Functional Reach Improvement in Normal Older Women After Alexander Technique Instruction

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**Background.** Functional reach (FR) is a clinical measure of balance. The Alexander Technique (AT) is a nonexercise approach to the improvement of body mechanics. This study investigated a possible relationship between FR performance and AT instruction.

**Methods.** Three groups comprised of women older than 65, with the exception of one male control, were studied: (i) a pilot group, and (ii) experimental and (iii) control groups. Groups 1 and 2 were given eight 1-hour, biweekly sessions of AT instruction with pre- and posttests in FR, whereas Group 3 was given only pre- and posttests in FR.

**Results.** Groups 1 and 2 both showed significant improvement in FR performance. Group 2 was retested 1 month after posttest and showed a slight decrease in FR performance. For Groups 1 and 2, a questionnaire allowing qualitative responses on a four-item scale showed an overall positive response to the AT instruction.

**Conclusions.** AT instruction may be effective in improving balance and thereby reducing the incidence of falls in normal older women.

FUNCTIONAL reach (FR) is a clinical measure of balance, representing the maximal distance one can reach forward beyond arm’s length while maintaining a fixed base of support in the standing position (1). The Alexander Technique (AT) is a method of postural control employing a nonexercise, or coordinational re patterning, approach to the improvement of body mechanics (2,3). Because falls are a major source of morbidity in older adults (4), and because body mechanics are assumed to be associated with balance, the present study was undertaken to investigate a possible relationship between FR performance and AT instruction.

In the present study, “body mechanics” refers to the mechanical correlation, or static and dynamic alignment, of body segments in posture and movement (5,6). Although the exact relationship between body mechanics and balance is unknown, that such a relationship exists may be inferred from observation of the normal infant’s process of learning to stand and walk, where increasing control among body segments eventually leads to successful performance. That body mechanics do not necessarily remain invariant after the acquisition of upright stance and locomotion may be inferred from the observation of the posture and movement of elderly persons relative to those of infants.

Most authors on the improvement of body mechanics, e.g., Goldthwait and colleagues (7), prescribe a regimen of exercises after qualitative analysis of existing mechanics has suggested the muscle groups to be appropriately stretched and/or strengthened. Alexander, however, devised a method for improving body mechanics in the context of ordinary daily movement tasks, such as standing, sitting, bending, and walking (8). This method involves direct guidance of the student by the instructor toward the goal of more efficient movement, using both tactual and verbal cues. In AT instruction, exercise per se plays no role.

Three groups were studied in this investigation: (i) a pilot group, and (ii) experimental and (iii) control groups. Groups 1 and 2 were given AT instruction with pre- and posttests in FR, whereas Group 3 was given only pre- and posttests in FR. At posttest, Groups 1 and 2 both showed significant improvement in FR performance. Group 2 was retested 1 month after posttest and showed a slight decrease in FR performance. For Groups 1 and 2, a questionnaire allowing qualitative responses on a four-item scale showed an overall positive response to the AT instruction.

These results indicate that AT instruction may be effective in improving balance, and thereby reducing the incidence of falls in normal older women.

**METHODS**

**Subjects**

All subjects were normally ambulatory volunteers, older than 65 and giving informed consent. Group 1 (six females, age range 71-88, median 85.5) was recruited in Fall 1994 from the population of a senior residence; Group 2 (seven females, age range 66-83, median 72) was recruited in Spring 1995 from the membership of a senior educational facility, as was Group 3 (five females, one male, age range 65-78, median 71). Subjects in Groups 1 and 2 received free AT instruction; Group 3 subjects were paid $15 each for service as controls.
FUNCTIONAL REACH AND ALEXANDER TECHNIQUE

Apparatus
FR testing required (i) one piece of plywood 3/4" thick by 14" wide by 24" long; (ii) one sheet of 14" by 17" newsprint drawing paper for each subject; (iii) a red marking pen; (iv) a wooden yardstick; (v) a Stanley no. 42-287 line level; (vi) a wooden ruler 12" long; (vii) "sticky".putty; and (viii) data recording forms. AT instruction required a straight chair with no arms for each subject and a room in which subjects could sit in a circle with about an arm's length of space on each side.

