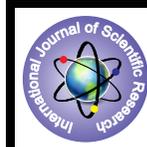


## The Effect of Pilates on Range of Motion in Aging Adults Living in Assisted Living Facilities



### Medical Science

**KEYWORDS :** Pilates, Range of motion, ROM, Elderly, Assisted Living Facility

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### ABSTRACT

*The purpose of this study was to determine if regular participation in Pilates exercise classes would improve the range of motion (ROM) in elderly adults living in assisted living facilities. This study specifically addresses the ROM of the shoulder, elbow, and neck muscles. Five aging adults from two different assisted living facilities participated in this study. Twelve ROM measurements were taken weekly in the Pilates group. The control group ROM measurements occurred at the beginning of week 1 and at the end of week 6. Data from this study did not meet the criteria for normality, therefore, the simple difference in the degrees of ROM was calculated. Results of the simple degree difference revealed that ten out of the twelve of the ROM measurements taken from the treatment (Pilates) group showed an increase in their of range of motion as a result of their participation in the six week study.*

In recent years, Pilates has become a popular trend in rehabilitation and fitness, in the United States, there are over 5 million practitioners (Chang, 2000); and an Internet search reveals that over 200 instructional videos are available. Pilates training is intended to improve general body flexibility and health by emphasizing "core" (truncal) strength, posture, and coordination of breathing with movement. Joseph Pilates noted that mobilizing early in rehabilitation resulted in a reduced convalescence period after musculoskeletal injuries. Advocates report that the exercises can be adapted to provide either gentle strength training for rehabilitation or challenge skilled athletes with a vigorous workout (Merrithew Corp, 2001).

This study focuses on problems of restricted movement and loss of range of motion faced by the growing demographic of elderly. The population of elderly persons is the fastest growing population across the world, and most of this population's health is deteriorating as rapidly as this demographic is growing (Mikalacki, M., Emeš, M., Čokorilo, N., Korovljević, D., & Ruiz Montero, 2012).

The purpose of this study was to determine if regular participation in Pilates classes would improve the range of motion in elderly adults. The identification of a therapeutic exercise method that proves effective in rectifying the loss of joint range of motion could dramatically improve the lives on millions of seniors throughout the world.

### Literature Review

The effects of Pilates exercises on dancers' posture, strength (force-generating capacity), and technique (McLain, Carter, & Able, 1997; Self, Bagley, Triplett, & Paulos, 1996; McMillan, Proteau, & Lebe, 1998; Parrot, 1993; Fitt, Sturman, & McClain-Smith, 1994) as well as on muscle contraction (Herrington, & Davies, 2005), body composition, and flexibility in adults who are healthy (Segal, Hein, & Basford, 2004) have been studied. Pilates exercise has been recommended to prevent and rehabilitate overuse injuries in ballet dancers (Kahn, Brown, Way, et al., 1995) as well as to treat groin (Phillips, 1999) and foot and ankle (Backman, Harris, Chisolm & Monette, 1997) injuries. Despite the increasing popularity of Pilates exercises, their effects have not been extensively studied in elderly individuals, or individuals with chronic disease.

In 2012, Mikalacki, et al. investigated the effects Pilates training on range of motion in aging adults. Their study showed that the implementation of the Pilates method was effective in improving range of motion. Plachy et al. (2012) conducted an overseas study with forty-two female volunteers from a retirement com-

munity and compared their results across three different groups; control - i.e., no instructional activity; Pilates instruction three times per week; and Pilates instruction once per week along with aqua fitness classes two times per week. All participants had been participating some form of exercise prior to the beginning of this study. Seven measurements (the right shoulder flexion, right hip flexion, lumbar spine flexion, thoracolumbar spine flexion, trunk lateral flexion on the right side, a six minute walk test, and the sit-to-stand 30 second test) were taken at the beginning of the study and at the end. At the end of the six month project, the data revealed statistical significant differences from the control group in Group 1 (Pilates only) and Group 2 (Pilates and Aqua fitness) in each of the following measures: shoulder flexion, lumbar flexion, and thoracolumbar flexion after the six month period.

