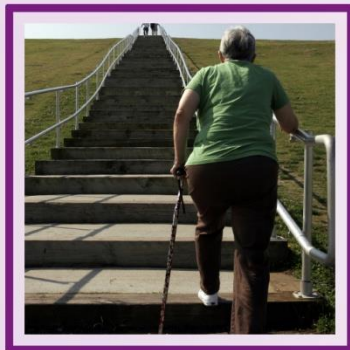


Tools to Implement the Otago Exercise Program: A Program to Reduce Falls

First Edition

Strength Training



Balance Retraining

Walking



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Introduction



The Otago Exercise Program (Otago) is an individually tailored, home-based, balance and strength fall prevention program that is delivered by a physical therapist over the course of 52 weeks.

Otago began in New Zealand and was developed, tested, and demonstrated to be most effective for reducing falls and fall-related injuries among high risk individuals: adults more than 80 years of age and those who have had a previous fall within one calendar year.¹ Otago also increased the percentage of older adults who were able to live independently in their community.² The program was developed by Professors John Campbell, MD, FRACP, and Clare Robertson, PhD, researchers at the University of Otago in Dunedin, New Zealand and the New Zealand Falls Prevention Research Group, in response to the frequency and severity of fall injuries among older adults in New Zealand.¹

The Centers for Disease Control and Prevention's (CDC), National Center for Injury Prevention and Control (NCIPC) modified and adapted the New Zealand Otago Exercise Program manual for use in the United States. NCIPC focuses on preventing injuries,² including those from falls among older adults through research, program implementation, and evaluation. With permission from the original developers of Otago, Professors John Campbell and Clare Robertson, NCIPC adapted the contents of the Otago Exercise Program manual for implementation at the state and local levels in accordance with Medicare and third party payor rules and regulations. Primary care providers and physical therapists in the United States can work with qualifying older adults¹ to develop a personalized Otago plan. This manual provides key information to successfully implement the Otago Exercise Program.

¹ Refer to the *Referral to and Billing for Otago* section in this manual to find out how to qualify to participate in the Otago program.

Overview of the Otago Exercise Program



Background on Older Adult Falls

This section provides implementers with background information about the problem of older adult falls and about the Otago Exercise Program.¹

Public Health Burden in the United States

- Falls occur frequently among older adults. More than 30 percent of people aged 65 and older who live in the community fall each year. The incidence increases to 50 percent for those aged 80 and older.^{3,4}
- Two-thirds of those who fall will do so again within 6 months.⁵
- Twenty to thirty percent of those who fall suffer moderate to severe injuries that make it difficult to get around or to live independently, which increases their risk of early death.⁶
- Older adults who fall are more likely to move into long-term care.
- Falls are the leading cause of injury, deaths, and hospital admissions for traumatic injuries among people aged 65 and older.^{3,4}
- In 2009, approximately two million older adults were treated in hospital emergency departments for fall injuries and 581,711 were hospitalized after being treated.⁶
- Data from 2007 show that 18,334 older adults died from injuries related to unintentional falls.⁶

Cost of Falls

- In 2000, the total direct medical costs of fall injuries for people aged 65 and older was \$19.2 billion or \$28.2 billion in 2010 dollars; two-thirds of these were hospital costs.⁶
- By 2020, the annual direct and indirect cost of fall-related injuries for people aged 65 and older is expected to reach almost \$55 billion (in 2007 dollars), \$32.4 billion of which will be covered by Medicare.^{6,7}
- An observational study of 1,017 seniors published in 1996 established the effects of fall severity on total annual health care costs.⁸
 - Older adults having one fall without serious injury during the course of one year incurred an additional annual cost of about \$3,500 (in 2010 dollars) compared with those who did not fall.
 - Having two or more falls without serious injuries increased costs by about \$16,500.

- Having one or more falls that involved at least one serious injury increased health care costs by about \$27,000.

Evidence-based Fall Prevention Programs

- Research has shown that fall prevention programs for high-risk older adults can produce a net-cost savings of almost nine dollars for each dollar invested.⁷
- Programs designed to prevent falls can: 1) save hospital admission and long-term care costs; 2) help older adults living in communities maintain their independence; and 3) help older adults increase their leg strength and improve their balance.¹
- A fall prevention meta-analysis showed that exercise programs that included at least 50 hours of exercise and that challenged balance were associated with significant reductions in fall rates.⁹

Background on Otago

- Otago is a muscle strengthening and balance retraining program delivered at home by a physical therapist with Otago training through a minimum of seven home visits as well as monthly phone calls when there is not a home visit over the course of a year.
- Otago was developed and tested by the New Zealand Falls Prevention Research Group in New Zealand.
- Otago is one of a few fall prevention programs that improves strength and balance and reduces falls and fall related injuries among older adults. Other interventions that address falls, some of which are funded by CDC, can be found in *A CDC Compendium of Effective Fall Interventions: What Works for Community-Dwelling Older Adults, 2nd Edition, 2010*.

Return on Investment

- The *Otago Exercise Program* delivered to persons aged 80 and older delivered a return of \$.70 per every dollar invested.¹⁰

The Four Otago Trials

- Otago was tested through four randomized controlled trials. A total of 1,016 men and women aged 65 to 97 participated in these trials.¹

Otago Trial Results		
Trial (Time Period)	Participants	Results
Trial One (Two Years; 1992-1994)	Women 80 years and older	<ul style="list-style-type: none"> ▪ Risk of falling for Otago participants was 32 percent lower than for the control group. ▪ After one year, the risk of a fall injury for Otago participants was 39 percent lower compared with people who received social visits.¹
Trial Two (44 Weeks; 1996)	Men and women 65 years and older regularly taking sleep medication	<ul style="list-style-type: none"> ▪ Falls among people who stopped taking sleeping medication decreased 66 percent compared with those who continued taking their medication. <ul style="list-style-type: none"> – However, 47 percent of patients who stopped taking medication started again one month after the trial ended. ▪ The Otago program did not decrease falls in this younger population.¹
Trial Three (One Year; 1998-1999)	Men and women 75 years and older	<ul style="list-style-type: none"> ▪ After one year, falls in the Otago group were reduced by 46 percent compared with the group that received usual care. <ul style="list-style-type: none"> – Falls were significantly reduced among patients aged 80 years and older. ▪ After one year, Otago participants had fewer serious fall injuries (i.e., fractures, hospital admissions, or stitches) compared to the control group.¹
Trial Four (One Year; 1998-1999)	Men and women 80 years and older	<ul style="list-style-type: none"> ▪ After one year, falls in the Otago group were reduced by 30 percent and fall injuries were reduced by 28 percent. ▪ Seventy percent of Otago participants were still exercising after one year, and 43 percent exercised each week as prescribed.¹

Trial Results Summary and Lessons Learned

- The Otago Exercise Program can reduce falls and fall related injuries. The program was most effective for adults 80 years and older.
- Men and women benefited equally.
- Participants' strength and balance improved markedly as assessed by the Chair Stand and the Four-Stage Balance tests.
- While older adults with and without previous falls benefited equally, if resources are limited, first offer the Otago program to adults 80 years and older,¹ as Otago was shown to be particularly effective in reducing falls and injuries among individuals in that age group.

Main Features of the Otago Exercise Program

The chart below gives implementers an overview of how the Otago Exercise Program works. It describes the assessments, activities, intensity, progressions, frequency, length of exercise sessions, and duration of the strengthening and balance exercises and walking program.¹

Otago Main Features			
	Strengthening	Balance Retraining	Walking
Assessment	30 Second Chair Stand Test ¹¹	Four-Stage Balance Test ^{12, 13}	Timed Up & Go ¹⁴⁻¹⁶
Activity	Five leg muscle strengthening exercises Four levels of difficulty	Twelve balance retraining exercises Four levels of difficulty Not all exercises may be prescribed	Advice about walking (see <i>Walking Tips</i>)
Intensity	Moderate Challenge 8-10 repetitions before fatigue	Moderate Challenge Each exercise at a level that the patient can safely perform unsupervised	Usual pace with usual walking aid
Progressions	Increase from one to two sets Increase amount of ankle weight after 2 sets of 10	Supported exercise to unsupported exercise	Walk indoors Advance to walking outdoors when strength and balance have improved
Length of Exercise Sessions	Approximately thirty minutes total for exercises; Exercises can be divided up over the day		Thirty minutes; can be split into three ten-minute walks throughout the day
Frequency	Three times a week with rest day between	At least three times a week	At least twice a week
Duration	52 weeks		

Practical Implications of Otago Research

This section gives implementers general information about instructor training, program prescription and implementation, and audience selection. Information in this section provides points to consider when implementing the program.¹

The research reported in this manual adds to the growing body of evidence that falls and resulting injuries can be reduced. Since older people who fall are more likely to require long-term care, preventing falls will help older people living in the community maintain their independence. Fall prevention programs have the potential to reduce hospital admission and long-term care costs, the major costs associated with fall injuries.

Unfortunately, many fall prevention programs are implemented in communities without regard to evidence of effectiveness. Not all interventions are effective in reducing falls and injuries.¹⁷ Otago has been tested in four controlled trials and shown to reduce falls and injuries in older people living at home, particularly in those 80 years of age and older. Otago has only been implemented on an individual basis in home settings. It is not known whether the program would be effective in group or long-term care settings.

Who Can Benefit from Otago?

Evidence shows that Otago is most effective in reducing falls among persons 80 years of age and older with a history of falls in the previous year. In clinical practice, the physical therapist should determine if others would also benefit from this program.

- Otago is most effective for older adults who have fallen and who have moderate to severe decreased strength and balance due to multiple risk factors, such as arthritis, de-conditioning, and inactivity. Participants should be living in the community and able to walk in their own home with or without a walking aid.
- Older adults who are less than 80 years of age and who are falling, as well as adults who are too frail to do standing exercises may require a more individualized physical therapy program.
- Older adults with mild strength and balance deficits may need a more challenging program than those in Otago and may benefit from other evidence-based fall prevention programs such as *Tai chi: Moving for Better Balance*.
- Older adults who fall due to syncope, vertigo, severely impaired vision, some neurologic conditions, or who have significant cognitive impairment may not benefit from Otago. These older adults should be referred to their primary health care provider who can prescribe treatment or refer them to appropriate specialists.

Who Will Implement Otago?

Otago was designed for delivery by a physical therapist in the home in New Zealand. In the United States, it is anticipated that implementation will be by organizations or agencies that employ physical therapists who are able to provide services in the home. These may be home health agencies or Medicare Part B providers. Because falls is a public health issue, there is the potential that agencies

and organizations can partner with state divisions of public health and aging to deliver the program. For those interested in pursuing these types of partnerships, contact your state department of public health or state department of aging and adult services.

