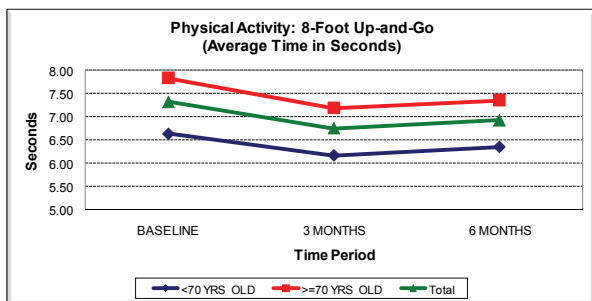
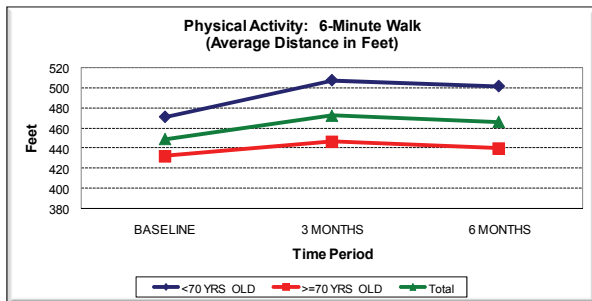
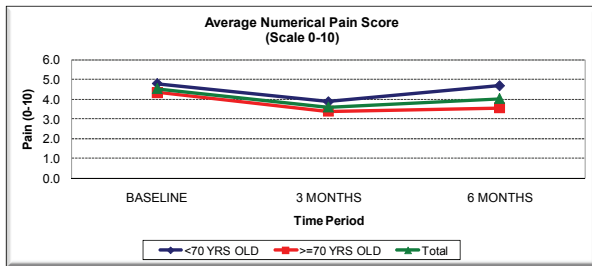


### 3-Month Follow Up

Three months after the end of the intervention BMI for younger patients increased again, from 30.6 at the end of intervention to 30.8,  $P=0.036$ . Older patients also had an increase in BMI from 26.7 at the end of intervention to 26.8,  $P=0.023$ , but not statistically significantly different from baseline BMI,  $P=0.815$ . Pain increased in younger patients by 21%, from the improved 3.9 at the end of the intervention to 4.7,  $P=0.003$ . In older patients pain increased, but only by 3% (change not statistically significant from the end of the intervention). Younger patients maintained their improvement in the 8-foot up-and-go measurement and at 3 months post intervention were 4% lower than the baseline value,  $P=0.005$ . The same is true for the 6-minute walk, which was a 6% improvement from baseline,  $P<0.001$ . Older patients maintained their improvement over baseline in the 8-foot up-and-go measurement but not the 6-minute walk.



### Conclusions

While many programs can improve physical function among adults with arthritis or joint pain, very few are designed to improve aerobic function. The FEPA program not only showed reductions in pain after the program ended, there were also noted improvements in mobility and aerobic function. Although these improvements were reduced at the next assessment 3 months after the program ended, the values were still higher than baseline values. This study indicates that a 3-month program can result in improvements in mobility and aerobic function even among people with arthritis over 70 years of age. This study suggests that, because these improvements declined in the 3 months after the program ended, more community-based programs based on the FEPA model may be needed to sustain physical functioning for older adults with arthritis.

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## Physical Changes among Adults Participating in the Fitness and Exercise for People with Arthritis (FEPA) Program

