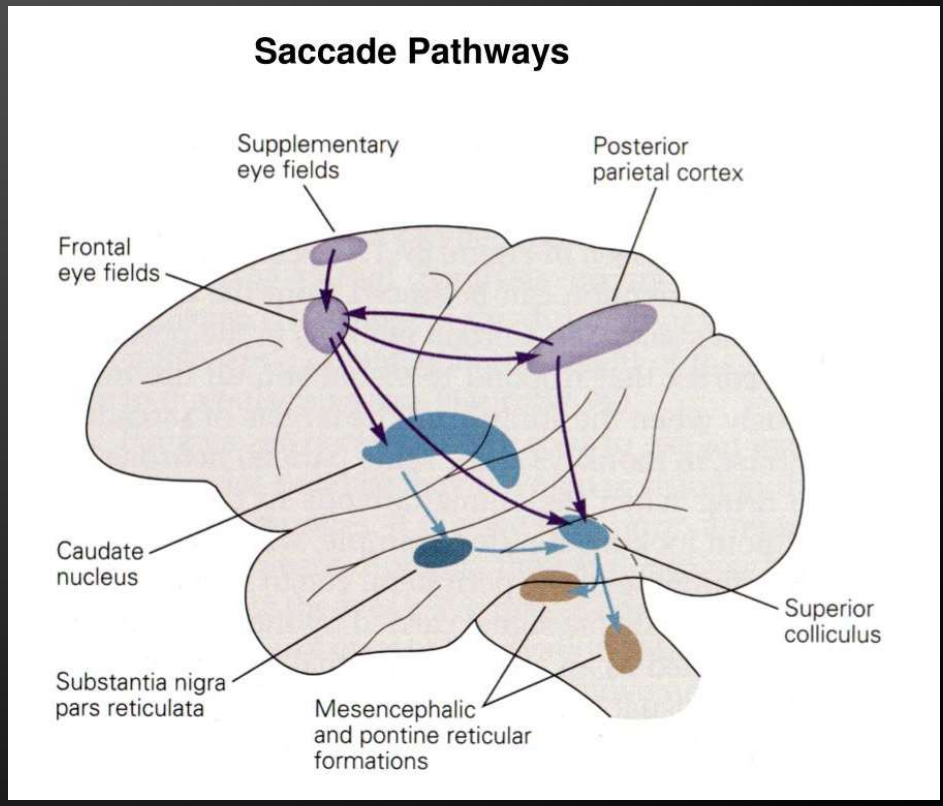
Central positional nystagmus

# *Test 2: pursuit and saccade*

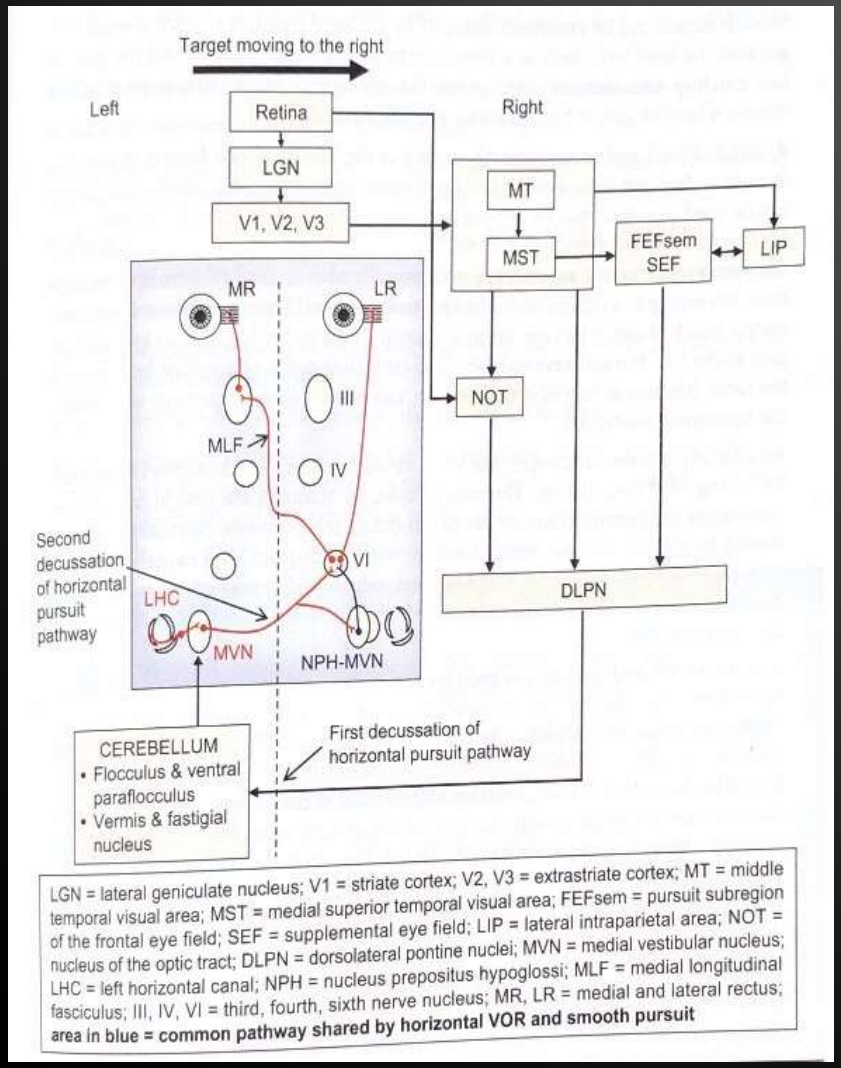
## Pursuit




## Saccade

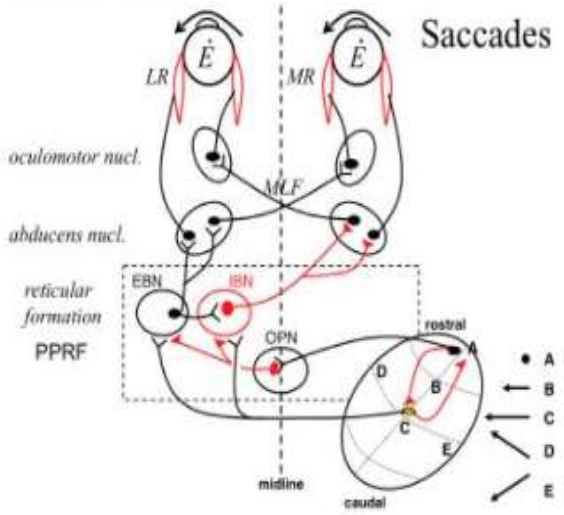


# Pursuit




# Saccade

- Example Saccades




- Saccadic circuit Velocity from burst neurons in paramedian pontine reticular formation (PPRF) for horizontal saccades and rostral interstitial nucleus (rIN) for vertical saccades

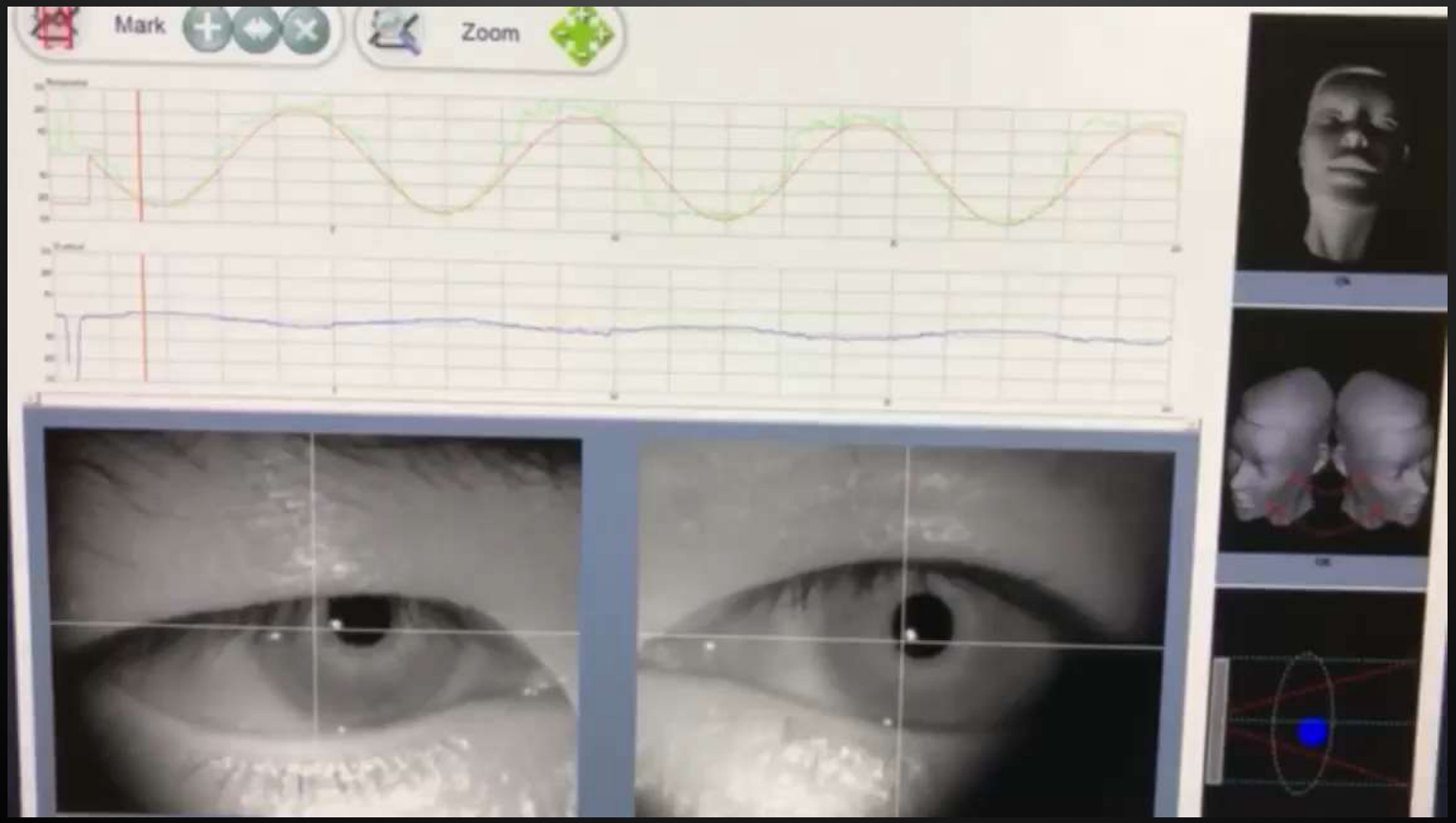
# *Test 2: pursuit*

Saccadic pursuit

# *Test 2: pursuit*

Saccadic pursuit

Medulla infarction



# *Test 2: others*

## Saccadic dymetria

⬅ undershoot saccade (hypometria)

