

眼震鏡下的眼震檢查

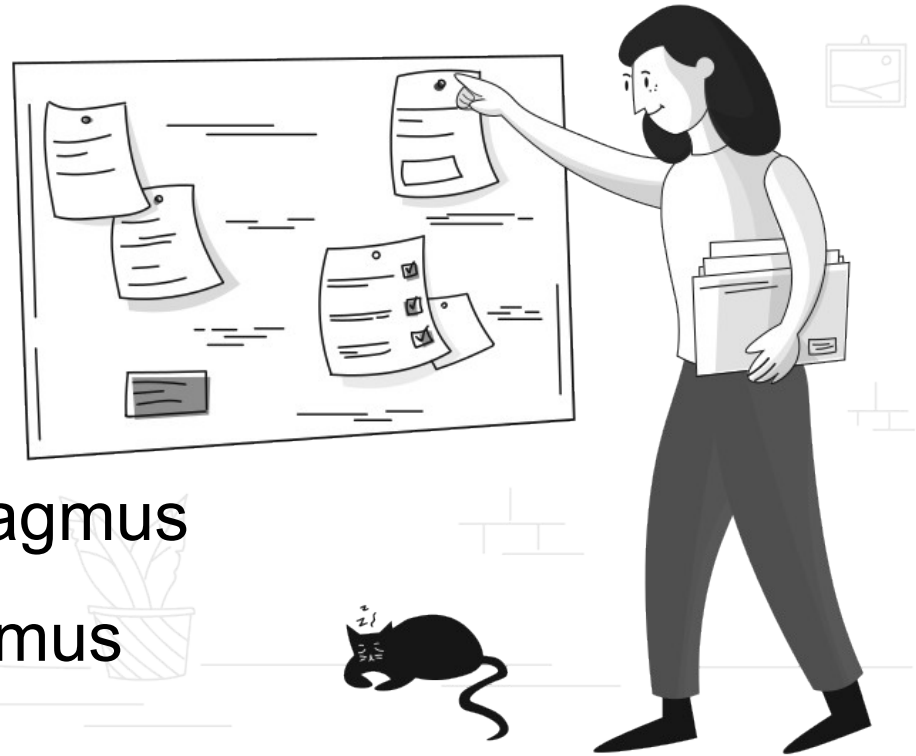
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2023 春季頭暈讀書
會

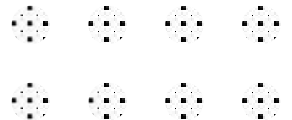
2023 年 3 月 18 日
14:20 ~ 15:05

Outlines

- Overview
- Visually enhanced VOR
- Head-shaking nystagmus
- Valsalva-induced nystagmus
- Hyperventilation-induced nystagmus
- Skull vibration-induced nystagmus
- Demo 1+2
- Q and A



Illustrations by [Pixeltrue](#) on [icons8](#)