Administrative Preparation

- **Recruit and train physical therapists.** Physical therapy home health agencies and/or non-hospital affiliated outpatient physical therapy practices that can provide Medicare B in the home. Plan a training event to educate physical therapists on the program structure and exercises. Training options are also available through the APTA.
- **Identify potential partners.** Regions or municipalities that have productive falls coalitions may contribute to implementation.
- **Educate primary care providers.** Disseminate information to primary care provider office administrators to educate primary care providers about falls, the importance of falls screening, and how to appropriately refer patients to physical therapy for medically necessary care, including Otago.
- **Prepare program materials.** Make copies of all forms, tools, and guides for physical therapists to use as they deliver Otago (reproducible forms are available in the *Practitioners' Toolkit* in this manual).

Physical Therapist Training

Physical therapists usually have the skills needed to provide the Otago exercises.

Physical therapists who integrate Otago into their practice should participate in additional training.

The UNC Center for Aging and Health in partnership with the Centers for Disease Control has created an online training which is available at:

<http://www.aheconnect.com/newahec/cdetail.asp?courseid=cgec3>

To access the training, click on the link above or copy and paste it into your browser. You will need to register with AHEC Connect. Once you have registered as a user, you can access the course.

The training programs include the research evidence and rationale for the program, and give clear guidelines for delivery, including how to conduct and prescribe each exercise.

Many physical therapists and agencies have found it helpful to have several therapists take the online training, and then hold an implementation session at state and national meetings. More information can be found by emailing Otago@unc.edu.

After completing their training, a physical therapist must be able to:

- Explain the rationale and benefits of the Otago program to all patients.
- Assess each patient and tailor the program to the individual's physical capacity and health.
- Identify when a patient is ready to start the program – when they are ready and able to see a PT at a frequency of once every other week and able to do their exercises on their own or with help.

- Ensure that patients can perform the exercises correctly and safely, making adjustments as needed because of physical limitations such as arthritis or joint replacement.
- Monitor the program and provide appropriate advice and exercise progression based on the patient’s responses to the exercises.
- Adapt the program as necessary after periods of patient illness.
- Provide support and motivation to each patient.

This training manual is designed to accompany all Otago Training Programs. The manual includes implementation procedures and handouts for patients. All reproducible forms, including the Otago visit chart, exercise calendar and diary, and evaluation forms can be found in later sections of this manual.

Participant Screening and Referral

If a primary care provider has diagnosed a patient with balance problems, the patient should be referred to an appropriate physical therapist to evaluate and treat these problems based on Medicare, Medicare Advantage, and/or third party insurance coverage. Primary care providers should also review the “What is Otago and How do I Refer my Patients?” handout located in the *Referral to and Billing for Otago* section of this manual.

Since Otago is delivered in the home, physical therapy may be covered under Medicare Part A (for individuals who fit the requirements for homebound status)¹⁸ and provided by a home health agency. Alternatively, physical therapy may be covered under Part B (for individuals who are not homebound, but receive the benefit of Part B Outpatient Therapy)¹⁹ and provided in the home by a non-hospital affiliated outpatient physical therapy practice. Physical therapists working in critical access hospitals also qualify to provide Otago under Part B requirements in the home.²⁰

Certain states allow for direct access to outpatient physical therapy without a physician referral. If referring to physical therapy directly the physical therapist will need to first check with their state practice acts to follow all direct access guidelines. If allowed to evaluate and potentially start treatment, the physical therapist will still need to obtain the appropriate physician certification under Medicare guidelines for reimbursement.

Since Medicare does not recognize fall prevention programs as a reimbursable expense, the physical therapist will need to determine if physical therapy services (i.e., Otago) fit the “medically necessary” guidelines of the patient’s Medicare, Medicare Advantage, and/or third party insurance coverage.

Maintaining Program Fidelity

Fidelity refers to delivering a program as intended. Since we know Otago was effective in several randomized controlled trials (ref), we strongly encourage you to replicate the original delivery model by:

- Conducting the program in the home
- Administering by a licensed physical therapist.
- Adhering to the Otago program schedule
- Providing the minimum number of visits
- Using adjustable ankle weights
- Having patients perform exercises as prescribed

Program Prescription

The program is designed to be delivered over 12 months and includes a minimum of seven home visits. The first visit is Day 1 of Otago when performance of the functional measures is assessed and the exercises are prescribed. Then the therapist will see the patient for 4 visits over an 8 week period (typically every other week). This is considered the initial bolus of Otago. Then the therapist will follow the patient via phone calls and a visit at 6 months, 9 months, and 12 months.

Otago is not designed to be started on Day 1 of therapy. It is designed to start when the patient is ready to start. The therapist can see the patient more than the 4 visits over the 8 weeks if that is what the patient needs. The therapist can discharge the patient to another program if the patient meets their goals.

A physical therapist will average about 8-10 hours per patient for the entire program, not including travel and administration time. More visits may be necessary if a patient progresses slowly, or if there is an illness, or a decline in function. Fewer home visits, changes in the recommended schedule for home visits, omitting phone calls, or program duration of less than a year may slow progression or result in poor compliance. As a result, patients may not achieve the required gains in strength and balance to reduce falls. Alternatively, progressing exercises too rapidly may decrease compliance and/or increase the risk of injury.

Ankle weights provide the necessary resistance. All exercises (except for the knee extensors) should be performed standing. All program participants should purchase adjustable ankle weights, but they should not use them before beginning Otago because this could result in injury.¹ Additional information about adjustable ankle weights can be found in the *Participants' Packet* section of this manual.

Program Note on Participant Costs

- Because Otago targets older adults with balance problems, services provided by Otago-trained physical therapists may be covered under Medicare Part A or B, Medicare Advantage, and/or third party insurers.
- Physical therapists should work with their patient's insurer to determine what, if any, co-pay may be required. If there is co-pay, the physical therapist should inform the patient and help determine if there are other avenues for funding their participation.
- Adjustable ankle weights are required for Otago. Physical therapists will bring ankle weights for the first few sessions. The patients need to purchase their own set of weights to use when exercising on their own.
- The physical therapist should provide patients with low cost options for purchasing adjustable ankle weights.

Program Safety

Otago involves low-to-moderate intensity physical activity. Although it is delivered by trained and licensed physical therapists, patient safety is always a concern. Physical therapists can address safety in the following ways:

- Ask all patients about existing health status and any physical limitations at the first home visit.
- Remind patients to monitor pain.
- Watch for any signs of discomfort or pain during all strength training, balance retraining and walking exercises.
- Maintain contact with patients' primary care providers for the duration of the program.

Additional safety measures can be found in the *Practitioners' Toolkit* in this manual.

Program Monitoring and Evaluation

Monitoring and evaluation help to maintain program fidelity, especially when multiple physical therapists will be delivering Otago to patients. Implementing organizations can choose if and how they will monitor and evaluate Otago implementation and maintenance. Alternatively, patients can be asked to evaluate the program to continuously improve upon how it is delivered. Sample reproducible monitoring and evaluation forms can be found in the *Practitioners' Toolkit*.

If you would like to participate in a project to track outcomes of patients participating in Otago, email Otago@unc.edu

Referral to and Billing for Otago



What is Otago and how do I refer my patients? A guide for physicians

Use the following information to educate physicians and other providers about the OEP

What is the Otago Exercise Program?

- Otago was developed, tested, and proven to be effective for preventing falls among adults 65 years of age and older in four randomized controlled trials in New Zealand.¹
- Otago has been shown to reduce falls by 35 percent among high risk individuals. It was most effective for adults 80 years of age or older, who have fallen within the last year, and who have moderate to severe decreased strength and balance due to multiple risk factors including arthritis, de-conditioning, and inactivity.^{1,9,21}
- Otago improves both strength and balance—two of the most readily modifiable risk factors for falls.⁹
- Otago was tested as a stand-alone, home-based intervention and is delivered by a trained and licensed physical therapist.¹
- Although tested as a stand-alone intervention the Otago Exercise Program could also be delivered as part of a multifactorial falls prevention program.

Why Should I Refer my Patients?

- Falls are a major threat for your patients.²²
 - One out of three adults aged 65 and older falls each year.
 - Half of all adults aged 80 and older fall each year.
 - Less than half of Medicare beneficiaries who fell in the previous year talked to their health care provider about it.
 - People who fall are two to three times more likely to fall again.
 - Every 29 minutes, an older adult in the U.S. dies from a fall and more than 18,000 seniors die from falls each year.
 - One out of every five falls causes a serious injury such as a head trauma or fracture.

- Direct medical costs for fall injuries in the U.S. total more than \$28 billion annually and hospital costs account for two-thirds of the total.
- Primary care providers (e.g., MD, DO, PA, NP) are in the best position to provide information about the causes of falls and to refer an older adult patient to evidence-based programs that reduce falls.

How Do I Make a Referral?

Assess your older adult patient for falls risk using a multi-factorial falls risk assessment, such as the STEADI (Stopping Elderly Accidents, Deaths, and Injuries) falls risk assessment or the American Geriatrics Society clinical algorithm. If your patient is found at risk for falls due to poor balance or mobility, refer your patient to physical therapy for Otago using the following language: “Evaluation and treatment for balance and falls; consider Otago.” Note that clinical judgment for referral should be used and recommendations could be adjusted (i.e., accepting people <80 and at risk for falls or people who have not fallen in the last year but are at increased risk of falls). The physical therapist will then determine the appropriate fall prevention exercise approach and if the patient would benefit from Otago or another program.

Patients to Refer

- Persons who are age 80 or older.
- Persons who have fallen in the past year.
- Persons who have muscle weakness and balance difficulties due to multiple risk factors, such as arthritis, de-conditioning, and inactivity.
- Person who are living in the community.
- Persons who can walk in their own home with or without a walking aid.

Will this be Covered by Medicare or Other Insurance?

Otago may be covered by Medicare if your patient has been diagnosed with a balance problem. However, Medicare will only cover home-based physical therapy when provided through a home health agency (for those who meet the requirements for homebound status and are covered under Medicare Part A) or a non-hospital affiliated outpatient physical therapy practice (for those who are not classified as homebound and receive the Part B Outpatient Therapy Benefit).

Medicare Advantage and supplemental insurance carriers typically follow what is covered by Medicare. Ensure that in-home physical therapy for your patient’s diagnosis is covered by their insurance prior to Otago referral.

How do I get reimbursed for Otago? A guide for physical therapists

This section provides information about the Medicare guidelines to insure payment for providing the Otago Exercise Program. There are three reimbursement models for delivery of Otago in the home. Physical therapists should review this section before implementing the Otago Exercise Program, and physical therapists should always review the most current Medicare and state practice act guidelines.

Model 1 –Home health physical therapist (Medicare Part A). The therapist starts the Otago program based on the plan of care. When the patient has met the goals of home health physical therapy or is no longer homebound, is discharged and transferred to a therapist who can provide Medicare Part B in the home to complete Otago.

