

# VESTIBULAR PHYSIOTHERAPY

*— the pivot in the contemporary ethical and rational  
management of balance disorders*

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# Physiotherapy and vestibular physiotherapy



**Physiotherapy**- treatment of disease, deformity and / or disability by physical methods such as massage / heat treatment, / exercise / physical workouts rather than by medicines or by surgery



# Physiotherapy and vestibular physiotherapy

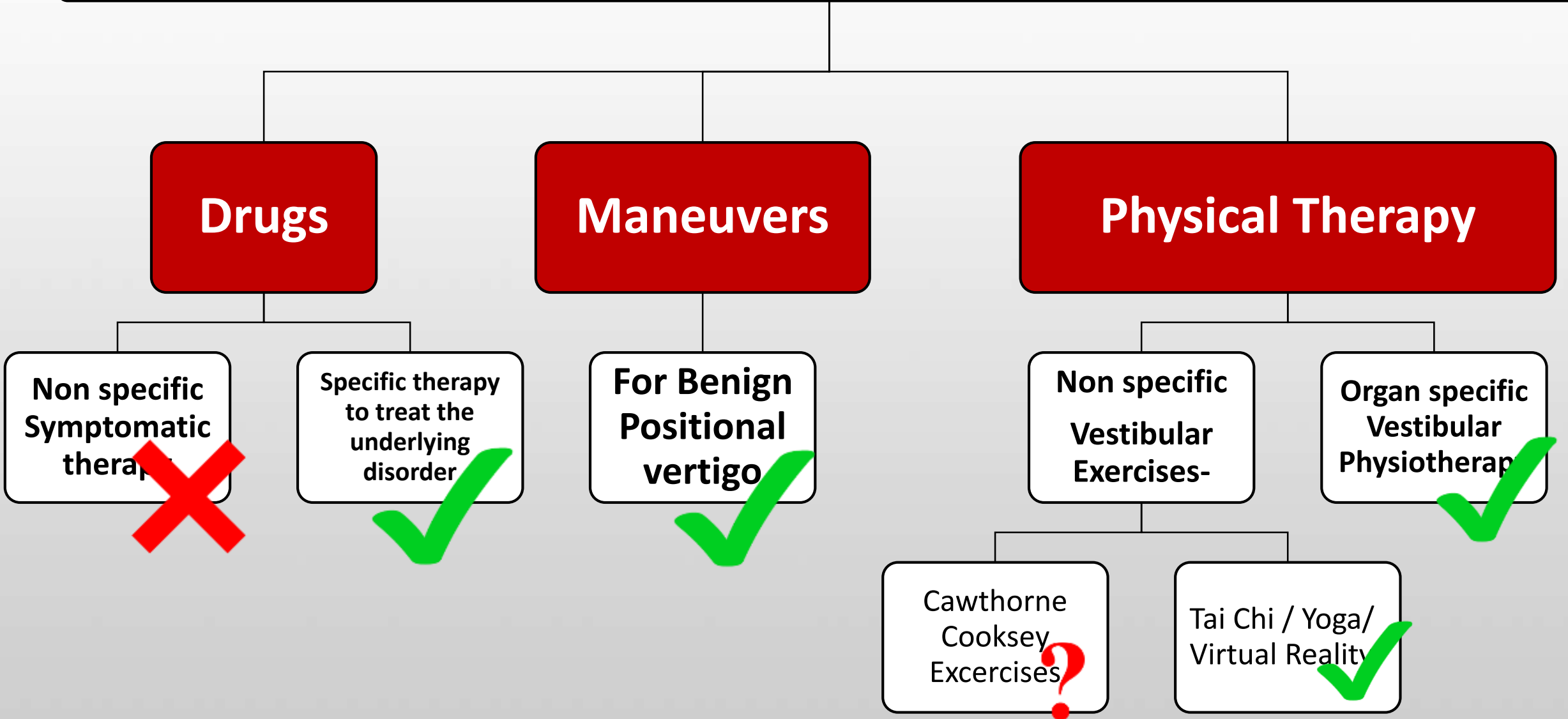


**Vestibular Physiotherapy**- Physical therapy to restore balance function after it has been deranged by disease. Acts by:-

- (1) enhancing the vestibular compensatory mechanism
- (2) improving the general balance function and sharpening the balancing skills of the subject
- (3) enhancing the functionality of a damaged part of the vestibular labyrinth or of a deranged mechanism in the vestibular system



# ETHICAL & RATIONAL MANAGEMENT OF VERTIGO



# Objectives of management of vertigo

- **Provide symptomatic relief** – *taking care of the inherent ill-effects of anti-vertigo drugs*
- **Diagnose the cause of the vertigo and treat the cause of the vertigo** *rather than merely suppress & camouflage the symptom of vertigo*
- **Treat the co-morbidities** *esp the psychological and cognitive impact of the balance disorder*
- **Restore the deranged balance function and reassure** *the patient as most such patients are in severe physical and mental distress*

# What is new in today's scenario ??

- **Our understanding of vestibular physiology has undergone immense refinement;** *the morbidity of the balance disorder patient is now better understood*
- **Any lesion in the vestibular system can be very precisely diagnosed with pin-point accuracy**
- **Very specific treatment is available for most causes of balance disorders today;** *management now involves treating the co-morbidities also*
- **Vestibular physiotherapy targeted to specific organs in the vestibular system is now a reality;** *virtual reality is being used for improving balance function*

# Physical therapy for vestibular compensation

- **VESTIBULAR COMPENSATION** is the mainstay of therapy in all peripheral vestibular lesions esp if unilateral, and also in some central lesions
- **VESTIBULAR COMPENSATION** is enhanced and facilitated by **VESTIBULAR REHABILITATION THERAPY (VRT)** which are exercises consisting of **HEAD / BODY / EYE** movements to increase sensory conflicts.
- Recurrence of symptoms are often due to decompensation and not due to recurrence of disease, hence re-initiation of exercises is the recommended protocol for recurrence of symptoms
- Even if drugs for symptomatic relief are used, only such drugs are to be chosen that **do not inhibit vestibular compensation** i.e., do not cause sedation / CNS depression

