

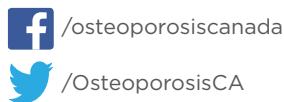


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Osteoporosis Canada

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Canadian
Physiotherapy
Association

Association
canadienne de
physiothérapie



Too Fit to Fracture:

Managing Osteoporosis through Exercise

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Disclaimer: “The information contained in this booklet is not intended to replace medical advice. If you are new to exercise, or are considering changing your exercise program, we recommend you speak to your healthcare provider or a fitness professional, in particular one who is knowledgeable about exercises that are safe and beneficial for someone with osteoporosis, who has fractured, or is at high risk of fracture.”

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The importance of exercise for people with osteoporosis

Exercise is very important for all of us, but especially for those with osteoporosis who are at risk of a broken bone (fracture).

Here are a few key reasons why exercise is important for individuals with osteoporosis:

To build muscle strength

Strength training improves muscle mass and strength.

To prevent falls

Performing challenging balance exercises can improve balance and coordination, which helps prevent falls, and this in turn may prevent fractures.

To protect the spine

Spine fractures are often caused by forces, or “loads,” on the vertebrae that are greater than they can withstand. Exercises that target the muscles that extend your back can help improve posture, reducing the risk of spine fractures.

To slow the rate of bone loss

Exercises aimed at increasing muscle strength (i.e., strength or resistance training), combined with weight-bearing aerobic physical activity, help to prevent bone loss as we age.

Other benefits

Whether or not you have osteoporosis, regular exercise improves health in many ways. People who exercise regularly have lower rates of depression, heart disease, dementia, cancer, diabetes and many other chronic diseases. Exercise can improve your physical fitness, strength, energy levels, stamina and mental health.

How active are you?

Which of the following describe you? Check off all that apply.

I do activities to increase muscle **strength**, such as lifting weights or working with exercise bands, twice a week or more.

Yes **No**

I do activities that challenge my **balance**, such as Tai Chi, dynamic balance activities or “standing still” balance challenges on most days of the week.

Yes **No**

I do **moderate or vigorous intensity aerobic physical activity** for at least 30 minutes on 5 or more days per week, in bouts of 10 minutes or more.

Yes **No**

I do exercises to improve my **posture** daily.

Yes **No**

I pay attention to my posture during daily activities, to avoid excessive twisting or forward bending.

Yes **No**

I **progressively increase the intensity** of the exercises I do over time, so that they are always challenging me.

Yes **No**

If you have any of the above checked “yes,” good for you! You have begun to develop good physical activity habits! Remember to progress the challenge over time for strength, balance, posture and aerobic training activities. We have suggestions for how to develop and progress your exercise program throughout this book.

If there are any activities above that are checked “no,” consider developing a plan to incorporate the activities into your routine.

Which areas should you focus on first? You can find each of the areas – strength, posture, balance and aerobic - on the pages that follow.

What types of exercise do you need?

If you have osteoporosis, different forms of exercise are needed to increase muscle strength, improve balance and posture, or maintain bone mass.

Your exercise routine should include exercises in each of the following areas:

- Strength training
- Posture training
- Balance training
- Weight bearing aerobic physical activity

If you have osteoporosis AND have had a spine fracture, all of the above forms of training are still important.

Start by speaking with a physical therapist to ensure you are choosing safe and appropriate physical activities for you.

Remember: if you have osteoporosis, aerobic exercise is not enough. Strength training and balance training are essential to maintain bone and muscle, and prevent falls.

Strength exercises

What is strength training?

Strength training refers to exercise where free weights (e.g., dumbbells), weight machines or exercise bands are used to make the bones and muscles work by lifting, pushing or pulling a “load.”

Strength training is a type of exercise with the goal of improving muscular strength. It involves performing movements against resistance; it is sometimes referred to as resistance training. Exercise bands, weights, machines or even your own body weight can be used for resistance. Strength training may increase spine and hip bone mineral density.

Muscle groups to target:

- Upper back
- Chest
- Shoulders
- Arms
- Upper and lower legs

How often each week? Strength training should be performed at least 2 days per week.

How hard should I work? Choose a difficulty level where you can perform 8-12 repetitions safely, but the last few repetitions are challenging to do. If that is hard to understand, you could use a 0 to 10 scale, where 0 is no work at all (e.g. sitting at rest) and 10 is a maximal effort. The intensity, when you reach repetitions 8-12, should be an intensity of 5-8 on the 0 to 10 scale (see page 8).

