

# **A Vestibular Rehabilitation Program for the Disequilibratory Patient**

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When medical or surgical intervention is not indicated for the disequilibratory patient, very little is available in terms of rehabilitation beyond conventional labyrinthine exercises. This paper describes a vestibular rehabilitation training program developed by the author and completed with 30 patients to date. The program consists primarily of (a) education and counseling, (b) physiological compensation activities, and (c) psychological compensation activities. In addition to conventional labyrinthine exercises, techniques include progressive relaxation, visualization and imaging, and systematic correction of patients' gait and movement errors to facilitate symptomatic alleviation.

Both audiologists and otologists are often involved in the assessment of patients whose primary complaint is dizziness. Dizziness is an all-encompassing term which may denote a variety of symptoms including lightheadedness, unsteadiness, gait disturbances, and true vertigo (a hallucination of movement); accompanied by nausea, vomiting, perspiration, blurring of vision, and other sensations; often resulting in a complete disruption of the patient's life. Diagnostic tests to determine site of lesion, including electronystagmography (ENG), are used widely.

If the etiology cannot be determined, or medical/surgical treatment fails to provide relief from the symptoms, these patients are often left to "live with it." They learn that certain activities or positions bring on the dizziness, and these movements are avoided; however, they remain symptomatic, and fear of future attacks may result in great anxiety and emotional disturbances (Shea, 1965).

Rehabilitation beyond medication and/or surgery is usually in the form of labyrinthine exercises and/or induction of dizziness to achieve habituation. Most often utilized are the Cawthorne-Cooksey vestibular exercises (Cawthorne, 1946; Cooksey, 1946) and Deliberate Dizziness Therapy (DDT) (Simmons & Goode, 1972).

As described by McCabe (1970), the Cawthorne-Cooksey vestibular exercises serve to encourage an attenuation of the vestibular symptoms through physiological compensation. When input from some part of the inner ear is lost, the brain compensates over time by experiencing over and over again those movements which bring on the dizziness. In

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other words, dizziness (or imbalance) itself serves to promote compensation, thus alleviating the dizziness (or imbalance) (McCabe, 1970).

The degree of vestibular compensation varies, depending on the age of the patient, stability of the lesion, and etiology of the disorder (Black, 1975; McCabe, 1970). In addition, for those patients in whom vestibular sensitivity shifts widely, as with Ménière's Disease and vertebrobasilar artery insufficiency, the exercises may be of no benefit at all (McCabe, 1970). Clinicians have reported an inability to predict outcome (Hecker, Haug, & Herndon, 1974; Traynor, 1982). Hecker et al. (1974) counsel patients on the initial visit that they may or may not obtain symptomatic alleviation through the use of the exercises.

When compensation does not occur, patients may be able to habituate. Batin (1974) described habituation as a process whereby the individual adapts to new and complex stimuli. In DDT (Simmons & Goode, 1972), caloric irrigation induces vertigo in order to facilitate habituation to vestibular symptoms. Because the procedure is extremely uncomfortable for the patient, it has not received wide acceptance as a rehabilitative procedure (Traynor, 1982).

The purpose of this paper is to describe an alternative vestibular rehabilitation training program. The program includes counseling and education, progressive relaxation, visualization and imaging techniques, and evaluation and correction of patients' movement and gait errors, in addition to standard labyrinthine exercises. Its goals are immediate symptomatic relief, long-term alleviation of the problem, and speedy return to normalcy.

### **VESTIBULAR REHABILITATION TRAINING PROGRAM**

Patients referred for vestibular rehabilitation training (VRT) present with a wide variety of disorders resulting from, for example, head trauma, stroke, fibrositis, and labyrinthitis. Many are enrolled in concurrent programs such as cognitive retraining, physical therapy, and pain management. VRT is conducted in either the clinic or the home. Direct physician referral is required.

Prior to being referred for VRT, the patient must undergo a complete audiovestibular evaluation. Audiometry, electronystagmography, and auditory brainstem response testing are used to identify site of lesion, if possible. If medical or surgical alleviation is indicated, appropriate recommendations are made.