Overview

- 眼震鏡檢查為理學檢查之延伸
- 優點
 - 去除視覺抑制
 - 放大
 - 錄影

PROTOCOL

Spontaneous Nys under visual fixation

Saccade and gaze fixation

Visually-enhanced VOR

Spontaneous Nys under fixation removal

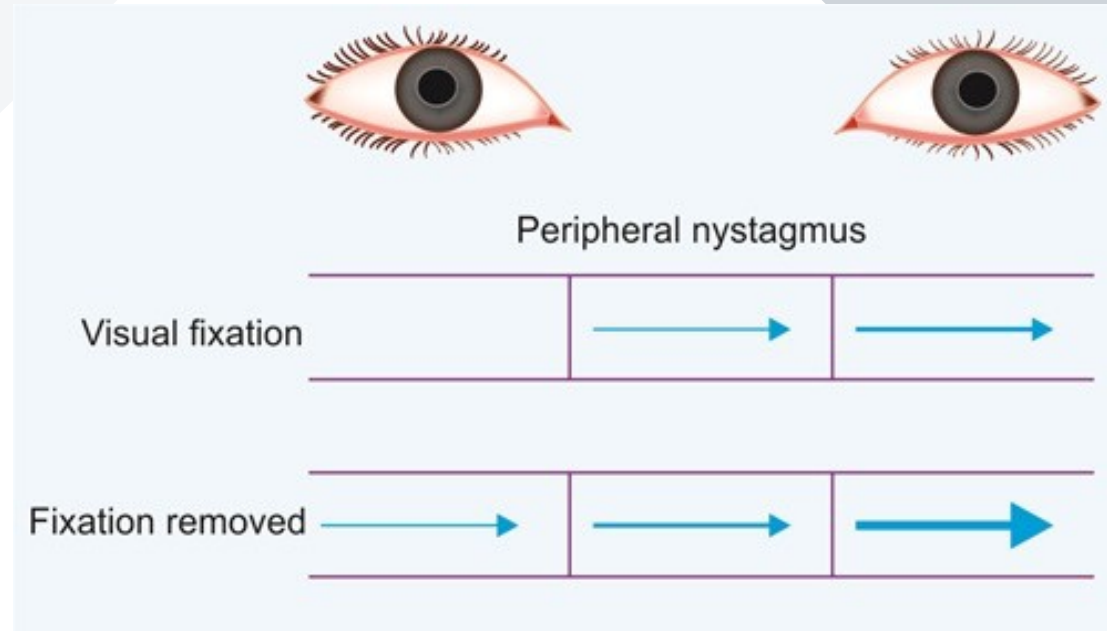
Triggered nystagmus

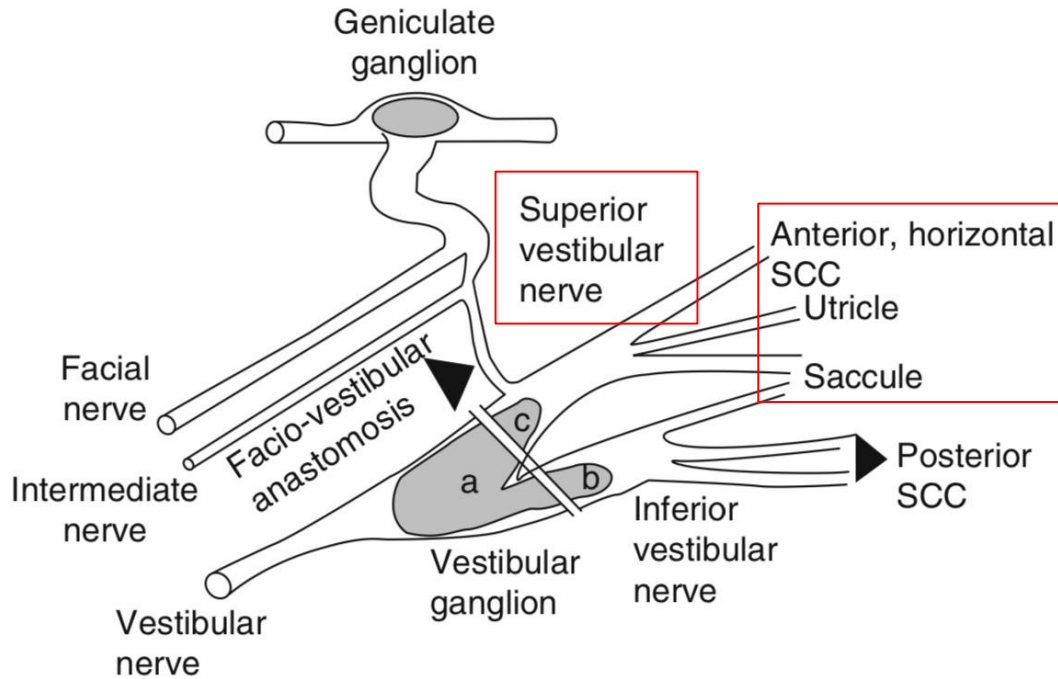
- Bow and lean test

Positional tests

Gaze-evoked nystagmus

- Gaze-holding function: 10–40° in the horizontal or 10–20° in the vertical
- Central pattern:
 - In all directions
 - Pure vertical, pure rotational, pure horizontal
 - Dissociated
- Peripheral pattern:
 - Horizontal + some rotational components
 - Alexander's law