1. Home Health

- Patients must meet all Medicare guidelines and regulations in order to qualify for Medicare Part A home health care.
 - A physician, physician assistant or nurse practitioner must physically see the patient 90 days prior to or within 30 days of starting treatment and complete an encounter sheet that states the patient was seen for balance impairment.
 - The physical therapist evaluates the patient for falls risks including balance impairments, and determines if the Otago exercise program is appropriate. A plan of care is developed.
 - The home health agency as well as the physical therapist is responsible for following all Medicare Part A guidelines of frequency, duration, certification and recertification to assure payment.
 - Medicare will not cover telephone calls or the patient's weights.
2. When the patient is no longer homebound while they are still in the Otago program they are discharged from the home health plan of care and transferred to a Medicare Part B plan of care. This could be the same physical therapist but paid for by a different reimbursement mechanism. This is only the case if the home health agency has the ability to provide physical therapy services under Medicare A and B. If the home health agency does not provide Medicare B, then the patient will need to be transferred to a Medicare B physical therapist that is not affiliated with a hospital and can provide services in the home. For details on reimbursement under Medicare B see Model 2.

Model 2 –Otago is delivered in the home by a physical therapist billing under Medicare part B.

- Physical therapy is ordered by a physician for evaluation and treatment for abnormal balance and falls. The physical therapist evaluates the patient for falls risks including

balance impairments and determines the Otago exercise program is appropriate. A plan of care is developed.

- If your state has direct access for physical therapy you may not require a physician's referral to assess for balance and falls. Check with your state practice act for direct access guidelines. However, even with direct access, Medicare does require a physician, physician assistant or nurse practitioner to sign the initial certification for the plan of care within 30 days and recertify the plan of care every 90 days.
- Medicare will cover 80% of the visit costs. If the patient has a secondary insurance, the secondary insurance will cover the remaining 20%. If there is no secondary insurance, the patient is responsible for the remaining 20%.
- In some cases, there may be a deductible and/or co-pay.
- Medicare does impose caps on therapy services. It is the responsibility of the therapist and/or outpatient facility/provider to know what the current caps are including exceptions to the cap, and to keep the patient advised if they are nearing the limit of the current cap.
- The physical therapist needs to follow all Medicare guidelines of frequency, duration, and certification/recertification to ensure payment.
- The patient must be seen a minimum of one time per 90 day recertification period for re-evaluation, tests/measures and documentation of therapy effectiveness.
- Otago is designed for delivery over a year; this may require 3-4 recertifications depending on whether the patient started Otago with home health, Medicare A, or with Medicare B.
- Medicare will not cover telephone calls or the patient's weights.
- Documentation of the treatment is required at every visit (see APTA [Guidelines: Physical Therapy Documentation of Patient/Client Management](#)).

Model 3 – Patient has Medicare C/Advantage program. An MA organization (MAO) offering an MA plan must provide enrollees in that plan with all original Medicare-covered services. MA plans vary and the physical therapist needs to know what the guidelines are for authorization, co-pays and documentation.

How do I code for Otago? An evolving guide

- Co-morbidities may be reported with the relevant ICD-9-CM codes and conditions that are related to therapy goals and affect the rate of recovery.
- In some jurisdictions, you will need to include ICD-9-CM code v15.88 (history of falls) on the claim, in addition to one of the ICD-9-CM codes for reporting “medically necessary” care.¹⁹

Relevant Otago ICD-9-CM Codes

- 719.7 Difficulty walking
 - 781.2 Abnormality of gait
 - 781.3 Lack of coordination
 - 781.92 Symptoms involving nervous and musculoskeletal symptoms, abnormal posture
 - 728.87 Muscle weakness (generalized)
-

What do I do after the final visit?

When a patient completes Otago, encourage them to continue with their exercise program at home to maintain their strength and balance. You can also recommend they participate in a group exercise class to enjoy the benefits of exercising with other older adults. You can discuss how they can integrate the class with their Otago exercises, for example, going to an exercise class one time a week and practicing the Otago exercises at home twice a week.

If the patient is not able to progress through Otago, even after modifications have been made, the physical therapist should create a discharge plan and work with the patient’s primary care provider to determine the appropriate fall prevention services needed by the patient.²³

Practitioners' Toolkit

Guide to Program Implementation

This section provides physical therapists with the Otago Exercise Program schedule, strength and balance exercises and walking plan, how to prescribe the exercises, and ways to sustain adherence to the exercise program. The physical therapist should review this section of the manual before delivering the program.¹

Physical Therapist Role



Once a patient has been referred to a physical therapist for Otago, the physical therapist should schedule the first home visit. Suggestions for what should take place at each home visit include the following:

- Allow at least one hour for the first home visit, 30 to 60 minutes for each of the remaining visits to allow for re-evaluation, tests and measures as needed.
- Start every home visit with flexibility exercises (available in the *Participants' Packet*).
- Instructing the patient on flexibility, strengthening, and balance exercises will take approximately 30 minutes to complete.
- The strength exercises should be done three times a week with rest days in between.
- The balance exercises should be done a minimum of three times a week.
- Assess the patient's safety when walking indoors and outdoors. Incorporate walking into the exercise program when it is safe to do so.
 - Determine if the patient has the appropriate walking aid and is using it correctly.
 - Some patients may need to wait to add the walking component until they have gained sufficient strength and balance, for example, after one month of exercising.
- Advise the patient to walk for 30 minutes at least twice a week, as long as they are physically capable. The walking can be broken up into shorter sessions, for example, three 10-minute sessions in one day.
- Participants should focus on the exercises and not skip them to go walking instead.

Exercise Prescription

- At each home visit, prescribe the exercises that suit the patient's overall health and physical ability
- Plan to increase the difficulty of the exercises at subsequent visits.
- Use the text and illustrated instructions for each Otago exercise to create an instruction booklet for the patient.
- You may need to add additional notes to the exercise sheets to clarify instructions.

- Encourage the patient to wear appropriate glasses and footwear and to use a mobility aid if needed to maximize safety when walking.
- Encourage the patient to scan ahead, focus on walking, and avoid multi-tasking. (Additional walking tips are available in the *Participants' Packet*.)
- Help support patient's exercise compliance using the Otago exercise calendars or diaries (available in the *Participants' Packet*). Although not mandatory, this method may improve compliance.

PT Management Phase							Self- Management Phase			
Month	1				2		3	4	5	6
Week	1	2	3	4	6	8				
	Initial	Visit		Visit	Visit*	Visit				Visit
							Call	Call	Call	
Month	7			8	9	10	11	12		
Week										
					Visit			Visit/DC		
	Call			Call		Call	Call			

The First Home Visit

- If this is your first day working with the patient:
 - Establish a good working relationship with the patient.
 - Explain why Otago is appropriate.
 - Take a clinical history and assess the factors that will influence safety and adherence to the exercise program.
- If you have been working with the patient awhile, and this is Otago Day 1
 - Conduct a functional assessment to measure baseline strength, balance, and walking ability.
 - Develop a plan of care with the patient, prescribe a set of exercises, and encourage the patient to become familiar with the instructions for each exercise.
 - Introduce a walking plan if the patient is physically ready and able and if it is safe to do so.

Functional Assessments

- Assess muscle strength, balance, and walking ability with: 1) the 30 second Chair Stand Test, 2) Four-Stage Balance Test, and 3) Timed Up & Go¹¹⁻¹⁶
- Use a stopwatch and chair to conduct these assessments.
- Determine patients' starting level based on their scores (see Otago Visit Chart)

Strength, Balance, and Walking Assessments

This section provides information about how to conduct the three assessment tests: 1) the 30 second Chair Stand Test, 2) the Four-Stage Balance Test, and 3) the Timed Up & Go to determine the patient's strength, balance, and walking ability.

These tests are used at the first visit, and at the six, nine, and twelve month visits. The physical therapist may be required to conduct other strength, balance, and walking assessments that are based on their practice setting.

30 Second Chair Stand Test¹¹

The purpose of this test is to assess leg strength and endurance. The equipment needed includes a chair with a straight back without arm rests (seat 17 inches high) and a stopwatch.

30 Second Chair Stand Test Instructions	
Participant	Physical Therapist
<ol style="list-style-type: none"> 1. Sit in the middle of the chair. 2. Place your hands on the opposite shoulder crossed at the wrists. 3. Keep your feet flat on the floor. 4. Keep your back straight. 5. On “Go,” rise to a full standing position and then sit back down again. 6. Repeat this for 30 seconds. 	<ol style="list-style-type: none"> 1. Place the chair against a wall for safety. 2. On “Go,” begin timing. 3. Count the number of times patient comes to a full standing position in 30 seconds. 4. If the patient is over halfway to a standing position when 30 seconds have elapsed, count it as a stand 5. A below average rating indicates a high risk for falls. 6. Record score on Otago Visit Sheet or in your medical documentation

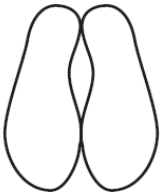



30 Second Chair Stand (# stands) ²⁴							
MEN				WOMEN			
Age	Below Average	Average	Above Average	Age	Below Average	Average	Above Average
60-64	<14	14-19	>19	60-64	<12	12-17	>17
65-69	<12	12-18	>18	65-69	<11	11-16	>16
70-74	<12	12-17	>17	70-74	<10	10-15	>15
75-79	<11	11-17	>17	75-79	<10	10-15	>15
80-84	<10	10-15	>15	80-84	<9	9-14	>14
85-89	<8	8-14	>14	85-89	<8	8-13	>13
90-94	<7	7-12	>12	90-94	<4	4-11	>11

Four-Stage Balance Test^{12, 13}

The purpose of this test is to assess static balance. The equipment needed is a stopwatch. This test includes four progressively more challenging positions. Participants should not use an assistive device (cane or walker) and should keep their eyes open and be in bare feet.

Describe and demonstrate each position. Stand next to the patient, hold their arm, and help them assume the correct foot position. When they are steady, let go, but remain ready to catch them if they should lose balance. If the patient can hold a position for 10 seconds without moving their feet or needing support, go on to the next position. If not, stop the test. An older adult who cannot hold the tandem stance for at least 10 seconds is at an increased risk of falling.

Four-Stage Balance Test Instructions	
Participant	Physical Therapist
<ol style="list-style-type: none"> Stand in each position for 10 seconds. You can hold your arms out or move your body to help keep your balance but do not move your feet. Hold this position until you are told to stop. 	<ol style="list-style-type: none"> For each stage, say “Ready, begin” and begin timing. After 10 seconds, say “Stop.”

Four-Stage Balance Test Stances			
Feet Together Stand	Semi-Tandem Stand	Tandem Stand	One Leg Stand
<ul style="list-style-type: none"> Stand with your feet side by side. 	<ul style="list-style-type: none"> Place the instep of one foot so it is touching the big toe of the other foot. 	<ul style="list-style-type: none"> Place one foot in front of the other, heel touching toe. 	<ul style="list-style-type: none"> Stand on one foot. 