# Types of PHYSICAL THERAPIES

-Cawthorne Cook

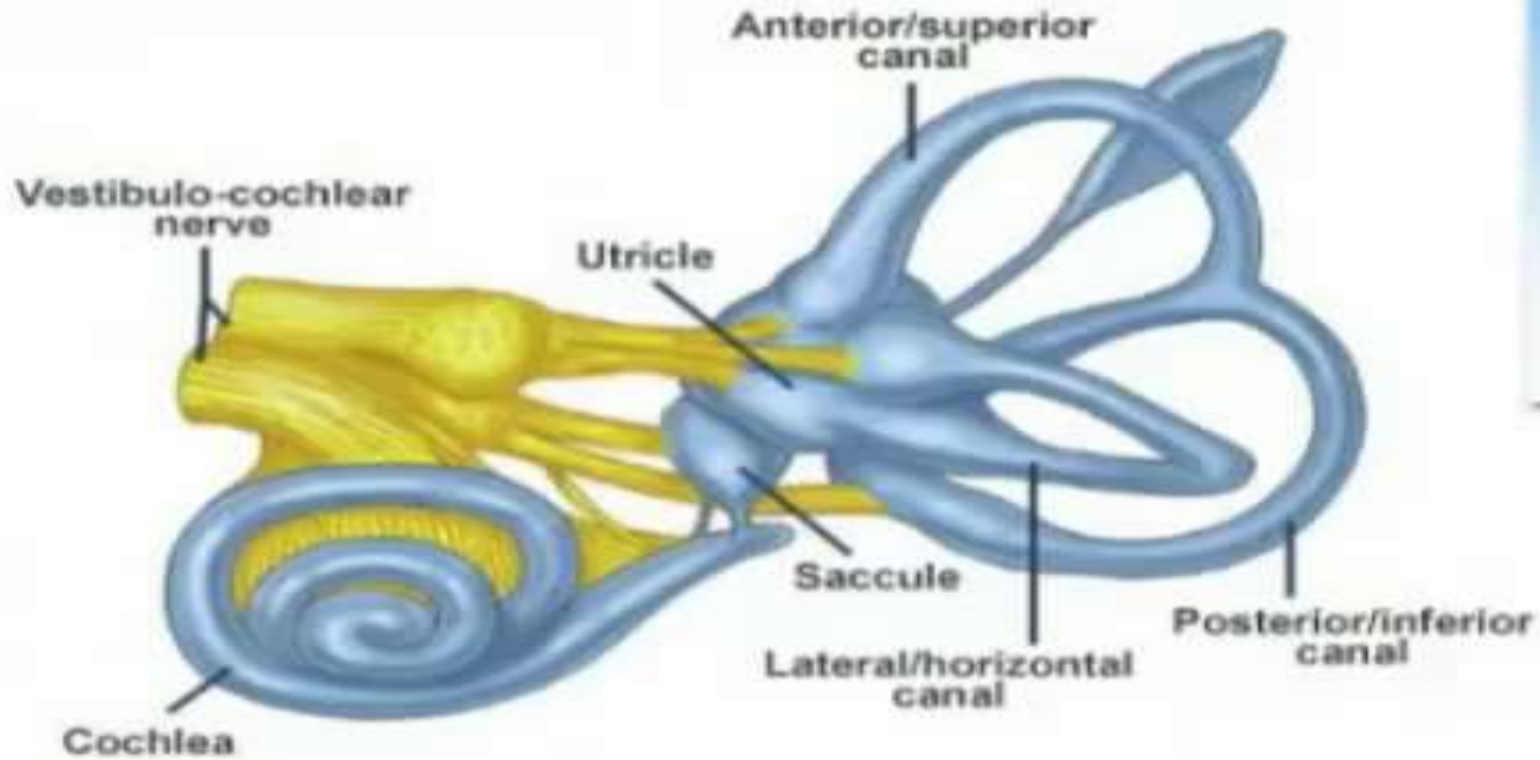
**ORGAN –SPECIFIC VESTIBULAR  
PHYSIOTHERAPY is possible today**  
- we can specifically stimulate the compromised vestibular  
sense organ after VESTIBULOMETRY has identified the defect

