The Efficacy of the ROM Dance Program for Adults With Rheumatoid Arthritis

Julia Van Deusen, Diane Harlowe

Key Words: exercise therapy • health education • relaxation techniques

This study examined the efficacy of an exercise and relaxation program for adults with rheumatoid arthritis. The program integrates principles of occupational therapy and Tai-Chi Ch’uan and was expected to be more effective than traditional exercise and rest regimens because of its expressive and pleasurable elements. There were significant differences between 17 experimental and 16 control subjects on two categories of dependent variables after the former group’s participation in the experimental program. These dependent variables were range of motion measures and subject self-reports of frequency, enjoyment, and benefits of home exercise and rest routines. Pretest, posttest, and 4-month follow-up data were analyzed.

Program participants showed significantly greater upper extremity range of motion 4 months after completing the program although the reported frequency of exercise and rest was greater in the control group. Postprogram reports of enjoyment were significantly higher for experimental than for control subjects. If these initial results are confirmed in further studies, the efficacy of the use of purposeful activity for exercise and rest will be supported. This study also supports the integration of Eastern and Western frames of reference in the treatment of patients with chronic illness.

The question of how to facilitate increased involvement in daily exercise and rest regimens for individuals with rheumatoid arthritis is worthy of investigation. Mayo reported in 1978 that patient education has been studied as a means to increase compliance with medical recommendations. Although education was found to increase patients’ knowledge about their diseases and treatment, it did not have an effect on compliance. The later literature does not negate the continuing need for increasing compliance (Dimonte & Hollis, 1982; Feinberg & Brandt, 1984; Lenker, Lorig, & Gallagher, 1984; Lorig, Laurin, & Gines, 1984; Parker et al., 1984; Robinson, Haldeman, Imrie, & Neubauer, 1980).

Program Description

Harlowe and Yu (1984) hypothesized that adults with rheumatoid arthritis would better adhere to a home exercise-rest program if it were enjoyable and per-
ceived to have intrinsic value. Therefore, they developed a health education program which employed the basic occupational therapy principle of addressing goals through the use of purposeful, meaningful activities which facilitate creativity and self-expression in a supportive environment. Their program was named the ROM Dance Program (ROM is pronounced ram and stands for range of motion). Program goals include the following:

1. To assist participants in following any medical recommendations provided by their personal physicians and therapists for involvement in daily exercise and rest routines
2. To increase the frequency, enjoyment, and perceived benefit of involvement in daily exercise and rest
3. To enhance the ability to cope with stress and pain through the use of relaxation techniques
4. To provide a forum for group interaction concerning personal health care management
5. To provide selected health education experiences
6. To improve body awareness
7. To promote an experience of well-being

The program's use of an expressive dance form for maintaining range of motion reflects occupational therapy principles more fully than does routine exercise. It emphasizes the creative use of relaxation and pain management techniques during prescribed rest periods to increase the benefits and perceived value of rest as a daily activity.

The group instruction format was chosen for the program to provide a forum for peer interaction and support. Brief occupational therapy patient education materials (Harlowe & Yu, 1984; Harlowe & Black, 1984) were included as a focus for discussion. Topics covered included coping with arthritis, the relaxation response, energy conservation, work simplification, and the use of adaptive equipment and splints. The program was designed to be provided in a series of eight, 90-minute, weekly health education classes with 15 to 25 participants. Each class included a repetition of the ROM Dance sequence, a guided relaxation experience, and a group discussion.

The ROM Dance sequence is a flowing progression of dance-like movements, which incorporates joint motion in ranges usually recommended for persons with rheumatoid arthritis (Harlowe & Yu, 1984). The 7-minute sequence is accompanied by a poem and music, both of which are provided to participants in an audiocassette (ROM Dance, 1984) for home use. Illustrated instructions are also provided (Harlowe & Yu, 1984).

In a holistic approach to maintaining function, the occupational therapy principles and techniques described here were integrated with those from an ancient Chinese exercise form, T’ai-Chi Ch’uan, which stresses slow, relaxed movement together with an awareness of postural alignment and breathing. The ROM Dance routine differs from T’ai-Chi in that it presents pleasant images of warm water, sunshine, and friendship rather than being oriented to the martial arts. A sample from the poetry to which the expressive movements are performed follows (Harlowe & Yu, 1984, p. 23).