Procedures—Quantitative
For FR testing, the yardstick was prepared by affixing the line level, bubble forward, with dots of sticky putty at the center on the calibrated surface, and by placing dots of sticky putty near each end on the other surface. Near one end of a wall clear of obstruction for about 6 feet, the plywood was placed with the narrow side against the baseboard. A piece of the drawing paper, secured with dots of sticky putty, was placed on the plywood equidistant from each end. For each subject, an assistant levelled the yardstick and affixed it with sticky putty at a position of shoulder height and about 12" forward of the shoulder. With the subject standing approximately centered on the drawing paper, the side of the body next to but not touching the wall, the red marker was used to make an outline of the feet, ensuring a similar stance for all tests. The assistant then instructed subject to raise the right arm forward of the body and parallel to the yardstick, with the hand level with the head. The assistant then instructed subject to "lean forward as far as you can, keeping your arm level with the yardstick, without losing your balance, and without touching the wall." No further instruction or coaching was given as to the subject's method of reaching. The extent of reach was observed and recorded as above, with FR being the difference between the first and second measurements. The assistant then instructed subject to sit down in a chair, sitting down in a chair, standing, walking, and lowering the body in space (commonly called "bending" but more properly "folding" the body). For example, in the mechanics of sitting down in a chair, the verbal part of the guidance typically was, "Let the knees fold forward and the hips fold back," while with the hands the experi-

menter suggested the desired direction of segmental movement in space. In cases where subject was able, instruction was also given in moving down to the floor to recline in a "constructive rest" position—supine with legs folded, feet on floor, knees pointing up, head and neck supported with books and/or a cervical roll (folded towel) so as to maintain spinal alignment—and in returning to standing. Previous clinical experience has shown that regular (daily) practice of constructive rest is useful in temporarily redistributing postural muscle tone, especially of the torso, leading to gradual modification of body image in upright stance and commensurate improvement in body mechanics. None of the instruction dealt with leaning movements per se.

Procedures—Qualitative
At the end of AT instruction, subjects in Groups 1 and 2 responded anonymously either "none," "a little," "a fair amount," or "a lot" to a questionnaire on their perceived improvement in (a) balance, (b) leg strength, (c) posture, (d) overall ease of movement, (e) general body awareness, (f) self-confidence in movement, (g) enjoyment of classes, and (h) extent of learning in classes. At the FR retest, subjects in Group 2 responded on the same scale to questions regarding (a) retention of instruction during the month, (b) desirability of additional instruction, and (c) helpfulness of instruction in daily life.

Statistical Methods
Data for Group 1 were analyzed by the *t* test for correlated means. Because Groups 2 and 3 were recruited separately, allowance was made for the nonequivalent control group (10) by using Welch's *t* (t-prime) statistic, sometimes referred to as the separate-variance *t* test, which is characterized by the use of separate sample variances and modified degrees of freedom (11). As improvement after instruction was anticipated, *t* tests were one-tailed.

RESULTS

Quantitative Results
Table 1 gives sample means, standard deviations, and standard errors of the mean for all FR tests. Analysis showed that Group 1 improved FR performance by 1.71 inches (*p* < .025), and Group 2 improved by 1.50 inches relative to Group 3, whose mean FR decreased by .74 inch (*p* < .005, *df* = 8). In Figure 1 each point is a subject whose posttest performance is readily visible relative to the dashed line representing the case where all pre- and posttest scores were equal. At retest 1 month after posttest, FR performance of Group 2 decreased by .32 inch.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, <em>N</em> = 6</td>
<td>7.42, 3.80, 1.70</td>
<td>9.13, 2.68, 1.20</td>
<td>n/a</td>
</tr>
<tr>
<td>2, <em>N</em> = 7</td>
<td>6.96, 2.86, 1.17</td>
<td>8.46, 2.24, 0.92</td>
<td>8.14, 2.86, 1.17</td>
</tr>
<tr>
<td>3, <em>N</em> = 6</td>
<td>11.57, 2.27, 1.02</td>
<td>10.83, 2.17, 0.97</td>
<td>n/a</td>
</tr>
</tbody>
</table>

FR, functional reach; n/a, not available.
Table 2. Percent FR Change by Subject (S) Between Pre- and Posttests

<table>
<thead>
<tr>
<th>Group</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>Mean</th>
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<tbody>
<tr>
<td>Group 1</td>
<td>52.0</td>
<td>125.6</td>
<td>28.5</td>
<td>26.2</td>
<td>-0.8</td>
<td>13.1</td>
<td>n/a</td>
<td>40.8</td>
</tr>
<tr>
<td>Group 2</td>
<td>1.2</td>
<td>14.8</td>
<td>71.8</td>
<td>100.0</td>
<td>-2.1</td>
<td>37.5</td>
<td>2.1</td>
<td>32.2</td>
</tr>
<tr>
<td>Group 3</td>
<td>-11.4</td>
<td>1.0</td>
<td>-4.2</td>
<td>-15.9</td>
<td>-0.7</td>
<td>-6.7</td>
<td>n/a</td>
<td>-6.3</td>
</tr>
</tbody>
</table>

FR, functional reach; n/a, not available.

Table 3. Postinstruction Questionnaire Responses—Groups 1 and 2

<table>
<thead>
<tr>
<th>Question</th>
<th>None</th>
<th>A little</th>
<th>A fair amount</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>---</td>
<td>---</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>b</td>
<td>---</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c</td>
<td>---</td>
<td>---</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Questions: (a) How much Alexander awareness would you say you have retained during the month? (b) How helpful do you think additional or ongoing study would be? (c) How helpful do you think the Alexander Technique has been to you in your daily life?