- HC: horizontal spontaneous nystagmus
- AC: rotational component
- Inferior VN, total VN: less common

Visually enhanced VOR

- Visuo–vestibular interaction (VVI): vestibulo–ocular reflex (VOR) + smooth pursuit (SP) + fixation + optokinetic reflex (OKN)
- Patient to fixate on the examiner's nose while performing a continuous slow side-to-side oscillation
- Normal VVOR gain 0.8-1.0
- Reflects a deficit of the VOR, OKN, or SP

Head-shaking nystagmus

- Asymmetry of velocity storage that occurs after peripheral or central (less common) vestibular lesions
 - Acoustic neuroma, vestibular neuritis, Ménière's disease
 - Lateral medullary syndrome
- Baseline 10 seconds
- Shake: 1-2Hz, 30 degree, slight downward about 20 degrees, 20 cycles

Valsalva-induced nystagmus (1/3)

- Valsalva maneuver increases intracranial pressure
→ induces nystagmus certain conditions (**superior canal dehiscence**, perilymphatic fistula, Chiari Malformation...)
- Nose-pinched method or Glottis-closed method
- 10 seconds
- In superior SCCD, AC is stimulated → down-beating and torsional nystagmus (nose-pinched method)

Valsalva-induced nystagmus (2/3)

- 60-yr-old man, c/o autophony, dizziness triggered with loud noises and straining at times
- Temporal bone CT: right sided **superior canal dehiscence (SCD)**
- Nose-pinch Valsalva maneuver:
Downbeat-torsional, towards the right ear, nystagmus (excitation of the right anterior canal)

Superior (Anterior) Canal Dehiscence Syndrome

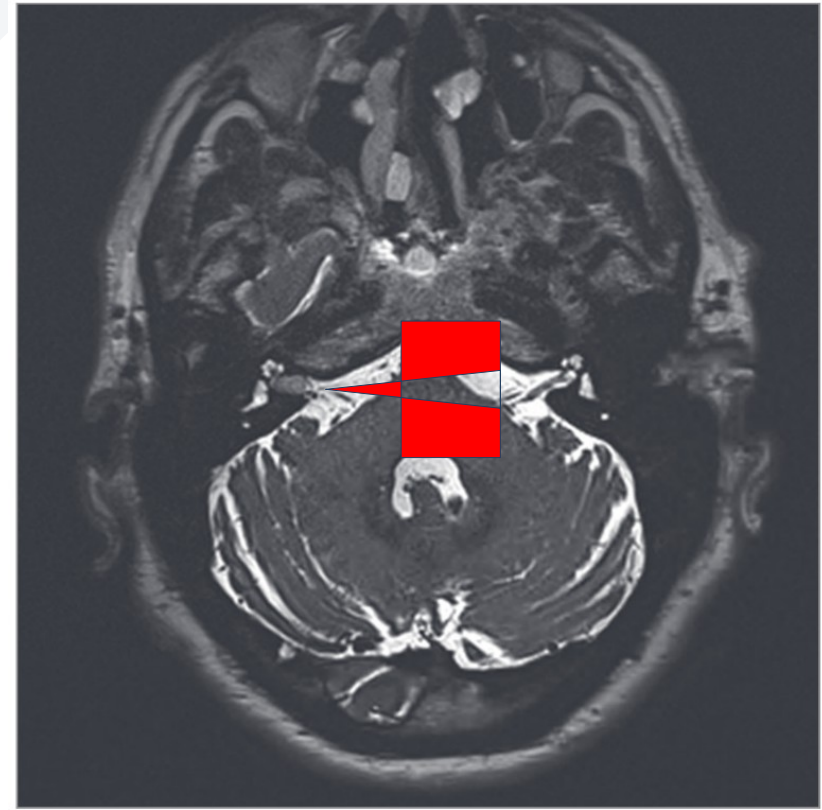
Hyperventilation-induced nystagmus (1/3)