➡ overshoot saccade (hypermetria)

Medulla infarction

*Test 2: others*

## the Test of Skew

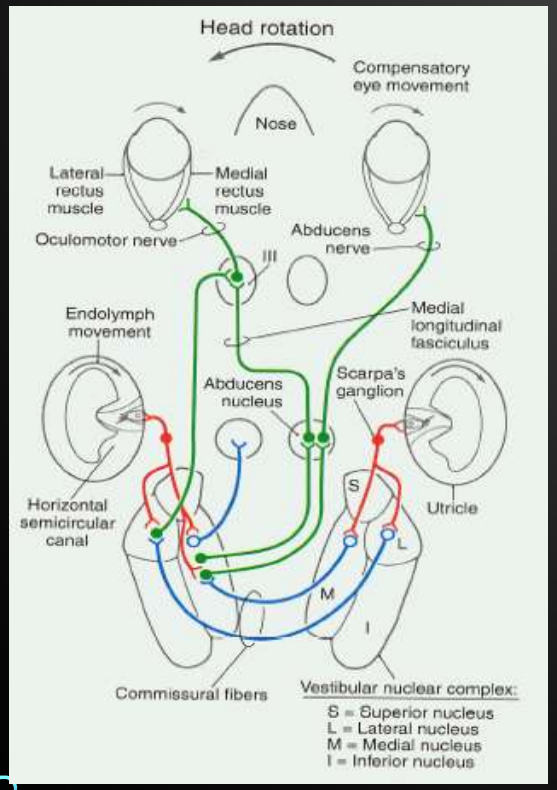
Alternate cover test

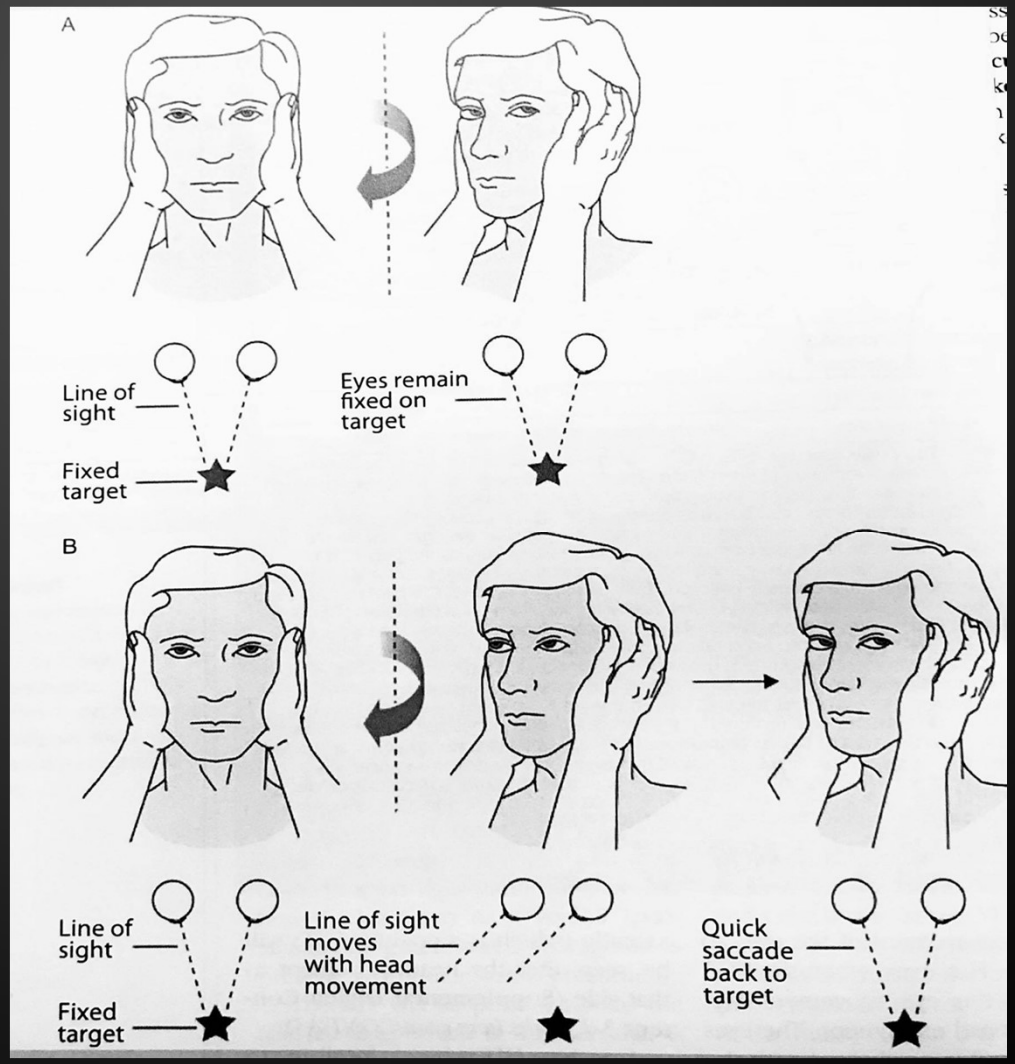
skew deviation.右眼高，遮左眼時右眼往下refixation. 左眼低，遮右眼時左眼往上refixation

Medulla infarction

# *Test 3: HIT*

## Head impusle test




顧

*Test 3: HIT*

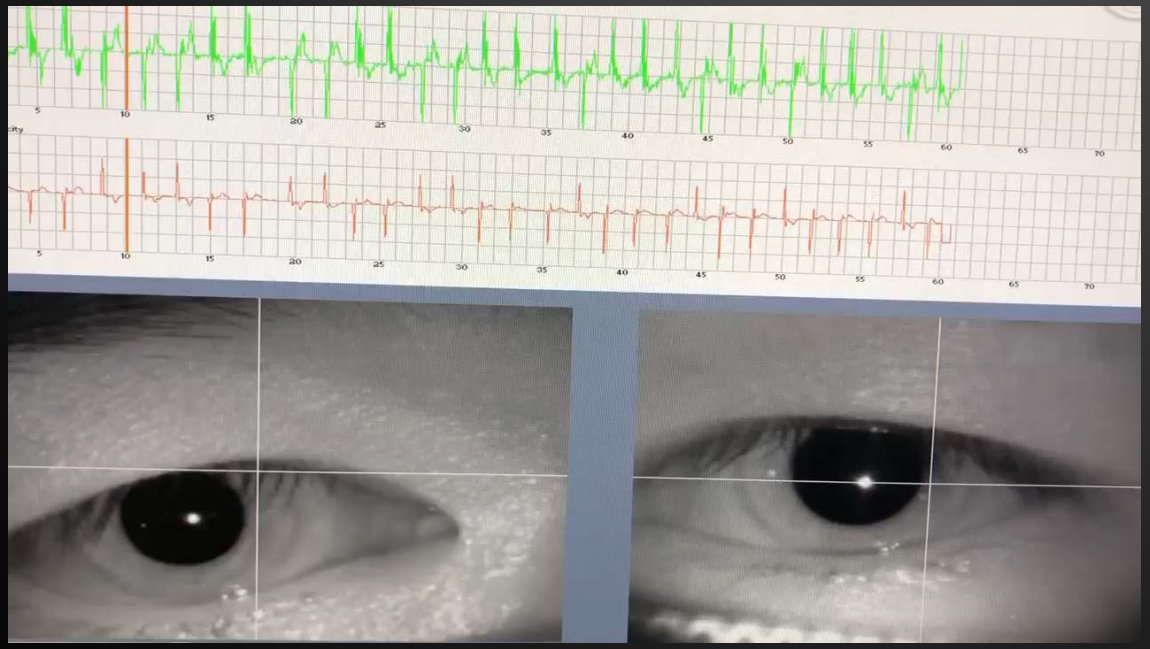
# HIT(+) 大都 unilateral ex: peripheral.....
# 但也要小心 central (Ex: AICA stroke )