-Tai Chi exercises :-



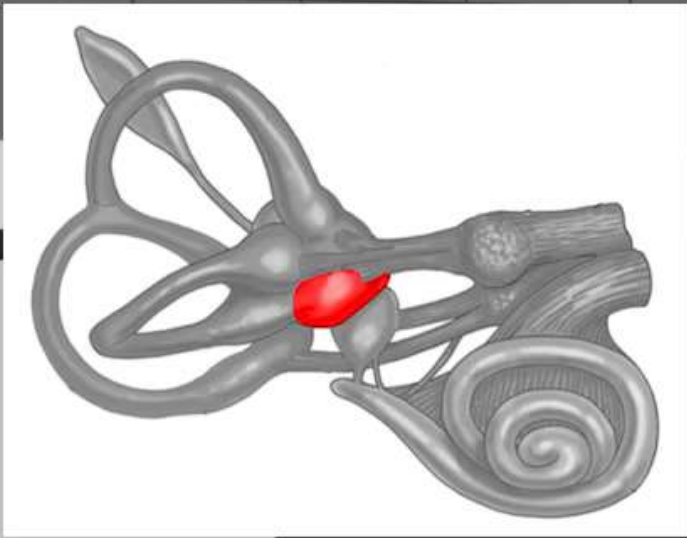


# Functions of different parts of the vestibular labyrinth as we know today



**VESTIBULAR LABYRINTH**

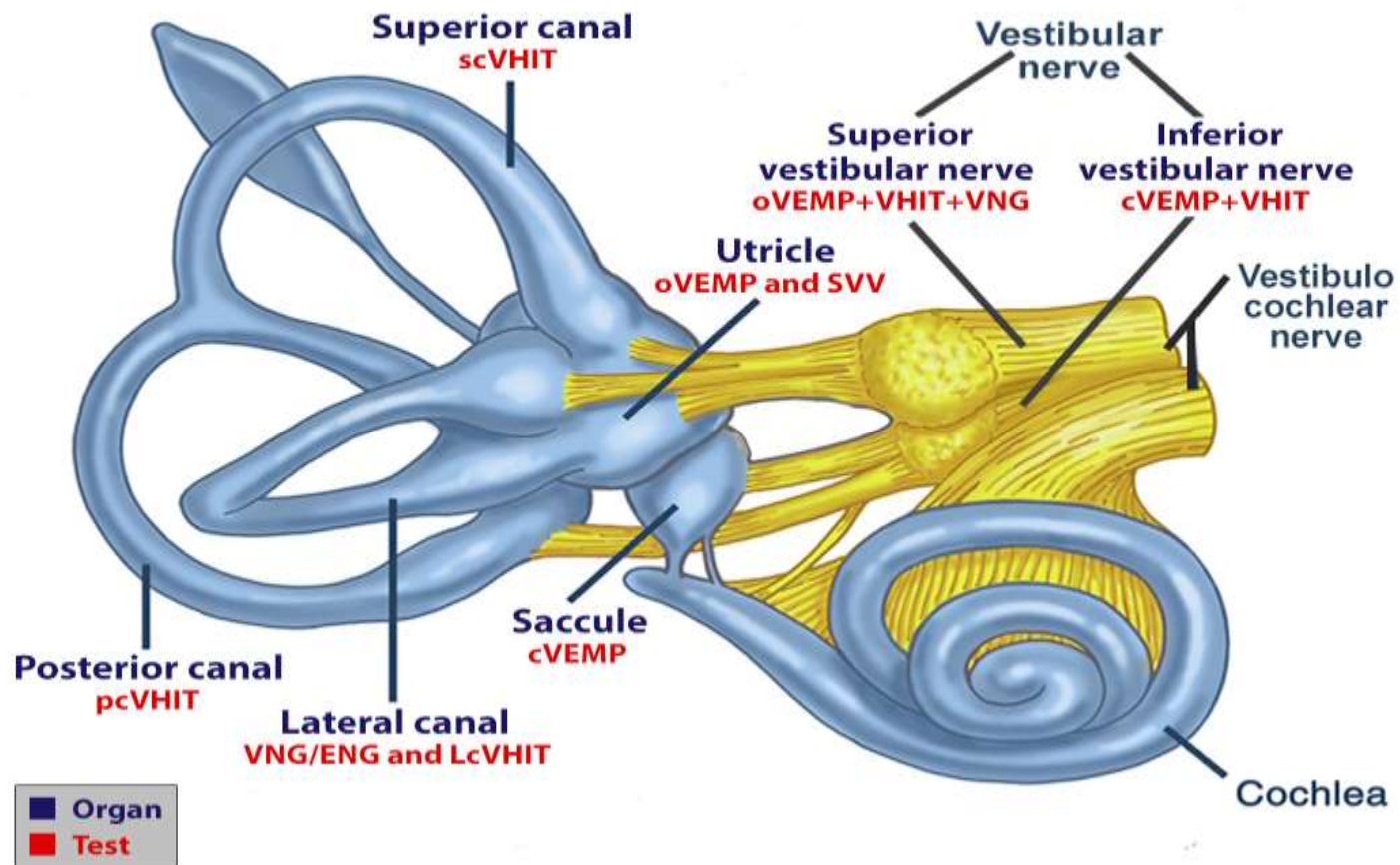
**Each part of the vestib. labyrinth senses a different type of head movement and are all equally important**



**UTRICLE**

# Functional status of each part of the vest. labyrinth can be evaluated with utmost precision today

## TESTS FOR VESTIBULAR LABYRINTH



1) Each part of the vestibular labyrinth has a specific function

2) Functional integrity of each part of the vestibular labyrinth can be evaluated and at different frequencies of vestibular stimulation

# Specific tests for each anatomical part

## ANATOMICAL PART tested

- Lateral SC canal
- Lateral SC canal
- Anterior SC canal
- Posterior SC canal
- **Utricle**
- **Sacculle**
- Sup Vest nerve
- Inf Vest nerve
- **Oculomotor system**
- **Sense of gravitational vertical**
- **Neural pathways**

## NAME OF INVESTIGATION

- ENG / VNG (at low freq)
- vHIT (at high freq)
- vHIT (at high freq)
- vHIT (at high freq)
- **oVEMP, SVV**
- **cVEMP**
- ENG/VNG/oVEMP/ VHIT
- cVEMP / VHIT
- **Oculomotor tests of VNG**
- **Sub. visual vertical (SVV)**
- NCV, SSEP

# **The story so far:-**

- The physiology & functional anatomy of the vestibular system is now unambiguously known**
- Modern vestibulometry now allows us to specifically identify the defective organ the vestibular system and also detect the underlying disorder causing vertigo**
- Treatment paradigms for vertigo have now changed and non-specific vestibular sedatives and non specific exercises are now a thing of the past.**
- The new therapy module in balance disorder pts is TARGETED & SPECIFIC TREATMENT both for pharmacotherapy as well as for physiotherapy.**