Aerobic physical activity, like brisk walking, is great for your overall health. But if you have osteoporosis, it's not enough. Make sure that you are including strength exercises at least twice a week and balance exercises every day.

Guidance from an experienced instructor will help you with proper form and the right progression of exercise intensity.

How long should I do it for? You can perform all of your exercises at one time/session, or at intervals throughout the day. You can even alternate days so that you do upper body one day and lower body the next. Be sure to train each muscle group at least twice per week.

What type of activity? Work against resistance through the range of motion. Examples: Squats or sit-to-stand exercises for legs and buttock muscles, heel raises for lower legs, wall pushups for chest and triceps, bow and arrow “pulls” with an exercise band for upper back and biceps, lateral raises with an exercise band for shoulders, back and arms. That’s only 5 exercises to train your whole body!

Tools: Use exercise bands, weights or your own body weight as resistance.

Progression: You can’t make improvements over time in your balance, strength or bone health if you don’t increase the challenge over time! Progression is a key component of an exercise program it refers to increasing the challenge over time. You can progress your exercise program by increasing the number of exercises, the duration spent exercising, or the difficulty of the exercises.

If you have a history of a spine fracture, consider first focusing on form and achieving good alignment, rather than how hard you are working. Then progressively increase the intensity over time to maintain a sufficient challenge. Even better, consult a Bone Fit™ trained instructor to design and teach you a program that is tailored to your ability. If a consultation with a Bone Fit™ trained instructor is not possible, it is best for you to use exercise bands or your body weight as resistance.

Tips for creating your strength training plan

- Learn how to perform the exercise with proper technique.
- Control the speed of the movement.
- Consult a Bone Fit™ trained instructor to help you achieve proper form and progression, even if only for 1-2 sessions.

Strength training machines, such as those found at the gym, often require forward bending and twisting to perform the exercises or to adjust these machines. If you're at risk of spine fractures, it's best to get training on the proper use and form for you, or avoid these machines if getting training is not possible.

Start your plan

Which strength training exercises feel right for you? Which ones do you feel you'd like to start right away? Look at the table below and think about how you can integrate strength exercises into your life. Then, add the exercises to the Action Plan worksheet on page 24. Below is an example of how to fill out the action planner.

Which exercises will you do? Why?	What time of the day will you do it?	What “trigger” can you link it to?	How many repetitions?	What tools or support objects do you need?
Squats to increase my leg strength	Evening	When there is a commercial on TV	I will do 2 sets of 12 repetitions	A sturdy chair placed against a wall

How Hard Are You Working? Borg Rating of Perceived Exertion (RPE) Scale

If you are engaging in strength training or aerobic physical activity, monitor how challenging it is using the following scale.

Look at the rating scale below while you are engaging in an activity; it ranges from 0 to 10, where 0 means “no exertion at all” and 10 means “maximal exertion.” Identify the number that best describes your overall level of exertion. Try to be as honest as possible. Think about how you feel, not what activity you are doing.

Moderate-intensity activity is a 5 or 6. You are breathing harder and your heart beats faster. You might be able to talk, but you would not be able to sing.

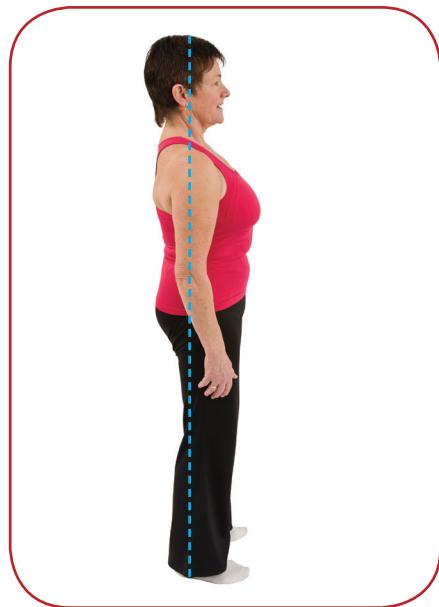
Vigorous-intensity activity is a 7 or 8. You are breathing hard enough that you won’t be able to say more than a few words without stopping to catch your breath.