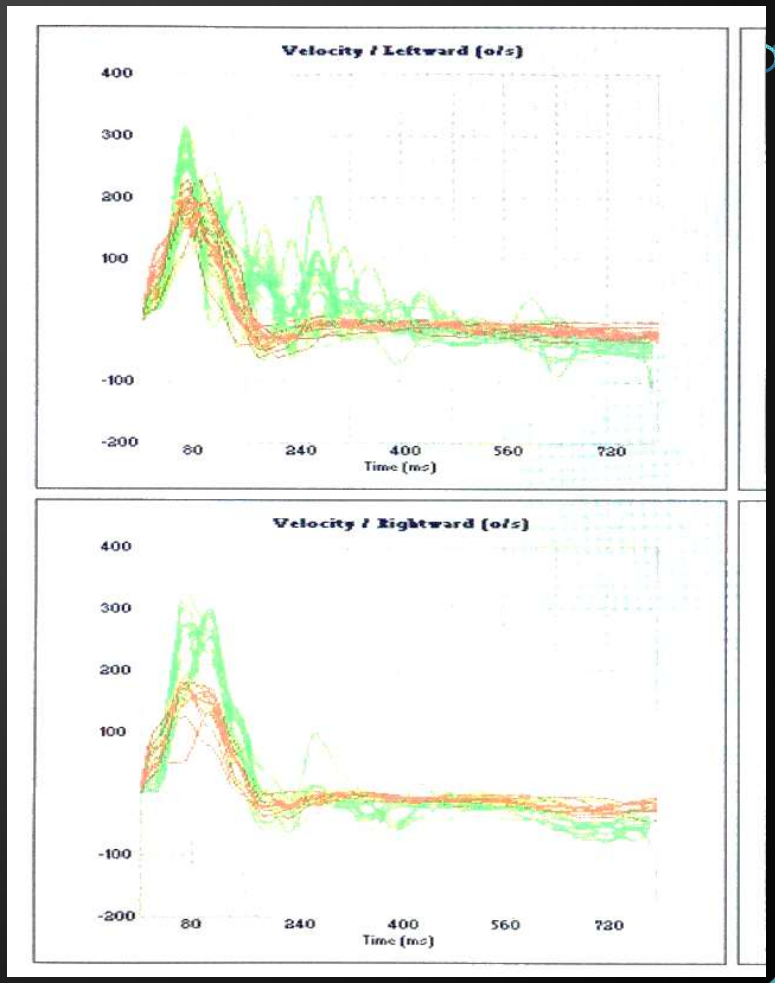
# *Test 3: HIT*

HIT(+) right Vestibular neuritis, right

# *Test 3: HIT*

HIT(+) left Perilymph fistula





*Test 3: HIT*

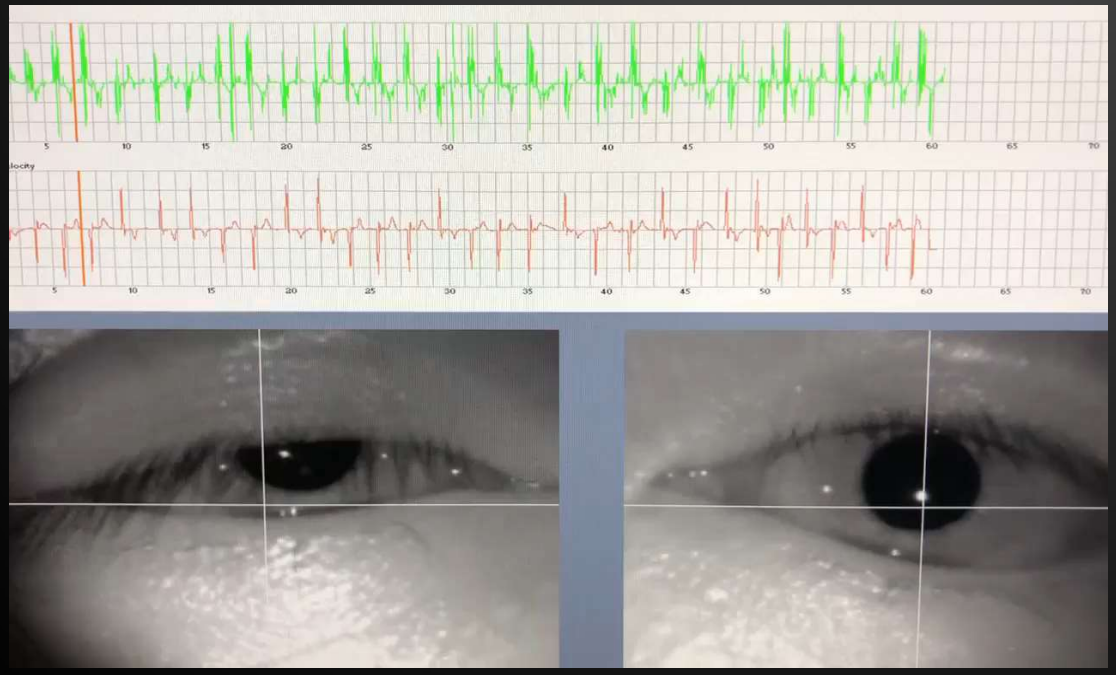
HIT(+)： Bilateral 不常見，但是也要小心。

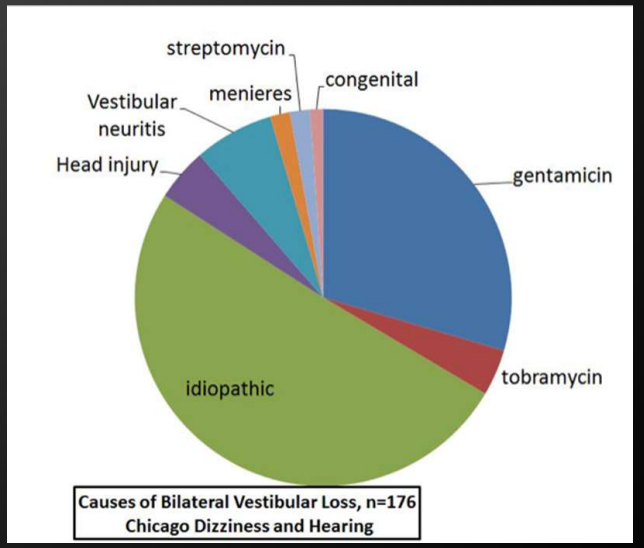
( Bilateral periperal vetibulopathy, cerebellum infartion .....)

# *Test 3: HIT*

## HIT(+) : Bilateral

## Gentamicin toxicity



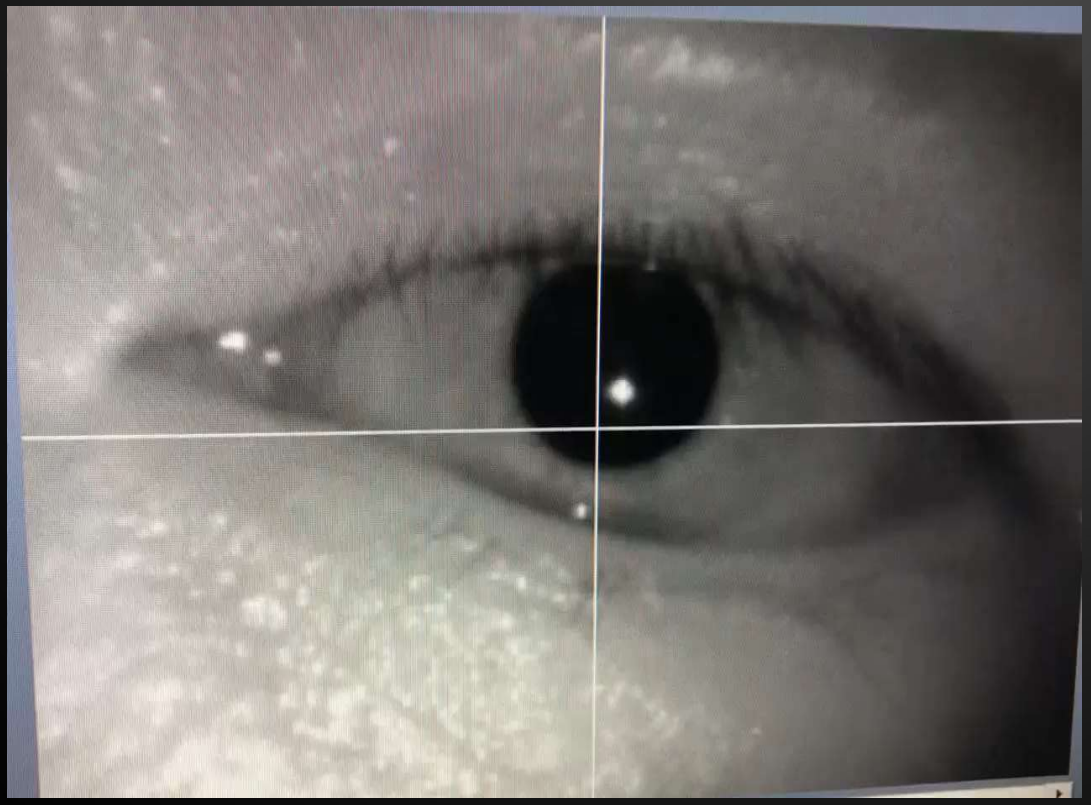


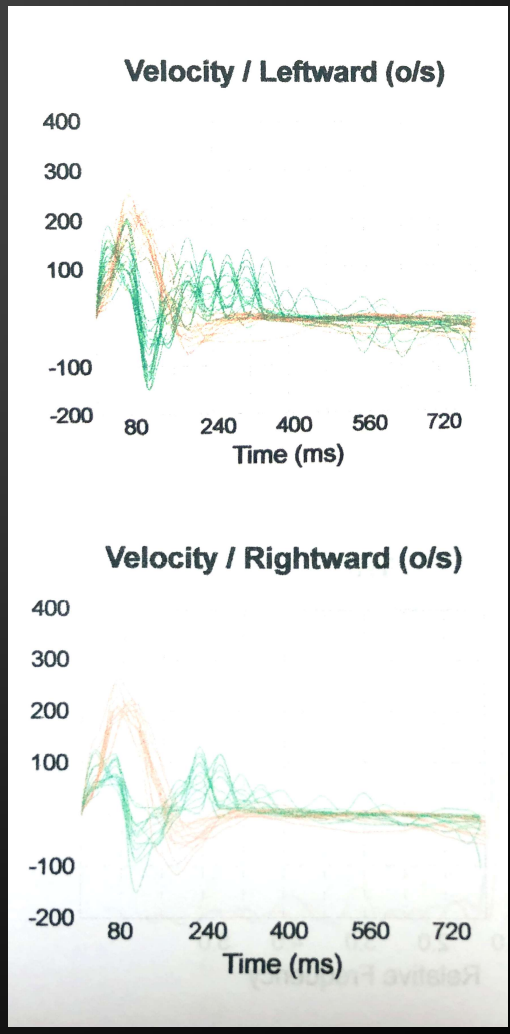

Causes of Bilateral Vestibulopathy
Timothy C.Hina MD March 10 2021

# *Test 3: HIT*

## HIT(+) : Bilateral

### Gentamicin toxicity



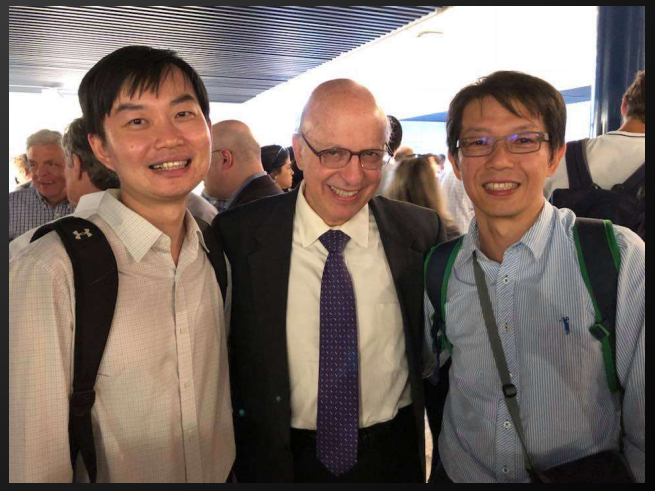


*Test 3: HIT*

HIT(-)

# HINTS

horizontal Head impulse test (-)
evaluation for Nystamus
the Test of Skew



# HINTS

## HIT(-)

1 Laterral medullary, lateral pontine, and inferior cerebellar infarctions : mimic acute peripheral vertigo

2 Typical neurological signs ( - ) : ≈ 1/2 ,

3 Large cerebellar infarctions : > 1/2 : just severe truncal ataxia , no neurological or oculomotor signs.
4 Initial MRIs : falsely negative (12% ) ( 48 hours after symptom onset )

5 Skew deviation : specific predictor of brainstem involvement ( ex. HIT (+) peudo-peripheral )

Stroke Volume 40, Issue 11, 1 November 2009 , Newman-Toler et al.