Components of the VRT program are listed in Table 1. Procedures are as described in the following sections.

#### **Counseling and Education**

Patients referred for VRT come to the initial session in various emotional states. For many, their disequilibratory symptoms have been longstanding, and they have been told that there was nothing that could be done to alleviate them. Often, patients have no clear understanding of the vestibular mechanism or the cause of their particular disorder and they respond to their symptoms with fear: fear of becoming ill during an attack, fear of falling and injuring themselves, and even fear of death.

Counseling and educating the disequilibratory patient are conducted in layman's terminology and consist of (a) description of the anatomy and physiology of the auditory and vestibular systems, (b) discussion of the patient's particular disorder and how it affects those systems, and (c) discussion of dizziness itself. Patients are assured that,

**Table 1**  
Components of the Vestibular Rehabilitation Training Program

1. Counseling and Education
2. Physiological and Physical Compensation Activities
a. Labyrinthine exercises
b. Correction of movement and gait errors
3. Psychological Compensation Activities
a. Progressive relaxation
b. Rotary vertigo imaging and control

while falling and injuring themselves during an attack is a possibility that must be guarded against, the disorder itself is not life-threatening. They are encouraged to get to know their dizziness, becoming as familiar as possible with its characteristics. Their first assignment is to provide a precise description of their dizziness (e.g., if they are spinning, to which direction and how fast; if they lose their balance, to which direction). It is expected that the patient will anticipate the next attack with less fear, having been given something precise to concentrate on.

Counseling can enhance adjustment to the problem. Many patients report feeling that their problem had been brushed off because no one had explained the disorder or allowed them to voice their feelings and fears. Through counseling and education, they learn that they are not alone, that others suffer from similar symptoms. The initial counseling session can result in patients feeling greatly relieved and hopeful, as well as less fearful of subsequent attacks.

#### **Physiological and Physical Compensation Activities**

*Labyrinthine exercises.* The labyrinthine exercise program is described in Table 2. As McCabe (1970) has suggested, patients are informed at the outset that they may not achieve alleviation of symptoms through these exercises alone.

Patients are taken through the exercises step by step until they reach that point at which they experience significant dizziness. That point then becomes the initial cut-off. Thus, one patient may only be able to do eye movements in the sitting position, while another may initially perform all of the activities in the sitting position and the first two or three in the standing position. Patients are requested to do the exercises a minimum of three times daily, and more if possible, always beginning with eye movements in the sitting position and moving through to the agreed-upon end point.

When patients are able to perform 15-20 repetitions of an exercise without significant dizziness, it is considered mastered and the next exercise in the sequence is added. Patients are warned that it is normal for the exercises to exacerbate their symptoms; nevertheless, they are to be done consistently. Patient motivation is extremely important for completing this part of the VRT program. As patients are able to perform a greater number of repetitions of each exercise, they are motivated to continue.

*Correction of movement errors.* Because movements such as walking and head turning can result in dizziness for these patients, they tend to avoid them. They may hold their backs and necks stiff and their eyes straight ahead or on the floor while walking and

standing. This stiffness may include the lower back and legs. Daily avoidance of dizziness-producing movements can result in altered gait. To avoid losing their balance or "tripping over their own feet," they may walk close to a wall or other support.

Rather than being due to a disequilibratory disorder itself, movement errors may result from constraints patients place upon themselves and which have become habitual. A