# Organ targeted vestibular physiotherapy



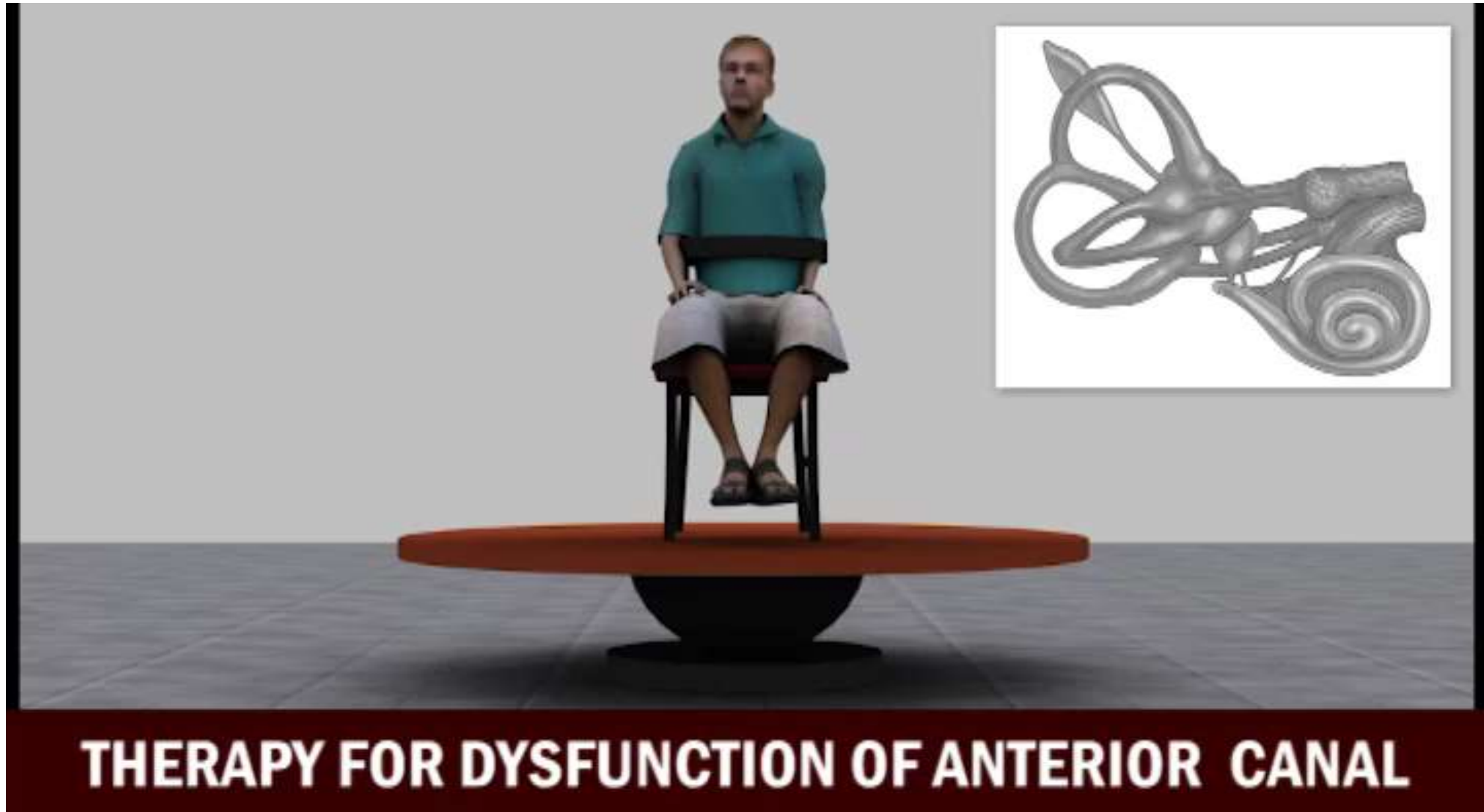
**THERAPY FOR DYSFUNCTION OF LATERAL CANAL**

# Organ targeted vestibular physiotherapy



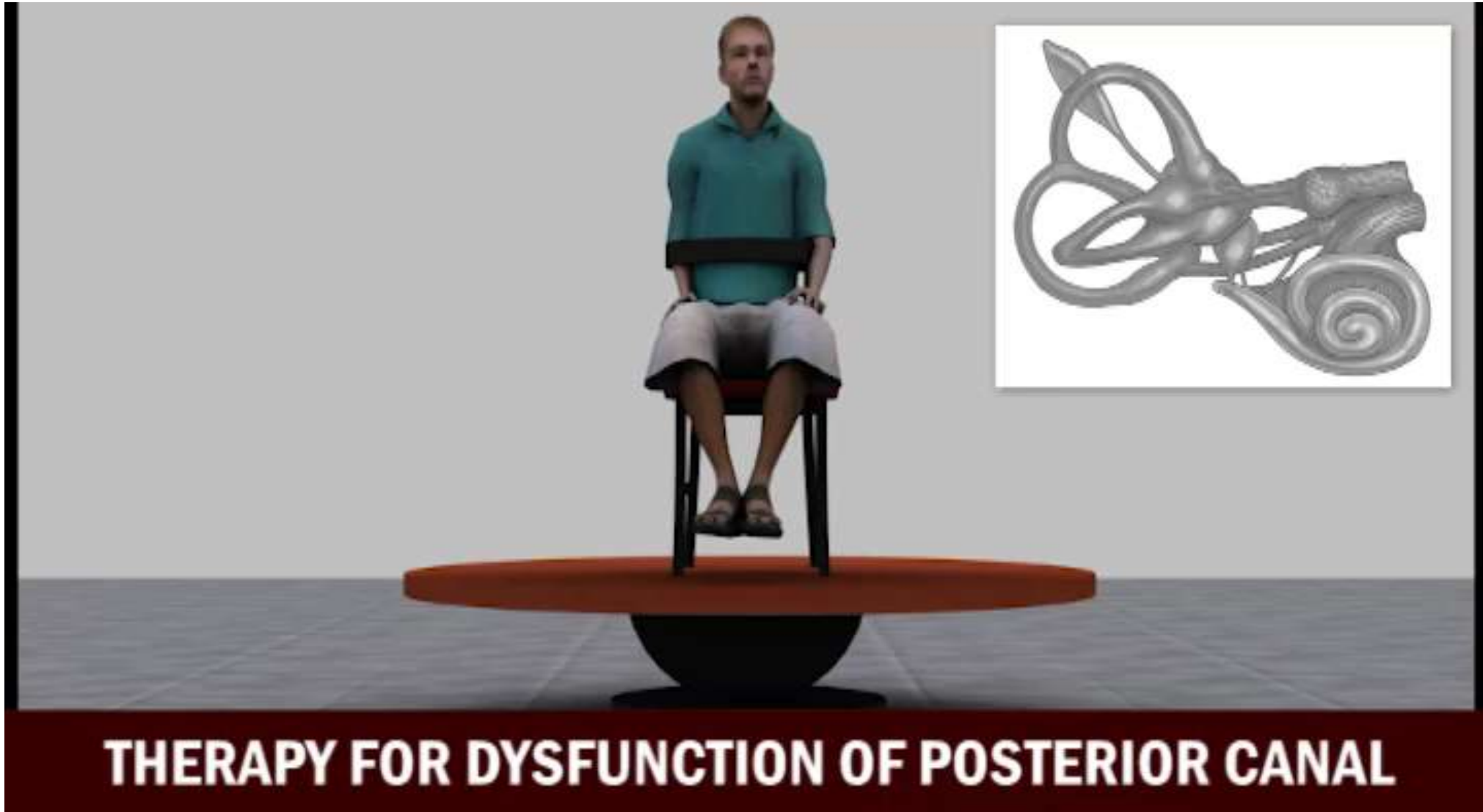
**THERAPY FOR DYSFUNCTION OF LATERAL CANAL**

# Organ targeted vestibular physiotherapy



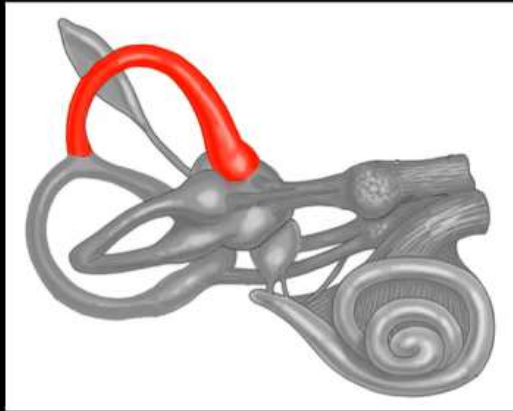


# Organ targeted vestibular physiotherapy

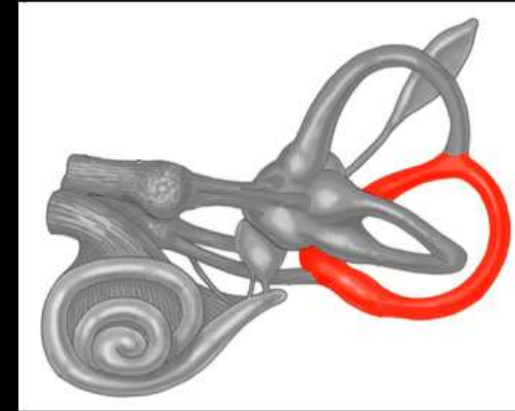


# Organ targeted vestibular physiotherapy

**RIGHT EAR**



**LEFT EAR**

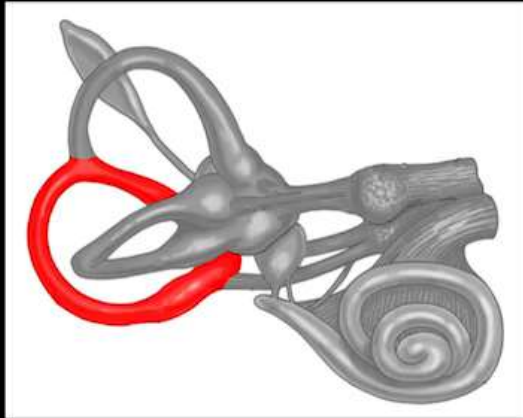


**THERAPY FOR DYSFUNCTION OF RIGHT ANTERIOR & LEFT POSTERIOR CANAL**

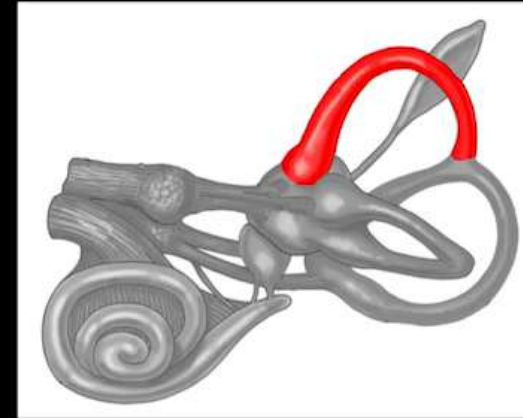