The Timed Up and Go (TUG) Test¹⁴⁻¹⁶

The purpose of this test is to assess older adult mobility. The equipment needed includes a stopwatch, a standard arm chair, and mark a line on the floor at 3 meters or 10 feet away from the edge of the front of the chair. The patient may use their usual walking aid and push off with their hands on the arms of the chair to stand up.

Instructions to the Patient

When I say “GO”, I want you to:

1. Stand up from the chair.
2. Walk to the line on the floor at your normal pace.
3. Turn.
4. Walk back to the chair at your normal pace.
5. Sit back down again.

Observe the patient’s postural stability, gait, stride length, and sway.

Circle all that apply:

Slow tentative pace — Loss of Balance — Short strides —

Little or no arm swing — Steadying self on walls — Shuffling —

En bloc turning — Not using assistive device properly

Notes:

On the word “Go” begin timing.

Stop timing after patient has sat back down and record.

Time: _____ seconds (##)

An older adult who takes ≥ 12 seconds to complete the TUG is at high risk for falling.



Exercise Prescription

Demonstrate, explain, and closely observe the patient performing all prescribed exercises. Ensure that the patient: 1) completes five minutes of gentle warm-up (flexibility) exercises, 2) has appropriately tailored exercises from the program, and 3) can safely continue doing the exercises without supervision between visits. A family member may be enlisted to help with the exercises.

Prescription of Exercises	
Strengthening	Balance Retraining
<ul style="list-style-type: none"> ▪ The Otago exercise program focuses on major lower limb muscles <ul style="list-style-type: none"> – Knee flexors, knee extensors, and hip abductors, which are important for function and mobility – Ankle dorsiflexor and plantar flexor muscles, which are important for maintaining balance. ▪ Determine the starting level of each exercise by the amount of ankle weight the patient can lift to perform eight to ten good quality repetitions before fatigue. This must be assessed for each muscle group on each leg. ▪ Recommend that patients aged 80 and older start with two to four pound weights. ▪ Starting with light weights at the outset will minimize both muscle soreness and compliance problems. ▪ Ensure throughout prescription that: <ul style="list-style-type: none"> – The patient uses adjustable ankle weights. – There is minimal substitution of other muscle groups. – The patient uses the correct breathing technique (inhale before a lift, exhale during, and inhale while lowering the lift). – The patient does the exercises slowly (two to three seconds to lift the weight, four to 	<ul style="list-style-type: none"> ▪ Observe the patient during the holding portion of each balance exercise. Make sure they can recover their balance using lower body strategies (as opposed to grabbing with their arms) before prescribing the exercise without support. ▪ Not everyone will start at the first level or be prescribed all of the balance exercises. Unstable patients may initially need a wider base of support. ▪ Ensure the patient's eyes stay looking ahead ▪ It is okay to make lower limb balance adjustments, such as taking a recovery step, while doing the exercise and is confident in doing so.

<p>five seconds to lower the weight) through the functional range of active joint movement.</p> <ul style="list-style-type: none"> - The patient takes a one to two minute rest between sets. - Apart from the “front knee strengthening” exercises, all strengthening exercises are performed standing 	
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- **The Walking Plan.** Advise the patient that including walking in their plan of care is part of the program and will increase physical activity. Discuss their walking activities and evaluate their gait (e.g., using the Timed Up & Go) and use of walking aid(s) indoors and outdoors to determine safety and feasibility of a walking program. Make it clear to the patient that walking alone, without the strength and balance exercises will not reduce their chances of falling.
 - Otago participants should plan to walk up to 30 minutes at their usual pace at least twice a week, as long as it is safe to do so.
 - The 30 minutes of walking can be broken up into shorter intervals, such as three 10-minute sessions.
 - Otago participants should only incorporate the walking plan when they are physically ready and able.
 - Otago participants should begin by walking indoors and advance to walking outdoors when strength and balance have improved.

Use the chart provided in this guide to record the exercises and levels prescribed at each home visit and the time the patient will walk.

Progressions at Follow-up Visits

As the program is progressed instruction sheets for new or exercises should be given to the patient. The physical therapist should demonstrate the proper technique and have the patient repeat the exercise, showing correct and safe technique. The follow-up phone calls will help patients maintain their exercises and resolve any problems encountered.

Progression of Exercises at Follow-up Visits	
Strengthening	Balance Retraining
<ul style="list-style-type: none"> ▪ Increase ankle weights or the number of sets performed, according to the <i>Levels and Repetitions for the Exercises</i> chart. – Participants should complete two sets of 10 repetitions before progressing to the next level – Increasing weights should not produce adverse side effects (e.g., pain, injury, cardiovascular events, non-compliance) if prescribed and done correctly. 	<ul style="list-style-type: none"> ▪ Progress from holding onto a stable structure to performing the exercise without support. ▪ Progress through the levels of exercise according to the <i>Levels and Repetitions for the Exercises</i> chart.

Otago Resources

Each Otago participant should be given

- Copies of the prescribed exercises with illustrations and instructions about how to do each exercise (available in the *Participants' Packet*), OR
- Videos of each exercises; Download at <http://www.med.unc.edu/aging/cgec/exercise-videos>
- A calendar or diary to monitor exercises (available in the *Participants' Packet*),
- One or more adjustable ankle weights easy to take on and off (note: the amount of the ankle weights will increase as the patient's strength improves)
- Their physical therapist's contact information.

The physical therapist delivering Otago should have

- A stopwatch for all assessments,
- A copy of the *Levels and Repetitions for the Exercises*, which lists the exercises and progression
- Photocopies of the exercises with text, illustrations, and instructions for each exercise at each level
- Only those handouts for which exercises have been prescribed will be provided to the patient
- A chart to record the strength and balance exercises and the levels prescribed at each visit; the patient's plan of care.

Additional Safety Measures

Participants may have health conditions that limit their ability to safely perform prescribed exercises. In such cases, physical therapists should:

- Screen for medications that may affect balance and risk of falls.

- Advise patients with rheumatoid arthritis, osteoarthritis, or other painful conditions to work in a pain-free range.
- Advise the patient to stop exercising and to contact their primary care provider if dizziness, chest pain, and/or shortness of breath occur while exercising, or muscle pain does not cease.
- Advise the patient to see their primary care provider and to consider other successful injury prevention strategies if they do have a fall.
- If the patient stopped Otago due to medical reasons or other reasons, advise the patient to contact their physical therapist before restarting Otago. In this situation, the patient may need additional program visits by their physical therapist.

Monitoring

Some simple measures can be used to monitor a patient's success in Otago.

- Calendars or diaries can monitor compliance with the strength training, balance retraining, and walking exercises.
- The initial strength, balance, and walking tests (e.g., 30 second Chair Stand Test, Four-Stage Balance Test, and Timed Up & Go) can be repeated periodically and the results can be compared to assess progress. Sharing the results with the patient helps with motivation.
- Use the Otago Visit Chart to monitor frequency and duration of visits, falls, progression of exercises and walking, and comments made at each visit.

Once Otago Ends

After a patient completes Otago, encourage them to continue their exercise program at home to maintain their strength and balance. If they are able to participate in a group exercise class recommend they join a community exercise program that includes balance exercises to enjoy the benefits of exercising with other older adults. You can discuss how they can integrate the class with their Otago exercises, for example, going to an exercise class one time a week and practicing the Otago exercises at home twice a week.

Stress the importance of physical activity and remind patients if they stop exercising, they will lose the gains they have made in the program. Physical therapists should note that community programs will vary by location and the importance of working with each patient to find one that fits best.

Group programs, such as *Stepping On* and *Tai chi: Moving for Better Balance*, provide opportunities for patients cognitively intact and who do not need an assistive device for walking indoors (may use an assistive device for walking outdoors) to continue to participate in an evidence-based falls

Sustaining the Benefits of Otago

- Provide ongoing support and motivation.
- Encourage walking and other physical activities.
- Involve family members and other caregivers.
- Involve the patient's primary care provider.

prevention program. *Stepping On* includes some of the same exercises as Otago, and provides education on fall prevention strategies using self-efficacy principles. *Tai chi: Moving for Better Balance* includes eight Yang-style Tai chi forms to improve functional ability to decrease falls, fear of falling, and fall risk. (See the *Key Resources* section to find more information about these two programs).

- Contact your local falls coalition for additional information and tips about what your patient can do after Otago ends. Information regarding falls coalitions can be found at the National Council on Aging, Center for Healthy Aging at <http://www.healthyagingprograms.org/>.

Levels and Number of Repetitions for the Exercises

This table provides information about the Otago Exercise Program exercises, including how many repetitions and which exercises can be done at each level.¹ This information will be useful for physical therapists when meeting with a patient. It details the number of repetitions per exercise based on the patient's starting abilities. Remember that not everyone will start at the first level or be prescribed all of the balance exercises. Some balance exercises may have to be modified due to pain or safety. All strength exercises are prescribed throughout the duration of the program, although not all may be prescribed at the first home visit.

Otago Exercise Levels and Repetitions			
WARM-UP (FLEXIBILITY) EXERCISES			
Head Movements	Stand tall, 5 times on each side	Trunk Movements	Stand tall, 5 times each side
Neck Movements	Stand tall, 5 times	Ankle Movements	Stand or sit, 10 times
Back Extension	Stand tall, 5 times		
STRENGTHENING EXERCISES			
Knee Extensor	ALL 4 LEVELS		
Knee Flexor	Ankle weights are used to provide resistance; perform 10 repetitions of each exercise, when able to do 2 sets of 10 repetitions add/progress weights.		
Hip Abductor			
Calf Raises	LEVEL C 10 repetitions, hold support, repeat	LEVEL D 10 repetitions, no support, repeat	
Toe Raises	10 repetitions, hold support, repeat	10 repetitions, no support, repeat	

Otago Exercise Levels and Repetitions				
BALANCE RETRAINING EXERCISES				
	LEVEL A	LEVEL B	LEVEL C	LEVEL D
Knee Bends	10 repetitions Hold support	10 repetitions No support <i>or</i> 10 repetitions Hold support, repeat	10 repetitions No support, repeat	10 repetitions, 3 times No support
Backwards Walking		10 steps, 4 times Hold support		10 steps, 4 times No support
Walking And Turning Around		Walk and turn around (do a figure 8) twice Use walking aid	Walk and turn around (do a figure 8) twice No support	
Sideways Walking		10 steps, 4 times Use walking aid	10 steps, 4 times No support	
Tandem Stance (Heel Toe Stand)	10 seconds Hold support	10 seconds No support		
Tandem Walk (Heel Toe Walk)			Walk 10 steps Hold support, repeat	Walk 10 steps No support, repeat
One Leg Stand		10 seconds, Hold support	10 seconds, No hold	30 seconds, No hold
Heel Walking			10 steps, 4 times Hold support	10 steps, 4 times No support
Toe Walk			10 steps, 4 times Hold support	10 steps, 4 times No support
Heel Toe Walking Backwards				Walk 10 steps No support, repeat
Sit To Stand	5 stands, 2 hands for support	5 stands, 1 hand <i>or</i> 10 stands, 2 hands for support	10 stands, no support <i>or</i> 10 stands, 1 hand for support, repeat	10 stands No support, repeat
Stair Walking	As instructed	As instructed	As instructed	As instructed, repeat

Otago Visit Chart

The physical therapist uses the *Otago Visit Chart* to prescribe specific levels and number of repetitions of Otago exercises and the number of minutes of walking for each visit or call up to the one-year mark.¹ It is recommended that exercises are prescribed only at home visits, while phone calls are used to reinforce these exercises. The physical therapist can use the *Otago Visit Chart* to follow up with a patient about their exercises at the next scheduled visit or phone call. The information from the chart can also be used for the physical therapists required medical record documentation. The chart should not be given to Otago participants.

