Increased independence and decreased vertigo after vestibular rehabilitation

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OBJECTIVE: **We sought to determine the effectiveness in decreasing some symptoms, such as vertigo, and increasing performance of daily life skills after vestibular rehabilitation.**

STUDY DESIGN AND SETTING: **Patients who had chronic vertigo due to peripheral vestibular impairments were seen at a tertiary care center. They were referred for vestibular rehabilitation and were assessed on vertigo intensity and frequency with the use of the Vertigo Symptom Scale, the Vertigo Handicap Questionnaire, the Vestibular Disorders Activities of Daily Living Scale, and the Dizziness Handicap Inventory. They were then randomly assigned to 1 of 3 home program treatment groups.**

RESULTS: **Vertigo decreased and independence in activities of daily living improved significantly. Improvement was not affected by age, gender, or history of vertigo.**

CONCLUSION: **For many patients a simple home program of vestibular habituation head movement exercises is related to reduction in symptoms and increasing independence in activities of daily living.** (Otolaryngol Head Neck Surg 2003;128:60-70.)

In the 1940s Cawthorne[1] and Cooksey[2] suggested a treatment for vertigo that was a radical departure from the traditional medical management that many physicians still use today. They suggested that encouraging patients with vertigo to move their heads repeatedly to elicit vertigo would eventually alleviate vertigo. Later groups described "vestibular habituation training" for adults with "vestibular hypofunction."[3,4] These reports indicated improvements in balance symptoms. The University of Michigan reports also introduced another improvement—the use of a therapist to administer intervention. Whitney and Rossi provide a more thorough review.[5]

Several articles describe broad-based vestibular rehabilitation programs for patients with chronic, uncompensated vertigo, excluding Meniere's disease and benign paroxysmal positional vertigo.[6,7] These programs may include balance training, strengthening, repetitive head movements for vertigo habituation, purposeful activities that incorporate repetitive head movements, and gaze stabilization exercises that also incorporate repetitive head movements. Cass et al[8] reported that within varying periods after their patients had received such broad-based vestibular rehabilitation programs, 60% of subjects had improved balance, decreased symptoms, and decreased disability. Similarly, Cowand et al[9] reported significant improvements in self-report of functional limitations after a vestibular rehabilitation program that involved multitask outpatient physical therapy followed by a postdischarge home program.

Two experimental studies combined head movement exercises and balance training. Horak et al[10] reported that subjects given repetitive head movement exercises and balance retraining improved more than did subjects given a medication regimen or a general conditioning program, but the groups were small, and the treatment duration varied. Szturm et al[11] reported improvements in posttest scores compared with pretest scores in balance for patients given a broad-based outpatient program plus a home program but not in a group doing only daily Cawthorne-Cooksey exercises at home. Curiously, the two groups were not compared statistically. The data from these studies are suggestive but, as with the descriptive reports, the critical parts of the programs were not clear. Head movement exercises or balance therapy alone could have caused the improvements.

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Cohen et al[12] showed that after 6 weeks of treatments using repetitive head movements, either a home program using head movement exercises or biweekly therapy sessions using purposeful activities plus a home program, subjects with chronic peripheral vestibular impairments improved on measures of balance, functional performance, and vertigo. Thus balance retraining, strength training, and specific gaze stabilization exercises were not essential for improvement. The key components were repetitive head movement and gradual increases in movement speed and visual/vestibular interaction. That the home program group did as well as the outpatient group, who also had a home program, was unexplained by the investigators and suggests that a home program alone may have been sufficient.

In the only study with a no-treatment control group, Yardley et al[13] found that after 6 weeks of intervention, subjects given a home program of head and body movement exercises plus relaxation exercises improved significantly on self-reported scales of symptoms, anxiety, vertigo, and functional limitations and on sharpened Rhomberg tests of standing balance. Differences between the exercise and control groups were greater after 6 months. Yardley and Hallam also studied the effect of vertigo and improvements in vertigo on psychosocial status using two self-assessments: the Vertigo Symptom Scale (VSS) and the Vertigo Handicap Questionnaire (VHQ).[14] The significant decrements on these scales suggest the influence of mental health issues on recovery.

One psychologic factor that has not been well addressed but is known among therapists is the contribution of *locus of control.* This term refers to the belief that one has influence over one's own destiny and is not just at the whim of forces beyond one's control. For example, a patient in an exercise program in rehabilitation must participate actively to strengthen a weak muscle. Passive range of motion by the therapist will not have the same effect. To be willing to participate, the patient must believe that he or she has the ability to effect the desired change. Strong locus of control should lead to greater willingness to engage in exercise and therefore should contribute to improved posttreatment scores. Yardley[15] has shown a relationship between handicap and low locus of control. As part of the development of the VSS and VHQ, she developed several questions about locus control, although these questions were not published (L. Yardley, unpublished data, personal communication). These questions were used in conjunction with those questionnaires in this study.

Patients complaining of chronic vertigo span the adult age range.[9,10,12] Studies of normal subjects suggest the occurrence of age-related decrements in vestibular function.[16] Curiously, however, no studies of vestibular rehabilitation have addressed the influence of age on recovery.