**THERAPY FOR STIMULATING THE ANTERIOR AND POSTERIOR SEMI-CIRCULAR CANALS**

# Organ targeted vestibular physiotherapy

**RIGHT EAR**



**LEFT EAR**



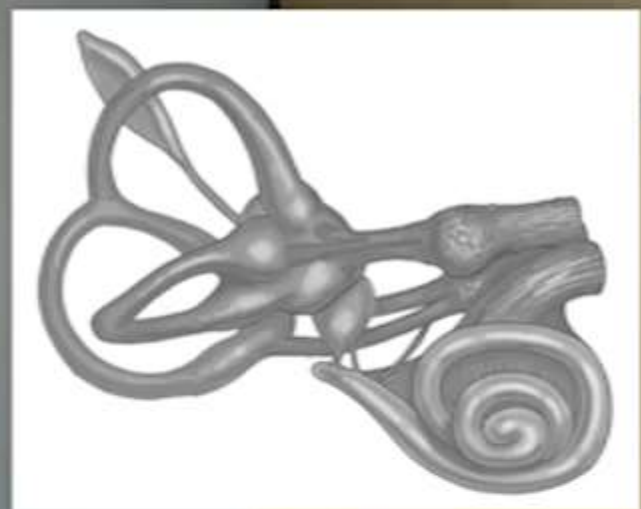
**THERAPY FOR DYSFUNCTION OF LEFT ANTERIOR & RIGHT POSTERIOR CANAL**

**THERAPY FOR STIMULATING THE ANTERIOR AND POSTERIOR SEMI-CIRCULAR CANALS**

# Organ targeted vestibular physiotherapy



**THERAPY FOR DYSFUNCTION OF SACCCULE**



**THERAPY FOR DYSFUNCTION OF SACCCULE**

# High frequency stimulation of the sacculle



# Organ targeted vestibular physiotherapy



# Organ targeted vestibular physiotherapy



**THERAPY FOR