- Hyperventilation transiently alters neuronal conductivity across a demyelinated segment of the vestibular nerve (often **vestibular schwannoma** or **vestibular paroxysmia**)
→ **excitatory** (> inhibitory) **pattern** of nystagmus
- 1 breath/second for 30-60 seconds

Hyperventilation-induced nystagmus (2/3)

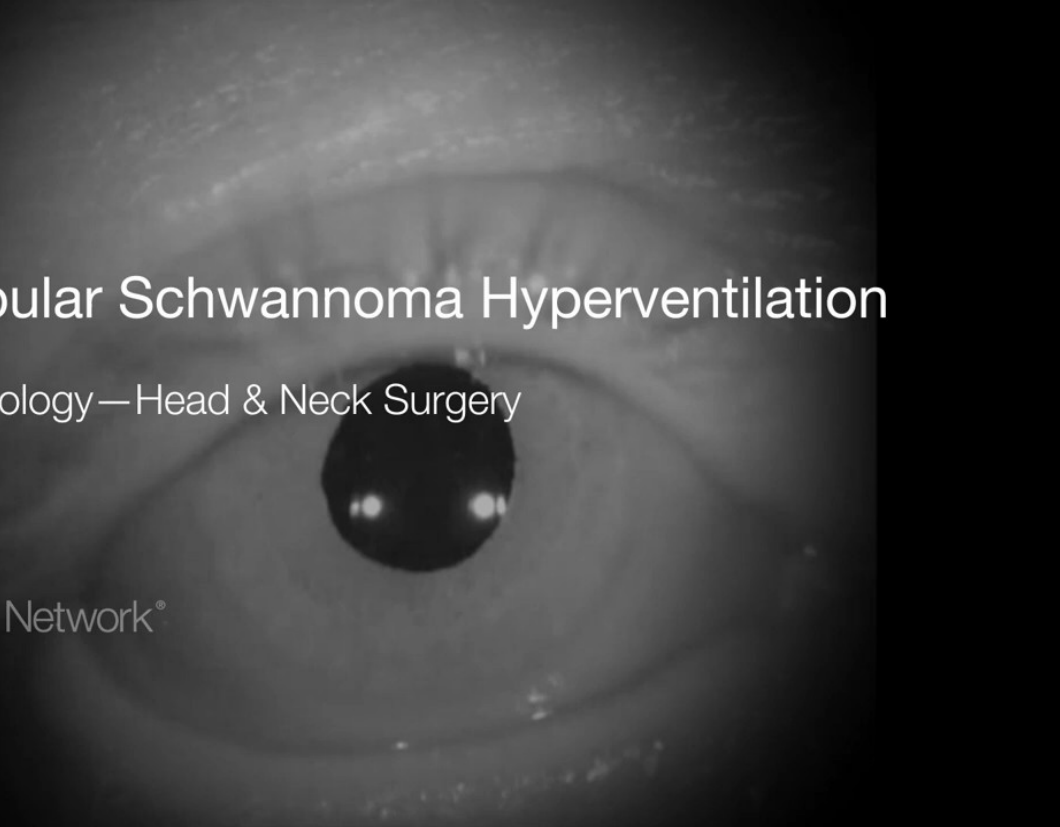
- 60+ male, persistent motion-induced vertigo and superimposed episodes of exercise-induced vertigo x 12 months
- Asymmetric hearing loss x 10 years
- MRI: right **vestibular schwannoma**
- Source: Foster, E., & Chen, L. (2017). Exercise-Induced Vertigo in Vestibular Schwannoma. *JAMA Otolaryngology–Head & Neck Surgery*, 143(9), 955–956.