We sought to determine if a minimal home program of head movement exercises was sufficient to decrease vertigo and improve independence and psychosocial functioning in patients with chronic, uncompensated vestibular impairments. We also sought to determine if age and length of time from onset of symptoms affected the response to rehabilitation.

METHODS

Subjects

Subjects were recruited from patients referred to this laboratory for vestibular rehabilitation. All patients who met the inclusion criteria described here were invited to participate. Although 71 subjects had been recruited originally, several subjects were excluded, so the final sample on which data analyses were performed included 53 adults (38 women and 15 men; age range, 25 to 84 years; mean age, 51.1 ± 13.6 years; median age, 48 years). One subject each in groups 1 and 2 (the groups are described in Treatment Protocol later) requested that they be excluded due to unrelated illness (1 had cardiac arrhythmias and 1 was a passenger in an automobile accident); 1 subject each in groups 1 and 3 did not return after the pretest because they felt better; and 1 subject in group 2 stopped due to nausea. Physicians subsequently revised diagnoses in 5 subjects so they no longer fit the study criteria, and 5 subjects decided not to return after pretesting for unknown reasons. They included 1 subject in group 1 and 2 subjects each in groups 2 and 3. Data for 3 subjects were lost due to technical difficulties.

Every subject had a history of vertigo for at least 2 months (mean duration, 6.1 ± 12 years;

median duration, 1 year). (For brevity, for the remainder of this report the length of time that subjects reported having had vertigo before entering the study will be called *history*.) Every subject had been diagnosed with chronic vestibulopathy.[17] This diagnosis indicates the failure to compensate 2 months or more after experiencing some peripheral labyrinthine event. These patients are the group described by Whitney and Rossi[5] as being good candidates for vestibular rehabilitation. All subjects had true vertigo, not vague dizziness or giddiness, with or without disequilibrium. All subjects had range of motion of the neck within functional limits, and all subjects were ambulatory without assistance or gait aids. Patients were excluded if they had Meniere's disease, benign paroxysmal positional vertigo, acute vestibular neuronitis or labyrinthitis, significant orthopedic limitations, a history of head trauma, a history of neurologic disease, or a history of prior otologic disease. No patients took vestibular-suppressant medication.

Experienced physicians (ie, neurotologists on the faculty of this department or otolaryngologists or neurologists in the community) made all diagnoses based on clinical examination and objective diagnostic testing. Objective tests included computerized dynamic posturography (Equitest), bithermal caloric tests, and a battery of oculomotor tests, including saccades, smooth pursuit, optokinetic tests, and low-frequency sinusoidal rotatory testing in darkness. Every subject had a caloric weakness and/or rotatory asymmetry; some but not all subjects had abnormal posturography. Pretest vestibulo-ocular reflex (VOR) scores are shown in Table 1. The treatment groups did not differ significantly on any measures.

Pretest Assessments

To characterize vertigo, subjects were asked to rate the intensity of vertigo on a 10-point scale where 1 indicates no vertigo and 10 indicates extreme vertigo. They were asked to rate the frequency of vertigo on a 10-point scale where 1 indicates no vertigo and 10 indicates constant vertigo. For each of these scales, the subject viewed a 13 × 18-cm printed card on which the scale was printed and selected the number that most closely matched his or her experience.

Table 1. Pre-test results of rotatory and bithermal caloric tests of the VOR in darkness. Means, standard deviations in parentheses.

VOR sum gain 0.0125 Hz	0.4 (0.18)
VOR sum gain 0.05 Hz	0.6 (0.16)
VOR sum gain 0.2 Hz	0.72 (0.18)
VOR phase 0.0125 Hz	38.3 (16.3)
VOR phase 0.05 Hz	13.4 (9.9)
VOR phase 0.2 Hz	4.0 (5.5)
VOR bias 0.0125 Hz	1.0 (3.23)
VOR bias 0.05 Hz	0.7 (3.4)
VOR bias 0.2 Hz	0.9 (3.6)
Percent caloric weakness	21 (19.9)

To evaluate the psychologic impact of vertigo, subjects completed the VHQ and the VSS.[14] These well-normed, self-administered scales ask the individual about the occurrence of vertigo, the reactions of significant others to the individual's vertigo, and the individual's sense of self due to the vertigo. The original scales included nine questions on locus of control adapted from earlier work.[18] The data from these questions were summed according to advice from Yardley (personal communication). Yardley's locus of control questions are listed in Appendix A. To evaluate self-perceived independence in activities of daily living, subjects completed the Dizziness Handicap Inventory (DHI)[19] and the Vestibular Disorders Activities of Daily Living Scale (VADL).[20]

Treatment Protocol

After completing the pretest assessment, subjects were randomly assigned to 1 of 3 treatment groups. All groups were given written instructions with diagrams describing repetitive head movements to be performed as a home program 5 times per day. Each home program was designed to take approximately 5 to 10 minutes. Subjects were given either slow or fast head movements in pitch, roll, yaw, and circumduction. The investigator explained the premise of the program to each subject, demonstrated the exercises, and had the subject practice the exercises until he or she performed them correctly. All subjects performed their home programs for 4 weeks and then returned for posttesting. Group 1 (slow head movements while seated) started with 2 repetitions on each of 4 exercises, that is, 2 complete cycles, gradually increased to 10 cycles, at approximately

0.04 Hz, which was the lowest frequency at which most subjects could move smoothly. Although the investigator demonstrated the exercises at approximately 0.01 Hz, most subjects were unable to perform the program that slowly. Subjects were not advised to look at anything in particular. They were advised to increase the number of repetitions by 1 or 2 as tolerated.