# Test 3: HIT

Postural imbalance with deviated to right

1st day

**HIT ( - )**

- Nystagmus : +, left-beating nystagmus with rotational component
- Visual fixation ( - )

2nd day

- Postural imbalace
- Right gazed –evoked nystagmus on persistent left-beating nystagmus

MRI : Infarct on the dorsolateral pons

THE Laryngoscope
FOUNDED IN 1896

Vestibular

## A tiny infarct on the dorsolateral pons mimicking vestibular neuritis†

Tzu-Pu Chang MD ✉ Yi-Chang Wu MD

First published: 24 August 2010 | https://doi.org/10.1002/lary.20935 | Citations: 15

† The authors have no funding, financial relationships, or conflicts of interest to disclose.

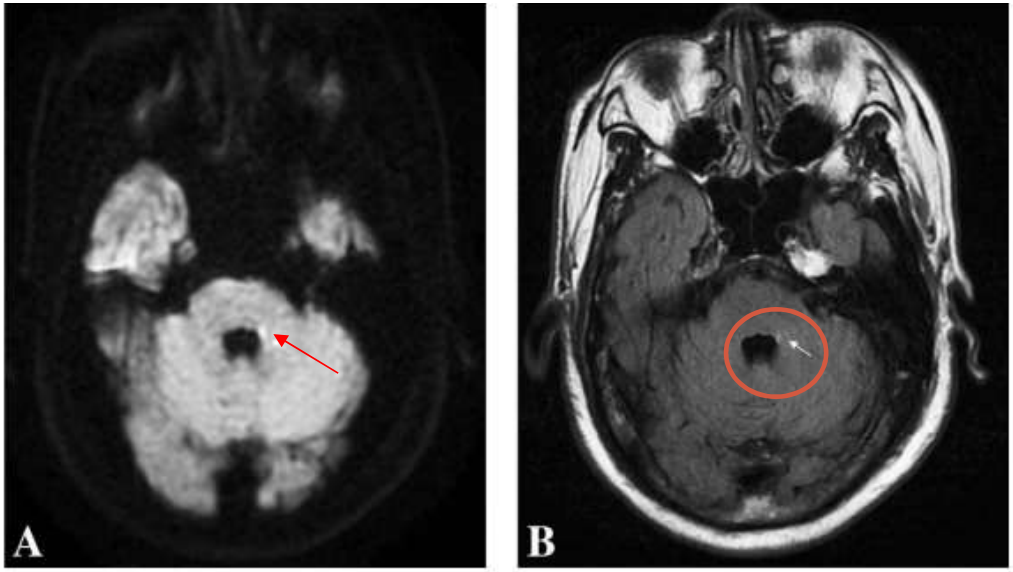



Fig. 1. Transverse section of magnetic resonance imaging scan. A small hyperintense signal (arrow) in the left dorsolateral pons on diffusion-weighted image (A) and fluid-attenuated inversion recovery image (B).

*Test 4: SVV*

# SVV（subjective visusal vertical）

Friedman, in 1970, studied subjective vertical (normal < 2°). Severe derangement of this test is confined to brainstem lesions and the immediate postoperative period of peripheral vestibular lesions. The SVV tilts toward the side of lesion.

盼

# *Test 4: SVV*

## Subjective visual vertical

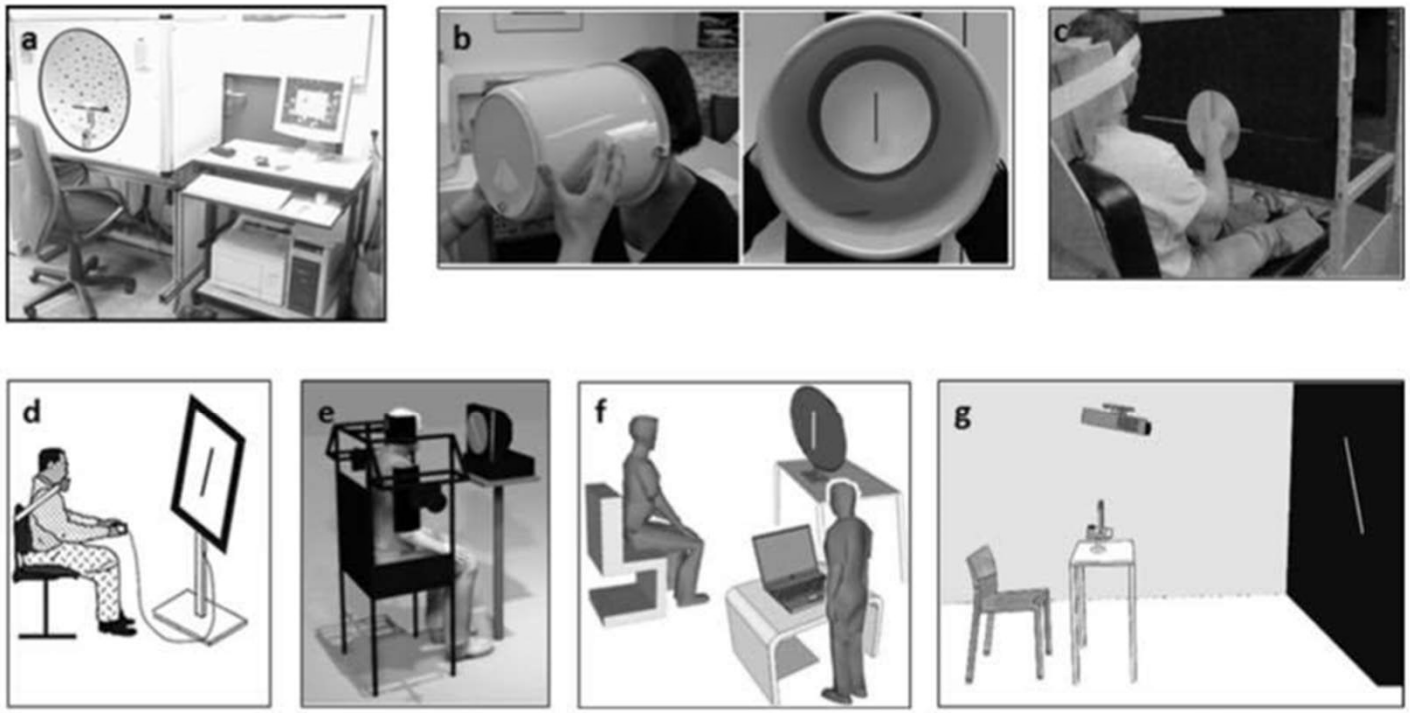
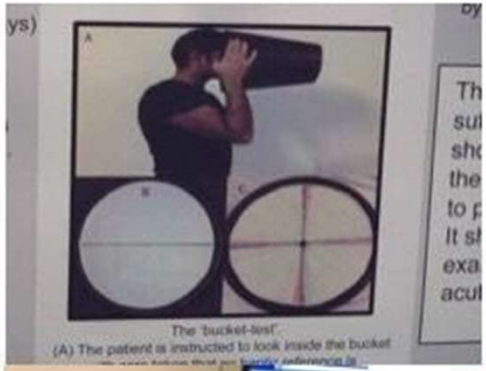


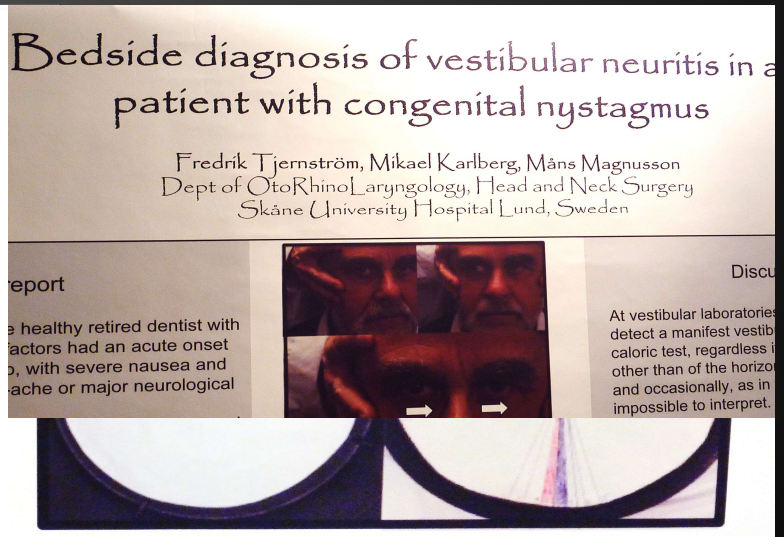

**Fig. 4.** Different types of paradigms to assess the VV after stroke. a: hemispheric dome method [62]; b: bucket test [62]; c: visuo-haptic vertical [34–36,40,54,55,59]; d: rod and frame test [72]; e–g: homemade protocols with a luminous line presented, either on a computer screen; e [8,18,19,44,58] and f [48] or g: projected on a wall by a video projector [7].