- 0 - Nothing at all
- 1 - Very light
- 2 - Fairly light
- 3 -
- 4 - Somewhat hard
- 5 - Hard
- 6 -
- 7 - Very hard
- 8 -
- 9 -
- 10 - Very, very hard

Borg, G.V. (1982) Psychological basis of perceived exertion. *Medicine and Science in Sports and Exercise*, 14, 377-381. American College of Sports Medicine. Note: the word moderate was removed from 3 to reduce confusion, since we define moderate as 5 or 6.

Posture training

Posture training involves paying attention to how the parts of our body are aligned with each other.



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Good alignment - where the ear, shoulder, elbow, hip bone, knee and ankle line up.

The alignment of the vertebrae of the spine can become a concern among individuals with osteoporosis. Some kyphosis, or curvature of the upper back, is normal, but fractures or weak back extensor muscles can cause the spine to curve more than usual, resulting in an exaggerated kyphosis or excessively curved upper back.

Poor alignment, especially during activities that involve bending and twisting, can cause increased loads on the spine and result in fractures. Attention to alignment during activity and at rest, along with exercises targeting the back extensor muscles, can improve the alignment of the spine.

Check regularly that you stand with good posture by reminding yourself of the following:

- Balance your weight evenly on both feet.
- Gently draw the belly in.
- Keep your gaze parallel to the floor or “straight” ahead.
- Gently tuck your chin in.
- Draw your breastbone up slightly.

When sitting, sit erect with support for your lower back, like a small pillow or supportive chair.

Exercises to improve posture

There are many exercises that work the back, abdominal areas and shoulders that help to maintain good posture.

A great and simple yoga pose to help promote extension of the spine is “Shavasana.” Intersperse prolonged sitting or standing with 5-10 minutes lying flat on your back on a firm mattress or the floor with your arms turned palm up and your legs straight (or if this is uncomfortable, legs bent slightly and resting on a pillow or bolster placed under the knees).

To promote extension during this exercise, only use a pillow under your head if your head cannot reach the floor/bed when you lie flat. Focus on your breath. Imagine your collarbones are wings – spread your wings slightly without pulling your shoulders back.

You can progress from “Shavasana” to exercises that increase the endurance of your back extensor muscles with some advice from a physical therapist or Bone Fit™ trained exercise professional. Endurance is important for our back extensor muscles – they need endurance to hold us up all day!



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How often each week? Posture training should be performed daily.

How hard should I work? Attention to alignment is more important than intensity.

How long should I do it for? 5-10 minutes per day of posture exercises, and attention to your posture during daily activities.

What type of activity? Start with “Shavasana” and looking at your posture in the mirror.

Tools: A mirror and a floor mat or soft but supportive surface (e.g. firm mattress).

Progression: Progress to active exercises to improve back extensor endurance on advice of a Bone Fit™ trained professional!

Start your plan

Which posture exercises feel right to you? Which ones do you feel you'd like to start right away? Look at the table below and think about how you can incorporate posture exercises into your life. Then, add the exercises to the Action Plan worksheet on page 24. Complete the table below.

Which exercises will you do? Why?	What time of the day will you do it?	What “trigger” can you link it to?	How many repetitions?	What tools or support objects do you need?

You may hear the term “abdominal” or “core” muscles; these are muscles that run from your ribs to your pelvis on the front and sides of the torso. If you are doing any exercises for your “core,” those that challenge your core while you are in neutral alignment, such as a wall plank or side plank, are best. Exercises that involve repetitive/sustained, rapid/forceful, weighted or end-range forward bending or twisting of the torso should be avoided. End-range means end of the range of motion – bending all the way forward or twisting all the way to the side. See the section on how to move safely and protect your spine on page 28.

Balance exercises

What is balance training?

Balance training exercises are those that challenge your balance.

Examples include:

- Reducing your base of support (e.g., standing on one leg instead of two, walking on your toes or your heels),
- Walking in an unusual pattern (e.g., heel to toe walking in a line, figure eights),
- Shifting weight to the limits of support (e.g., moving your weight more to one foot than another),
- Responding to a disturbance (e.g., correcting your balance after being thrown off balance by something), or
- Performing strength training exercises that also challenge your balance (e.g., lunges).

