Falls and related injuries are a major health problem in all Western societies. About 30% of community-dwelling seniors fall annually, and of these, half have recurrent falls. This article focuses on fall prevention in community-dwelling older people. It reviews risk factors for falls, addresses the role of exercise to prevent falls, and outlines management tips for physicians who see patients who fall. There is good evidence that strength and balance training should be prescribed to prevent falls. Also, there are many simple things a physician can do to reduce fall risk, such as medication rationalization and treating fall risk factors in a coordinated manner.

Key words: falls, exercise, balance, resistance training, risk factor modification.

Endurance training can also be beneficial in reducing falls, as there is a certain level of cardiovascular fitness required for adequate daily function. Without such a level of cardiovascular fitness, a vicious cycle can ensue with the person becoming progressively less active, and thus weaker and more unsteady.

Older people can benefit from endurance fitness training, and three- to 12-month interventions have shown 5–20% improvement in cardiovascular fitness. This has proven to be feasible in community-dwelling elderly, institutionalized elderly, as well as those with vascular conditions, musculoskeletal disease and respiratory illness. Specific endurance training guidelines suggest such exercise for at least three days/week, for 20 minutes duration, at 40–60% heart rate reserve or 11–13 on the Borg scale of perceived exertion (where 20 represents maximum exertion).

Delivery of Optimal Falls Prevention in Community-Dwelling Older People

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Falls are a major health problem in all Western societies. About 30% of community-dwelling seniors fall annually, and of these, half have recurrent falls. This article focuses on fall prevention in community-dwelling older people. It reviews risk factors for falls, addresses the role of exercise to prevent falls, and outlines management tips for physicians who see patients who fall. There is good evidence that strength and balance training should be prescribed to prevent falls. Also, there are many simple things a physician can do to reduce fall risk, such as medication rationalization and treating fall risk factors in a coordinated manner.

Key words: falls, exercise, balance, resistance training, risk factor modification.
Exercise Prescriptions for Fall Prevention in Community-Dwelling Elderly

Balance exercises are beneficial to the aging patient because they allow for an increased balance range as well as an improvement in postural sway. Risk factors for falling may be reduced.

Strength-building exercises improve the patient’s agility and postural sway. Weightbearing exercises that mimic daily activities may be more beneficial than seated exercise training.

Weight-supported exercises, such as aqua-aerobics, provide balance support to the patient while exercising. Such exercises also may elevate cardiovascular fitness required for adequate daily function.

Stretching exercises may improve agility and reaction time. However, stretching exercises do not affect strength or postural sway. This and dynamic abdominal exercises and excessive trunk flexion are not suited for osteoporotic patients.
in certain settings. Lord, et al. found a reduction in fall risk factors with a structured intervention in community-dwelling, healthy older women. Benefits included improved lower limb strength, reaction time, neuromuscular control, postural sway, maximal balance range and ability on a coordinated stability task. Tai Chi has been found to delay falls, although this did not seem to be due to improvements in balance. In the Osteofit study of women 65–75 years old with osteoporosis (of whom 50% had a previous osteoporotic fracture), the Osteofit classes improved fall risk factors of knee extension and dynamic balance.

However, it must be remembered that not all group exercise intervention studies have been successful in reducing fall risk or falls. For example, studies have shown that seated flexibility did not affect strength and gait velocity, exercise with light weights did not result in strength benefit compared with unweighted exercise, and stretching and non-resisted strengthening did not affect strength or postural sway.

Robertson, Gardner and colleagues have consistently found that a physiotherapist- or nurse-administered strength and balance intervention reduced falls in people over 80 years of age. Individualized physical therapy provides exercise prescription plus the benefit of a “motor learning approach,” whereby the physiotherapist coaches the older person. It is not just a case of the patient passively receiving “therapy”. For fall prevention, the physical therapist assesses motor performance, analyses the cause of movement problems, develops an intervention program and ensures that the patient is able to undertake the exercises.

Thus, exercise plays an important role in the multifactorial approach that has been shown to reduce falls. It is important for physicians and other health care providers to ensure that appropriate exercise prescription and implementation is provided to at-risk patients.