Group 2 (rapid head movements while seated and while standing) started with 10 repetitions on each of 7 exercises performed at approximately 1.5 Hz: pitch, roll, yaw, and circumduction while seated and head and trunk pitch, roll, and yaw while standing in place. Subjects were advised to keep their eyes open and look at a stationary object in the room. They were instructed to increase the number of repetitions in increments of 5, as tolerated. For example, when the subject could perform 10 repetitions of downward/upward pitch (the motions that therapists call flexion/extension, respectively) without experiencing vertigo, then the subject increased the number of repetitions to 15. Subjects were instructed to move within a comfortable distance to avoid straining their necks. This set of instructions was adapted from a previously published home program.[12]

Group 3 (rapid head movements plus attention) received the same exercises as group 2 but also received a weekly telephone call to encourage compliance and give psychologic support.

Informed Consent

The principal investigator obtained informed consent during each subject's first appointment for vestibular rehabilitation but before the subject was given the pretest assessment. This study was approved by the Institutional Review Board for Human Subject Research for Baylor College of Medicine and Affiliated Hospitals.

Statistical Analysis

Multilevel modeling was used to analyze the data.[21] This statistical technique is useful for repeated measures designs because the same model can account for the correlations within groups and between repeated measurements on subjects. Unlike repeated measures analyses of variance, multilevel models explicitly describe the changes in the response variables as a function of time and permit the use of incomplete cases. Because the timing of measurements is explicitly used in the model, unlike a standard repeated measures analysis of variance, the effect of unequal timing of observations is to provide information.

Multilevel models incorporated changes (compensation) over the tests in measures of vertigo and other responses and the effects of covariates on rate of compensation. A separate model was fitted for each outcome. The multilevel models involved 2 levels: at level 1, the measurements for each individual over time were characterized by intercept and slope terms. The estimated regression coefficients for each individual were treated as a multivariate summary of that individual's response over time. At level 2, the coefficients from subjects were related to the effects of exercise, age, and vertigo intensity. The fit of each model to the data was evaluated by graphic analyses of the level 1 and level 2 residuals. Judgments about the significance of these variables were made by examining the improvement (deviance) in the $-2\ln(\text{likelihood})$ statistic after each variable or group of variables was added to the model and by examining the estimated regression coefficients and their standard errors. All subjects were analyzed in the groups to which they were originally assigned. STATA release 6.0 software (2000 version; STATA Corp, College Station, TX) and MLwiN version 1.10 (2000; Multilevel Models Project, Institute of Education, University of London, London, UK) were used for the analyses.

RESULTS

Level of Vertigo

Scores decrease with improvement on the vertigo intensity and frequency scales. Vertigo intensity decreased exponentially ($P < 0.001$), with the most dramatic changes in the first 30 to 45 days, followed by a more gradual decline (Fig 1). Changes were not associated with age, gender, history, or treatment group. Changes were moderately associated with changes in VSS locus of control questions ($P = 0.009$), and VHQ locus of control questions ($P = 0.001$). Changes were highly associated with changes in VADL Total score ($P = 0.004$) and weakly associated with changes in VADL Ambulation scores ($P = 0.044$).