Exercises that improve balance and coordination may also reduce falls and fractures. However, when balance is challenged, there is also an increased risk of falling. For this reason, it is important to observe safety precautions while doing balance training, such as having a table, wall or chair nearby to hold onto, or by having someone “spotting” you. Choose exercises that challenge your balance, but take safety precautions. Always start by holding a support object (e.g., wall, chair, counter) and gradually reduce your contact with it over time.

Tai Chi is a very safe and effective low impact form of exercise that improves balance and reduces the risk of falls.

How often each week? Practise balance exercises daily - 15-20 minutes each day.

How hard should I work? Start with an exercise that is safe, but a little challenging. If you cannot do it for 5 seconds or less without losing your balance, it is too challenging. If you can hold it easily without wavering for 30 seconds, it is probably not challenging enough.

How long should I do it for? Try to accumulate 2 hours of balance training each week. You can work on your balance training all at once (a 15-20 minute session), in short bouts throughout the day, or by building balance training into your daily activities. Example: Shift your weight from one leg to the other while you brush your teeth.

What type of activity? It's important to do exercises that challenge your balance both while standing still and during dynamic movement (see below). Dancing and Tai Chi count as dynamic balance challenges!

Tools: Use a support object or have one nearby. Example: Hold on to a chair, counter or wall, or have one nearby.

Progression: Start carefully and increase the difficulty and intensity of your balance exercises over time.

Sample exercises, with progressions:

Here is a series of exercises. Try the first one, if you can do it for 30 seconds without wavering or holding on to anything, progress to the next, and so on. Have a support object nearby.

Only move to the next progression if you feel you can do it safely, and can do the previous one without losing your balance for 30 seconds without holding on to anything.

Start with feet together → **progress** to shifting weight from toes to heels → **progress** to inside of one heel touching big toe of other foot → **progress** to standing with one foot in front of the other (heel of one foot directly in front of toes of the other, in a line) → **progress** to walking in a line with one foot directly in front of the other, heel-to-toe walking, or “tandem” walking → **progress** to backwards tandem walking.

There are many options. If you need more ideas or bigger challenges, consult a Bone Fit™ trained instructor.

How to prevent falls during balance exercises (examples):

- Use supportive objects, such as a sink, chair or wall, to hold on to.
- Perform balance exercises in areas with soft flooring.
- Wear flat-soled shoes with good traction.

Sample “Standing still” balance training exercises (exercises that reduce your base of support while standing still):

- Standing on one leg
- Standing with the inside of one heel touching the big toe of the other foot
- Standing with one foot in front of the other, front heel touching back toes
- Standing on your heels only
- Standing on your toes only

Sample “Dynamic” balance training exercises (exercises that shift weight, challenging your stability):

- Shifting weight between your heels and toes while standing

Exercises that challenge your balance while moving:

- Walking on your toes only
- Walking on your heels only
- Walking heel-to-toe, where the toes of the back foot touch the heel of the front foot at each step
- Walking in figure 8s
- Walking backwards

Exercises that combine shifting weight, upright posture and balance while moving:

- Tai Chi
- Dancing

How to progressively increase the challenge over time (examples):

- Gradually reduce your contact with supportive objects.
- Add weight shifting to “standing still.” Example: Stand on one leg then shift weight between heels and toes.
- Close your eyes during “standing still” exercises.
- Progress from “standing still” exercises to exercises that challenge your balance while moving. Example: Progress from doing heel raises on one leg to walking on your toes.
- Do another activity or mental challenge while doing balance exercises. Example: Count backward from 100 by 7s while walking on your toes.



Stand with good posture while holding a sturdy chair. Imagine your torso is a box.

Your shoulders and hips are the corners. Keep the torso box straight.

Place the back of your right heel in front of the toes on your left foot.

- Put only two fingers on the chair or support object
- Do it without holding on to support object
- Do it with eyes closed (keep support object nearby)



Stand with good posture. Look straight ahead.

Come up onto your toes.



Walk _____ steps on your toes. Lower the heels to the ground. Turn around. Repeat the toe walk back to the starting position.

Start your plan

Which balance exercises feel right for you? Which ones do you feel you'd like to start right away? Look at the table below and think about how you can integrate balance exercises into your life. One example is provided. Then add the exercises to the Action Plan worksheet on page 24.

Which exercises will you do? Why?	What time of the day will you do it?	What “trigger” can you link it to?	How many repetitions?	What tools or support objects do you need?
One legged stance	Morning and night	When I brush my teeth	Alternate each leg for 10 seconds (twice)	Counter to hold on to

Aerobic physical activity

What is aerobic physical activity?