DYSFUNCTION OF UTRICLE**



# Organ targeted vestibular physiotherapy



**THERAPY FOR STIMULATING /SENSITISING PROPRIOCEPTORS IN THE SOLES OF THE FEET**

# Vestibular physiotherapy for balance improvement



**THERAPY FOR GENERAL BALANCE IMPROVEMENT & STIMULATING PROPRIOCEPTORS**

# Physiotherapy for improvement of gait



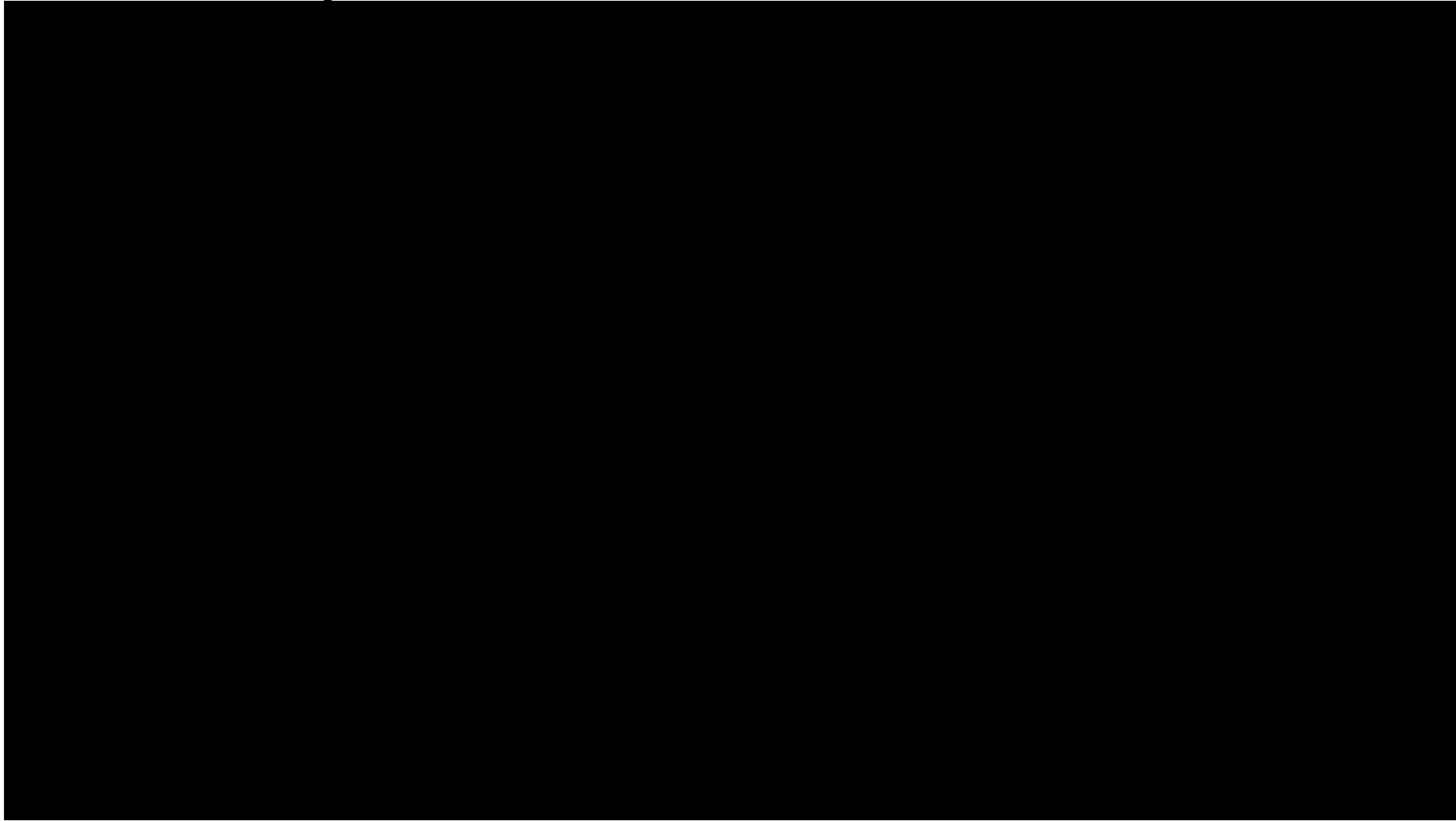
**THERAPY FOR IMPROVEMENT of GAIT**

# Physiotherapy for improvement of coordination



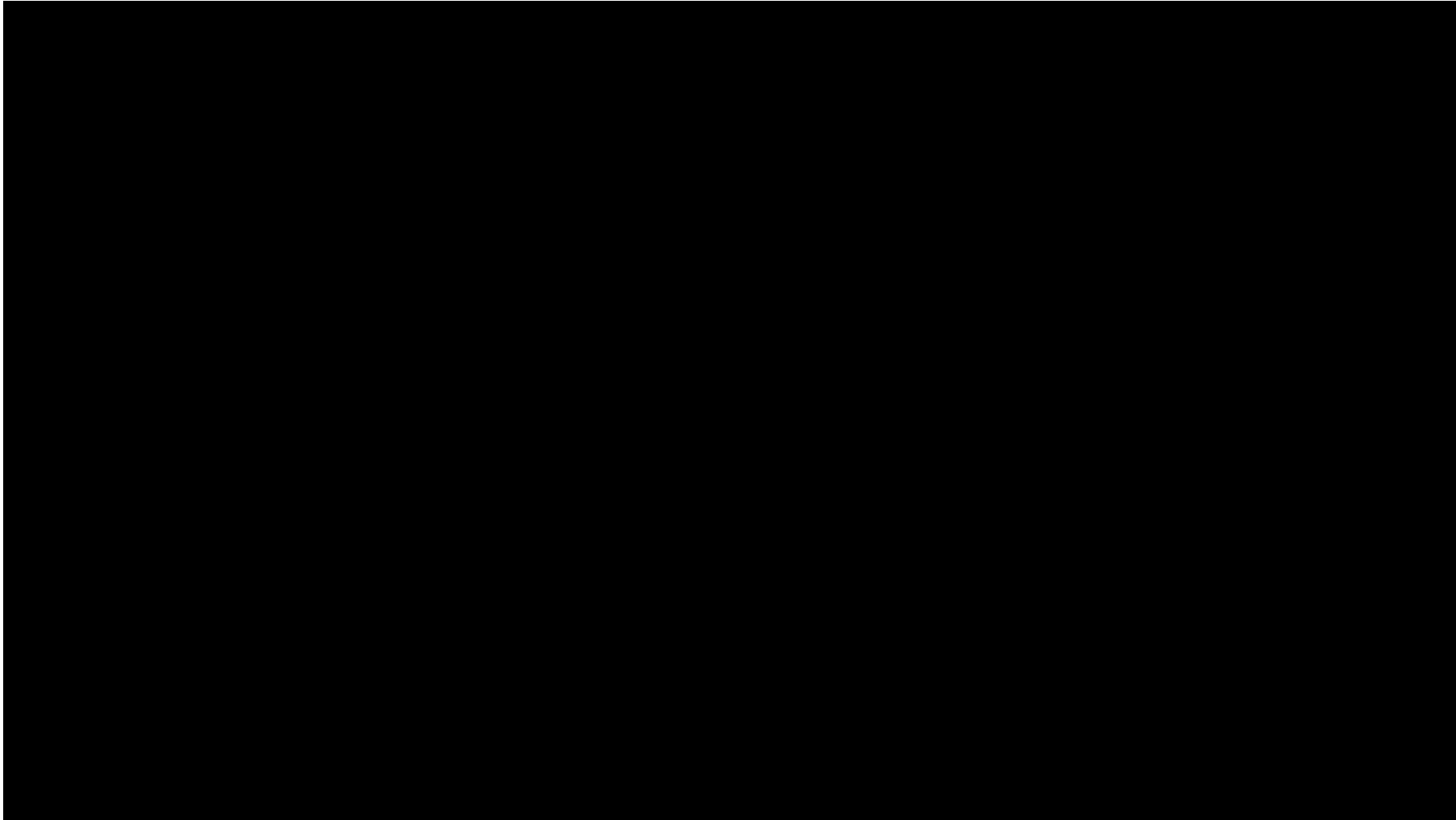
**THERAPY FOR IMPROVEMENT of COORDINATION & GENERAL BALANCE**

# Virtual Reality (VR) in vestibular physiotherapy



**THERAPY FOR ADAPTATION by