Vestibular Rehabilitation Therapy

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What is Vestibular Rehabilitation Therapy (VRT)?

- VRT is an exercise-based program designed to promote CNS compensation for inner ear deficits.

- The goal of VRT is to retrain the brain to recognize and process signals from the vestibular system in coordination with vision and proprioception.

- This often involves desensitizing the balance system to movements that provoke symptoms.
Why is VRT needed?

- When the vestibular organs are damaged with disease or injury, the brain can no longer rely on them for accurate information about equilibrium and motion.
  - Dizziness
  - Vertigo
  - Balance problems
  - Nausea
  - Headaches
  - Nystagmus
Spontaneous Nystagmus

- Nystagmus
  - Involuntary oscillation of the eyes
  - Typically has a fast and a slow component that alternate in opposite directions
- The direction of the fast component defines the direction of the nystagmus
What are the effects of VRT and how does it help?

- Some exercises and activities may at first increase in symptoms as the body and brain attempt to sort out the new pattern of movements.
- However, in most cases balance improves over time if the exercises are correctly and faithfully performed.
- VRT is very successful.
Anatomy of the EAR

- Ear Canal
- Inner Ear
- Eustachian Tube
- Pinna
- Eardrum
- Middle Ear
Inner Ear

- Cochlea
- Saccule
- Utricle
- Anterior semicircular canal
- Posterior semicircular canal
- Ampulla
- Lateral semicircular canal
- Vestibule
Inner Ear

- The boney labyrinth is a series of hollow channels
  - Central chamber: Vestibule
  - Anterior chamber: Cochlear
  - Posterior chamber: Vestibular
Pathophysiology of Common Vestibular Disorders

- Vestibular Neuritis
- Benign Paroxysmal Positional Vertigo (BPPV)
- Labryrithitis
  - Inflammation of the inner ear caused by a virus
- Meniere’s Disease
  - Overproduction of endolymph that causes edema of the endolymphatic spaces and damages hair cells in the cochlea and vestibular organs
- Acoustic Neuroma
- Cervical Vertigo
- Head Trauma
BPPV

- The most commonly seen in physical therapy clinic
- It accounts for 6 million clinic visits in U.S. every year

Positional Vertigo

- Spinning sensation caused by changes in head position
  - Prone to Supine/Supine to Prone
  - Looking over your shoulder
  - Blow drying your hair
BPPV Symptoms

- Vertigo
- Short Duration (Paroxysmal)
  - Lasts seconds to minutes
- Positional onset
- Nausea
- Nystagmus
  - Last about 30 seconds or more
- Syncope
  - Fainting spells during positional change
Cause of BPPV

- Within the labyrinth of the inner ear lie collections of calcium crystals known as otoconia.

- In patients with BPPV, the otoconia are dislodged from their usual position within the utricle.

- They migrate over time into one of the semicircular canals (the posterior canal is most commonly affected due to its anatomical position).

- When the head is moved against gravity, the gravity-dependent movement of the heavier otoconial debris ("ear rocks") within the affected semicircular canal causes abnormal endolymph displacement causing vertigo to occur.
Otoconia

“Ear Rocks”
Development of the Treatment Plan for a Person with a Vestibular Disorder

- Patient Complaints (Dizziness, Imbalance)
- Oculomotor Exam
- Motion Provoked Testing
- Balance
- Functional Limitations

Treatment Plan
What happens during VRT?

- PT will perform a thorough evaluation that begins with
  - Symptoms
    - Describe the symptoms
      - Try not to use the word dizzy
        - Dizziness can have several meanings
        - Modified Vertebral Artery Test
  - Past Medial history
    - Including Medication
      - Some medications can cause dizziness
        - Blood pressure medications
        - Antidepressant Drugs
What happens during VRT?

- Subjective Measure of Dizziness
  - Dizziness Handicap Inventory
    - Measure of self-perceived disability attributable to vestibular disease
  - Vertigo Symptom Scale
    - Consists of 2 subscales
      - Anxiety
      - Vertigo
  - Vertigo Handicap Questionnaire
    - Measures effect of vertigo on physical and social function
What happened during VRT?

- Dizziness Questionnaires
  - Can be useful to gather information from the patient before they even come to the clinic
  - Can assist the therapist in ensuring important questions regarding the history are asked and answered
During the initial examination the PT will use balance and gait assessment tools:

- Tinnetti Assessment Tool
- Berg Balance Scale
- Single Leg Stance, Romberg
- Dynamic Gait Index
- Functional Gait Assessment
- Foam and Dome
Vestibular Compensation Exercises (CRP)

- Canalith Repositioning Procedures
  - These procedures help reduce the feeling of dizziness by moving tiny particles that are stuck in a sensitive portion of the inner ear
  - Otoconia “calcium crystals”
    - Epley Maneuver
      - Uses four 30 second position sequences
    - Semont Maneuver
      - The patient is quickly moved from lying on one side to the other.
Treatment Plan

The most effective treatment plan will be individualized to the patient’s complaints, impairments, and disabilities.
Certification

- Physical therapists and PTAs typically need a week or two of intensive course instruction in order to be certified in VRT.

Contact:
- Vestibular Disorders Association (VEDA)
  - www.vestibular.org
Oculomotor Exam

- Allows the clinician to examine the interaction between the patient’s visual and vestibular systems by having the patient perform a variety of head and eye movements.

![Diagram]

Figure 2A: Look straight ahead.
Figure 2B: Turn your head 45 degrees towards the right.
Figure 2C: Turn your head 45 degrees towards the left.

Note: Business card should be positioned at eye level. © T.C.Hain, 2002
What is Vestibular Rehab. Therapy?

A. Exercise Program designed for ears, eyes and nose deficits

B. Exercise based program designed to promote CNS compensation for inner ear deficits

C. Rehabilitation for the middle ear
Quiz

What are some symptoms of VRT?
- A. Vertigo & Nystagmus
- Sweating & Dizziness
- Dizziness & High Blood Pressure

What is nystagmus?
- A. Involuntary eye movement
- B. Voluntary eye movement
- C. No eye movement
Quiz

- VRT is not very successful
  - True      False

- What is the most common vestibular disorder?
  - A. Vestibular Neuritis
  - B. Benign Paroxysmal Positional Vertigo
  - C. Head Trauma
Quiz

- What are the calcium crystals in the inner ear called?
  - A. Osteophytes
  - B. Endolymphs
  - C. Otoconia

- Anyone can do VRT?
  - True  False
References