# Test 4: SVV




2010 Bárány meeting Fredrick Tjernstrom 的 Post presentation

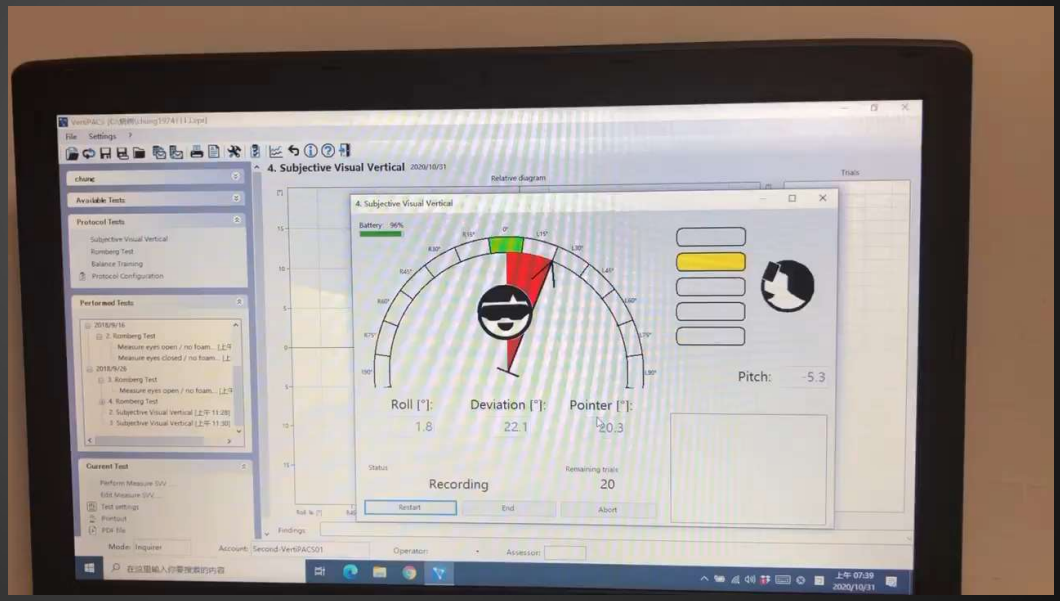
自製的SVV



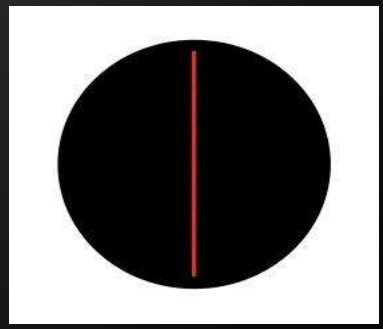

The 'bucket-test'.
(A) The patient is instructed to look inside the bucket with care taken that no haptic reference is available from the elbows.
B) On the bottom of the bucket inside is there a black line, which the patient is instructed to put either horizontal or vertical.
(C) On the bottoms outside the examiner is able to determine the subjective vertical and horizontal since a pendulum indicate the degree of misalignment.

Reykjavik, Iceland august 18-21 2010

# Test 4: SVV





Uppsala Swedon June 10-13 2018

# Test 4: SVV

RESEARCH ARTICLE Open Access

## The bucket test differentiates patients with MRI confirmed brainstem/cerebellar lesions from patients having migraine and dizziness alone

Tzu-Pu Chang[1,2†], Ariel A. Winnick[3†], Yung-Chu Hsu[4], Pi-Yu Sung[5] and Michael C. Schubert[6,7*]

Chang *et al. BMC Neurology* (2019) 19:219
https://doi.org/10.1186/s12883-019-1442-z

*Test 4: NE*

# NE (neurological examination)

FNF (finger nose finger )
Facial palsy
Muscle power
Visual field ...

定

# Case Discussion

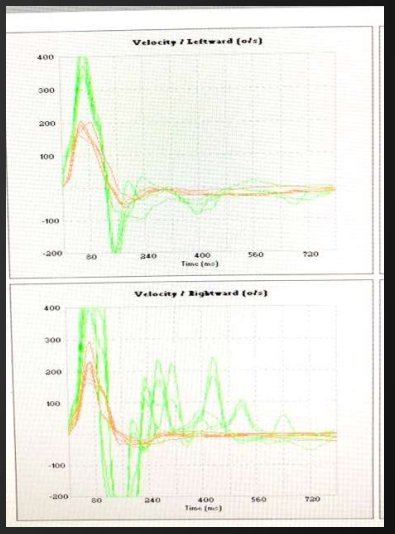
雖變化萬端，而理唯一貫。由著熟而漸悟懂勁，由懂勁而階及神明。

# Case 1

32y/o female

- Yesterday morning ,
- Violent vertigo; 1st attack
- Vomiting
- Bed rest all day
- Persistent nausea until today

# Case 1



0421 Posture , gait : ok but imbalance sensation
Nystagmus : Left-beating
SVV 6-7°,
HIT + R IMP : Vestibular neuritis, R

0422 VHIT + SVV 4-6°
0427 SVV --> NORMAL

# Case 2

- 55 y/o male with migraine history
- 3 days ago  new-onset dizziness and unsteadiness
- Vertigo (–)
- Nausea (+), vomiting (–)
- Now slight dizziness; no other neurologic sign

# Case 2

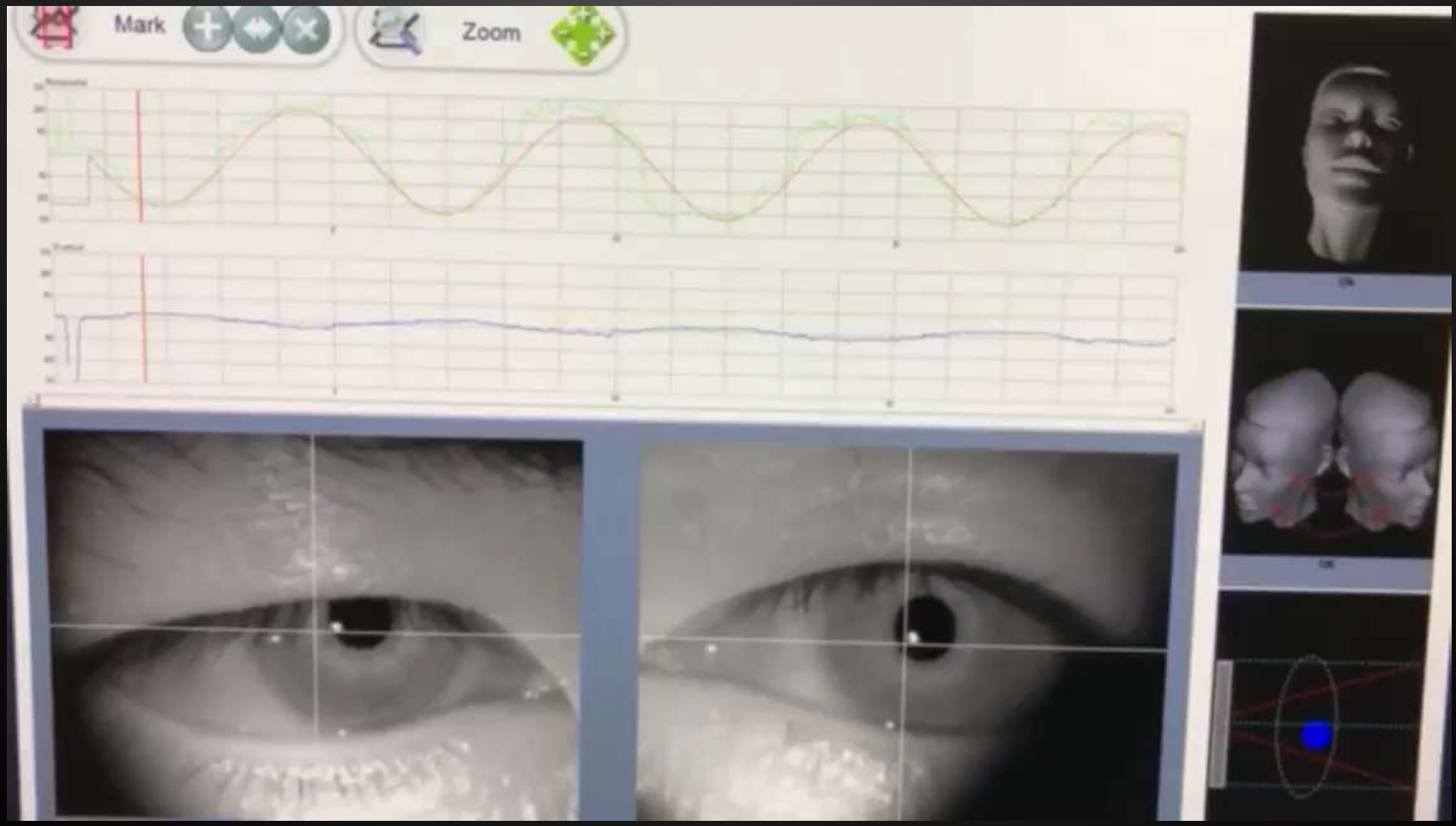
nystagmus,


prusuit,


HIT

# Case 2

## Saccadic pursuit



# Case 2

DWI ( diffusion-weighted image ):
hyperintensity ( 2 ~ 48 hour , 7 day peak ) persist for 3 week

APC(apparent diffusion coefficicent ):
hypointensity
24 hours (peak) presist for 7days ~10 days :
psudo-normal ,,and then change to hyperintensity