I gather the sun’s warmth down over me
Bathing me in a shining light
My hands feel warm
And a sunbeam shines between them
Then shines back to the sun.

The relaxation component of the ROM Dance Program includes a wide variety of methods (Harlowe & Yu, 1984), which are introduced in a graded sequence. Emphasis is placed on individual experimentation with the presented techniques. Simple biofeedback devices are introduced, and relaxation audiocassettes are provided for home use (ROM Dance, 1984).

Results of a pilot study by Harlowe and Yu (1984) of 17 adults with rheumatoid arthritis showed an increase in the reported frequency of exercise, rest, and perceived benefit after participation in the ROM Dance Program. Subjects also reported that the program was beneficial in increasing their ability to cope with arthritis.

The purpose of the present study was to ascertain if there were significant differences on the dependent variables between experimental subjects in the ROM Dance Program and control subjects on traditional exercise and rest regimens (a) immediately after the 8-week program and (b) 4 months after the completion of the program. The dependent variables were range of motion measures and subject self-reports of the frequency, enjoyment, and benefits of home exercise and rest programs as operationally defined by scores on the scales shown in Figure 1.

Method

Subjects

Ambulatory adults with rheumatoid arthritis who had medical recommendations for home rest and exercise and no prior ROM Dance experience were recruited. Of 110 potential subjects contacted 46 agreed to participate in the project and were randomly assigned to experimental and control groups with 23 subjects each. All control subjects were informed that they could participate in a future program as experimental

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1. Instructional materials for the ROM Dance Program (book, audiocassette, and videocassette) can be purchased from St. Mary’s Services, 1011 Erin Street, Madison, WI 53715 (Telephone: 608-258-5700).

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Figure 1

Exercise–Rest Self-Report Scales

Please complete the following statements by putting a check next to the most appropriate response (choose only one). Please read all responses carefully since they are not in any particular order.

**Exercise Scales**

A. People often have difficulty following advice to schedule regular exercise periods during the day. On the whole, I do my recommended home exercises

- 1. less than once a week
- 2. once or twice a week
- 3. three to five times a week
- 4. daily
- 5. almost always

B. In terms of enjoyment, I can say that

- 1. hate having to take exercise periods
- 2. get almost no enjoyment from my exercise periods
- 3. occasionally enjoy my exercise periods
- 4. usually enjoy my exercise periods
- 5. almost always enjoy my exercise periods

C. I feel that my home exercise program is of

- 1. no benefit
- 2. little benefit
- 3. some benefit
- 4. much benefit
- 5. tremendous benefit

**Rest Scales**

A. I am able to sit quietly and rest my joints

- 1. less than once a month
- 2. once or twice a week
- 3. three to five times a week
- 4. daily
- 5. almost always

B. I feel that rest periods are of

- 1. no benefit
- 2. little benefit
- 3. some benefit
- 4. much benefit
- 5. tremendous benefit

C. In terms of enjoyment, I can say that

- 1. hate having to take rest periods
- 2. get almost no enjoyment from rest periods
- 3. occasionally enjoy my rest periods
- 4. usually enjoy my rest periods
- 5. almost always enjoy my rest periods

**Note.** Numbers are for use in scoring and were not on forms filled out by subjects.

Demographic data collected on the 46 participants and on a random selection of 32 nonparticipants were comparable with the exception of age (see Table 1). The average age was greater for the nonparticipants than for the subjects.

**Instrumentation**

Exercise–rest rating scales (see Figure 1) were developed on the basis of the self-report scales in the pilot study questionnaire (Harlowe & Yu, 1984). These scales were used to obtain data on the reported frequency, benefits, and enjoyment of rest and exercise. Scale items were randomly placed to rule out position habits in response patterns.