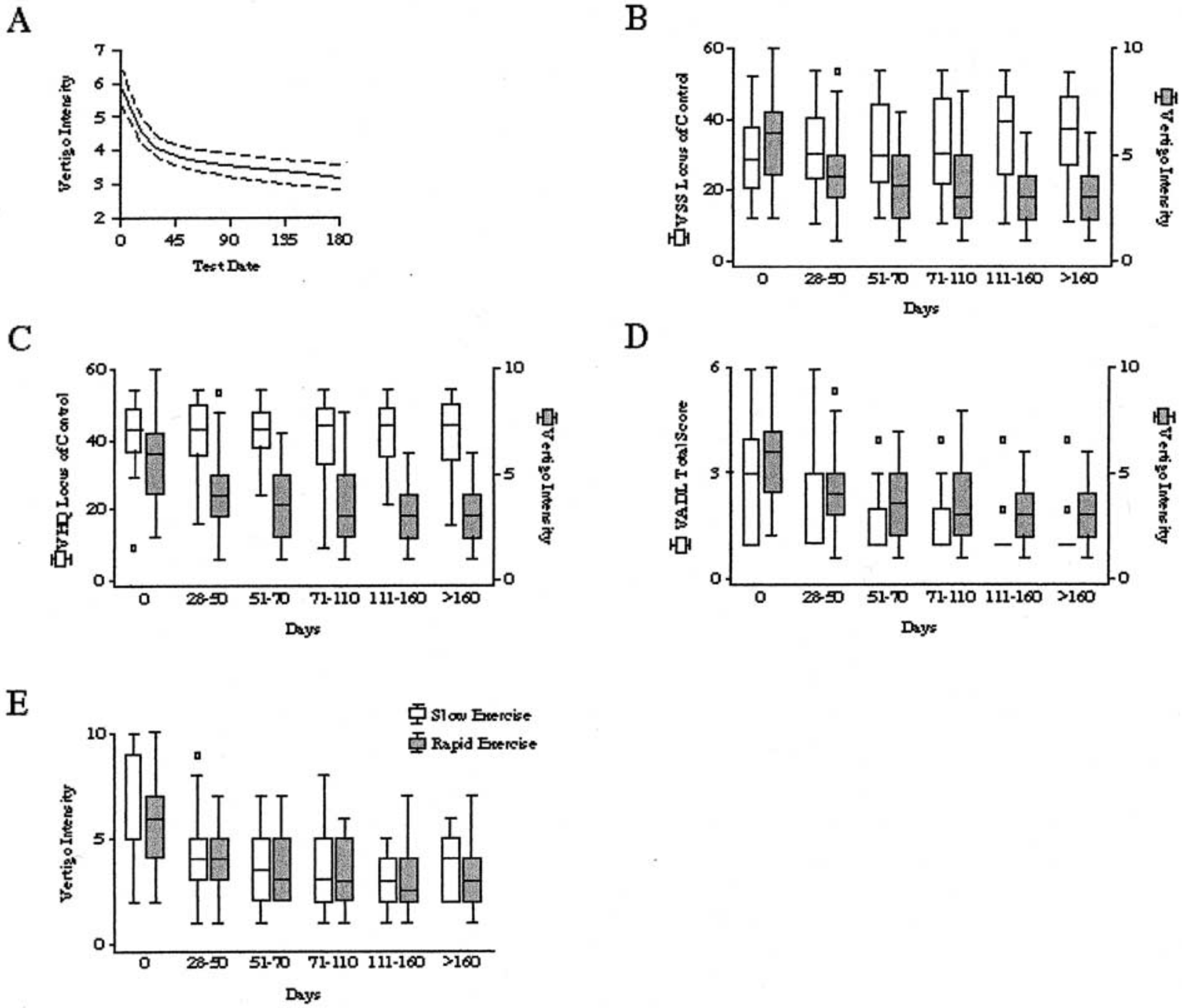

Fig 1. Vertigo intensity over time. **(A)** Changes in scores. The *curved solid line* indicates the mean score. *Curved dotted lines* indicate the 95% confidence interval. **(B)** Relationship to VSS locus of control over time. **(C)** Relationship to VHQ locus of control scores. **(D)** Relationship to VADL Total score. **(E)** Scores separated by treatment group. *White boxes* are slow exercise subjects (group 1), and *gray boxes* are fast exercise subjects (groups 2 and 3 combined). **(B, C, D, and E)** *Center horizontal bars* indicate the mean scores, the top and bottom lines of the *rectangles* represent the 75th and 25th percentiles respectively, and the upper and lower error bars indicate error bars indicate 90th and 10th percentiles, respectively. *Small circles* are outliers.

Vertigo frequency also decreased very highly significantly, with the most dramatic changes in the first 30 to 45 days ($P < 0.001$) (Fig 2). Changes were not associated with treatment group, age, or gender. Changes were weakly associated with changes in the VHQ locus of control question ($P = 0.027$) and VADL Total score ($P = 0.03$) and Ambulation score ($P = 0.03$). Changes were moderately associated with history ($P = 0.004$) and changes in locus of control questions from the VSS ($P = 0.015$).

Self-Efficacy in Functional Skills

On the VADL, the Total score showed very highly significant changes at the posttest, with slow and steady decreases over the 6-month follow-up period ($P < 0.001$). These changes were not associated with treatment group, age, gender, locus of control, or history of vertigo. As indicated in Figure 3, similar patterns were seen for Functional ($P < 0.001$), Ambulation ($P < 0.001$), and Instrumental ($P < 0.001$) subscores. The Instru-