**Table 2**  
Sequential Labyrinthine Exercises

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- A. FROM A SITTING POSITION (without arm rests)
1. Move eyes.
    - a. Up and down
    - b. Side to side
    - c. Repeat a and b, focusing on finger at arm's length
  2. Move head.
    - a. Forward and backward
    - b. Side to side
  3. Shrug shoulders.
  4. Rotate shoulders.
    - a. Forward
    - b. Backward
  5. Bend forward and touch ground.
  6. Rotate head with eyes open; then closed.
  7. Rotate head and shoulders with eyes open; then closed.
  8. Rotate head, shoulders, and torso with eyes open; then closed.
- B. WHILE STANDING
9. Repeat #1.
  10. Repeat #2.
  11. Repeat #6.
  12. Change from sitting to standing position with eyes open; then closed.
  13. Throw ball from hand to hand, above eye level.
  14. Throw ball from hand to hand, below knees.
  15. Change from sitting to standing while turning around.
  16. Repeat #7.
  17. Repeat #8.
- C. WHILE WALKING
18. Walk across room with eyes open; then closed.
  19. Walk up and down slope with eyes open; then closed.
  20. Walk up and down stairs with eyes open; then closed.
  21. Walk on uneven surface (e.g., gravel) with eyes open; then closed.
  22. Walk with one foot up on curb with eyes open; then closed. Repeat for other foot.
  23. Do any games involving stooping or stretching and aiming, such as bowling and shuffleboard.
  24. Stand on one foot with eyes open; then closed.
  25. Walk with one foot in front of the other with eyes open; then closed.
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*Note.* Portions of the above exercise program adapted from "Treatment of the Vertiginous Patient Using Cawthorne's Vestibular Exercises" by H.C. Hecker, C.O. Haug, and J. Herndon, 1974, *Laryngoscope*, 84, pp. 2067-2068.

rigid neck and gaze would not allow one to see irregularities in the surface of the floor. Stiff back and legs can result in dragging one's feet, tripping, or losing balance. Overall stiffness of the body may cause a sway while walking, thus stimulating the vestibular system further, causing a sensation of motion sickness.

To facilitate more natural, spontaneous movement, one-third of each therapy session is spent walking. Suggestions are given regarding head movements, eye movements, natural arm swing, bend of the legs, and rolling heel-to-toe action of the feet. Walking is done first on level ground, then irregular surfaces such as ramps, stairs, and gravel. The goal of daily practice is for conscious correction to become automatic, and for errant gait and posture to be replaced with easy, more natural movement. It is expected that patients will feel a lessening of disequilibrium, dizziness, and nausea while walking.

### **Psychological Compensation Activities**

*Progressive relaxation.* Progressive relaxation is a technique that has been used widely in psychotherapy. Designed by Jacobson (1938), the approach has been applied to a variety of disorders and complaints including stress/tension disorders, nervous disorders, and pain. In addition, it has been used to aid in the discomfort of childbirth.

The natural human reaction is to tense the musculature in an attempt to protect against the discomfort of an unpleasant physical or emotional stimulus. This tension causes the initial discomfort to worsen, which then increases the tension, and so forth. The primary purpose of progressive relaxation is to break the pain-tension cycle and replace the tension response with a relaxation response (Benson, 1975). Patients are taught to alternately tense and relax their muscles, thus learning the experience of relaxation and how to invoke it. They systematically visualize and relax each part of the body, releasing or "letting go" tension progressively in the feet, legs, arms, torso, neck, and head.

In VRT, patients are taught progressive relaxation and helped to invoke the relaxation response at the onset of the disequilibratory symptom until it becomes automatic. In addition, light touch and massage are used (a) to identify those muscles which remain tense (usually in the neck, shoulders, and upper back), (b) to facilitate patients' attention to them, and (c) to aid release of tension within them.

*Rotary vertigo imaging and control.* As the name suggests, this portion of the program is effective with true rotary vertigo (a sensation of spinning) and is used only with those patients reporting a rotary sensation. After the first homework assignment to describe their dizziness precisely, patients are asked to "show me your dizziness." Using circular arm and finger motions, patients develop a motoric representation of their vertigo.

Patients are then led through an exercise in which a visual image is assigned to the vertigo. The image depends on the patient. While one individual may adopt an image of a merry-go-round, another may rely merely on the image of a finger going around in time with the vertigo. At this point in the session, vertigo is deliberately induced, usually through rapid movement. Patients are asked to "follow the dizziness," employing the motoric representation previously created and, at the same time, to concentrate on the visual image they have chosen. Finally, patients are given a verbal command to slow the speed of the motoric action (or to drag the motion as if brakes were being applied) while slowing the speed of the visual image, thus slowing and eventually stopping the vertigo.