Table 4. Retest Questionnaire Responses—Groups 2

<table>
<thead>
<tr>
<th>Question</th>
<th>None</th>
<th>A little</th>
<th>A fair amount</th>
<th>A lot</th>
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<tbody>
<tr>
<td>a</td>
<td>---</td>
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<td>4</td>
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<td>c</td>
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<td>1</td>
<td>5</td>
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Remarks are in order on five specific aspects of the quantitative procedures and data.

1. At the senior educational facility, not enough volunteers responded to the initial solicitation in order to assign randomized experimental and control groups. A second solicitation 1 month later offering compensation yielded the necessary controls.

2. Note that the control group’s mean FR at pretest was 11.57 inches, 4.61 inches greater than that of the experimental at 6.96 inches. The published mean for 14 women in this age group is 10.47 inches, SD = 3.53 (1). Thus, both experimental and controls fell within one standard deviation of the published mean, though the experimental were borderline on the low side. It is possible that factors associated with the self-selection of volunteers were responsible for this difference, e.g., the experimental being more motivated to volunteer because of felt need.

3. That the control group’s FR performance decreased by .74 inch at posttest raises the issue of test-retest reliability, which is claimed for the FR measure by its authors (1). However, because descriptive statistics on the variable showed no particular abnormality, such as influence by extreme scores, the lower posttest score was attributed to intertest variability of unknown origin.

4. That the experimental group’s FR performance at retest decreased by .32 inch raises the issue of retention of learning. This issue might be addressed by further testing at monthly, bimonthly, or longer intervals. Such recurrent testing would raise the issue of practice effects on the test itself, although it is clear that optimal maintenance levels of instruction should be investigated.

Figure 1. Graphical display of functional reach pre- and posttest scores.
Within the context of the present study, the observed decrease seems reasonable, given the short period of AT instruction relative to lifelong habits of body mechanics.

5. A question could be raised as to the quantity (eight sessions) and quality (group vs individual) of AT instruction employed in this study. On this point, Austin and Ausubel gave the orthodox AT view that 20 private sessions constitutes an entry level with up to 100 sessions over 2 years required for permanent improvement (3). It is the researcher’s experience that such a course of study, however valid as an ideal, is seldom realized even in the nongeriatric population, and is, for most practical purposes, unnecessary in the geriatric context. Based on the experience of the present study, the researcher ventures to suggest that the group session for seniors is educationally viable, more financially feasible, and probably socially preferable. Of course, it would indeed be desirable to study geriatric AT instruction on a more extensive basis than eight sessions, say 16, an outcome toward which publication of the present findings will hopefully lead.

Regarding the study’s qualitative results, the usual cautions concerning subject bias preclude an overenthusiastic interpretation of the overall positive trend that was especially strong in the areas of body awareness, enjoyment of classes, and extent of learning. Nonetheless, Langer’s important work has demonstrated the beneficial effects of mindfulness as defined in various operational contexts (12). Clearly, awareness, enjoyment, and knowledge of one’s own body in practical daily use form such a context. Based on the evidence of the present study, it appears that some older adults profited mentally as well as physically from re-examining fundamental movement skills they originally acquired as infants. Illustrating the point are two among several comments that were returned on the postinstructon questionnaire:

1. My legs are stronger and I am less fearful of falling.
2. I have been walking 1 hour daily for 18 years. I was afraid I would have to quit because I felt like I was trying to carry a heavy load. I learned from the Alexander Technique how to stand tall and get rid of that burden. I feel in control (emphasis added).

Although the AT has been taught since early this century, it is still little known as an alternative therapy. At the 1997 national meeting of the American Association on Aging, the researcher served as a panelist on “Complementary Therapies and Aging,” where the new watchwords seemed to be aerobics, massage, and t’ai chi. The present study shows that AT instruction can also be an effective intervention in some geriatric contexts, and that a viable research protocol is available. Further cooperation is called for between the geriatric and AT professional communities (see Appendix A) in replicating and extending these results. Certainly our aging population stands to benefit from fuller access to this self-empowering resource.

Acknowledgments

Sincere appreciation is extended to King’s Bridge and Life Enrichment Services, Inc., both of Atlanta, for cooperation in securing subjects and providing teaching facilities; to my AT colleague Judith Stern, MA, PT, for originally bringing the FR measure to my attention; and to my student Patricia Zobel, MA, for competently and faithfully assisting me in administering the FR testing.

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References


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Appendix A

For more information, contact the North American Society of Teachers of the Alexander Technique (NASTAT), 3010 Hennepin Ave So, Ste 10, Minneapolis, MN 55408; 800-473-0620. The Alexander Technique by W. Barlow (2), himself an MD, remains the best introduction to AT for the medically oriented reader (available from NASTAT Books at the above address).