An activity can be considered aerobic physical activity if:

- It is a rhythmic activity that you do for at least 10 minutes at a time continuously, and
- It increases your heart rate and makes you breathe harder than you usually do during your daily activities.

Canada's Physical Activity Guidelines suggest that ALL adults (including those over 65 years of age) participate in at least 30 minutes of moderate to vigorous intensity physical activity on most days of the week (5 days a week or more).

To understand what moderate and vigorous mean, check out *How Hard Are You Working?* on page 8.

Moderate-intensity aerobic physical activity is a 5 or 6. You are breathing harder and your heart beats faster. You might be able to talk, but you would not be able to sing.

Vigorous-intensity aerobic physical activity is a 7 or 8. You are breathing hard enough that you won't be able to say more than a few words without stopping to catch your breath.

Physical activity doesn't have to be traditional exercise. If you are sweeping, dancing or gardening for at least 10 minutes without rest, and the intensity is moderate to vigorous (i.e., 5-8 on the 0-10 scale), it can count towards your physical activity for the day – just make sure you accumulate 30 minutes or more a day.

What is weight-bearing physical activity?

For individuals with osteoporosis, we often recommend weight-bearing aerobic exercise or physical activity. In **weight-bearing physical activity**, bones and muscles of the legs and trunk work against the force of gravity while they bear the weight of the body. Activities like walking, jogging, step aerobics, dancing and stair climbing are all examples of weight-bearing exercise, as are sports

that involve running and jumping such as soccer, basketball, volleyball, racquet sports and others.

Weight-bearing exercises are the most effective forms of exercise for maintaining strong bones, especially the bones of the hip and spine. However, not all aerobic exercise is weight-bearing (e.g., swimming and cycling).

The latest evidence suggests that aerobic physical activity alone may not be enough. If you have osteoporosis or a spine fracture, strength and balance training are very important.

Why is aerobic physical activity important?

Everyone should participate in weight-bearing aerobic physical activity, not only to maintain strong bones, but to improve your overall health – research suggests it can improve heart, brain and mental health too! If you choose aerobic physical activities that also challenge your balance, like dancing or an aerobics class that has you moving in different directions, you achieve two goals in one activity!

How often each week? 5 or more days per week.

How hard should I work? Moderate or vigorous intensity. The difficulty level should be 5-8 on a 0-10 scale.

How long should I do it for? Accumulate at least 150 minutes per week. Perform at least 20-30 minutes per day, for at least 10 minutes at a time.

What type of activity? Activities that you do for at least 10 minutes at a time continuously, and that increase your heart rate and make you breathe harder than you usually do during your daily activities. Weight-bearing activities such as walking, fitness classes, dancing and stair climbing are best.

Tools: Shoes with good traction. Environment without fall hazards - avoid slippery ground/floors or cluttered spaces.

Progression: Increase intensity over time by increasing the amount of time spent performing the activity, the number of sessions per day or

per week, or the difficulty level. Increase intensity gradually, e.g., increase duration by 5 minutes at a time.

Individuals who are in good general health and are trying to reduce their risk of osteoporosis will be able to do much more vigorous and frequent physical activity than those who have more complicated health issues or have a greater risk of fracture. Moderate-intensity aerobic physical activity may be more appropriate than vigorous-intensity aerobic activity for individuals with a history of a spine fracture or those who are not used to exercise. If you have a history of spine fracture, or are at high risk of fracture, you may need to modify or avoid higher impact activities (e.g., jumping, jogging, running) or activities with a high risk of falls (e.g., skating) or contact (e.g., martial arts) or rapid twisting (e.g., golf). If you have a strong desire to participate in these activities, consult your physician or a Bone Fit™ trained professional about whether you can adapt them so that they are safer for you. Consider fitness classes designed specifically for individuals with osteoporosis, or taught by Bone Fit™ trained professionals.

Additional tips:

- Choose exercises that are appropriate for your fitness level, abilities and health.
- If you are new to exercise, start at a low or moderate intensity for 10 minutes at a time. You can gradually increase the duration and intensity of your exercise to meet the recommended levels.
- Regardless of which weight-bearing aerobic physical activities you adopt, it is important to combine aerobic physical activity with some form of strength training, balance training, posture and stretching exercises.
- If you know that you have balance difficulty, use a walker or cane if it has been recommended for you, choose an alternative to walking (or other activities that may increase your risk of falls) or consult with a physical therapist to help find exercises that are right for you.