**Medication Modification**

Interventions to address medication use in older people include minimizing the total number of drugs taken, assessing the risks and benefits of each drug, choosing drugs that are less centrally acting and do not produce postural hypotension, and reducing the dose wherever possible. However, reducing medication use in older people is difficult, and in itself may produce detrimental effects, particularly if performed too quickly. For example, rapid withdrawal of benzodiazepines may lead to confusion and restlessness, which may impair an older person’s ability to navigate obstacles in their environment. Nevertheless, the appropriate withdrawal of psychoactive medication can offer considerable benefits, and may not necessarily be associated with increased psychological problems. In contrast, the disadvantages of withdrawing antihypertensive or anti-inflammatory drugs would appear to outweigh the small potential reduction in falls risk, and therefore is not recommended.

**Medical Management of Falls**

Many medical conditions are associated with falls in community-dwelling...
## Table 2

### Suggestions for Primary Care Management of Medical Risk Factors for Falls

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Management</th>
<th>Referral/liaison</th>
</tr>
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<tbody>
<tr>
<td><strong>Eye disease</strong> (age-related maculopathy, cataracts, glaucoma)</td>
<td>Routine eye examination, repeat prescriptions of topical eye medications, education</td>
<td>Ophthalmologist, optometrist, occupational therapist</td>
</tr>
<tr>
<td><strong>Foot disorders</strong> (corns and calluses, bunions, nail problems, ulceration)</td>
<td>Scalpel reduction of calluses, orthotic devices/insoles, footwear and home footcare advice and education</td>
<td>Podiatrist, orthopedic surgeon, orthotist, boot-maker</td>
</tr>
<tr>
<td><strong>Musculoskeletal disorders</strong> (osteoarthritis, rheumatoid arthritis, acute soft tissue injuries)</td>
<td>Appropriate diagnostic evaluation, anti-inflammatory drugs, mobility aids (frames, walking sticks), self-treatment education, prescription of hip protectors, exercise advice</td>
<td>Physiotherapist, orthopedic surgeon, prosthettist, orthotist, rheumatologist, occupational therapist</td>
</tr>
<tr>
<td><strong>Peripheral neuropathy</strong></td>
<td>Manage diabetes, screen for vitamin B12 deficiency, walking stick, education regarding improvement of walking safety, foot orthoses</td>
<td>Neurologist, endocrinologist, physiotherapist, podiatrist</td>
</tr>
<tr>
<td><strong>Use of medications</strong></td>
<td>Minimize total medications taken, assess each medication, prescribe lowest effective dose, frequent re-assessment, education</td>
<td>Pharmacist, geriatrician, aged care facility staff</td>
</tr>
<tr>
<td><strong>Orthostatic hypotension</strong></td>
<td>Assessment of medications, rehydration</td>
<td>Cardiologist, aged care facility staff</td>
</tr>
<tr>
<td><strong>Vestibular dysfunction</strong></td>
<td>Avoid drugs with vestibular effects, otolaryngological evaluation</td>
<td>Otolaryngologist, neurologist</td>
</tr>
<tr>
<td><strong>Neurological disorders</strong> (stroke, cerebellar disorders, Parkinson’s disease)</td>
<td>Appropriate diagnostic evaluation, prescription of hip protectors</td>
<td>Neurologist, geriatrician, physiotherapist, occupational therapist</td>
</tr>
<tr>
<td><strong>Psychological factors</strong> (dementia, depression, anxiety, delirium)</td>
<td>Detect reversible causes, take care with prescription of centrally-acting drugs, prescription of hip protectors</td>
<td>Neurologist, psychiatrist, psychologist, aged care facility staff</td>
</tr>
<tr>
<td><strong>Incontinence</strong></td>
<td>Appropriate diagnostic evaluation, advice, assessment of diuretic use</td>
<td>Urologist, continence nurse, gynecologist, physiotherapist, occupational therapist, aged care facility staff</td>
</tr>
<tr>
<td><strong>Severe and recurrent dizziness</strong></td>
<td>Appropriate diagnostic evaluation to determine cause</td>
<td>Otolaryngologist, vascular specialist, neurologist</td>
</tr>
</tbody>
</table>
individuals. Therefore, the primary care physician has an important role to play in both the diagnosis and management of these conditions. Table 2 outlines suggestions for the management and/or appropriate referral for each of the major medical risk factors for falls in the elderly.

Summary

A number of large prospective studies have determined key risk factors for falling, and many of these can be alleviated. Exercise, in particular, has been effective in preventing falls, but not necessarily injurious falls or fractures. Larger studies are still required. The value of environmental modifications to promote safety in the home and strategies for reducing hazardous medication use in preventing falls have not yet been conclusively demonstrated. Multifaceted interventions have demonstrated efficacy in preventing falls, particularly those in which older people are assessed by a health professional trained to identify both intrinsic and environmental risk factors.

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References