VIRTUAL REALITY**

# Virtual Reality (VR) in vestibular physiotherapy



**THERAPY FOR ADAPTATION by VIRTUAL REALITY**

# Results of our study on 53 patients

Assessed Pre-therapy and Post therapy by:-

- Activity Balance Confidence Scale,
  - Burg Balance Scale
  - Dizziness Handicap Inventory scale
- 
- Results show:-
    - Gross improvement in all three parameters after 10 sessions Average improvement in the scores was between 30% to 85%

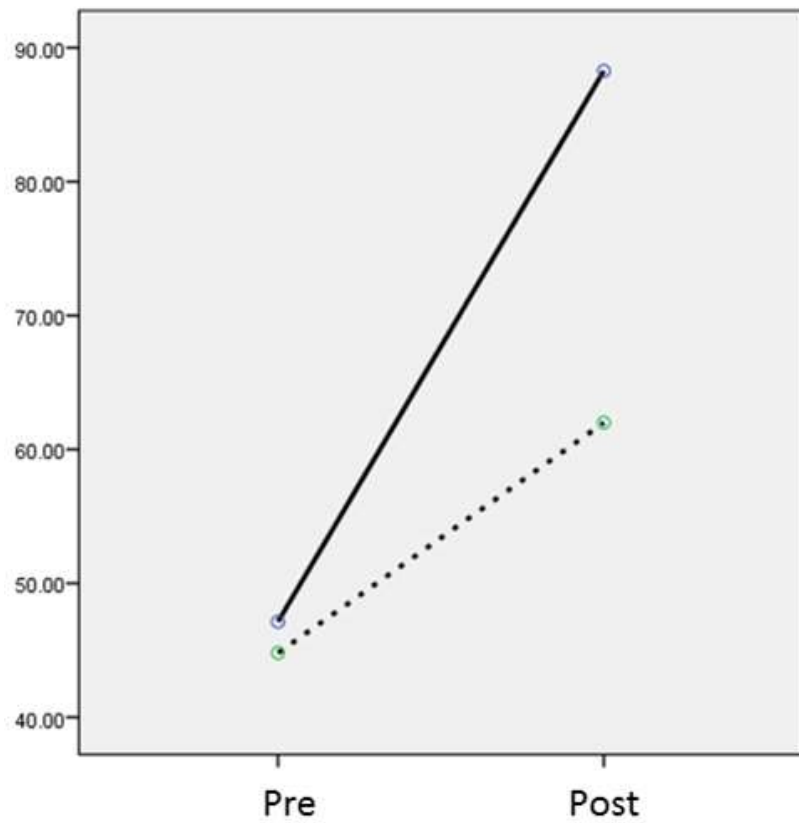
# A Controlled Study on 30 patients with OTOLITH dysfunction

15 with Cawthorne Cooksey Exercises only and 15 with our specific organ targeted physiotherapy

