Fit and Strong!:
An evidence-based exercise program for older adults with lower-extremity osteoarthritis

Contact Information

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Year Program First Implemented in Community Settings: 1996

Program Description

- General description of program
  - Fit and Strong! is an evidence-based physical activity/behavior change intervention that has been successfully implemented in multiple community-based settings. Participants are older adults who have lower-extremity joint pain and stiffness related to osteoarthritis. Fit and Strong! blends a multiple component exercise program with group problem solving/education using a curriculum designed to facilitate arthritis symptom management, confidence in ability to exercise safely with arthritis, and commitment to lifestyle change (Hughes et al., 2004; Hughes et al., 2006). Before the end of the 8-week Fit and Strong! program, participants meet with the instructor to develop individualized exercise plans that foster ongoing maintenance of a balanced physical activity routine.
- Program goals
  - The overall goals are to help participants:
    - Maintain independent functioning
    - Reduce and manage arthritis symptoms
    - Learn a variety of stretching, balance, aerobic and strengthening, exercises while gradually increasing the frequency, duration, and intensity of exercise over time

        - Gain a clear understanding of what osteoarthritis is and how physical activity that is tailored to the needs of persons with arthritis can help them manage arthritis symptoms
        - Incorporate physical activity into lifestyle by exercising three times/ week for 1 hour
        - Develop individualized, tailored, multiple component physical activity program that is sustainable after the program ends
- Reasoning behind the program design and elements
    - Osteoarthritis (OA) is the most common condition affecting older people today and is the leading cause of disability among them (CDC, 2006; Hootman & Helmick, 2006).
    - Lower extremity osteoarthritis is a known risk factor for disability (Guralnik, Ferrucci, Simonsick, Salive, & Wallace, 1995; Jette, Branch, & Berlin, 1990), and lower extremity joint impairment caused by osteoarthritis is a major mechanism through which disability develops (Dunlop, Hughes, & Manheim, 1997). Osteoarthritis causes limitation of mobility, as individuals with OA in their large lower extremity weight-bearing joints, minimize movement in order to reduce their exposure to pain. As older adults with osteoarthritis become more sedentary over time, they experience more strength and aerobic deficits compared to age matched peers (Minor, Hewett, Weber, Anderson, and Kay, 1989; Semble, Loeser, and Wise, 1990).
    - Older adults with lower extremity osteoarthritis who engage in stretching, strengthening, aerobic, and health education programs experience functional and health-related improvements (Kovar et al., 1992; Lorig et al., 1996; Ettinger et al., 1997; Sullivan et al., 1998; Evcik et al., 2001; van Baar et al., 2001; Thomas et al., 2002,).
- Target population
    - Sedentary older adults who are experiencing lower-extremity joint pain and.
- Essential program components and activities
    - Warm-up and Stretching/Balance Exercises (up to 15 minutes)
    - Aerobic and Endurance Exercises (up to 20 minutes)
    - Strengthening and Resistance Exercises using exercise bands and ankle cuff weights (also include a balance component) (up to 20 minutes)
    - Cool-down Exercises (up to 5 minutes)
    - A group problem solving component (additional 30 minutes) is very important in increasing participants' confidence in their ability to exercise safely and maintain a program over time
    - Health Education/group problem solving improves arthritis symptom management and increases confidence to exercise safely with arthritis and maintain a balanced physical activity program over time and in the presence of barriers
    - Discussions focus on topics related to osteoarthritis and physical activity, problem-solving around barriers, and motivating participants to develop a physically active lifestyle

- Length/Timeframe of Program
    - 90 minutes 3 times per week for 8 weeks.
- Recommended class size
    - 20-25 people at enrollment, class size typically drops off a bit.
- Desired outcomes
    - Increased self-efficacy
    - Increased adherence to physical activity
    - Improved lower-extremity muscle strength
    - Improved aerobic capacity
    - Reduced joint pain and stiffness
- Measures and evaluation activities
    - Trainings are conducted by a Fit and Strong! Master Trainer in order to maintain program fidelity. Providers will need to assure that participants meet eligibility criteria. Outcomes testing is conducted at the beginning and end of the program. Measures include the following: demographics, WOMAC, Geri-AIMS, RAPA,. Instructors complete an evaluation of the training, and participants complete an evaluation of the program.

Health Outcomes and Evidence Supporting Health Outcomes

A large-scale randomized clinical trial funded by the National Institute on Aging tested the impact of Fit and Strong! among participants age 60-92 years (average age 73 years). Preliminary findings comparing baseline measures taken prior to the Fit and Strong! program to measures taken 6 months later, found that participants who completed the program compared to a no treatment control group had significant benefits on:

- Increased adherence to physical activity
- Improved self-efficacy (SE) for exercise
- Reduced lower extremity joint stiffness (WOMAC)
- Decreased lower extremity joint pain (WOMAC)
- Improved aerobic capacity (6-minute distance walk)

(Hughes, S. L., Seymour, R.B., Campbell, R., Pollak, N., Huber, G., Sharma, L. (2004). Impact of the Fit and Strong! intervention on older adults with osteoarthritis. *The Gerontologist, 44,* 217-228.)

Final findings from the same randomized clinical trial, comparing baseline measures taken prior to the Fit and Strong! program to measures on the complete sample 6 and 12 months later, found that participants who completed the program compared to a no treatment control group experienced the following significant benefits:

- Increased adherence to physical activity (56% increase in treatment group over baseline at 12 months)
- Improved SE for exercise
- Increased SE for adhering to exercise over time
- Reduced joint stiffness (WOMAC)
- Reduced arthritis pain (WOMAC and GERI AIMS)

(Hughes, S.L., Seymour, R.B., Campbell, R.T., Huber, G., Pollak, N., Sharma L., Desai, P. (2006). Long Term Impact of Fit and Strong! on Older Adults with Osteoarthritis. *The Gerontologist, 46,* 801-814.)