Figure. Magnetic Resonance Image



Axial T2-weighted magnetic resonance imaging reveals right vestibular schwannoma

Hyperventilation-induced nystagmus (3/3)



Right Vestibular Schwannoma Hyperventilation

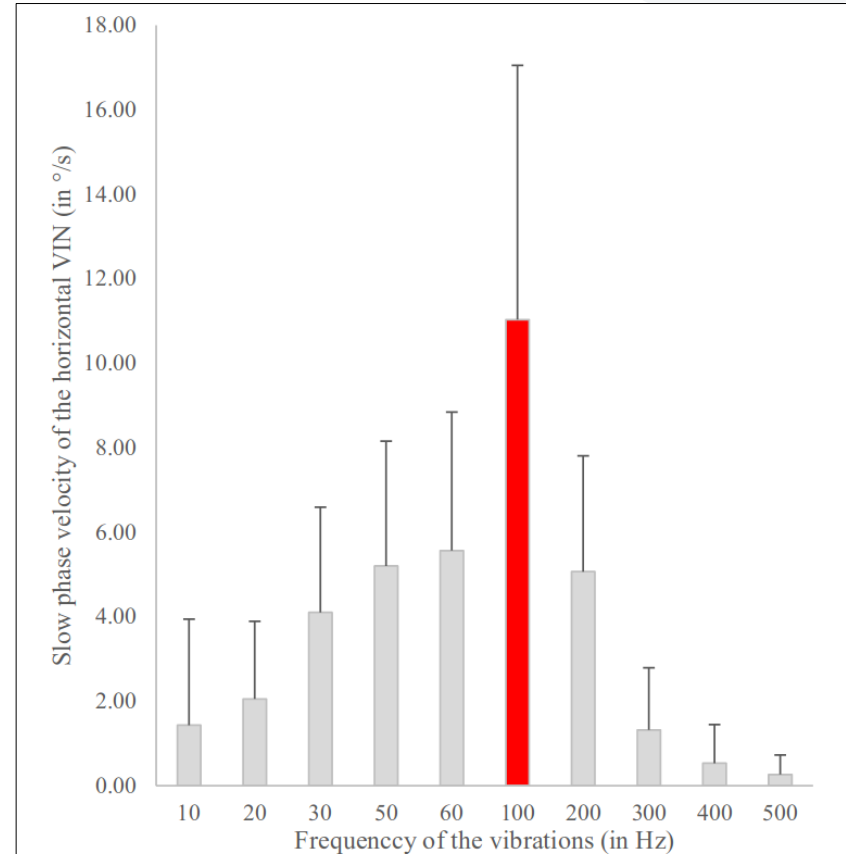
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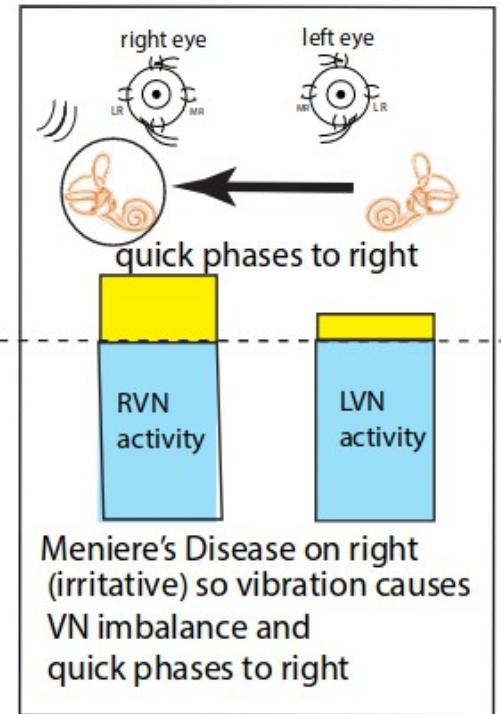