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### Abstract

While physical activity is useful in improving function, maintaining joint health, and reducing the co-morbidities associated with inactivity in individuals with arthritis, the prevalence of regular exercisers among this population is lower than people without arthritis. This 2007 study examined the effects of a community-based exercise program on functional fitness and pain reduction in individuals with arthritis. Participants were 103 community-dwelling individuals with arthritis (Mean age=70.1 years, SD=11.7) who completed a 3-month instructor-led program of exercise classes. The classes focused on joint protection and integrated muscular and aerobic conditioning. Participants completed measures of physical function at baseline, post-program and 6-month follow-up. For the age-specific analyses the mean was used to create two age groups (70 years or older and younger than 70 years). All measures improved overall and in both age groups from baseline to the 6-month follow-up, although not all were statistically significant. Overall, increases were found post-program in aerobic conditioning (6-minute walk,  $P<0.001$ ), mobility (8-foot up-and-go,  $P<0.001$ ) and pain reduction ( $P=0.044$ ). At the 6-month follow-up aerobic ( $P<0.001$ ) and mobility ( $P=0.005$ ) improvements were sustained by those less than 70 years of age but pain reduction ( $P=0.507$ ) was not. However, for those older than 70 years improvements in mobility ( $P=0.030$ ) and pain reduction ( $P=0.038$ ) were sustained but aerobic ( $P=0.093$ ) improvement was not. Although not all changes observed were sustained at the 6-month follow-up, the overall and age-specific values remained higher than baseline values suggesting the need for additional access to community programs for long term benefit.

## Background

Based on data from 2003-2005, over 21% of noninstitutionalized adults over age 18 have a doctor's diagnosis of arthritis (CDC, 2006). Because arthritis affects a large proportion of the population and its prevalence increases with age the numbers affected are expected to increase substantially as the population ages. The overriding characteristics of this disease include pain and loss of function. Although the mortality rate for this disease is relatively low, it is associated with the development of a number of co-morbidities that are associated with increased mortality. People with arthritis engage in less physical activity than people without arthritis (CDC, 2009). This may be due to functional limitations, including joint immobility and pain (Der Ananian et al., 2008). As aging occurs, this lack of physical activity can lead to a myriad of other problems such as an increased risk of heart disease and diabetes, and has been shown to impair the immune system (Haaland et al., 2008). Many of the recommended and promising programs that successfully improve function and reduce arthritis-associated pain are not designed to improve aerobic capacity (Brady et al., 2009). Maintaining function for everyday life activities is important, but increasing cardiorespiratory fitness can have long term health benefits. Many existing programs that have been shown to improve arthritis symptoms are water-based, making them unavailable to individuals without access to a pool. Of the land-based programs, many require equipment that is not readily available or may be too "easy" for young adults with arthritis. Limitations of existing programs led to the development of Fitness and Exercise for People with Arthritis (FEPA), a land-based program designed to improve function by increasing strength, balance, and flexibility as well as increasing functional and aerobic capacity. The purpose of this report is to document the physical changes that occurred among participants enrolled in the 3-month program, and to assess physical changes sustained 3-months post program.

## Methods Program

The FEPA program was conducted between January and June 2007 in San Diego California. This 12-week progressive exercise program for people with arthritis or joint pain was instructor led and met twice per week for 60 minute sessions. Attendance was collected by the exercise instructors during the 12-week intervention. While there were 24 maximum days of attendance, actual classes varied depending on holidays. For each participant, an attendance percentage was calculated using the number of classes attended divided by the number of possible classes at that site. The focus of the program was to increase strength, flexibility, core/ balance and aerobic endurance and worked all muscle groups and joints in the body.

## Study Population

The study population was recruited through various mediums (personal announcements, flyers, closed circuit television prompters (residential facility), church bulletins, and online sources that included sites such as senior centers, YMCA clubs, rheumatologist offices, hospitals, churches, and residential centers. The final study included eight sites in San Diego County. The participants included in the study were at least 30 years of age and reported a diagnosis of arthritis or had experienced joint pain, aching, or stiffness in the past 30 days. Participants were excluded if they were told by a doctor not to exercise because of an existing health condition or if they were confined to a wheelchair or currently participating in another exercise program. Upon enrollment, written consent was obtained from each participant. Institutional Review Board (IRB) approval was obtained through San Diego State University.