OTAGO VISIT CHART

Patient ID										
Visit Number	1	2	3	4	5	6	7	8	9	10
Date (mm/dd/yy) Note if Cancellation (C) or No Show (NS)										
Therapist ID										
Meeting Type Face-to-Face(F) or Phone (P)										
# of Falls Since last visit										
Payment Type Medicare A (A), B (B), or C/Advantage (C) Medicaid (M) Private Payor (P) Patient Pay (%)										

EXERCISES

Warm-up Yes (Y) or No (N)										
Strength Exercises										
Front Knee Record as Weight/Reps										
Back Knee Record as Weight/Reps										
Side Hip Record as Weight/Reps										
Calf Raises Record as Weight/Reps Note Support: 1 Hand (1H), 2 hands (2H), No Support (NS)										
Toe Raises Record as Weight/Reps Note Support: 1 Hand (1H), 2 hands (2H), No Support (NS)										

Balance Exercises Note Support: 1 Hand (1H), 2 hands (2H), No Support (NS)										
Knee Bends Record as Support/Time or Steps/Reps										
Backwards Walk Record as Support/Time or Steps/Reps										
Walk And Turn Record as Support/Time or Steps/Reps										
Heel Toe Stand Record as Support/Time or Steps/Reps										
Heel Toe Walk Record as Support/Time or Steps/Reps										
One Leg Stand Record as Support/Time or Steps/Reps										
Heel Walking Record as Support/Time or Steps/Reps										
Toe Walking Record as Support/Time or Steps/Reps										
Heel Toe Walk Backwards Record as Support/Time or Steps/Reps										
Sit To Stand Record as Support/Time or Steps/Reps										
Walking										
Stair Walking Record as # of Steps										
Walking Record avg. min. walked, # of times/day, and # times/week										

Functional Assessments

Record Point	Baseline				3 Months				6 Months				9 Months				12 Months			
TUG Record to tenth of a second (0.0 seconds)																				
30 Second Chair Stand Record as number of raises																				
Four-Stage Balance Test Did patient hold each position for 10 seconds? Mark Yes(Y), No (N), or (X) in each box.	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Otago Visit Chart Instructions:

- 1. Identification:** The first row is used to identify and follow one patient through their Otago program. Please insert the **Patient ID** number here. The ID number will remain the same throughout the entire program for a patient.
- 2.** The second row denotes the **Visit Number**. This form has space to record a patient's information for up to 10 visits. If you conduct more than 10 visits with a patient, please obtain another sheet, insert the patient ID, and continue recording the patient's information. If able, please staple additional forms to original forms.
- 3. Date of Visit:** The date is important to record start of care, frequency of visits, and duration of the Otago program. Recording if a patient cancels or is a no show is up to each agency. To do this, please place "C" for cancellation or "NS" for no show in the box under the date. This may be useful information to review for quality indicators of the program. If the agency chooses to monitor this, it is recommended that a reason for the cancellation or no show be recorded in the comments section.
- 4.** The **Therapist ID** is used to help identify the therapist at each visit. Each therapist who is conducting Otago in an agency will have his or her own ID. The therapist ID is important, especially if different therapists are providing care for the same patient, for example when patient is transferred from Home Health to a Medicare B therapist.
- 5.** To record **Meeting Type**, please note whether the meeting with the patient took place face-to-face (e.g. in a home) or over the phone. Place "F" in the box for a face-to-face meeting or "P" in the box for a phone meeting.
- 6. Number of falls since last visit:** If the patient is keeping a falls calendar, copy the information to the chart to record the number of falls since the last visit or phone call. If the patient does not keep a calendar, record falls by conducting a patient interview. It is recommended that the number of falls and circumstances of falls be recorded in the physical therapists required medical record documentation. Total number of falls over a specific time frame may be also used for other reports, for example, number of falls over 6 months or over one year.
- 7. Payment Type:** The physical therapist's agency may want to record payment information for the Otago program. Record the type of payment used for each Otago visit. For Medicare A, write "A" in the box, for Medicare B write "B", for Medicare C/Advantage write "C", for Medicaid write "M", and for Private Payor write "P" in the box. You may use more than one code. For example, the patient may have Medicare B and a private supplemental insurance or they may have both Medicare and Medicaid. If the patient has to pay out of pocket for **ANY** of the Otago visits, record the percentage the patient pays in the box (e.g. 25%).
- 8. Exercises:** The chart is a good way to quickly scan for progression of exercises.
 - a. Warm-up Exercises:** The flexibility exercises are used as a warm-up each time before the strength and balance exercises are performed. The number of repetitions for each does not

change. Record Yes (“Y”) or No (“N”), to indicate whether or not the patient is doing warm-up exercises at each visit or phone call. If some of the flexibility exercises are deleted from the program, indicate this in the comments section and the reason why.

b. Strength Exercises: Record which strength exercises the patient is doing at each visit or phone call. Record the amount of weight and the number of repetitions for each exercise. If the weights are decreased, record the reason for the decrease in the comments section.

c. Balance Exercises: Record which balance exercises the patient is doing at each visit or phone call and the amount of upper extremity support the patient is using (e.g. 1 hand “1H”). For a walking balance exercise, record the number of steps. For a standing balance exercise, record the number of seconds holding the position. For all of the balance exercises, record the number of repetitions. Examples: **Backward Walk** with one hand support, 10 steps, turn around and walk backwards 10 steps to the beginning, record 1H/10 steps x 2. For **One Leg Stand** with no support for 10 seconds on each leg, record NS/10 sec x 1 each.

9. Walking:

a. Stair walking: Record the number of steps that the patient does at one time for exercise. For example, if one flight is 16 steps and they go up and down the stairs two times record 64 steps.

b. Walking: Record the average number of minutes in one walk, how many times a day and how many days per week. Example: a patient walks for 15 minutes at a time, two times a day and for 3 days a week. Record as 15 min/2 x day/3 x wk.

10. Comments: Record if there are cancellations or no shows and the reasons why. Since this may impact the recommended frequency of Otago visits and could affect outcomes. Record any other general comments about the visit, including if there was a decline in ability to do a certain level of exercise and why.

11. Functional Assessments: Refer to the Otago Manual to perform the assessments. You should perform each assessment at baseline, 3 months, 6 months, 9 months, and 1 year. For the **TUG**, record the number of seconds to the tenth of a second (e.g. 0.0 seconds) it takes the patient to complete the assessment; for the **30 Second Chair Stand**, record the number of repetitions the patient performs in a 30 second time frame; and for the **Four-Stage Balance Test**, place a Yes (“Y”) or No (“N”) to indicate whether the patient completes the balance test for each of the four positions listed in the manual. If the patient does not perform one of the four positions, place an “X” in the box.

Evaluation Forms

This section provides samples of evaluation forms that may be used if the organization implementing Otago chooses to evaluate the program.

Otago Evaluation Forms	
Section	Description
Patient Progress Use Otago Visit Chart	Provides physical therapists with the means to assess each patient's strength, balance, and gait at baseline, six, nine, and twelve months.
Fidelity Monitoring Use Otago Visit Chart	Allows implementing organizations or physical therapists to conduct a quality check on the implementation of Otago
Patient evaluation	Otago Participant Entry and Exit Forms



Participants' Packet

The *Participants' Packet* contains all of the documents to be given to the patient by the physical therapist, as needed.

Participant Packet Overview	
Section	Description
Welcome to Otago! ¹	Provides a short outline of the Otago Exercise Program.
Otago Exercise Program Activity Booklet ¹	Gives the patients a guide to all Otago exercises . Physical therapists should provide a copy of each exercise as it is prescribed, with instructions and a picture of how to perform each one . Participants should only be given a copy of each exercise as prescribed.
Walking Tips ¹	Provides general tips about walking indoors and outdoors and how to walk safely. Otago participants should review this handout before undertaking the walking portion of the program.
Otago Exercise Calendar	Provides a calendar so patients can track their daily Otago exercises and walking . The calendar should be reviewed with the physical therapist at each home visit or phone call so they can keep track of the participant's progress when they are not there.
Otago Exercise Diary	Provides a diary template so patients can record their thoughts about the Otago exercises and walking plan and any improvements or issues they have noticed while doing the strength and balance exercises and walking. The diary also gives patients a frame of reference when talking with their physical therapist about their progress during a home visit or phone call.



Welcome to Otago!

Welcome to the program! This exercise program has been designed specifically for you.

History

Otago is a muscle strengthening and balance retraining program that can reduce falls. It is delivered at home by a physical therapist through seven home visits over one year. The New Zealand Falls Prevention Research Group developed and tested the program. The rationale behind Otago is that while muscle strength, flexibility, balance, and reaction time are risk factors for falls, they can easily be modified.

Benefits

The benefits of exercise are plentiful—by maintaining your program, you can improve:

- Balance,
- Muscle strength,
- General fitness, and
- General well-being.

You need to do the prescribed exercises three times each week.

You can divide the exercises up; they do not have to all be done at the same time. Take three or more deep breaths between each set of exercises.



You may feel a little sore or stiff after you first start to exercise. This is quite normal. You are using muscles that may not be used to the exercise. It is important that you keep on exercising. The stiffness will leave as soon as your body becomes more familiar with the exercises.

Safety



Always check with your primary care provider and physical therapist prior to beginning any of the Otago strength, balance, and walking exercises. Only add exercises to your routine when your physical therapist has advised you to do so. Never exercise holding on to an object that may move, such as a chair. Always use the side of something stable like a counter or solid table, unless otherwise instructed. Exercises should not be painful. If you are experiencing pain, talk with your physical therapist to have the exercises adjusted. If illness stops you from maintaining the exercise program, contact your physical therapist before starting again.