Dx : lateral medullary infarction

# Case 3

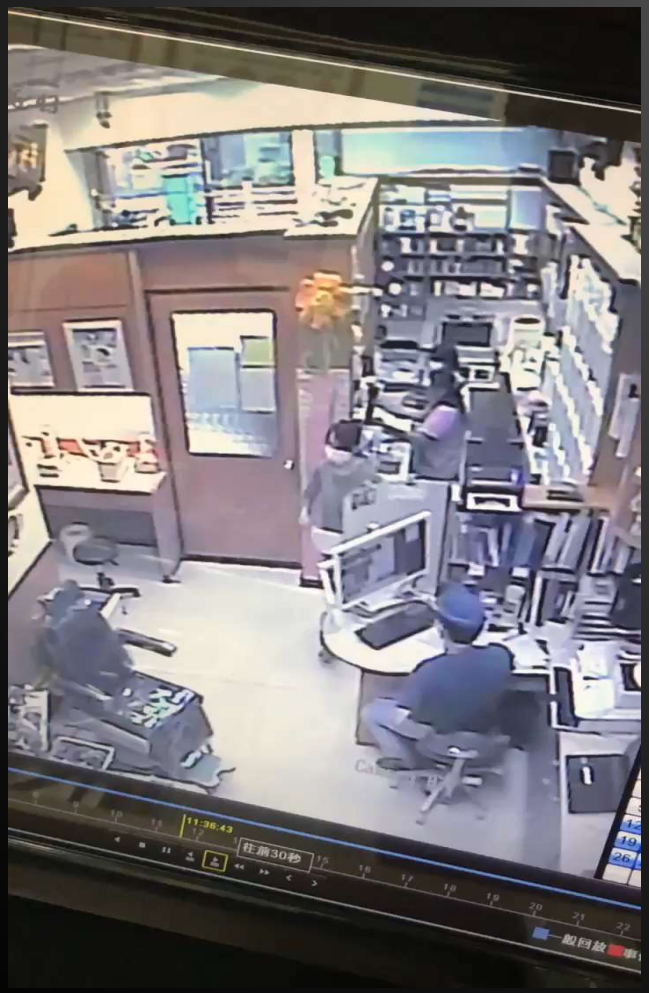
43y/o male, no vertigo hx

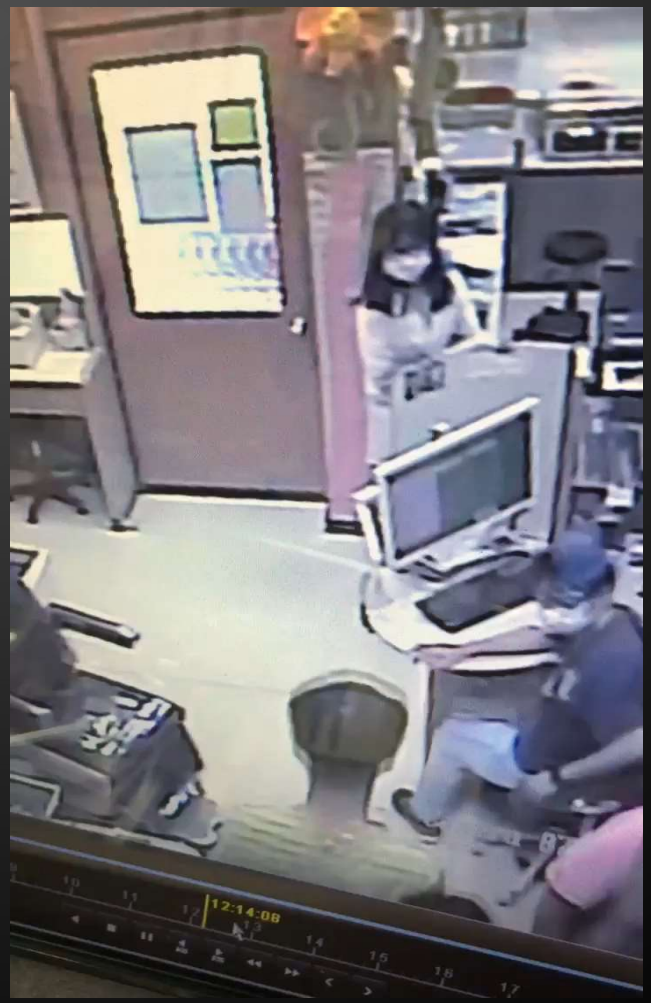
- **CC: Loss of balance and vomiting for 10 days**

- Headache off and on for one month (with ibuprofen 600mg)
- Dizziness, severe vomiting, and unsteady gait 7 days ago → R/O stroke in ER
- **Day 1:** Hospitalization
- **Day 1 – 3:** Persistent vomiting
- **Image study:** CT , MRI : normal (according to patient)
- **Day 4:** Vomiting improved, but unable to walk without support
- **Day 7:** Discharge
- **Day 10 in my clinic:** Still had imbalance and nausea during activity

# Case 3

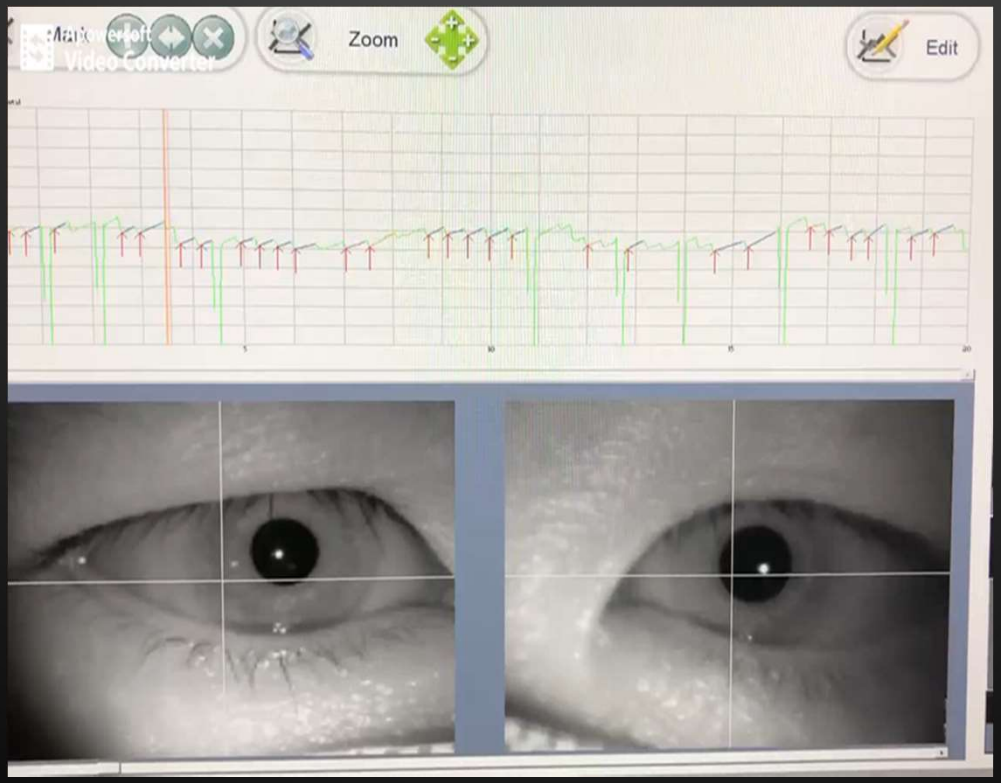
Gait :  can’t  walk alone, posture deviated to right





# Case 3

nystagmus



## Case 3

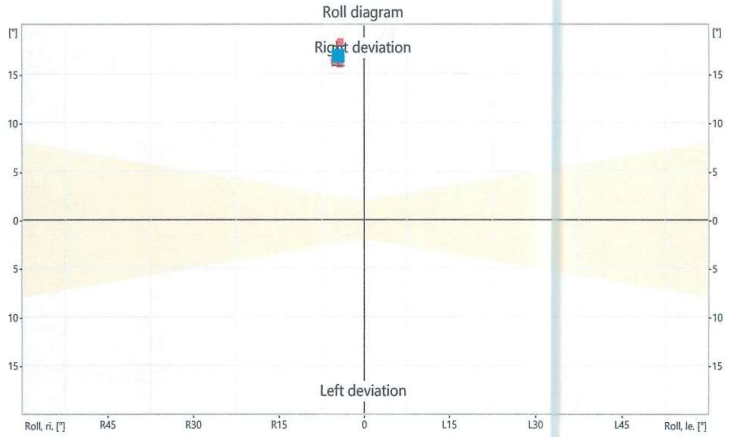
SVV :
deviated to Right  22°

8/29

安田耳鼻喉科诊所,

chung D. o. B.: 1974/11/13 ID: 59935

1. Subjective Visual Vertical 2018/8/29




Value table

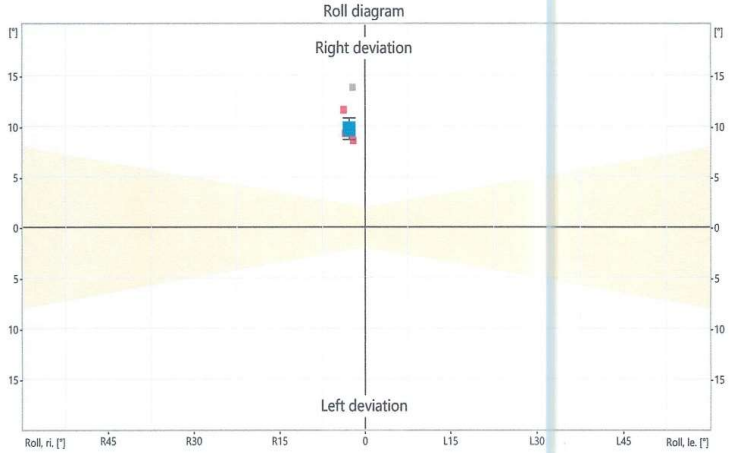
| Group: | R90 | R75 | R60 | R45 | R30 | R15 | 0 | L15 | L30 | L45 | L60 | L75 | L90 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trials: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Roll Ø [°]: | | | | | | | 4.6 | | | | | | |
| Deviation Ø [°]: | | | | | | | 16.9 | | | | | | |
| SD [°]: | | | | | | | 1.0 | | | | | | |