## Questionnaires and Physical Measures

Demographic and health status information was collected by self-reported questionnaires administered via interview by trained data collectors. Demographic data included age, sex, marital status, education level, and race/ethnicity. The 10-point Numerical Pain Scale (NPS) was used to assess pain with a high number indicating more pain. In addition to measured height and weight, several physical measures were included. For this analysis, the two that measure mobility and aerobic endurance were used. The 8-Foot Up-and-Go Test is a measure of mobility and assesses the time it takes the participant to rise from a chair and walk 8-feet and return. Shorter time to complete this task is a positive outcome (Piva et al., 2004). The 6-Minute Walk Test measures aerobic endurance and assesses how many yards (or feet) the participant can walk in six minutes (Harada et al., 1999). A higher number is a positive outcome. Information was collected at 3 time-points: prior to starting the exercise program, after the completion of the 12-week exercise program, and three months after the end of the program.

## Statistical Analysis

Descriptive statistics describing the study population are provided using frequencies, proportions, means, and standard deviations. Baseline demographics and population characteristics were compared between younger (<70 years old) and older patients (>=70 years old) using Chi-square tests and Fisher's exact test when variables were categorical and Mann-Whitney tests when variables were continuous. Participant's BMI, pain, and physical measurements change over time were compared using Wilcoxon Sign Rank tests. All analyses were performed using the SPSS program (SPSS for Windows Release 14.0.0, SPSS Inc., Chicago, IL, USA).



## Results

### Study Population

Eight sites participated in the study with 154 patients enrolled at baseline, 111 (72%) patients completed the 3 month intervention and 103 (67%) patients returned for the six month follow up. See Table 1 for the population detailed description by younger (<70 years old) vs older patients (>=70 years old). Overall participants attended 75% (SD=20%) of the classes offered, younger participants attended 78% (SD=19%) while older participants attended 73% (SD=20%) of the classes, P=0.268.

Table 1. Study Participants Demographics Information by Age Categories

		<70 Years Old		≥70 Years Old		P Value
		N	%	N	%	
Total Participants		44	42.7	59	57.3	
Women		39	88.6	45	76.3	0.109
Marital Status	Single	4	9.1	3	5.1	0.186
	Married	30	68.2	31	52.5	
	Separated/Divorced	2	4.5	3	5.1	
	Widowed	8	18.2	22	37.3	
Education Category	HS or Less	14	32.6	15	25.4	0.251
	Some College/Voc	9	20.9	19	32.2	
	College or More	20	46.5	25	42.4	

### Baseline

The study population overall BMI was 28.4 (SD=5.3), younger patients (BMI=30.3, SD=6.0) had a statistically significant higher BMI than older patients (BMI=26.9, SD=4.0), P=0.003. At baseline the overall average pain for the cohort was 4.5 (SD=2.4), for younger patients pain was 4.8 (SD=2.6) and for older patients it was 4.3 (SD=2.3), P=0.612. The overall 8-foot up-and-go average was 7.3 seconds (SD=2.11), while the younger patients did it on average in 6.6 seconds (SD=1.65), and the older patients in 7.8 seconds (SD=2.27), P=0.004. In the baseline 6-minute walk test the average distance traveled was 449 feet (SD=86) for the overall cohort, and 471 feet (SD=69) for the younger patients and shorter for the older patients at 432 feet (SD=94), P=0.025.

### End of Intervention

At the end of the 3 month intervention older patients maintained their BMI within the same range as baseline (P=0.132) and younger patients increased their BMI slightly from 30.3 at baseline to 30.6, P=0.014. However, pain related to arthritis improved in both groups, younger patients decreased their pain by 19%, from 4.8 to 3.9, P=0.014, and older patients by 21%, from 4.3 to 3.4, P=0.006. Physical activity levels measured by the 8-foot up-and-go and 6-minute walk tests also improved in both groups. In younger patients get up and go decreased from 6.6 to 6.2 seconds, a 7% improvement and statistically significant, P<0.001. The 6-minute walk test distance improved by 8%, from 471 feet to 507 feet at the end of the intervention, P<0.001. Older patients improved their 8-foot up-and-go by 8%, from 7.8 to 7.2 seconds, P=0.001; and their 6-minute walk by 5%, from 449 to 472 feet, P<0.001.