Contact your primary care provider if you experience the following while exercising:

- Dizziness,
- Chest pain, or
- Shortness of breath (you are unable to speak because you are short of breath).

If you have any questions about the exercise program, do not hesitate to call your physical therapist or primary care provider.

Walking

Walking is an excellent way to improve your general fitness. Talk with your physical therapist before starting to walk as they should first assess your ability to walk indoors and outdoors using your usual walking aid(s). Try to go for a walk on the days in between your exercises. Try to increase the distance and the time you spend walking. Take advantage of nice weather to go for a walk. Be safe while walking. See the *Walking Tips* handout for more information about walking, including safety tips.



Day to Day

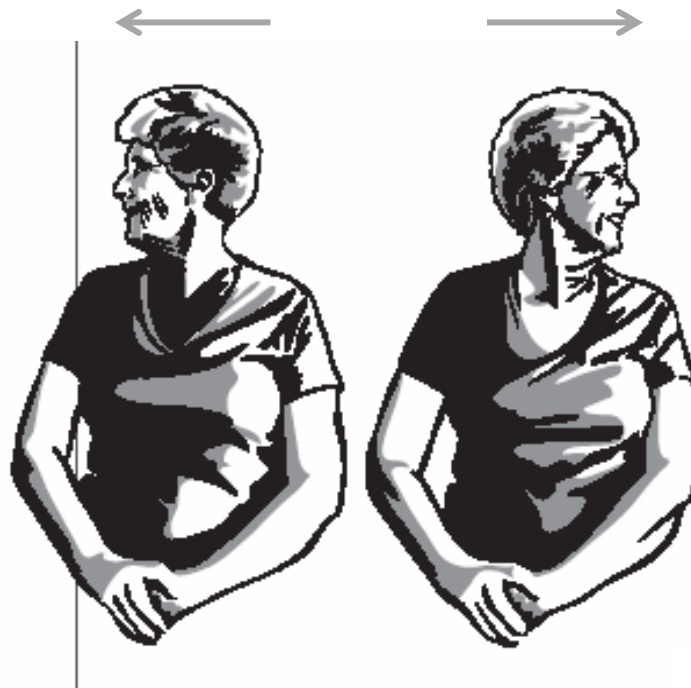
Did you know that you can improve your general fitness by simply being more active in your day-to-day life? Here are some examples of activities to build into your day:

- Walk instead of drive to stores, as long as it is safe to do so,
- Walk to talk with your neighbor instead of using the telephone,
- Take the stairs rather than the elevator or escalator, and
- Stand to fold clean clothes.



Head Movements

- Stand up tall and look ahead.
- Slowly turn your head as far as you can to the right.
- Slowly turn your head as far as you can to the left.
- Repeat five times to each side.



Neck Movements

- Stand up tall and look ahead.
- Place one hand on your chin.
- Guide your head straight back.
- Repeat five times.



Back Extension

- Stand up tall with feet shoulder-width apart.
- Place your hands on the small of your back.
- Gently arch your back.
- Repeat five times.



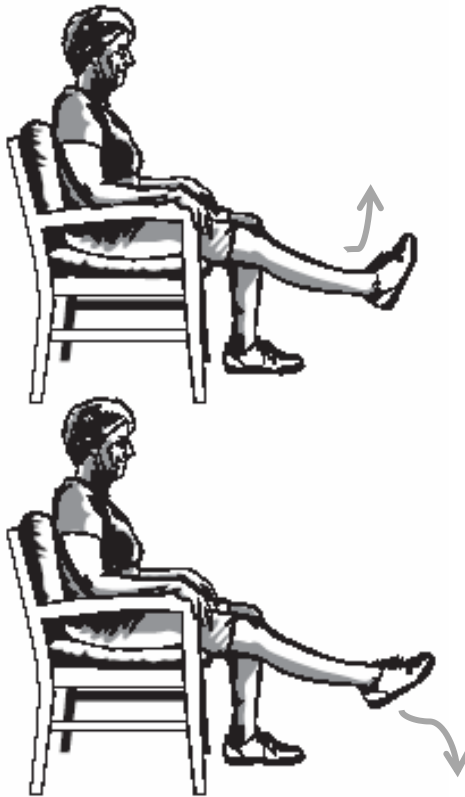
Trunk Movements

- Stand up tall and place your hands on your hips.
- Do not move your hips.
- Turn as far as you can to the right, comfortably.
- Turn as far as you can to the left, comfortably.
- Repeat five times to each side.



Ankle Movements

- Either stand or sit.
- Pull the foot towards you, then point the foot down.
- Repeat 10 times for each foot.



Strength Exercises

Strengthening exercises are essential for maintaining healthy bones and the muscles necessary for walking and being independent in your daily activities.

You should aim to do these exercises three times a week with a rest day in between.

Your physical therapist will prescribe certain weights for you to use during these exercises and may also prescribe additional weight as you become stronger. Using too much weight before your physical therapist tells you it is okay may cause injury.



Lift the weight slowly through the entire range of movement. Never hold your breath while lifting. Inhale before lifting, exhale while lifting, and inhale again while lowering the weight.

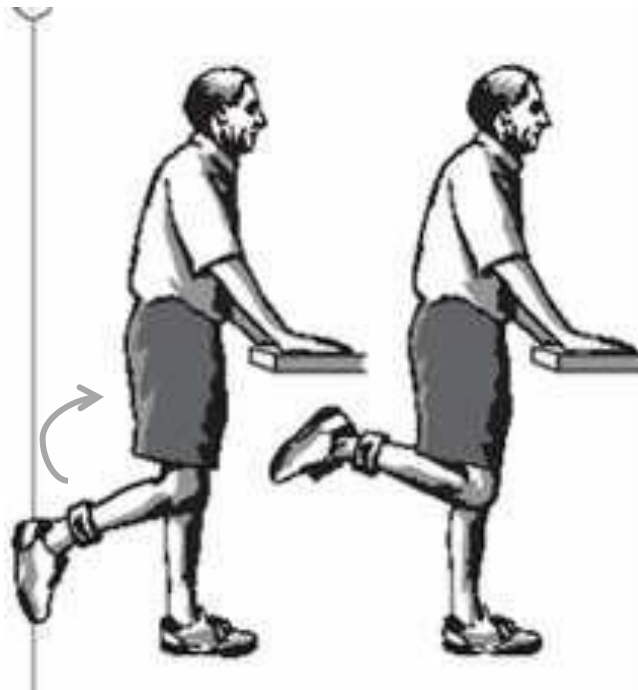
Front Knee Strengthening Exercise

- Strap the weight onto your ankle.
- Sit in a chair with your back well supported.
- Straighten the leg out.
- Lower the leg.
- Repeat 10 times.
- Strap the weight onto your other ankle.
- Repeat this exercise 10 times.



Back Knee Strengthening Exercise

- Strap the weight onto your ankle.
- Stand up tall facing a table with both hands on the table.
- Bend the knee, bringing the foot toward your bottom.
- Return to the starting position.
- Repeat 10 times.
- Strap the weight onto your other ankle.
- Repeat this exercise 10 times.



Side Hip Strengthening Exercise

- Strap the weight onto your ankle.
- Stand up tall beside a table and hold onto it.
- Keep the exercising leg straight and the foot facing straight ahead.
- Lift the leg out to the side and return.
- Repeat 10 times.
- Strap the weight onto your other ankle.
- Turn around.
- Repeat this exercise 10 times.



Calf Raises – Hold Support

- Stand up tall facing a table.
- Hold onto the table and look ahead.
- Your feet should be shoulder-width apart.
- Come up onto your toes.
- Lower your heels to the ground.
- Repeat this exercise 10 times.



Calf Raises – No Support

- Stand up tall near a table and look ahead.
- Your feet should be shoulder-width apart.
- Come up onto your toes.
- Lower your heels to the ground.
- Repeat this exercise 10 times.



Toe Raises – Hold Support

- Stand up tall beside a table.
- Hold on and look ahead.
- Your feet should be shoulder-width apart.
- Come back onto your heels, raising your front foot off the floor.
- Lower your feet onto the ground.
- Repeat this exercise 10 times.



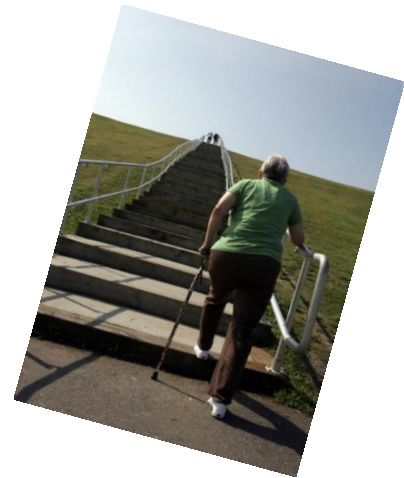
Toe Raises – No Support

- Stand up tall near a table and look ahead.
- Your feet should be shoulder-width apart.
- Come back onto your heels, raising your front foot off the floor.
- Lower your feet to the ground.
- Repeat this exercise 10 times.



Balance Exercises

Balance is important for everyday activities. The following quick balance exercises should be done three times a week, but you are encouraged to do them as often as you can! They can be done every day.



Knee Bends – Hold Support

- Stand up tall facing a table with both hands on the table.
- Place your feet shoulder-width apart.
- Squat down half way, bending your knees.
- The knees go over the toes.
- When you feel your heels start to lift, straighten up.
- Repeat ___ time(s).



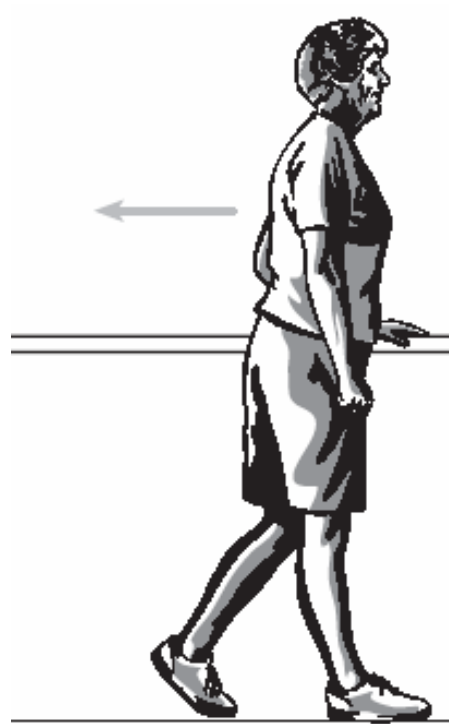
Knee Bends – No Support

- Stand up tall near a table and look ahead.
- Place your feet shoulder-width apart.
- Squat down half way, bending your knees.
- The knees go over the toes.
- When you feel your heels start to lift, straighten up.
- Repeat ___ time(s).