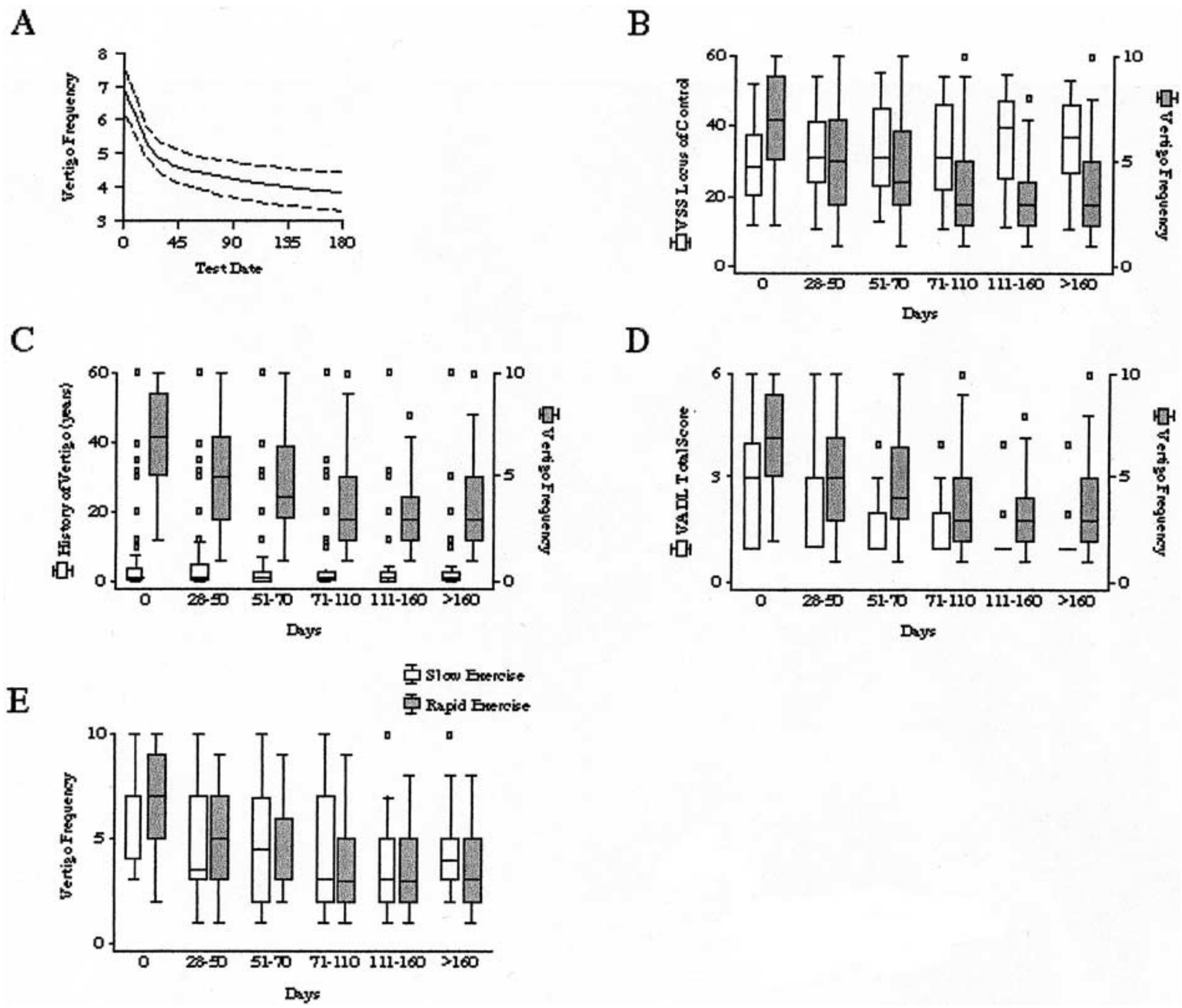

Fig 2. Vertigo frequency over time. **(A)** Changes in scores. The *curved solid line* indicates the mean score. *Curved dotted lines* indicate the 95% confidence interval. **(B)** Relationship to VSS locus of control over time. **(C)** Relationship to history. **(D)** Relationship to VADL Total score. **(E)** Scores separated by treatment group. *White boxes* are slow exercise subjects (group 1), and *gray boxes* are fast exercise subjects (groups 2 and 3 combined). **(B, C, D,** and **E)** *Center horizontal bars* indicate the mean scores, the top and bottom lines of the *rectangles* represent the 75th and 25th percentiles respectively, and the upper and lower error bars indicate error bars indicate 90th and 10th percentiles, respectively. *Small circles* are outliers.

mental subscore was weakly associated with changes in locus of control on the VSS (P=0.04) (Fig 4).

As with the VADL, DHI scores decreased (ie, improved) sharply from pretest to posttest and then continued to decline over the 6-month follow-up period ($P < 0.001$) (Fig 5). Changes were not associated with treatment group, age, gender, or history of vertigo. Changes were very highly associated with changes in the locus of control scores from the VSS ($P = 0.001$), indicating that DHI Total score improved as locus of control score improved over time. Changes on the DHI Total score were also very highly associated with VADL Total score ($P < 0.001$) and with VADL Ambulation score ($P < 0.001$). Thus DHI Total score decreased as VADL scores decreased.

On the VSS, scores decrease with improvements. Scores decreased very highly significantly from pretest to posttest and then decreased more gradually over the 6-month follow-up period ($P < 0.001$) (Fig 6). Changes were very highly associated with changes in locus of control questions from this question-

