A CLINICAL APPROACH:

Vestibular Rehabilitation: Techniques for Geriatric Clients

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INTRODUCTION

Although many audiologists are involved with the diagnostic aspects of vestibular disorders, few are providing rehabilitative services for their "dizzy" patients. Even fewer are providing these services to the millions of vestibular impaired geriatric individuals. Too often, these patients are sent back to a "nursing home" or other residence after superficial counseling and/or labyrinthine exercise. These individuals often develop an extreme anxiety about their vestibular disorder which may result in a serious limitation of their daily existence. It is specifically devastating to the active elderly individual still contributing to society through regular or volunteer work. Dysequalibritory disease can often be the reason for entrance into a "nursing home" or other institution. Realizing this need among the elderly population, the following approach has been conducted with some success by the University of Northern Colorado, Geriatric Aural Rehabilitation Program, Greeley, Colorado. Due to the possibility of concomitant disorders, the techniques presented would ideally be conducted by an audiologist upon a physicians referral/clearance. Although the techniques presented are primarily designed for geriatric patients, the concept could be applied to other age groups by

adjusting the emphasis put upon certain components. In addition, it is hoped that this paper will stimulate conversation and much needed research in Vestibular Rehabilitation.

THE PROBLEM

The ability to maintain equilibrium depends upon the integrity of the vestibular, ocular, and proprioceptive modalities. If at anytime two or more of these modalities are not functioning normally, dysequilibrium occurs. Rubin and Norris (1974) suggest that the proprioceptive modality in geriatrics may possess the greatest number of problems as is often recognized by the individual's unsteady gate. When proprioceptive difficulties, due to age, are combined with pre-existing ocular and/or vestibular disturbances, varying degrees of dysequilibrium occur.

According to Sheldon (1960) and Droller *et al* (1953) over one-half of all elderly individuals possess a significant amount of dysequilibrium. The amount of dysequilibritory handicap experienced by an individual depends upon 1) the type and physiological degree of damage occurring within the vestibular, ocular and proprioceptive modalities, 2) the existence of other on-going systemic disturbances and 3) the psychological reaction to the dysequilibrium.

Although much has been documented regarding the incidence of ocular dysfunction among the aged, there appears to be a greater incidence of equilibritory dysfunction resulting from degeneration within the proprioceptive and vestibular modalities. Within the vestibular end-organ, Rosenhall (1973) reported a 21% reduction of macular hair cells in the utricle from individuals 70 to 95 years of age, 24% reduction of macular hair cells in the saccule of individuals 70 to 92 years of age and a 40% reduction of hair cells in each of the three semicircular canals from individuals over 70 years of age. Along the vestibular pathways, Bergstrom (1973) has shown that the reduction in the number of nerve fibers in elderly individuals is 37%. Krompotic-Nemanic (1969) refers to changes of vestibular functions, due to age, as "Presbystasis."

Presbystasis can occur "continuously" or "suddenly." Continuous presbystasis is usually due to a multitude of ongoing systemic problems such as reduced cerebral blood flow, decreased proprioception, presbyopia and other concomitant problems of aging. The sudden presbystasis, however, is more often due to some form of vasoconstriction decreasing the flow of blood in the vertebral arteries or the vertebrobasilar syndrome (Pathy, 1973). A sudden attack of this syndrome often occurs when an elderly individual turns his head or extends the cervical part of the spine while reaching up, thereby reducing the blood supply to vertebral vessels. The individual often loses his balance and/or consciousness.

Among geriatric clients, this disturbance can have a slight effect or cause violent illness. If the individual can learn to cope with this disturbing condition through some therapeutic method, then it is possible that the extent of the handicap can be reduced. This is especially true for geriatric clients who often over react to their dysequilibritory condition by less participation in social activities, limited ambulation, or refusing to get out of bed due to a fear of injury during a vertiginous attack.

SUGGESTED TECHNIQUES FOR USE WITH THE "DIZZY" GERIATRIC PATIENT

Vestibular Rehabilitation for geriatric clients should be conducted 15-30 minutes, once or twice per week. The sessions should consist of 1) obtaining a complete subjective and objective dizziness assessment, 2) counseling regarding the anatomical and physiological aspects of the disorder and 3) labyrinthine exercise/dysequilibrium induction treatment.

In addition to the physicians recommendation, the subjective dizziness assessment provides the audiologist with knowledge regarding the particularities of the problem, i.e.: which ear is involved, continuous or intermittent, positional, etc. The clinician should also have a recent electroystagmogram for the patients records as an objective assessment of the dysequilibrium. These data may then be utilized to determine the patient's treatment needs and baseline information.

Counseling the "dizzy" patient is as important as counseling the hearing impaired person in that they possess a disorder which has affected a complex mechanism which they may or may not understand. We must, therefore, provide information regarding the audio-vestibular system. This component is designed to reduce the patient's anxiety about the dysequilibrium. It consists of an explanation of the auditory mechanism utilizing colorful charts and models. The vestibular portion is given particular emphasis in terms of anatomy, physiology and the specifics of the patient's dysequalibritory disorder. Hecker (1969) noted that when patients were councelled about dysequalibrium, their adjustment to the problem was greatly enhanced.