We originally tested Fit and Strong! using licensed Physical Therapists (PT) as instructors but transitioned to using nationally Certified Exercise Instructors (CEI) in order translate Fit and Strong! into community based settings. We used a two group design to test the impact of this shift on participant outcomes. The first 161 participants to sequentially enroll in Fit and Strong! received instruction from PTs. The next 190 sequential enrollees received instruction from CEIs. All participants were assessed at baseline, at the conclusion of the eight-week Fit and Strong! program (2 months), and at 6 months. We found no significant differences by group on outcomes at eight weeks or 6 months. Participants in both groups improved significantly with respect to lower-extremity strength (sit-stand test), aerobic capacity (6 minute distance walk), pain, stiffness, and physical function. Participant evaluations rated both types of instruction equally highly, attendance was identical and no untoward health events were observed or reported under either instruction mode. We conclude that outcomes under the two types of instruction are remarkably stable and justify the use of CEIs to extend the reach of Fit and Strong!. (Seymour, R.B., Hughes, S.L., Campbell, R.T., Huber, G., Desai, P. (in press). Comparison of Two Methods of Conducting Fit and Strong! *Arthritis Care and Research*.)

A recent large effectiveness trial with approximately 500 participants found substantial maintenance of treatment effects for Fit and Strong! out to 18 months. We examined pre/posttest outcomes following participation in the 8-week Fit and Strong! program at baseline, 2, 6, 12 and 18 months. The study found significant increases in participation in physical activity at two months that were maintained at 18 months. This sustained increase in physical activity was accompanied by maintenance of significant improvements in lower extremity joint stiffness, pain and function, lower extremity strength (timed-stands test), mobility (6 minute distance walk), and anxiety and depression over the same time period. These results are important because lower extremity strength and mobility are both risk factors for falls and mobilility is also an independent risk factor for mortality. Further, walking speed is known to decrease 12-16% per decade for persons 62 years of age and older (Himann et al., 2009). Our high risk population showed sustained increases over 18 months (Hughes, S. L., Seymour, R. B., Desai, P., Campbell, R. T., Huber, G., & Chang, H. J.2010 Fit and strong!: Bolstering maintenance of physical activity among older adults with lower-extremity osteoarthritis. *American Journal of Health Behavior, 34*, 6, 750-763).

Requirements and Materials for Implementation

Instructor Requirements:

- Instructors must be identified by site program directors
- Fitness instructors must be certified by a nationally recognized fitness organization such as (AFAA), (ACSM), (ACE), (CIAR), (ISSA), (NASM), (NCSF), (NFPT), (NSCA), (YMCA), and have current CPR certification.
- Must have experience leading group-based exercise classes. Experience working with older adults and/ or individuals with arthritis preferred.
- 1 instructor/class required, 1 assistant/class recommended.
- Instructors must attend a training led by Fit & Strong! Staff and/or T/Master Trainers.

- We are currently bundling Fit and Strong with other evidence based programs like Chronic Disease Self Management Program and Matter of Balance. Master trainers certified to teach those programs can participate in a special 12 hour training to be certified in Fit and Strong!.

Space Requirements

- Large, open, unobstructed area for walking (perimeter of room, long hallways, outdoor space if weather permits)
- Room for chair placement for each participant
    - Participants should be able to stand and extend both arms laterally
- Class size- depends on room size and ability level of participants
    - A maximum of 20-25 participants per class is ideal
- Storage space for equipment
- Mirrors nice if available
- Microphone if necessary and available
- Access to aerobic exercise equipment is nice if available

Program Costs

Equipment

- Fit & Strong! Manuals
    - One Instructor manual
    - Set (one per participant) of Participant Manuals
- Tape or CD player and Music – tapes or CD's
- Resistance equipment:
    - Elastic exercise bands/ tubing with foam handles- integrated handles work best
    - Ankle cuff weights – 10 lbs
- Chairs for participants
- Floor mats for floor-based exercises

The costs quoted here are *estimates* for providers seeking to replicate Fit and Strong! The estimates are for one complete 8-week iteration of Fit and Strong! (24 90-minute sessions held 3 times per week) and are based on the assumption that 20 persons will be enrolled in each iteration of the program.

If site already has any of the following items available: exercise bands, CD player, exercise music CDs, mats, ankle weights, then it will not be necessary to purchase that item.

One-Time Equipment Costs Chart

Ankle Weights $28.87/ each	$577.40
Exercise Bands $9.95/ each	$199.00
Participant Manuals $35.00/ each	$700.00
CD Player	$25.00
Exercise Music CDs	$20.00
Mats $14.25/ each	$285.00

Total Cost **$1806.40**
Total *Unit* Cost **$90.32** per Fit and Strong! class participant

Certified Exercise Instructor Costs

If your site already has a certified exercise instructor on paid staff, these costs will not apply. If you need to hire a certified exercise instructor, note that the hourly rate for instructors varies by region.

Breakdown of Instructor Hours	
8 hours	Fit and Strong! instructor training*
48 hours	24 sessions @ 2 hours per sessions
7 hours	Develop one-on-one exercise contracts with class participants
63 hours	**Total Hours**
$1,890 Cost of instructor for program (year 1) assuming $30/hour Total Unit Cost: $94.00	
* Instructor training is a one-time cost.	