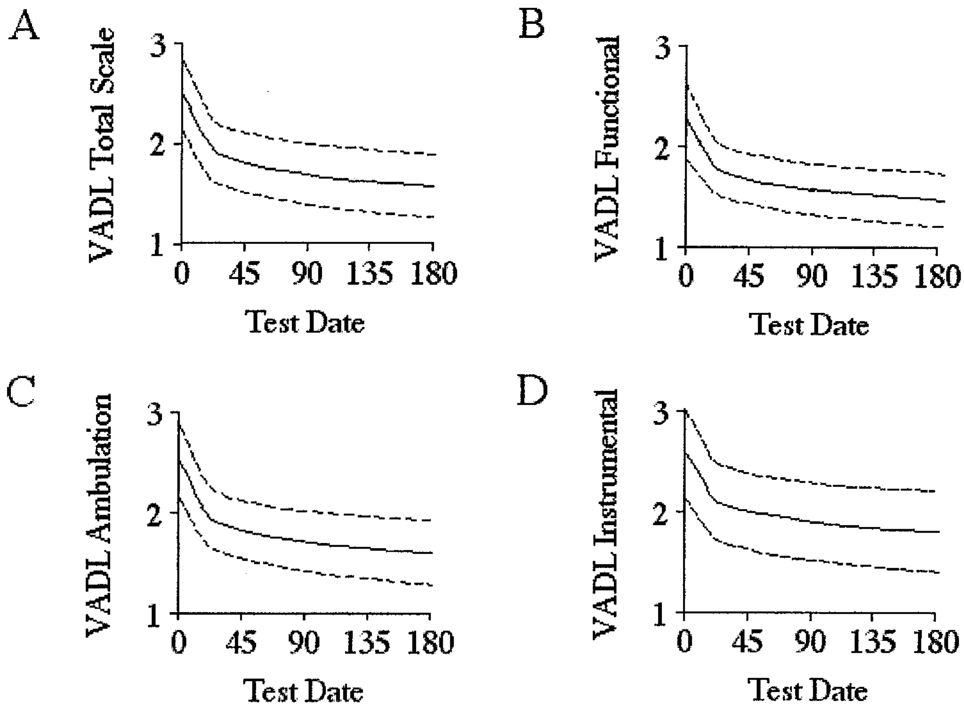

Fig 3. VADL scores over time. The *curved solid lines* are mean scores. *Curved dotted lines* indicate the 95% confidence intervals. On all graphs the confidence intervals become wider at the final test dates because some subjects chose not to return for testing. **(A)** Total score. **(B)** Functional subscore. **(C)** Ambulation subscore. **(D)** Instrumental subscore.

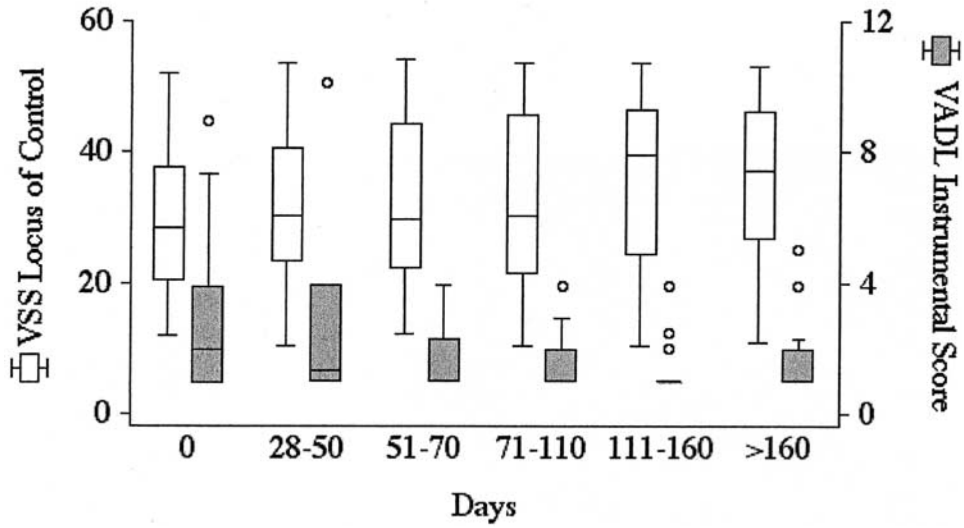

Fig 4. VADL Instrumental scores and VSS locus of control scores over time. The *dark center circle* or *square* indicates the mean score, *center horizontal bar* indicates the median score, the top and bottom lines of the *rectangles* represent the 75th and 25th percentiles respectively, and the upper and lower error bars indicate error bars indicate 90th and 10th percentiles, respectively.

naire ($P < 0.001$), indicating that the Total score decreased as locus of control increased. Changes were mildly associated with treatment group ($P = 0.016$), indicating that group 1 leveled out before groups 2 and 3. This difference is barely detectable and is unlikely to be clini-