### Table 1

Demographic Data: 46 Subjects (Experimental and Control) Versus 32 Nonsubjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chi-Square</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of medications</td>
<td>9.27</td>
<td></td>
<td>5</td>
<td>0.09</td>
</tr>
<tr>
<td>Age</td>
<td>4.69</td>
<td>1</td>
<td>0.03*</td>
<td></td>
</tr>
<tr>
<td>Number of surgeries</td>
<td>0.20</td>
<td>1</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>0.36</td>
<td>1</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Years since onset</td>
<td>0.17</td>
<td>1</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>Whether or not devices are used</td>
<td>1.80</td>
<td>1</td>
<td>0.18</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at or beyond the .05 level.

Standard goniometry as described by Trombly (1983) was used by four occupational therapists to measure selected joint ranges (see Table 2). Prior to the study, a generalizability coefficient (Berk, 1979) of .83 had been obtained for the four therapists' goniometry measurements showing a relatively high degree of agreement among the therapists' measurements.

**Procedures**

Using the instruments discussed above, we collected pretest data from all subjects in the experimental and control groups. Demographic data and medical histories were also obtained through questionnaires. Potentially confounding variables were examined by chi-square analyses and analysis of variance ($F$ test) to determine if there were significant differences between the control and experimental subjects on variables that might influence the results of the study.

The 23 experimental subjects were encouraged to practice the ROM Dance sequence on a daily basis at home in addition to any specific exercises recommended by their physician or therapist. They were also encouraged to practice relaxation techniques during daily periods of rest. All 23 control subjects received a brochure which explained the ROM Dance Program and the research project. They were not given any specific instructions concerning exercise and rest at home.

Posttest data were collected with the same instruments immediately after the 8-week ROM Dance Program. By this time, because of illness, geographical move, or other reason, the number of experimental subjects had gone down to 22 and the number of control subjects to 17. Demographic data on these subjects are presented in Table 3.

Data on range of motion measures and the self-report scales were again collected 4 months after the cessation of the ROM Dance Program. These follow-up data were obtained for 17 experimental subjects and 16 control subjects. Scaled data were analyzed by the median test, range of motion data by analysis of variance ($F$ test). On one variable (lower extremity...
Table 2

Range of Motion: Differences Between 17 ROM Dance Participants and 16 Control Subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest Mean</th>
<th>SD</th>
<th>Posttest Mean</th>
<th>SD</th>
<th>4-month follow-up Mean</th>
<th>SD</th>
<th>F</th>
<th>df</th>
<th>p</th>
<th>Experimental Mean</th>
<th>Control Mean</th>
<th>Experimental SD</th>
<th>Control SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Shoulder flexion</td>
<td>Pretest</td>
<td>2.64</td>
<td>0.11</td>
<td>Posttest</td>
<td>0.13</td>
<td>0.73</td>
<td>4-month follow-up</td>
<td>5.65</td>
<td>1</td>
<td>0.02*</td>
<td>291</td>
<td>270</td>
<td>75</td>
</tr>
<tr>
<td>B. Shoulder internal and external rotation</td>
<td>Pretest</td>
<td>3.22</td>
<td>0.08</td>
<td>Posttest</td>
<td>1.14</td>
<td>0.29</td>
<td>4-month follow-up</td>
<td>5.33</td>
<td>1</td>
<td>0.03*</td>
<td>290</td>
<td>248</td>
<td>81</td>
</tr>
<tr>
<td>C. Wrist extension</td>
<td>Pretest</td>
<td>0.06</td>
<td>1</td>
<td>Posttest</td>
<td>0.05</td>
<td>1</td>
<td>0.81</td>
<td>0.82</td>
<td>0.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Total upper extremity combined: Above ranges plus elbow flexion and wrist flexion</td>
<td>Pretest</td>
<td>0.68</td>
<td>1</td>
<td>Posttest</td>
<td>0.69</td>
<td>1</td>
<td>0.77</td>
<td>0.42</td>
<td>0.048*</td>
<td>899</td>
<td>843</td>
<td>232</td>
<td>96</td>
</tr>
<tr>
<td>E. Metacarpal phalangeal flexion—five digits</td>
<td>Pretest</td>
<td>2.00</td>
<td>0.17</td>
<td>Posttest</td>
<td>0.15</td>
<td>0.70</td>
<td>4-month follow-up</td>
<td>0.13</td>
<td>1</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Ankle plantar flexion</td>
<td>Pretest</td>
<td>0.76</td>
<td>1</td>
<td>Posttest</td>
<td>4.96</td>
<td>0.05</td>
<td>4-month follow-up</td>
<td>1.35</td>
<td>1</td>
<td>0.25</td>
<td>114</td>
<td>90</td>
<td>35</td>
</tr>
<tr>
<td>G. Lower extremity flexion: Hip, knee, ankle dorsal flexion</td>
<td>Pretest</td>
<td>5.83</td>
<td>1</td>
<td>Posttest</td>
<td>4.79</td>
<td>0.04*</td>
<td>4-month follow-up</td>
<td>0.45</td>
<td>1</td>
<td>0.51</td>
<td>487</td>
<td>453</td>
<td>36</td>
</tr>
</tbody>
</table>