9/26

安田耳鼻喉科诊所,

chung D. o. B.: 1974/11/13 ID: 59935

3. Subjective Visual Vertical 2018/9/26



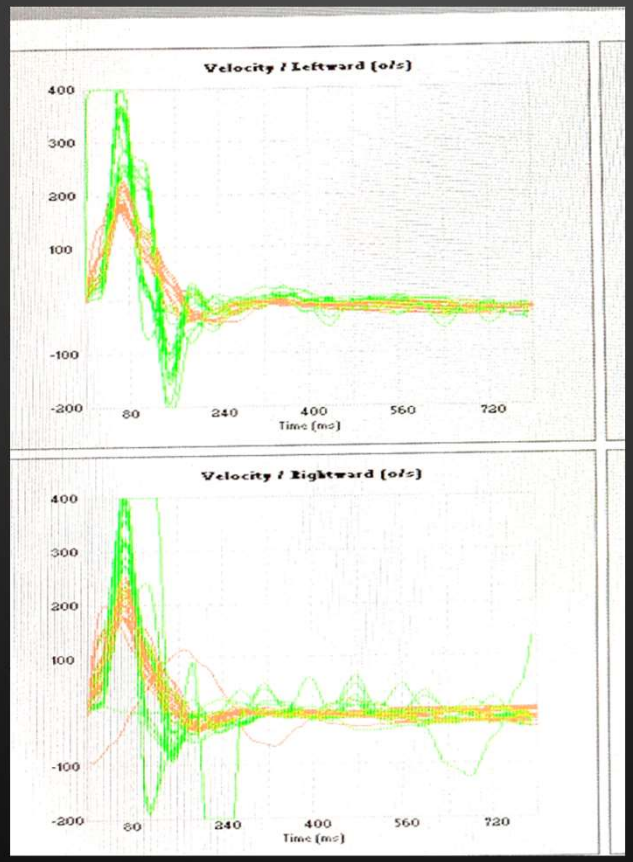

Value table

| Group: | R90 | R75 | R60 | R45 | R30 | R15 | 0 | L15 | L30 | L45 | L60 | L75 | L90 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trials: | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Roll Ø [°]: | | | | | | | 2.8 | | | | | | |
| Deviation Ø [°]: | | | | | | | 9.7 | | | | | | |
| SD [°]: | | | | | | | 1.0 | | | | | | |

# Case 3

HIT : ( - )

Video head impulse test (VHIT)

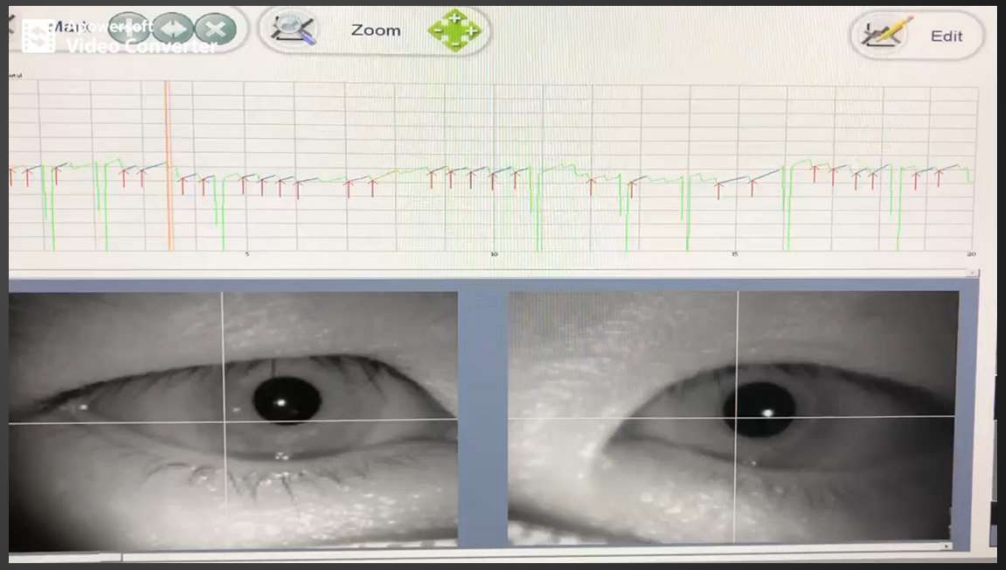


# Case 3

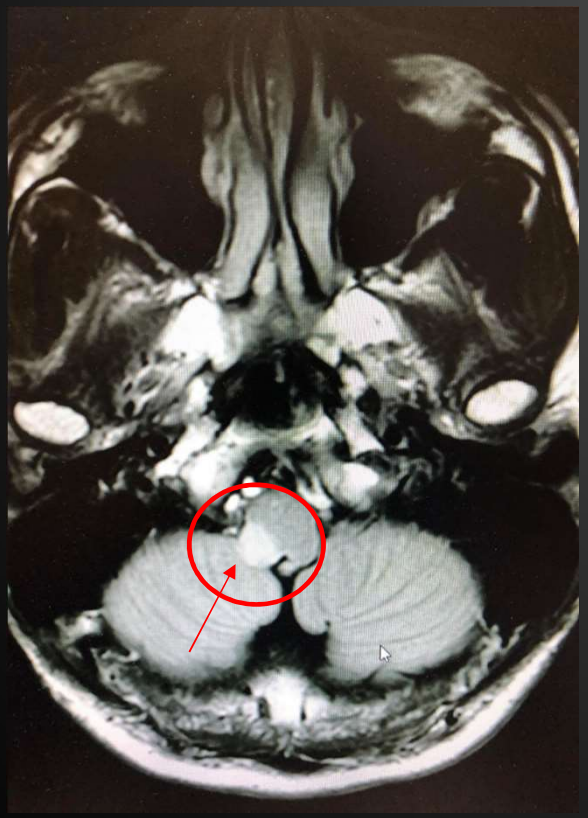
8/29

# Nystagmus improved but Horner syndrome developed!

9/12



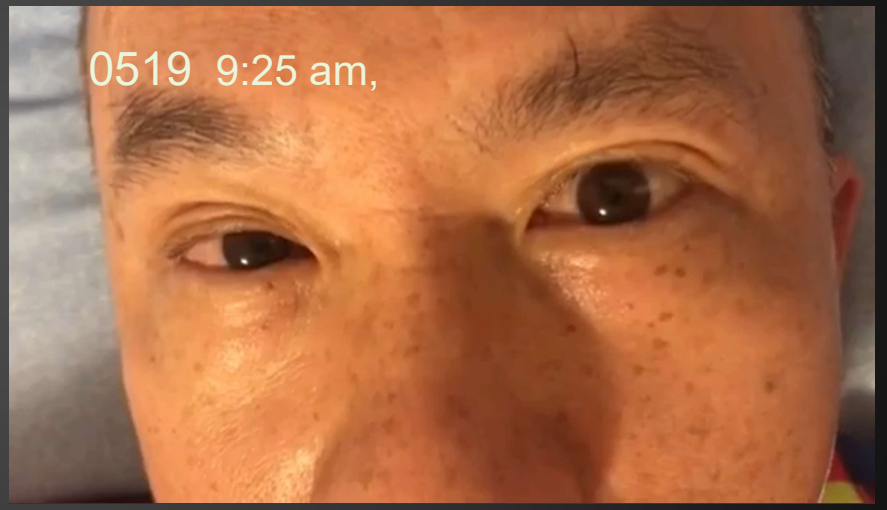

# Case 3

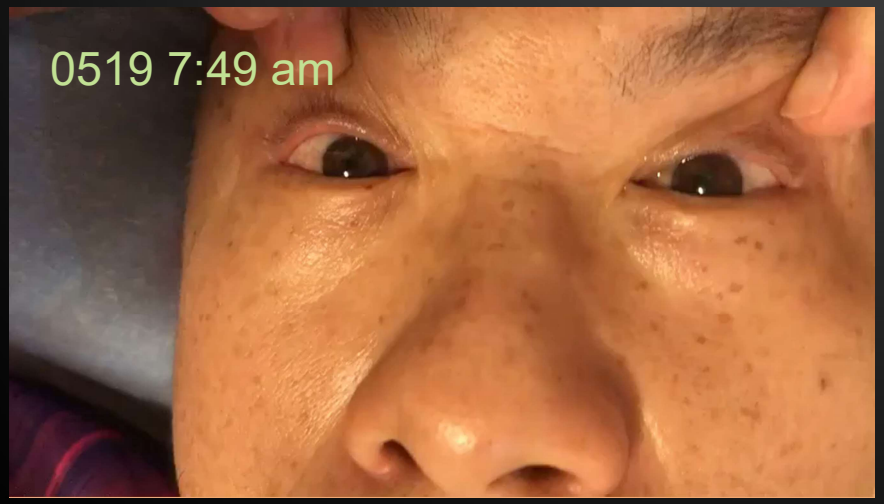


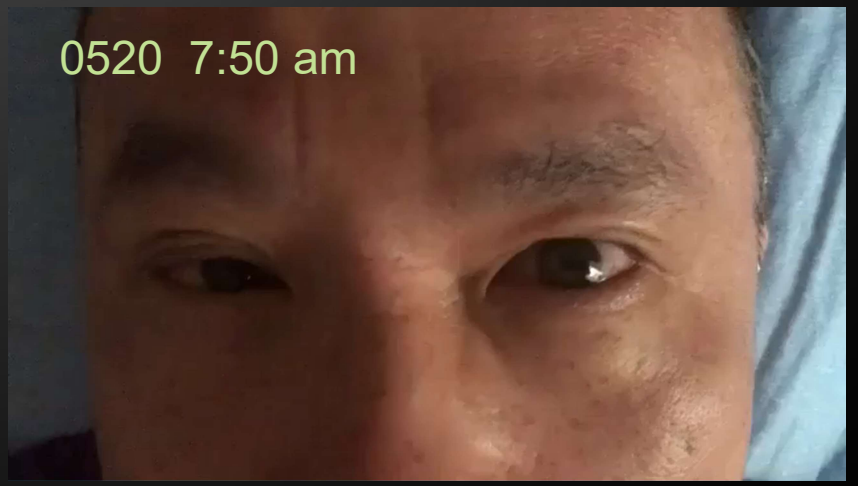
Dx : Lateral medullary sydrome

# Telemedicine for vertigo

51 y/o male, nausea ,vomiting, spinning sensation this morning (5/19), can't walk alone , No auditory symptoms; no headache hx; no head injury, no focal neurologic sign
Call me for help.
Under my instructions, he sent his video to me 。