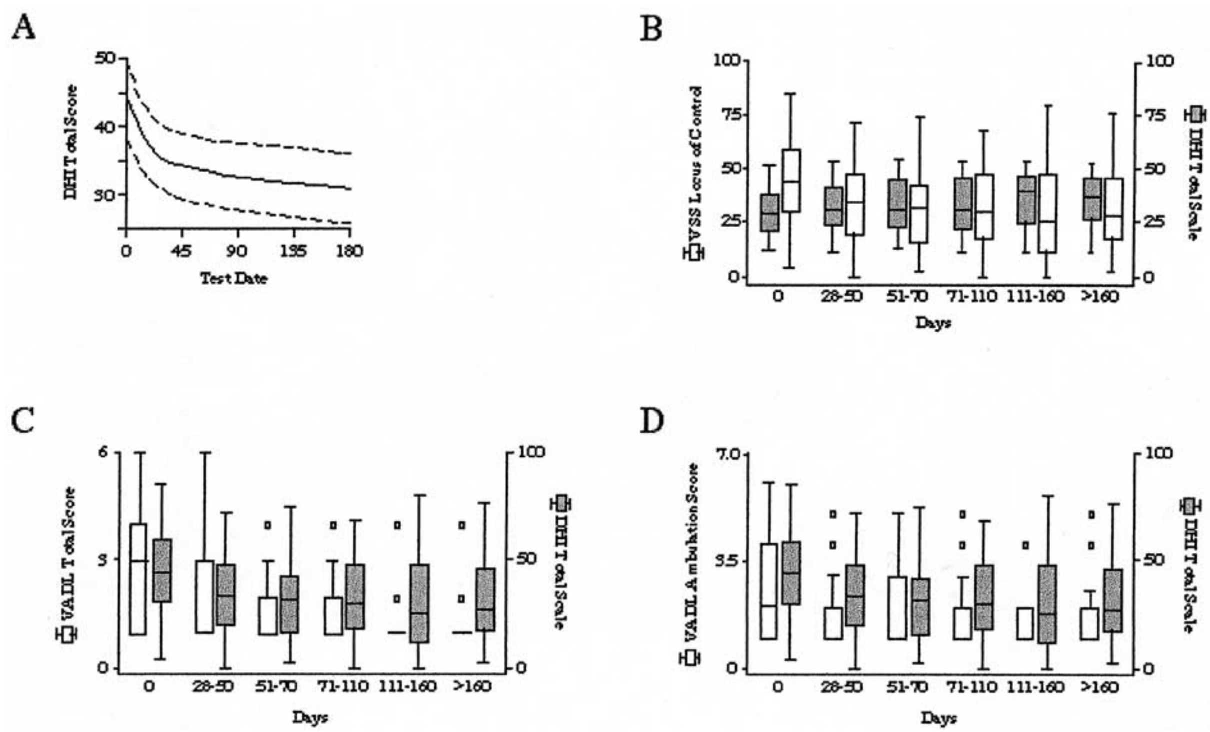

Fig 5. DHI scores over time. **(A)** Changes in Total scores. The *curved solid line* is the mean score. *Curved dotted lines* indicate the 95% confidence interval. **(B)** Relationship to VSS locus of control scores. **(C)** Relationship to VADL Total scores. (D) Relationship to VADL Ambulation scores. (**B, C,** and **D**) *Center horizontal bar* indicates the mean score, the top and bottom lines of the *rectangles* represent the 75th and 25th percentiles respectively, and the upper and lower error bars indicate error bars indicate 90th and 10th percentiles, respectively. *Small circles* are outliers.

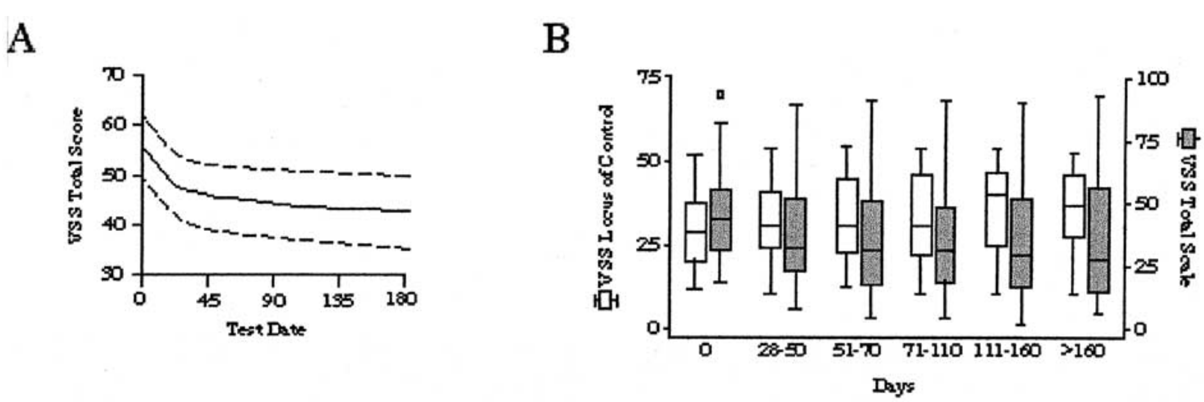

Fig 6. VSS scores over time. **(A)** Changes in scores. The *curved solid line* indicates the mean score. *Curved dotted lines* indicate the 95% confidence interval. **(B)** Relationship to VHQ locus of control scores over time. The *dark center circle* or *square* indicates the mean score, *center horizontal bar* indicates the median score, the top and bottom lines of the *rectangles* represent the 75h and 25th percentiles respectively, and the upper and lower error bars indicate error bars indicate 90th and 10th percentiles, respectively.

cally significant. Changes were not associated with age, gender, locus of control on the VHQ, VADL scores, or history of vertigo. Scores on the VHQ did not change over time.

DISCUSSION

Independence in activities of daily living, vertigo frequency and intensity, and psychosocial factors all improved over the course of this study, most dramatically from the pretest to the posttest. This dramatic change followed by more gradual changes is easily explained. Subjects were instructed to do their exercises for 4 weeks and were posttested at the end of that time. Most subjects reported informally that occasionally they used their exercises after that time but only intermittently. The most likely cause of improvements in functional skills and psychosocial interactions is the decreased vertigo. As subjects felt better, moving their heads did not elicit vertigo or elicited less vertigo, so they were better able to engage in self-care, mobility, home management, and vocational or avocational activities. Subjects had previously avoided these activities, had needed assistance to perform them, or had performed them more slowly or carefully than usual. Increased participation in daily life tasks and related increased activity levels may have generated more head movement, facilitating the effect of habituation exercises.