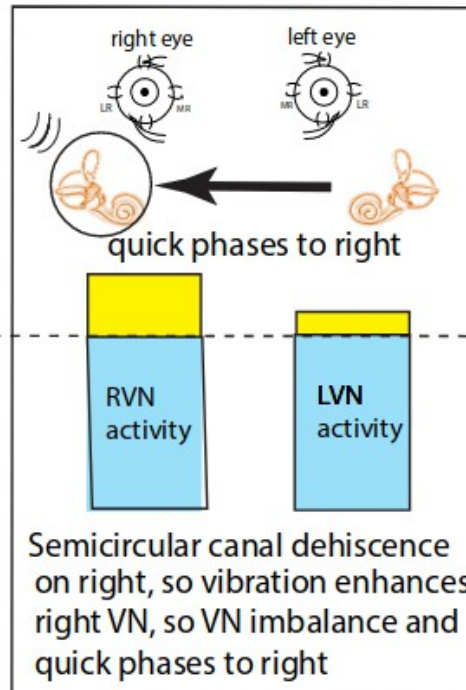
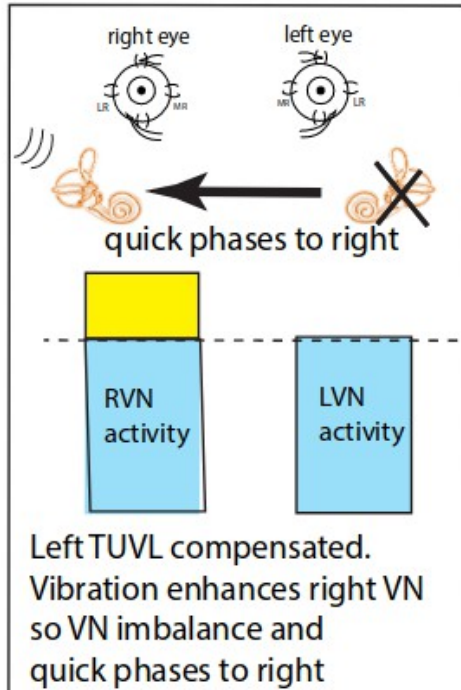
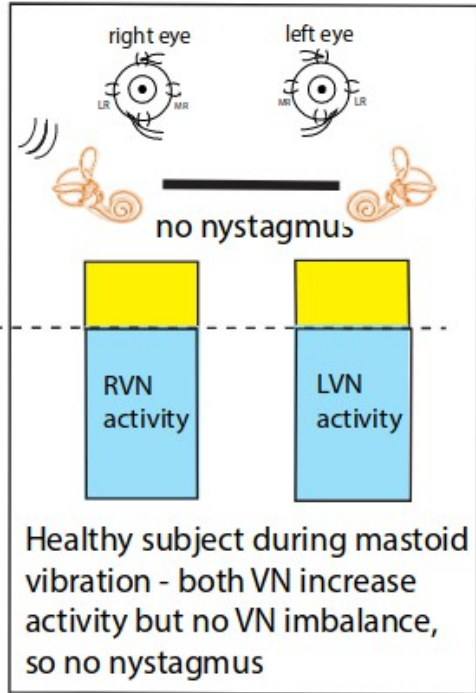
1. Weak spontaneous left beating nystagmus
2. Right beating nystagmus after HV for 15 seconds (excitatory)
3. Weak spontaneous left beating nystagmus