According to McCabe (1970), labyrinthine exercise conducted under mild sedation has been successful in facilitating more rapid compensation in patients with peripheral vestibular disorders. The exercises outlined by Cooksey (1946) and Cawthorne (1962) have been successfully utilized by Hecker (1969), Hecker (1974) and Herdon (1975) to promote compensation among the vestibular impaired.

Cawthorne-Cooksey Vestibular Exercise Program to Overcome Dizziness (as presented by Hecker, 1974)

AIMS OF EXERCISE:

(1) To loosen up the muscles of the neck and shoulders in order to overcome the protective muscular spasm and tendency to move "in one piece."
(2) To train movement of the eyes, independent of the head.
(3) To practice balancing in everyday situations with special attention to developing the use of the eyes and the subcutaneous and kinesthetic senses.
(4) To practice head movements that cause giddiness, and thus gradually overcome the disability.
(5) To become accustomed to moving about naturally in daylight and in the dark.
(6) Generally, to encourage the restoration of self-confidence and easy spontaneous movement.

All exercises are started in exaggerated slow time and gradually progressed to more rapid time. The rate of progression from the bed to sitting and then to standing exercises depends upon the vertigo of each individual case. It has been found that group exercises encourages a steady rate of progress.

(A) In bed supine (only if patient cannot sit up), otherwise in sitting position without arm rest.
  (1) Head immobile, eye movements—at first slow, then quick.
    a)Up and down.
    b) Side to side.
    c) Repeat a) and b), focusing on finger.
    d) Focusing on finger moving about 3 feet to 2 inches away from face and back.
  (2) Head mobile—head movements at first slow, then quick. Later with eyes closed.
    a) Bending forward and backward.
    b) Turn from side to side.

(B) Sitting position—without arm rests.
Repeat as in 1 and 2.
  (3) Shrug shoulders and rotate.
  (4) Bend forward and pick up objects from the ground.
  (5) Rotate head and shoulders slowly, then fast.
    a) Rotate head with eye open, then closed.
  (6) Rotate head, shoulders and trunk with eyes open, then closed.

(C) Standing.
  (7) Repeat Number 1.
  (8) Repeat Number 2
  (9) Repeat Number 5.

(10) Change from a sit to stand position, with eyes open, and then shut.
(11) Throw ball from hand to hand (above eye level).
(12) Throw ball from hand to hand under knees.
(13) Change from sitting to standing and turn around in between.
(14) Repeat Number 6.

(D) Walking.

(15) Walk across room with eyes open, then closed.
(16) Walk up and down slope with eyes open, then closed.
(17) Do any games involving stopping, or stretching and aiming, such as bowling, shuffleboard, etc.
(18) Stand on one foot with eyes open then closed.
(19) Walk with one foot in front of the other with eyes open then closed.

These exercises are usually conducted by the patient three times per day for at least five minutes. At each of these exercise periods the patient is asked to start from exercise No. 1 and proceed down to a point where they experience dysequalibrium. At this time, the patient stops exercising and waits for the next exercise period.

Although compensation has a definite physiological basis, in general it applies to individuals under age 60. Goertzen and Jacobson (1975) found that elderly clients did not compensate as easily or as rapidly as their younger counterparts utilizing labyrinthine exercises. This observation concurs with Black (1975) which states, the amount of vestibular compensation utilizing labyrinthine exercises becomes critically determined by the patient's age; i.e., the older patient, the poorer the prognosis. In addition, it appears that as the individual becomes older, the central processes designed to suppress or increase the input from each end-organ are not as well co-ordinated.

Among geriatric clients, labyrinthine exercise should be conducted to provide the patient with any available compensation, however, the clinician should be aware that past experience (Hecker 1974, McCabe 1970) indicates that a high level of motivation is necessary to achieve success.

A simple process of dysequalibrium induction may be utilized as part of labyrinthine exercise or singularly to demonstrate to the patient abilities and limitations during the dysequalibritory attacks. The goal of dysequalibrium induction is that of psychological adjustment to the disorder rather than physical compensation. The patient is put into a situation which aggravates the dysequalibrium. The clinician then works with the patient to provide assistance in ambulation, falling safely and other

essential tasks. The exercises may also be utilized to demonstrate to the patient abilities and limitations during the dysequilibritory attacks. Although this causes the dizziness, it facilitates pyschological adjustment. Through such improved psychological adjustment, we have found that often patients will be better able to ambulate and/or stay more active in the presence of a dysequilibritory disorder. The amount of time involved with each patient to achieve success seemed to be related to the clinicians rapport with the client.

The methodology though effective with this population may vary with the patient's age, motivation, and type of vestibular disorder. Although vestibular rehabilitation is a complex process, we as audiologists must begin providing rehabilitative assistance in addition to electronystagmography.

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