This imaging and control technique has been immediately successful with all 30 of the author's clients who have had rotary vertigo. Each has been able to slow, then stop, the vertigo within 10 seconds on the initial attempt. Reaction to the immediacy of this effect

is often very dramatic and emotional as represented by one man's tearful comment: "For five years, I have been dizzy and thought that there was nothing I could do about it. Now, in five minutes, I have learned that I can stop the dizziness. I can control it, instead of letting it control me." Initially, the imaging exercise takes a great deal of concentration, and usually must be accompanied by the motoric action in order to be successful. Because patients are instructed to employ this technique *every time* they experience vertigo, proficiency in the technique usually follows rapidly. As with progressive relaxation, patients learn with practice to invoke the visual image quickly without using the motoric cue. Some may be able to stop the rotary vertigo before it even begins, without interrupting normal activities. The goal is for patients to control the vertiginous symptom and carry on normal activities, even if they remain symptomatic.

### DISCUSSION

This paper has described a vestibular rehabilitation program which uses standard labyrinthine exercises, correction of movement and gait errors, progressive relaxation, and imaging and control exercises in order to facilitate alleviation of disequilibratory symptoms.

Because each patient's etiology of disorder and complaints are unique, the therapy plan is highly individualized. Vestibular therapy typically has consisted solely of labyrinthine exercises and/or dizziness induction to facilitate habituation. Psychological compensation activities, in addition to more conventional physiological compensation activities, afford a second mechanism for symptom relief, even if physiological compensation never occurs and a patient remains symptomatic.

Clinicians who wish to apply the program components described in this paper in their own settings should familiarize themselves with progressive relaxation methodology. In addition, clinicians are cautioned to work closely with physicians, physical therapists, and others involved in the overall management of the patient so that patient injury can be avoided and carry-over of activities into other disciplines can be facilitated.

Finally, although the program described in this paper has been completed with 30 patients and appears to show promise as a therapeutic method, validation of program efficacy is critical as a topic of future research. Pre- and post-therapy patient questionnaires, numerical tallies of specific behaviors over time, and electronystagmographic recordings of eye movements during rotary vertigo imaging and control are three mechanisms through which quantitative data can be collected in order to investigate further the efficacy of the VRT program.

### REFERENCES

- Batin, R. (1974). *Vestibulography*. Springfield, IL: Charles C. Thomas.
- Benson, H. (1975). *The relaxation response*. New York: Morrow.
- Black, O. (1975). Vestibular causes of vertigo. *Geriatrics*, 30, 123-132.
- Cawthorne, T. (1946). Vestibular injuries. *Proceedings of the Royal Society of Medicine*, 39, 270.
- Cooksey, F.S. (1946). Rehabilitation in vestibular injuries. *Proceedings of the Royal Society of Medicine*, 39, 273.
- Hecker, H.C., Haug, C.O., & Herndon, J. (1974). Treatment of the vertiginous patient using Cawthorne's vestibular exercises. *Laryngoscope*, 84, 2065-2074.
- Jacobson, E. (1938). *Progressive relaxation*. Chicago: University of Chicago Press.
- McCabe, B.F. (1970). Labyrinthine exercises in the treatment of diseases characterized by vertigo:

- Their physiological basis and methodology. *Laryngoscope*, 80, 1429-1433.
- Shea, J.J., Jr. (1965). The treatment of Ménière's Disease. *Mississippi State Medical Association*, 11, 411.
- Simmons, F.B., & Goode, R.L. (1972). Deliberate dizziness therapy (DDT). *Archives of Oto-rhinolaryngology*, 95, 221-224.
- Traynor, R.M. (1982). Vestibular rehabilitation: The role of the audiologist. In R.H. Hull (Ed.), *Rehabilitative audiology*. New York: Grune & Stratton, Inc.