Skull vibration-induced nystagmus (1)

- **100 Hz** bone-conducted vibration → vestibular stimulation (via utricle and SCC)
- Enhance vestibular asymmetry → peripheral pattern of nystagmus
- aka Vestibular Weber test
- R mastoid 10s, L mastoid 10s, vertex 10s



Skull vibration-induced nystagmus (2)



Skull vibration-induced nystagmus (3)



BK Mini-shaker



SYNAPSYS Vestibular Vibrator



Euroclinic Vestibular Vibrator



North Coast Mini Vibrator

DEMO

Spontaneous Nys under visual fixation

Saccade and gaze fixation

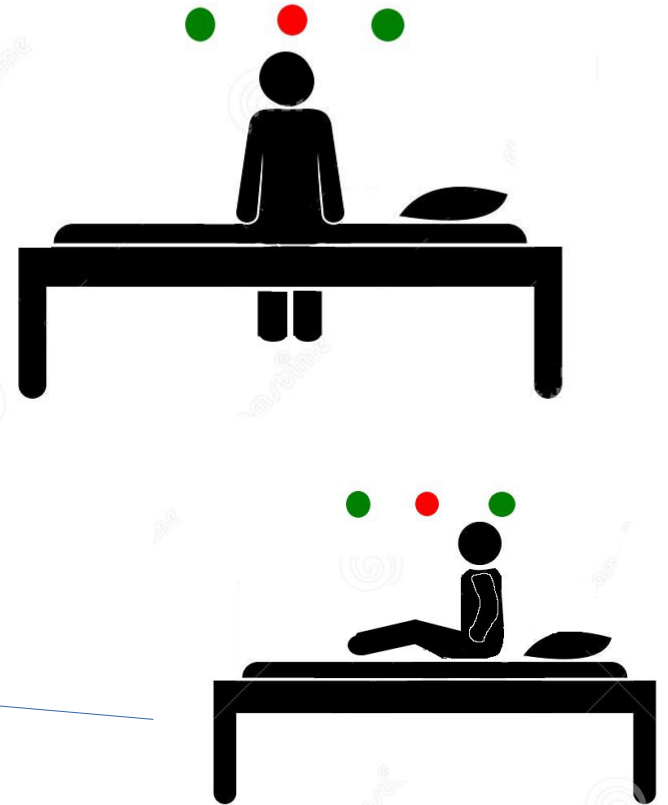
Visually-enhanced VOR

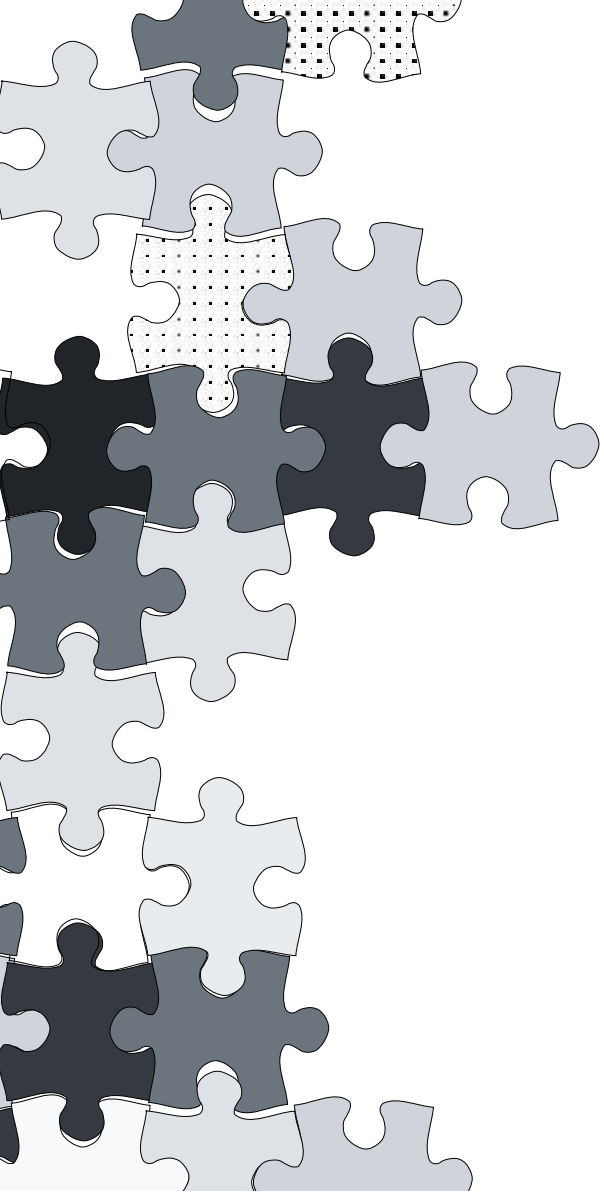
Spontaneous Nys with fixation removal

Triggered Nys (HSN, Valsalva, HV, SVIN)

Bow and lean test

Positional tests





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感謝聆聽

Q A 時間

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