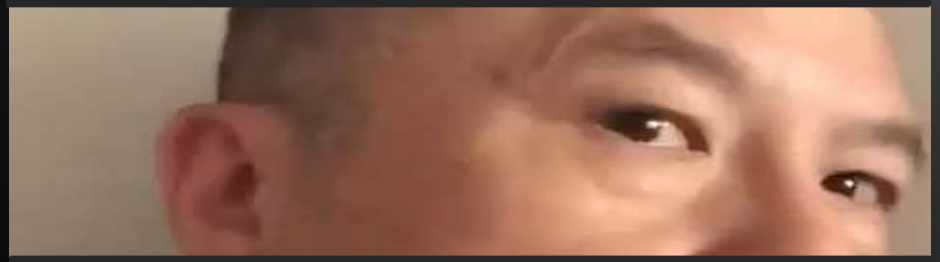



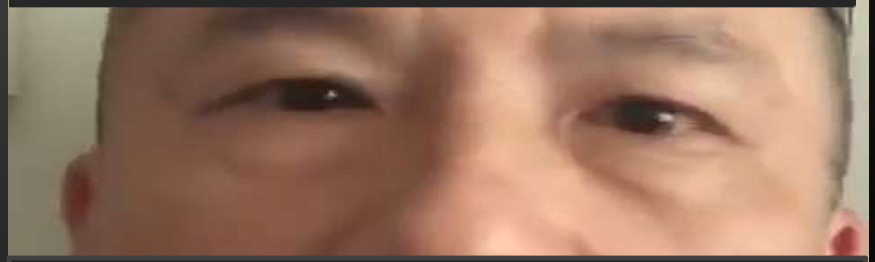
# Telemedicine for vertigo

Head impulse test : + , left

0520 :8:18 am



0520 11:00 am



# Telemedicine for vertigo

Dear Dr 鄭，

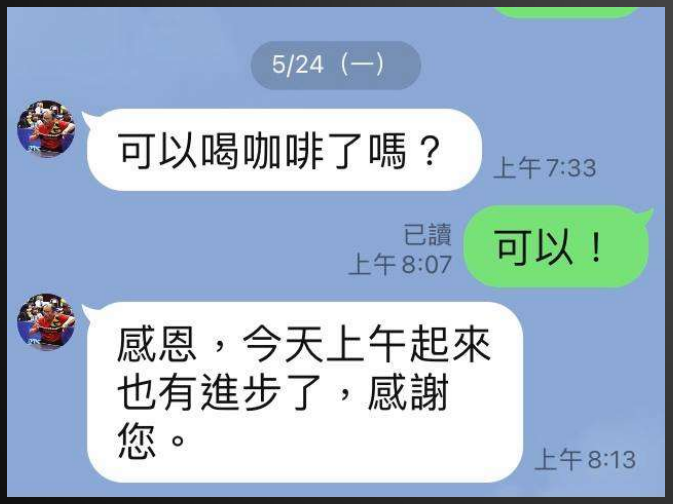
Mr Chang suffered acute vertigo syndrome 2 days ago. EOM : Nystagmus beat to right obvious within days) head impulse test : seems (+) in the left side . So acute vestibular neuritis,left. is considered. Please check him again .if VN is impressed, steroid will help him to improve.( prednisolone 0.5-1 mg/ kg is suggested for 3-7 days )

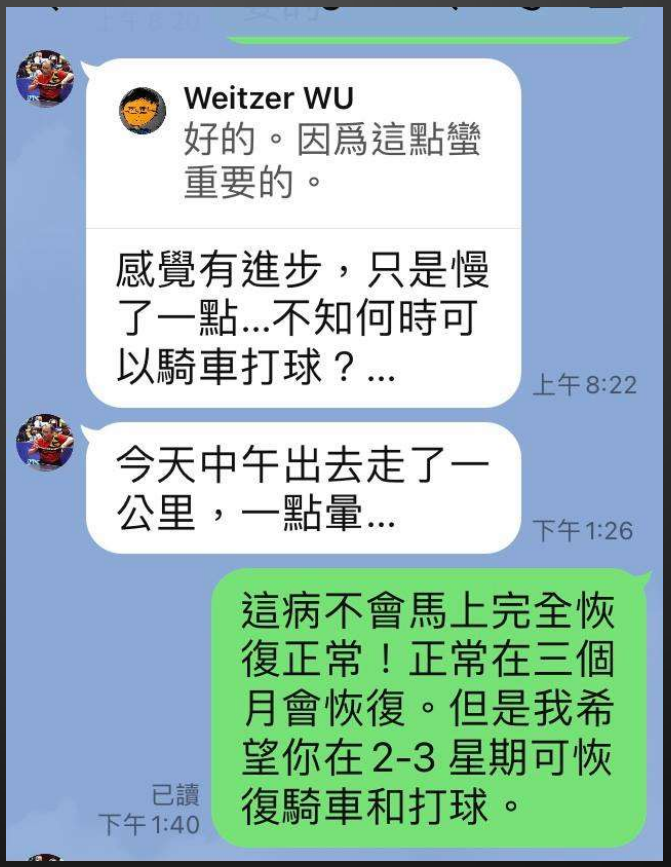
Many Thanks for your help!

安田耳鼻喉科診所　吳宜璋敬上

Dx : Vestibular neuritis ,left

# Telemedicine for vertigo




# Etiology of dizziness

Brandt T (n=4790 patients in 1989-2003)

| | |
|---|---|
| Benign paroxysmal positional vertigo | 18.3% |
| Psychophysiologic dizziness | 15.9% |
| Central vestibular vertigo | 13.5% |
| Vestibular migraine | 9.6% |
| Vestibular neuritis | 7.9% |
| Meniere's disease | 7.8% |
| Bilateral vestibulopathy | 3.6% |
| Vestibular paroxysmia | 2.9% |
| Perilymphatic fistula | 0.4% |
| Various other disorders | 12.3% |
| Unknown etiology | 4.2% |

(18.3+15.9+13.5+9.6+7.9+7.8) % ≈ 60 %

# *Central or Peripheral*

Nerve <-> Vessel
Physiological <-> Psychogenic
Sudden deafness : virus <-> vascular
Meniere disease <-> Vestibular migraine
BPPV : otolith <-> fluid viscosity
Acute vertigo attack : MD <-> HC BPPV

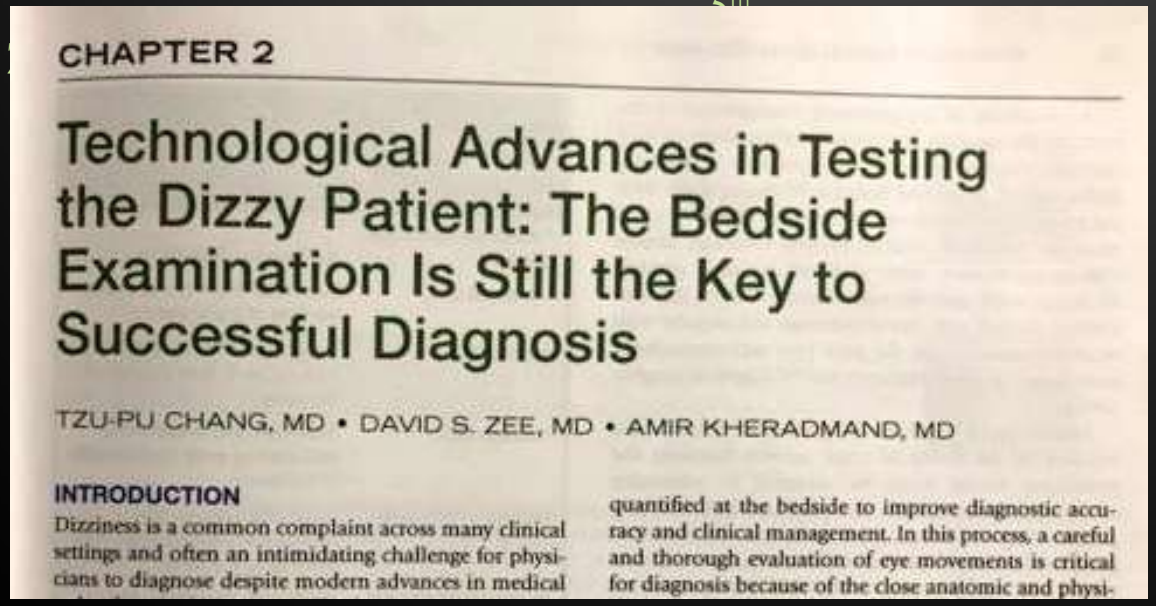
色即是空 ，空即是色 。色不異空，空不異色。

--

心經

建議書目

1 Dizziness and Vertigo Across the lifespan 2018 A.TUCKER GLEASON /BRADLEY W.KESSER
2 Dizziness A practical approach to diagnosis and management 2nd 2017 Adolfo Bronstein/ Thomas Lempert
3 Vertiog and Dizziness common complaints 2005 Thomas Brandt Marinanne Dieterich
4 Vertigo and disequilibrium A practical guide to dianosis and management 2007 Peter C. Weber
5 Electronystagmography and Videonystagmography 2013 Devin L. D
6 The Neurology of eye movements 4th 2006 R. John Leigh , Daved S ZEE
7 5th 2015 R. John Leigh , Daved S



CHAPTER 2

# Technological Advances in Testing the Dizzy Patient: The Bedside Examination Is Still the Key to Successful Diagnosis

TZU-PU CHANG, MD • DAVID S. ZEE, MD • AMIR KHERADMAND, MD

## INTRODUCTION

Dizziness is a common complaint across many clinical settings and often an intimidating challenge for physicians to diagnose despite modern advances in medical

quantified at the bedside to improve diagnostic accuracy and clinical management. In this process, a careful and thorough evaluation of eye movements is critical for diagnosis because of the close anatomic and physi-

# UPDATE :
## EYE MOVEMENTS

1 Bio-physical properties of neuron

2 Brain : Bayes processes

Link basic advances to clinical finding → understand underlying pathophysiology→ hone (磨練出) our diagnosic skills

David S. Zee


當你好好的治療一個又一個眩暈病人時，病人也一次又一次的教導你如何看眩暈。

欲天下豪傑延年益壽，不徒作技藝之末也。

武當 張三丰

# 眩暈診療

道德經 第四十一章

上士聞道勤而行之；中士聞道，若存若亡；
下士聞道，大笑之。不笑不足以為道。

The road to Barrany Sociey Meeting
Reykjavik Iceland August 2010

The road to Barrany Sociey Meeting
Uppsala Swedon 2018

# Thanks !!


| | | |
|---|---|---|
| 前台南醫院耳鼻喉科 | 蔡行生 | 主任 |
| 成大醫院耳鼻喉部 | 蔡森田 | 教授 |
| 馬偕醫院耳鼻喉部 | 林鴻清 | 教授 |
| 前台南醫院耳鼻喉科 | 黃堅原 | 主治醫師 |
| 慈濟醫院神經內科 | 張滋圃 | 主治醫師 |