* Significant at or beyond the .05 level.

flexion) significant pretest differences were observed
and analysis of covariance was used to determine
posttest and follow-up differences. To reduce the
number of variables for appropriate statistical analysis,
left and right limb range of motion scores were com-
bined as well as various other scores (see Table 2).  

Results

The potentially confounding variables examined were
age, sex, number of arthritis-related surgeries, in-
volvement in occupational therapy or physical ther-
apy, number of medications currently taken, number
of years since onset of the arthritis, and current use
of assistive devices. The only demographic variable
showing significant differences was age, with control
subjects being older (X = 60) than experimental
subjects (X = 52). Pretest data were also compared
for experimental and control subjects by the same
methods. See Tables 2 and 4 for differences.

Table 4 shows the results of the analyses for the

Table 3

Demographic Data on the 39 Subjects at Posttest

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Subjects</th>
<th>Mean</th>
<th>SD of Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years since onset</td>
<td>38</td>
<td>10.92</td>
<td>2.17</td>
<td>0</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Number of surgeries</td>
<td>9</td>
<td>2.68</td>
<td>18</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Number of medications</td>
<td>37</td>
<td>2.14</td>
<td>55.81</td>
<td>2.60</td>
<td>29</td>
<td>80</td>
</tr>
<tr>
<td>Age</td>
<td>39</td>
<td>55.91</td>
<td>2.60</td>
<td>29</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had OT</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male = 7</td>
</tr>
<tr>
<td>Had PT</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Female = 32</td>
</tr>
<tr>
<td>Uses device</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes = 27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No = 11</td>
</tr>
</tbody>
</table>

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Subjects.

In all of these analyses where significant differences were no longer evident at the 4-month follow-up may indicate that group involvement was the effective component.

A number of explanations can be provided for the significantly better upper extremity mobility status of the experimental groups 4 months after the completion of the program. The ROM Dance sequence involves "total body" range of motion, whereas subjects' prescribed exercises may have been limited to specific joints or to the lower extremities. The emphasis placed on slow, relaxed movement in the ROM Dance may enhance the benefits of exercises for range of motion. The weekly instruction and reinforcement for learning provided by the program may have affected the participants' ability to perform the motions accurately and to full range. It is interesting to note that the only reported upper extremity ranges that did not show significant differences at the 4-month follow-up test were wrist extension and metacarpal phalangeal flexion. One possible explanation for this finding is that these ranges are more likely to be affected by joint fusion than others reported in the study. Therefore, they may have been less likely to show changes in range. Another explanation for the lack of significant differences in these ranges is that both control and experimental subjects would tend to maintain wrist and finger range through their ordinary daily activities.

The finding that the significant differences between groups for lower extremity ranges occurred only at the posttest is difficult to interpret. One possible explanation is that the ROM Dance sequence places more emphasis on upper extremity motion. During classes, however, the lower extremity motions are repeated frequently for instructional purposes, which could have had an initial influence. That there were no lasting differences could be due to the fact that ambulatory adults perceive the maintenance of upper extremity ranges to be more essential to function and, consequently, intensity efforts in this area during home exercise.