Originally we had expected that rapid head movements would be more effective than slow head movements in facilitating rehabilitation. The lack of difference between the groups may be explained in several ways. One explanation may be that the head must be moved just fast enough to stimulate the vestibular system. One problem with this paradigm is that we have no way of knowing the velocity, frequency, and active range of motion that subjects actually used at home. We accepted their assurances that they did the exercises as instructed. Another related possibility is that the visual/vestibular interaction is the key factor, rather than the vestibular stimulation, per se. The visual system is a relatively slow system, and the speed of head movement must stay within range of the patient's dynamic visual acuity while the patient views a stationary target. We did not measure dynamic visual acuity, so we are unable to test this idea. Another possibility is that the exercise itself is a placebo; this explanation is unlikely.

The lack of relationship to age or gender is interesting. The common wisdom among clinicians and patients is that aging is associated with decreased performance and greater difficulty in recovering from an impairment. Age, however, is not necessarily associated with loss of independence in activities of daily living.[22] These results show that age is not necessarily associated with decreased ability to recover independence or to decrease vertigo after a vestibular impairment. Although specific reflex functions may be associated with age-related loss of cells, weakness, and brain shrinkage, the ability to compensate for vestibular loss is probably not compromised as long as the central nervous system remains intact. In this study, subjects had no neurologic problems. Age had no influence on the amount of change in either the level of vertigo or the level of ADL independence. These data suggest that in the neurologically intact patient, age is not a factor in recovering from a peripheral vestibular insult.

Interestingly, history had a very minor relationship to recovery. It was only moderately associated with decreases in vertigo frequency and was not associated with decreases in vertigo intensity or improvements on the other measures. All of our subjects had failed to compensate spontaneously after developing vertigo, for unknown reasons. These data suggest that the length of time a patient has had vertigo chronically (ie, 2 months or longer) is unrelated to the patient's ability to recover, so history is not a good predictor of who will do well in rehabilitation. Thus physicians should be cautioned to avoid considering history alone when considering whether to include vestibular rehabilitation in the treatment plan of any patient who has failed to compensate spontaneously within a reasonable period of time.

A new finding is the relationship of recovery to locus of control. Locus of control may influence recovery in a variety of health conditions. Our data suggest that the patient's sense of having some ability to control his or her own destiny is an important component of recovery. The finding is not surprising. Adults expect to feel competent; that is, they expect to be able to move about the environment easily, while seeing clearly and feeling well oriented, and they expect to be able to care for themselves independently. The sense of disorientation and tentativeness and the associated decrements in ADL independence are profoundly disturbing. Patients who believe they can influence the direction of their recovery are likely to seek medical care and are likely to be willing participants in rehabilitation. When receiving medical or surgical care, the patient is largely a passive recipient of service by the physician. Rehabilitation, however, is a partnership between the patient and the therapist; the patient must be an active participant to be successful. To do so requires having a sense that one is able to participate and is able to effect a change. This sense of control, and probably of competence, increases as the patient feels better, which in turn may lead to greater participation in activities that involve head movement, facilitating more recovery.

Unlike previous reports that used repeated visits of outpatient therapy, the results of this study suggest that for many patients a minimal home program is sufficient. The busy person who does not have time to return repeatedly for outpatient therapy can still be treated successfully and can even take the exercise program along on business trips or other travel. The simplicity and portability of this program are likely to increase compliance. Also, a rapid return to independence in routine daily life tasks, including occupational roles, is an important psychologic benefit.

This habituation program should be implemented by a trained therapist, who has time to educate the patient about the rationale for the program, the time needed for compensation, and the expected outcomes. The therapist also has the time and expertise to (1) instruct the patient in the program, (2) have the patient practice during the visit to be sure the patient understands the program and performs it correctly, and (3) adapt the basic program to tailor it to the patient's orthopedic limitations, cognitive impairments, or lifestyle. This individualized patient education was essential, even in the context of this highly controlled study, in which well-motivated patients received care on a rigid protocol and subjects were aware of the importance of following the protocol exactly. In the average clinical setting, this individualized care issue is even more important.

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APPENDIX A
Locus of Control items from the Vertigo Handicap Questionnaire (courtesy of Lucy Yardley, PhD)

1. I have a lot of confidence in my ability to cure myself once I get sick.
2. Coping with a health problem depends on how well I deal with the problem myself.
3. When I have a health problem, I am usually able to cope with it on my own.
4. I am largely in control of whether or not my health improves when I have a problem.
5. If I get sick, it is my own behavior that determines how soon I will get well.
6. If I become sick, I have the power to make myself well again.
7. I am generally able to take care of health problems through my own efforts.
8. I am directly responsible for my getting better when I am sick.
9. Coping with illness depends mostly on what I myself do.

APPENDIX B
Locus of Control items from the Vertigo Symptom Scale (courtesy of Lucy Yardley, PhD)

When I get symptoms of vertigo I sometimes think that

1. I will fall over.
2. I will be unable to behave normally in public.
3. I will faint or pass out.
4. I will hurt myself by stumbling or falling over.
5. The dizziness is a sign that there is something seriously wrong with me.
6. I will lose control.
7. I will be unable to manage potentially dangerous activities (eg, crossing the road, walking downstairs, driving).
8. I will become very ill.
9. I will do something embarrassing.
10. I have a serious disease that no one understands.
11. I will let people down.

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