# FALL PREVENTION PROGRAM RECOMMENDATIONS FOR AN AGING POPULATION

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By 2050 the number of adults over the age of 55 is expected to skyrocket to 1.5 billion (7). With an increasing aging population, personal trainers need to be equipped with the necessary knowledge to assist an older population and improve their quality of life. One of the primary areas this improvement is needed in is fall prevention. This article will discuss the role of strength training, stretching, and functional mobility exercises in reducing falls in older adults and provide a guide for creating a program.

## THE IMPORTANCE OF A FALL PREVENTION PROGRAM

According to a survey conducted by LeBlanc et al., older adults reported a severe fear of falling (8). These fears are based in reality as a metastudy documented muscular atrophy, dysfunctional walking mechanics, and balance issues increased the risk of falls in older populations (13). Another reason for more falls in older adults is cellular deterioration and damage, which results in a compromised neurological and cardiopulmonary system (3). Lima et al. highlight that "falls are the leading cause of fatal and nonfatal injuries among older adults," (9). The World Health Organization suggests that, "one in every three elderly individuals will experience a fall," (14).

As personal trainers, it should be part of our mission to adapt the programming for the aging clientele in order to address these concerns. From the same survey conducted by LeBlanc et al., the fear of falling diminished significantly after completing a training program. The change was due to increased feelings of strength, mobility, and balance. The solution to fall prevention is a three-pronged synergistic approach between all three components—strength, balance and flexibility—specifically focused on lower body and core musculature.

## STRENGTH

Le Blanc et al. identified a strong relationship between muscle strength and decreased fall risk (8). Atrophied musculature makes daily living more difficult by limiting range of motion or accessible tasks. Unfortunately, after the age of 50, strength decreases roughly by 15 – 20% every decade and this percentage increases with a sedentary lifestyle, which is why older adults experience weakness (1). When people retire and decrease their daily activity, their body adapts to a sedentary lifestyle muscular atrophy begins to occur. The good news is if older adults start resistance training, they can regain muscle mass and slow down age-related muscular atrophy (3).

To ensure a smooth transition into working out and preventing injury, it is suggested that older adults perform 1 – 3 sets of 8 – 12 repetitions of bodyweight or light-intensity weight or resistance bands (40 – 50% of one-repetition maximum [1RM]) then progress to moderate-to-vigorous intensity weight or resistance bands (60 – 80% of 1RM) (15). The program can include strengthening exercises like sit-to-stands, step-ups, and heel raises, which condition the lower leg musculature while simultaneously practicing movements of everyday life.

## BALANCE

Balancing is a complex skill requiring the proper use of the vestibular, visual, central, and peripheral nervous system in conjunction with sensory reactionary responses from the musculoskeletal system (10). As people age, the functionality of these systems decreases, making it harder for older adults to maintain their balance (10). The ability to balance also decreases if the older adult lacks a healthy range of motion, muscle strength, and proprioception.

As people age, levels of physical activity decrease resulting in less equilibrium while standing and moving. Balancing exercises encourage neuromuscular connections and muscular strength throughout the lower leg and trunk musculature. While balancing exercises may not be able to fix vestibular and nervous system dysfunctions, they will still help retain and improve balance (6). Exercises like tandem balance, heel to toe walks, weight shifts, single-leg balance, and switching from stable to unstable surfaces can help stability. Fuzhong et al. found a balancing program with the aforementioned exercises can decrease falls up to 49% (4). In this study, 511 volunteers aged 65 years or older participated in a 60-min balance session twice a week for 48 weeks and after the program ended, 93% of them stated they felt improvements (4).

Progression in a balance program can include narrowing the base of feet support, reducing upper limb support, and adding movement in the arms, such as reaching (10). Becoming proficient in balancing not only will improve clients' confidence and peace of mind, but also promote self-efficacy. Older adults will feel capable to perform daily tasks, which leads to increased independence and better quality of life.