Backwards Walking – Hold Support

- Stand up tall and hold onto a table.
- Walk backwards 10 steps.
- Turn around and hold on with the other hand.
- Walk backwards 10 steps to the beginning.
- Repeat this exercise.



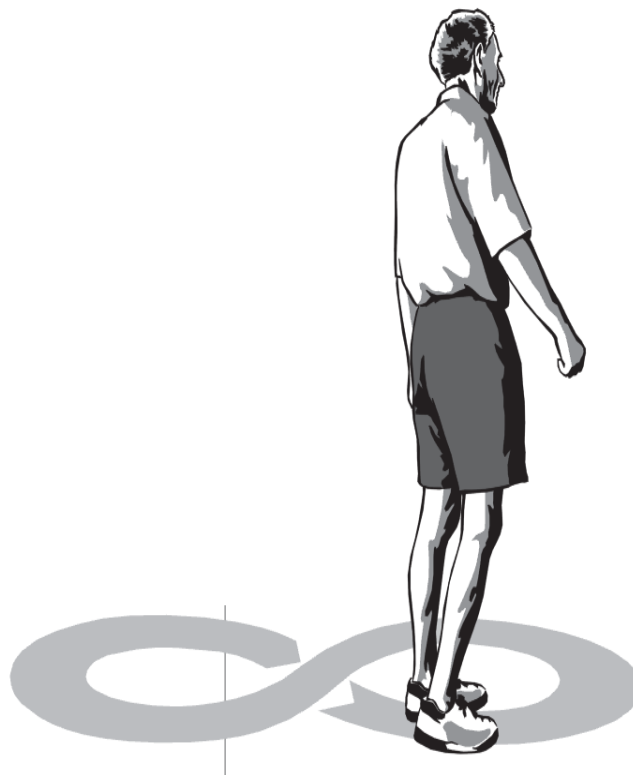
Backwards Walking – No Support

- Stand up tall near a table and look ahead.
- Walk backwards for 10 steps.
- Turn around.
- Walk backwards 10 steps to the beginning.
- Repeat.



Walking and Turning Around

- Stand near a table.
- Walk at your regular pace.
- Turn in a clockwise direction.
- Walk back to your starting position.
- Turn in a counter-clockwise direction.
- The exercise is a figure-eight movement.
- Repeat this movement.



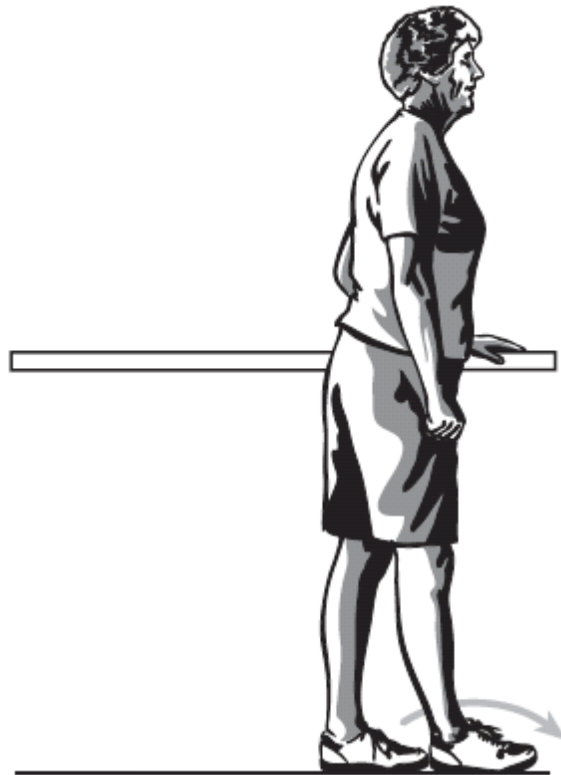
Sideways Walking

- Stand up tall near a table and place your hands on your hips.
- Take 10 steps to the right.
- Take 10 steps to the left.
- Repeat.



Heel Toe Standing – Hold Support

- Stand up tall beside a table.
- Hold onto the table and look ahead.
- Place one foot directly in front of the other foot so your feet form a straight line.
- Hold this position for 10 seconds.
- Change position and place the foot behind directly in front of the other.
- Hold this position for 10 seconds.



Heel Toe Standing – No Support

- Stand up tall near a table and look ahead.
- Place one foot directly in front of the other so your feet form a straight line.
- Hold this position for 10 seconds.
- Change position and place the foot behind directly in front of the other.
- Hold this position for 10 seconds.



Heel Toe Walking – Hold Support

- Stand up tall beside a table.
- Hold on and look ahead.
- Place one foot directly in front of the other so your feet form a straight line.
- Place the foot behind directly in front of the other.
- Repeat for 10 more steps.
- Turn around.
- Repeat this exercise.



Heel Toe Walking – No Support

- Stand up tall near a table and look ahead.
- Place one foot directly in front of the other so your feet form a straight line.
- Place the foot behind directly in front of the other.
- Repeat for 10 more steps.
- Turn around.
- Repeat the exercise.



One Leg Stand – Hold Support

- Stand up tall beside the table.
- Hold on and look ahead.
- Stand on one leg.
- Try to hold this position for 10 seconds.
- Stand on the other leg.
- Try to hold this position for 10 seconds.



One Leg Stand – No Support

- Position yourself near a table.
- Stand on one leg.
- Try to hold this position for 10 seconds.
- Stand on the other leg.
- Try to hold this position for 10 seconds.



One Leg Stand – No Support

- Position yourself near a table.
- Stand on one leg.
- Try to hold this position for up to 30 seconds.
- Stand on the other leg.
- Try to hold this position for up to 30 seconds.



Heel Walking – Hold Support

- Stand up tall beside a table.
- Hold on and look ahead.
- Come back onto your heels, raising the front of your foot off the floor.
- Walk 10 steps on your heels.
- Lower your feet to the ground and turn around.
- Walk 10 steps on your heels.
- Repeat.



Heel Walking – No Support

- Stand up tall near a table and look ahead.
- Come back onto your heels, raising the front of your foot off the floor.
- Walk 10 steps on your heels.
- Lower your feet to the ground and turn around.
- Walk 10 steps on your heels.
- Repeat.



Toe Walking – Hold Support

- Stand up tall beside a table.
- Hold on and look ahead.
- Come up onto your toes.
- Walk 10 steps on your toes.
- Lower your heels to the ground and turn around.
- Walk 10 steps on your toes.
- Repeat.



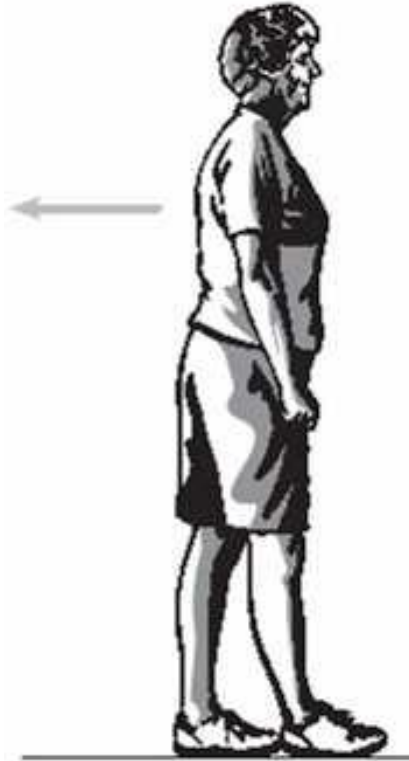
Toe Walking – No Support

- Stand up tall near a table and look ahead.
- Come up onto your toes.
- Walk 10 steps on your toes.
- Lower your heels to the ground and turn around.
- Walk 10 steps on your toes.
- Repeat.



Heel Toe Walking Backwards

- Stand up tall near a table and look ahead.
- Place one foot directly behind the other foot.
- Place the foot in front directly behind.
- Repeat for 10 more steps.
- Turn around.
- Repeat the exercise.



Stand To Sit – Two Hands

- Sit on a chair that is not too low.
- Place your feet behind your knees.
- Lean forward over your knees.
- Push off with both hands to stand up.
- Repeat ___ time(s).



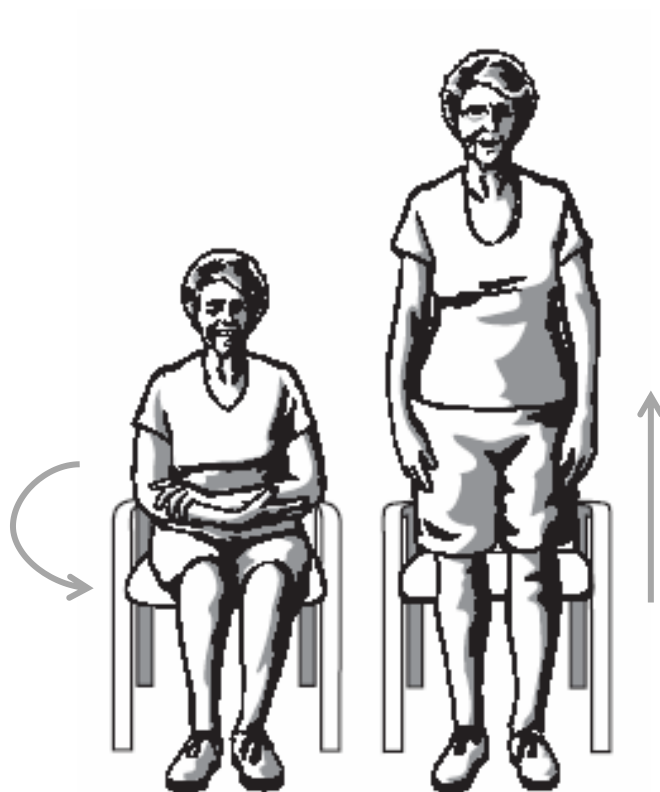
Stand To Sit – One Hand

- Sit on a chair that is not too low.
- Place your feet behind your knees.
- Lean forward over your knees.
- Use one hand to help you stand up.
- Repeat ___ time(s).



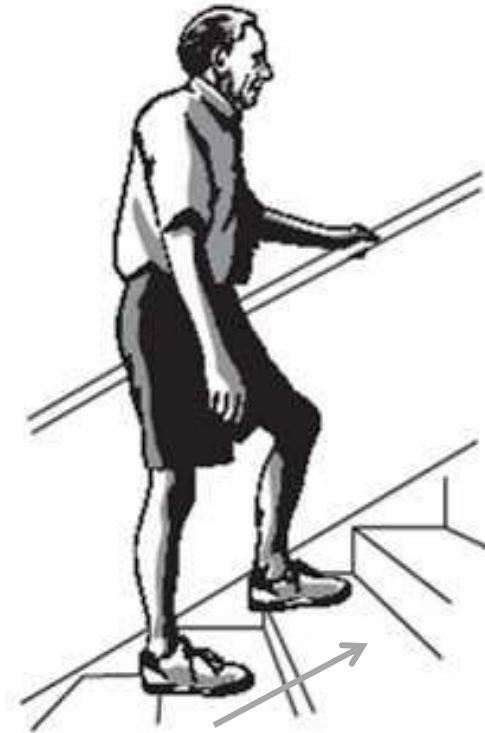
Stand To Sit – No Hands

- Sit on a chair that is not too low.
- Place your feet behind your knees.
- Lean forward over your knees.
- Stand up without using your hands.
- Repeat ___ time(s).