Another interesting finding is that control subjects reported a higher frequency of exercise and rest than did the ROM Dance participants at the 4-month follow-up. One possible explanation is that the program repeatedly emphasizes the daily practice of range of motion exercise. Control subjects may have thought that any exercise, such as walking, would qualify for frequency, whereas the experimental subjects, having been specifically oriented to the program, would have been more cognizant of the intent of the questions on the self-report scale. On the other hand, a basic initial assumption was that an increased frequency of exercise and rest would promote the desired results. If the self-report data are accurate, this could be a faulty assumption and hence it would not necessarily be true that more exercise and rest means better exercise and rest.

If these initial results are confirmed in future studies, the efficacy of the ROM Dance Program and

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chi-Square</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a Pretest</td>
<td>1.59</td>
<td>1</td>
<td>0.21</td>
</tr>
<tr>
<td>b Posttest</td>
<td>0.24</td>
<td>1</td>
<td>0.62</td>
</tr>
<tr>
<td>b 4-month follow-up</td>
<td>3.74</td>
<td>1</td>
<td>0.05*</td>
</tr>
<tr>
<td>Enjoyment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a Pretest</td>
<td>1.07</td>
<td>1</td>
<td>0.30</td>
</tr>
<tr>
<td>b Posttest</td>
<td>3.74</td>
<td>1</td>
<td>0.05**</td>
</tr>
<tr>
<td>b 4-month follow-up</td>
<td>0.65</td>
<td>1</td>
<td>0.83</td>
</tr>
<tr>
<td>Benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a Pretest</td>
<td>0.18</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>b Posttest</td>
<td>0.94</td>
<td>1</td>
<td>0.33</td>
</tr>
<tr>
<td>b 4-month follow-up</td>
<td>0.40</td>
<td>1</td>
<td>0.53</td>
</tr>
</tbody>
</table>

a Control group of 14 subjects and experimental group of 17 subjects. b Control group of 16 subjects and experimental group of 17 subjects. * Controls significantly greater at the .05 level. ** Experimentals significantly greater at the .05 level.

Discussion

In analyzing results, it is important to consider the combined effect of all program elements that differ markedly from traditional approaches.

Since the ROM Dance incorporates a variety of occupational therapy and T'ai-Chi principles, it may be more satisfying than routine exercise. This notion is supported by the significantly greater enjoyment reported by the experimental group immediately after the completion of the ROM Dance Program. That the reported differences in enjoyment were no longer evident at the 4-month follow-up may indicate that group involvement was the effective component.

In summary, the ROM Dance Program is a potential alternative to routine exercise. It is more satisfying than the control group and has effects that are likely to be similar to traditional exercise.

Acknowledgments

The authors wish to acknowledge the cooperation and assistance of all participants in the study. They also wish to express their appreciation to the staff and faculty of the occupational therapy program at the University of Illinois at Chicago for their support and encouragement.
the value of integrating Eastern and Western frames of reference in the treatment of some chronic disease patients will be supported.

Limitations
There were a number of limitations in this study. For ethical reasons, subjects had to sign either control or experimental consent forms, and the potentially motivating effects of study participation could not be avoided. Because of scheduling problems and the fact that experimental subjects talked about their involvement, the evaluators were occasionally aware of which subjects were in the experimental group and which were in the control group. This limitation could have affected the results of the study.

Another limitation is the large drop-out rate of 28% at the 4-month follow-up. An added problem was that because of the low number of subjects it was necessary to decrease the number of dependent variables for statistical reasons. Therefore, groups of goniometry measures were made. A lack of data on the exact home exercise procedures used by the control subjects was a further limitation.

A final limitation was the fact that measurement tools lacked rigorous validity and had not been tested with the population under consideration. The current study, however, can help alleviate this limitation by contributing reliability and construct validity data.

Acknowledgments
We extend our appreciation to Kenneth Ottenbacher, PhD, OTR, for statistical consultation, the occupational therapy students at the University of Wisconsin-Madison for research assistance, and the St. Mary’s Hospital Medical Center and professional participants Patricia Yu, Andrea Alder, Becky Black, Mary Jahake-Hanson, and Nancy Walker for data collection.

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References