## FLEXIBILITY

Flexibility is another key component of fall prevention programming because a reduction in the extensibility of contractile and noncontractile soft tissue decreases muscle performance and increases fall risk (5). Flexibility is the ability for a muscle or connective tissue to extend and return to its original length. For example, when an older adult lacks flexibility in their hamstring, they may struggle to create hip flexion and not be able to step over an obstacle like a curb. Individuals with a fall history often have reduced lower-extremity flexibility compared to individuals with no fall history (7). Fortunately, flexibility can be increased with a simple stretching routine that includes static and dynamic stretching.

Static stretches require someone to reach the end of their range of motion and hold the position for at least 30 s (12). Holding a stretch for at least 30 s has been shown to create more extensibility compared to participants who held a static stretch for a shorter duration (12). By consistently increasing the extensibility of muscles, the change in flexibility can become lasting. The increase in flexibility improves the quality of body movement and helps to prevent damage to the muscles and tendons.

Dynamic stretching is movement-based stretching that lubricates joints and can be a great warm-up choice. While static might be the safer method of stretching, dynamic is still very beneficial, as it can improve joint range of motion and decreases passive muscle tension (14).

If a client is able to perform dynamic stretches, the personal trainer should include them into their program. If not, the personal trainer should create modified versions on a chair.

Dynamic exercises to include in your program are chest openers, marching, knee circles, and modified jumping jacks. Some muscles to statically stretch are calves, hamstrings, and hip flexors, as the mobility in these muscles are necessary for proper walking mechanics. When walking mechanics are optimal, the risk of falling decreases (7).

## CONCLUSION

Increasing a client's peace of mind and empowering them to live an active life can be achieved even into old age. These programming guidelines can be a great starting point, but make sure to customize workouts to each specific client. Older adults vary in multiple ways in strength, health condition, and experience, and their program should reflect their specific needs. In addition to thinking about the physical improvements, a fall prevention program could provide social interaction, helping improve quality of life and retention.

**TABLE 1. DYNAMIC SAMPLE PROGRAM**

| EXERCISE | NOTES |
|---|---|
| D1: Knee circles | 1 – 3 sets; 15 – 20 repetitions; rest 30 s or as needed |
| D2: Hip circles | 1 – 3 sets; 15 – 20 repetitions; rest 30 s or as needed |
| D3: Marching | 1 – 3 sets; 15 – 20 repetitions; rest 30 s or as needed |
| D4: Modified jumping jacks | 1 – 3 sets; 15 – 20 repetitions; rest 30 s or as needed |

**TABLE 2. BALANCE SAMPLE PROGRAM**

| EXERCISE | NOTES |
|---|---|
| B1: Weight shifts – forwards/backwards | 1 – 3 sets; 30 s or longer; rest 30 s or as needed |
| B2: Tandem balance | 1 – 3 sets; 30 s or longer; rest 30 s or as needed |
| B3: Heel-to-toe walks | 1 – 3 sets; 30 s or longer; rest 30 s or as needed |
| B4: Stability ball head turns | 1 – 3 sets; 30 s or longer; rest 30 s or as needed |

**TABLE 3. STRENGTH SAMPLE PROGRAM**

| EXERCISE | NOTES |
|---|---|
| S1: Leg extension | 1 – 3 sets; 8 – 12 repetitions; rest 30 s or as needed |
| S2: Step-ups | 1 – 3 sets; 8 – 12 repetitions; rest 30 s or as needed |
| S3: Sit-to-stand | 1 – 3 sets; 8 – 12 repetitions; rest 30 s or as needed |
| S4: Heel raises/calf raises | 1 – 3 sets; 8 – 12 repetitions; rest 30 s or as needed |
| S5: Seated toe raises | 1 – 3 sets; 8 – 12 repetitions; rest 30 s or as needed |

**TABLE 4. FLEXIBILITY SAMPLE PROGRAM**

| EXERCISE | NOTES |
|---|---|
| F1: Calf stretch | 1 – 3 sets; 30 s hold |
| F2: Hamstring stretch | 1 – 3 sets; 30 s hold |
| F3: Hip flexor stretch | 1 – 3 sets; 30 s hold |
| F4: Quad self myofascial release | 1 – 3 sets; 30 s hold |

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