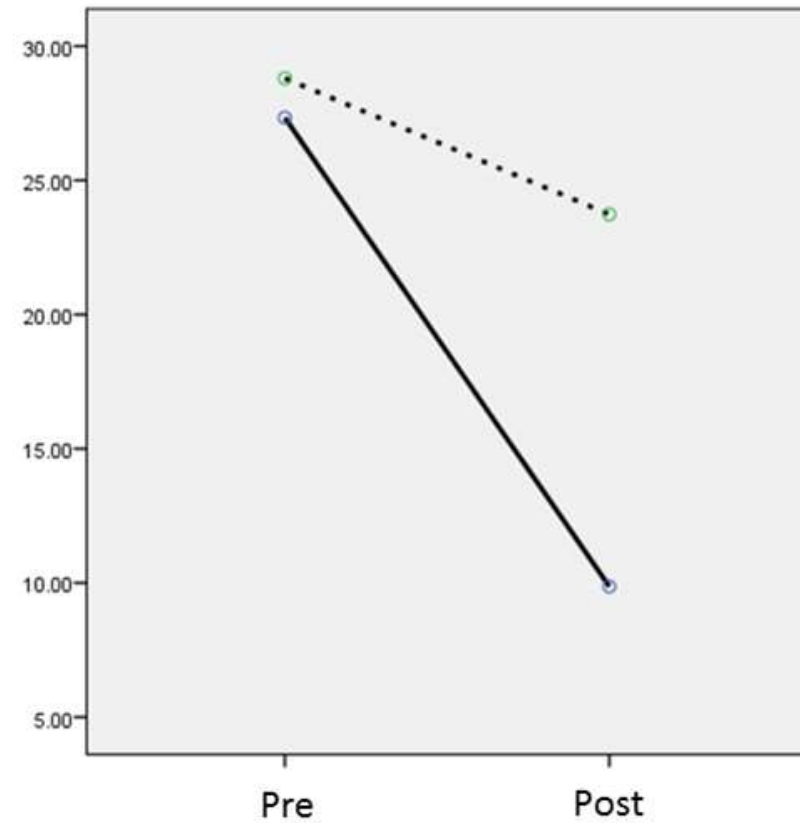
SUBJECTS	VESTIBULOMETRY	PHYSICAL THERAPY INTERVENTION	ABC (%) PRE TREAT	ABC (%) POST TREAT	BBS(_/56)PRE TREAT	BBS(_/56)POST TREAT	DHI PRE TREAT	DHI POST TREAT
SUB 9	ab utricular	Specific organ therapy,Balance training	62	92	38	50	24	10
SUB 10	ab utricular	Specific organ therapy,Balance training	30	90	38	56	30	12
SUB 4	ab utricular	Specific organ therapy,Balance training	50	86	38	46	22	10
SUB 14	ab utricular	Specific organ therapy,Balance training	50	90	36	52	20	10
SUB 27	ab utricular	Specific organ therapy,Balance training	52	90	34	50	24	8
SUB 31	ab utricular	Specific organ therapy,Balance training	54	90	36	54	36	12
SUB 45	ab utricular	Specific organ therapy,Balance training	46	90	39	52	28	10
SUB 50	ab utricular	Specific organ therapy,Balance training	50	92	43	55	30	8
SUB 51	ab utricular	Specific organ therapy,Balance training	62	94	45	54	22	6
SUB 22	sacculae	Specific organ therapy,Balance training	40	60	32	46	34	16
SUB 37	sacculae	Specific organ therapy,Balance training	38	86	39	54	26	10
SUB 44	sacculae	Specific organ therapy,Balance training	45	88	38	52	24	12
SUB 64	sacculae	Specific organ therapy,Balance training	42	92	36	52	28	10
SUB 66	sacculae	Specific organ therapy,Balance training	40	90	34	50	32	8
SUB 80	sacculae	Specific organ therapy,Balance training	46	94	38	54	30	6
SUB 6	ab utricular	Cawthorne-Cooksey Exercises	50	64	34	42	24	18
SUB 15	ab utricular	Cawthorne-Cooksey Exercises	40	58	32	38	32	26
SUB 25	ab utricular	Cawthorne-Cooksey Exercises	42	60	34	40	30	26
SUB 30	ab utricular	Cawthorne-Cooksey Exercises	48	64	38	42	28	24
SUB 36	ab utricular	Cawthorne-Cooksey Exercises	40	56	30	38	32	24
SUB 6	ab utricular	Cawthorne-Cooksey Exercises	38	56	30	39	28	22
SUB 12	ab utricular	Cawthorne-Cooksey Exercises	36	52	28	38	26	22
SUB 18	ab utricular	Cawthorne-Cooksey Exercises	48	66	36	40	30	24
SUB 38	ab utricular	Cawthorne-Cooksey Exercises	46	66	36	42	30	24
SUB 65	ab utricular	Cawthorne-Cooksey Exercises	44	64	34	38	26	22
SUB 78	sacculae	Cawthorne-Cooksey Exercises	42	60	32	38	26	22
SUB 76	sacculae	Cawthorne-Cooksey Exercises	48	66	35	40	30	26
SUB 82	sacculae	Cawthorne-Cooksey Exercises	52	68	38	42	32	28
SUB 58	sacculae	Cawthorne-Cooksey Exercises	50	68	38	46	30	24
SUB 61	sacculae	Cawthorne-Cooksey Exercises	48	62	36	44	28	24







ABC



DHI

- Specific Training Group
- ..... Cawthorne-Cooksey Exercise Group

# Special findings:-

## Patients with PPV and PPPD showed

- remarkable improvement with VR therapy +SSRI and 4pts who had drowsiness with SSRIs, showed improvement in all the 3 parameters only with VR+ balance improvement exercises

## • Patients with semi-circular canal dysfunction but no known disease

- significant improvement with PT for specific canals

## • Patients with utricular hypo-activity

- partial improvement with PT for utricular stim

## • Patients with saccular derangement

- significant improvement with low and high freq saccular stim

# Take home message

- A new look and a new mind-set for management of vestibular disorders is warranted in the current scenario
- Organ / system targeted vestibular physiotherapy is very effective, result-oriented and based on scientific logic
- Virtual Reality therapy is very effective for many types of psychogenic balance disorders
- TARGETED and SPECIFIC THERAPY both for drugs as well as for physical therapy is the most effective treatment modality to be embraced by clinicians

**Thank you**

# Physical Therapy



**THERAPY FOR IMPROVEMENT of COORDINATION & GENERAL BALANCE**