Keays, Harris, Lucyshyn, and MacIntyre (2008) investigated the effect of Pilates exercise on shoulder range of motion, pain, mood and upper extremity function in women living with breast cancer. Their small study (4 women who had undergone axillary dissection and radiation therapy for stage I to IV breast cancer) suggests a modest effect of the Pilates exercise program in improving shoulder abduction and external rotation ROM, and a statistically significant improvement in shoulder internal and external rotation for one of the subjects. They continue noting that "Not every woman treated for breast cancer will develop impaired shoulder ROM, but appropriate interventions are necessary for those who do develop impaired shoulder ROM. Although more people are engaging in Pilates exercise as a form of post-rehabilitation exercise therapy, few patient-based studies have been conducted. Although further study is needed, our preliminary data suggest that Pilates exercise appears to have a modest effect on improving shoulder abduction and external rotation".

### Methods

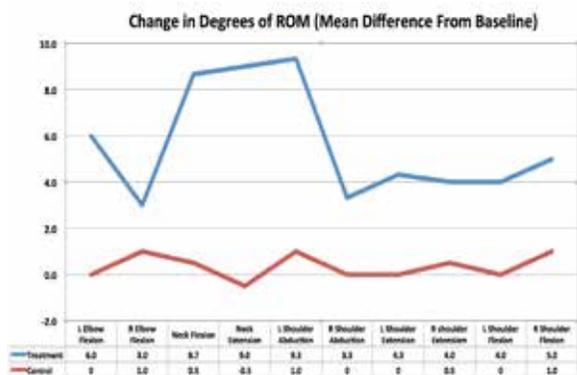
The study began with 10 senior adults, three Caucasian females, four African American females, two African American males, and one Caucasian male. All subjects were selected from two assisted living facilities in Nashville, Tennessee. Due to health issues, only five participants were able to complete the entire study (two African American females, two African American males, and one Caucasian male). Subjects were split into two groups for comparison: control and experiment. Each participant's range of motion was assessed and recorded for ten movements: right and left elbow flexion; neck extension and flexion; right and left shoulder abduction; and right and left shoulder flexion using the Range of Joint Motion Evaluation Chart guidelines (Washington

State Department of Social and Health Services, n.d.). Subjects in the experimental group received guided instruction and actively participated in twice weekly Pilates classes (Tuesday and Thursday) for 30 minutes for the six-week time period. Range of Motion (ROM) measurements for the Pilates (treatment) group was taken each Monday.

**Results**

The results showed the treatment group (thirty minutes of guided Pilates exercise twice a week for six weeks) improved their range of motion from the baseline measurements for all ten of the movements, i.e., right and left elbow flexion, neck extension and flexion, right and left shoulder abduction, right and left shoulder flexion. It was noted for shoulder abduction and elbow flexion that there was a larger increase on the left side; this most likely due to the fact that all subjects for this study were right hand dominant. Subjects in the control group (those who did not receive or participate in any Pilates instruction and did not deviate from their normal routine) showed little to negative changes in their ROM measurements over the six-week period. Figure 1 depicts the mean changes in ROM from baseline measures for each of the ten movements after the six-week period.

**Figure 1: Changes in Degrees of ROM from Baseline**



**Discussion**

Given the small sample size of five participants, inferential statistics could not be utilized, because the data did not meet the criteria for normality. However, any improvement in range of motion, or even the maintenance of range of motion with in elderly persons is beneficial and arguably adds to quality of life and independence. Ten out of twelve of the range of motion measurements that were taken in from the treatment group showed an improvement in the degrees of range of motion over the six-week time frame of the study.

**Suggestions for Future Research**

Studies with larger samples comparing Pilates exercises with more typical physical therapy exercise programs would be worthwhile, as would longer interventions with more responsive outcome measures. Randomized controlled trials comparing different exercise interventions (e.g., standard physical therapy, yoga, tai chi) with Pilates exercise are clearly needed. Individualized Pilates exercise programs could be compared with generic program used in this study, and include cost-benefit analyses of the 2 approaches.

**Conclusion**

Although further study is needed, our data suggest that Pilates exercise appears to have a modest effect on improving range of motion in elderly adults.

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