Stair Walking

- Hold onto the handrail for this exercise.
- Go up and down the stairs for ___ steps.





Walking Tips

While walking is important, it should not take the place of the Otago exercises. Only add a walking plan to your Otago exercise when your physical therapist tells you it is safe to do so.

General Walking Tips

- Wear good shoes.
- Wear prescription eyeglasses if advised by your primary care provider.
- Use your walking aid if recommended.
- Do not go outside if it is too cold or too warm
- Carry identification and a cell phone
- Have a set time during the day to walk so it becomes part of your routine and so your family and friends know where you are.

When You Walk

- Start with a warm-up (e.g., marching place for two minutes).
- Relax your shoulders and gently swing your arms in a way that is comfortable to you.
- Look ahead, not down
- With each step, land with your heel first, then push off on your toes.



in

- Walk at a normal and not a fast pace.
- Finish with a cool-down (e.g., marching in place for two minutes).
- Avoid multi-tasking (i.e., talking, carrying items).

Be Safe Outdoors

- Walk with a friend
- Walk in a well maintained, well lit, and well-populated area.
- Tell others when and where you are going for a walk
- Avoid walking outdoors if it is cold or hot
- Avoid roads or sidewalks that have tripping hazards.

How to Be Safe Indoors

- When walking in your house:
 - Remove scatter rugs.
 - Secure loose carpet.
 - Install handrails on staircases.
 - Tape down electrical cords.
 - Mark uneven floors.
 - Watch out for pets.
 - Keep walkways clear of clutter.
- When walking at the mall, choose times when it is less crowded.

Alternatives to Walking Outdoors

- Malls or other large indoor retail locations, including grocery stores,
- Indoor tracks at schools and/or universities, or
- YMCA, or other fitness or senior centers.

Adjustable Ankle Weights

Importance of Adjustable Ankle Weights

Adjustable ankle weights are weighted bands that fasten around the ankles (most often with Velcro). They add weight to your legs during a workout, which is an important component of the Otago Exercise Program (Otago). Weight bearing is critical to your improvement and progression through the program. Adjustable weights allow you to gradually increase the weight (one half pound to 20 pounds) and to progressively increase resistance while strengthening the knee flexors, knee extensors, and hip abductors. Adjustable weights also allow you to increase the intensity but not the impact to joints while strengthening the leg muscles.²⁵

Otago physical therapists will come prepared with the appropriate adjustable weights each time they visit you, but it is important that you have your own set of adjustable ankle weights to complete the Otago exercises when your physical therapist is not visiting your home.

Cost of Adjustable Ankle Weights

You are encouraged to purchase a weight set of 10 to 20 pounds, with each weight band holding 5-10 pounds. The cost for such a set ranges from \$20 to \$40. Adjustable weights can be purchased at large retailers and sporting goods stores or at online retail outlets. Please talk to your physical therapist about which weights are right for you and options for purchase.

Otago Exercise Calendar

Use this calendar to keep track of when you do your Otago exercises or when you walk. Just mark the days or time you spent exercising or walking. Show this to your Otago physical therapist when they visit your house as to keep track of your progress. Ask your physical therapist to provide you with additional pages of this calendar when you run out. An example of a completed exercise calendar follows the calendar template.

Otago Exercise Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Date:	Date:	Date:	Date:	Date:	Date:	Date:

SAMPLE – Otago Exercise Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Date:	Date:	Date:	Date:	Date:	Date:	Date:
<ul style="list-style-type: none"> ▪ Walk – 15 minutes 	<ul style="list-style-type: none"> ▪ Otago exercises – 30 minutes ▪ Walk – 10 minutes 		<ul style="list-style-type: none"> ▪ Otago exercises – 30 minutes ▪ 	<ul style="list-style-type: none"> ▪ Otago exercises – 20 minutes ▪ Walked around park – 15 minutes 	<ul style="list-style-type: none"> ▪ Otago exercises – 30 minutes ▪ 	<ul style="list-style-type: none"> ▪ Otago exercises – 30 minutes ▪ Walk – 10 minutes

Otago Exercise Diary

Use this diary to record your thoughts and feelings about your Otago exercises and how your body feels before and after you perform them. You can also keep track of how far you walk and where you walk in this diary. Ask your physical therapist to provide you with additional pages of this diary when you run out. An example diary entry is provided below.

Date

Notes (EXAMPLE)

Every day I do the Otago exercises they get a little easier. I still have trouble with the side hip strengthening exercise because of my bad hip, but I've noticed some improvement. I've also noticed I'm not as tired after finishing the exercises as I was when I first started. Today I also walked 10 minutes around my neighborhood.

Date

Notes

Date

Notes

Key Resources



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http://www.ehow.com/about_5071095_benefits-wearing-ankle-weights.html Accessed December 15, 2010.

Additional Resources

- The National Council on Aging publication, *Partnering to Promote Health Aging: Creative Best Practice Community Partnerships*
www.healthyagingprograms.org/content.asp?sectionid=92&ElementID=160
 - This manual describes ways to build partnerships at the state and local level between aging services, community health, and public health services that promote healthy aging.
- Falls Free: A National Falls Prevention Action Plan, *National Falls Prevention Action Plan*
<http://www.healthyagingprograms.org/content.asp?sectionid=69&ElementID=220>
 - A collaboration between The National Council on the Aging (NCOA), the Archstone Foundation and the Home Safety Council that describes specific goals and strategies to reduce falls among older adults to maximize their quality of life and independence.
- California Blueprint For Falls Prevention, *Preventing Falls in Older Californians: State of the Art*
www.archstone.org/publications2292/publications_show.htm?doc_id=246660
 - This a white paper that describes state-of-the-art approaches to reduce the falls risk. It highlights the challenges of implementing fall prevention programs in California. The intent of the white paper and accompanying documents is to provide the building blocks for a long-term collaborative effort to reduce falls among California's older population.
- Queensland, Australia Statewide Action Plan: *Falls Prevention in Older People 2002–2006*
<http://www.health.qld.gov.au/stayonyourfeet/documents/13693.pdf>
 - The action plan lays out a five-year framework and coordinated plan on how Queensland, Australia can address falls among older adults. The plan addresses this topic because older adult falls have been identified as a significant risk to health in Queensland.
- Washington State Department of Health Report-*Falls Among Older Adults: Strategies for Prevention*
<http://www.doh.wa.gov/hsqa/emstrauma/injury/pubs/FallsAmongOlderAdults.pdf>
 - This report includes a discussion about the problem of older adult falls in the State of Washington and provides strategies and best practices for preventing them. It also describes strategies for program evaluation.

- Community Toolbox for Public Health Partnerships
<http://ctb.ku.edu/en/default.aspx>
 - The Community Toolbox is a free global resource providing information and guidance about essential skills for building healthy communities. The toolbox promotes community health and development by connecting people, ideas, and resources. It was developed and is managed by the Work Group for Community Health and Development at the University of Kansas.

- Partnership Self-assessment Tool
<http://partnershiptool.net/>
 - This tool was created by the Center for Advancement of Collaborative Strategies in Health and was designed to help partnerships assess how well their collaborative processes are working and to identify specific areas in which to focus to enhance their collaborations.

- Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control (NCIPC)
<http://www.cdc.gov/injury/about/index.html>
 - NCIPC focuses on preventing injuries and violence and on reducing their consequences. The Division of Unintentional Injury Prevention is a center within NCIPC and is involved in preventing home and recreational injuries, including older adult falls. This site provides information about other CDC-funded fall prevention programs such as *Stepping On*, and *Tai chi: Moving for Better Balance*. The NCIPC site also contains statistics and information about injuries and injury prevention.

- *Preventing Falls: What Works -A CDC Compendium of Effective Community-based Interventions from Around the World (2010)*
<http://www.cdc.gov/HomeandRecreationalSafety/Falls/preventfalls.html#Compendium>
 - The compendium was developed to help health practitioners effectively address the problem of older adult falls. It describes fall interventions that have scientific evidence supporting their effectiveness and includes information for practitioners and senior service providers who would like to implement fall prevention programs.

- The American Geriatrics Society
<http://www.americangeriatrics.org/>
 - The American Geriatrics Society (AGS) is a non-profit organization devoted to improving the health, quality of life, and independence of older adults by implementing and advocating for programs revolving around patient care, public policy, research, and professional and public education. The AGS/British Geriatrics Society Clinical Practice Guideline was developed for clinicians and provides recommendations about how to address older adult falls and fall prevention.

- Thomas S, Macintosh, and Halbert J. *Does the 'Otago Exercise Programme' Reduce Mortality and Falls in Older Adults?: A Systematic Review and Meta-analysis*
<http://ageing.oxfordjournals.org/content/39/6/681.abstract>
 - Reviewers evaluated the effect of the Otago Exercise Programme (OEP), older adult fall rates and the risk of death, and explored the effect of differing levels of compliance with the program. The authors concluded that the OEP significantly reduced the risk of falling and death among older adults living in the community.

- Davis JC, Robertson MC, Ashe MC, Liu-Ambrose T, Khan KM, Marra CA. *Does a home based strength and balance programme in people aged ≥80 years provide the best value for money to prevent falls?: A systematic review of economic analyses of falls prevention interventions*
<http://bjsm.bmj.com/content/early/2009/08/06/bjsm.2009.060988.abstract>
 - This review investigated the monetary value of different strategies to prevent falls among community-dwelling older adults through a systematic review of relevant peer-reviewed journal articles. The authors concluded that the best value was single factor interventions such as the Otago Exercise Programme.

- Campbell AJ and Robertson MC. *A comprehensive approach to fall prevention on a national level: New Zealand*
<http://www.sciencedirect.com/science/article/pii/S0749069010000522>
 - This article includes a discussion about the importance of individual assessment and treatment for older adults who are at high risk of falling and the benefits of fall prevention programs. It also describes two successful New Zealand interventions: 1) the Otago Exercise Programme, and 2) community Tai chi classes.

- American Board of Physical Therapy Specialists
<http://www.abpts.org/About/>
 - The American Board of Physical Therapy Specialists (ABPTS) oversees the certification and recertification of clinical specialists, including geriatric certified specialists and neurologic certified specialists. This site provides information about the certification process, including eligibility requirements and the application, along with additional resources and describes how to check on your application status.