Start your plan

What kind of aerobic physical activities feel right for you? Which ones do you feel you could start right away? Look at the table below and think about how you can integrate aerobic activities into your life. One example is provided. Then add the exercises to the Action Plan worksheet on page 24.

Which exercises will you do? Why?	What time of the day will you do it?	What “trigger” can you link it to?	How many repetitions?	What tools or support objects do you need?
Walking	Morning and evening	After breakfast and before dinner	15 minutes each	Shoes with good traction

Flexibility

Are flexibility exercises important too?

Many people become less active as they get older and lose flexibility. Areas that are particularly prone to losing flexibility or range of motion are the chest and front shoulders, the hip flexors (front of hips) and the muscles around the ankle. Here are a few things you can try.

- For the chest and front shoulders, start with the “Shavasana” stretch (see page 10). It will do double duty as an exercise for your posture!
- For the hip flexors (front of hips), try including lunges in your resistance training program or try including some longer strides in your daily walk.
- For the muscles around the ankle, try the following soleus stretch:



Lean into the wall, bending at the knee and ankle until the front leg's knee cap just touches the wall, without heel raising. A stretch should be felt just above the Achilles tendon and calf.

Stand in a stride/lunge position keeping both heels flat on the floor and hands on the wall to maintain balance.

What about Yoga and Pilates?

Yoga

Because yoga often includes balance and posture training, you might be wondering if it's a good exercise for you. There are many different types of yoga practice as well as different individual teaching philosophies, so it is difficult to make general recommendations about yoga.

However, the balance postures can increase your risk of falls-make sure you have a support object nearby.

Furthermore, **many yoga postures emphasize twisting of the spine or forward or backward bending of the spine, and these activities are not advisable if you have a spine fracture or are at high risk of a spine fracture.**

Some yoga postures can be modified to be safer. For example, doing a spinal twist while sitting places a lot of load on the spine, which can increase the risk of fracture. Individuals with osteoporosis but who don't yet have fractures may still be able to do a gentle, partial twist while lying on their back, instead of a seated twist. Individuals who have a spine fracture might want to avoid yoga twists.

Pilates

Pilates offers strength building benefits, particularly around the core muscles that support the spine. However, a typical unmodified Pilates program includes many exercises and movements that are not advised for people with osteoporosis. **Pilates exercises that include forward bending and side bending of the spine or twisting of the spine can put too much force on your spine, possibly causing fractures.**

It's true that some elements of yoga or Pilates can be beneficial. If you have osteoporosis and wish to do yoga or Pilates, you should consult a physical therapist or exercise professional who has special training in working with people who have osteoporosis.

Tips for Getting Started

If you are not accustomed to exercise, talk to a doctor, physical therapist or a certified kinesiologist before starting any type of exercise program. Consider consulting with a physical therapist or certified kinesiologist, if needed, about specific exercises you should do and others you may need to avoid. To find physical therapists or certified kinesiologists trained in working with people with osteoporosis, search using the Bone Fit™ Trained Professional Locator: <http://www.bonefit.ca/map-locator/>. If you are interested in going to an exercise class, you can even look up whether fitness instructors near you have training.

Next, use the table on the next page as a guide to identify the types of exercise you may perform, how often you should do them (frequency) and how hard you should work (intensity). Consider your current level of ability, your fracture risk (low, moderate, or high) and your overall health. Start at a level that is safe for you and progressively increase the difficulty of the exercises over time.

Type of exercise	How often should I exercise? (Frequency)	How hard should I work? (Intensity)	For how long should I exercise? (Duration)	What are the benefits of this type of exercise?
Strength training: Free weights, machines, exercise bands or body weight as resistance	At least 2 days of the week	If you can do more than 12 repetitions, the resistance is too easy. If you can't do at least 8 reps, the resistance is too hard.	Two sets of 8-12 repetitions per exercise. Include all major muscle groups	Improved muscle and bone strength, and mobility
Balance training: Tai chi, dancing, other exercises designed to challenge balance	Every day. You can incorporate balance training with weight bearing and/or strength training exercise to save time.	Beginners: "standing still" exercises (standing in one spot holding a posture) Advanced: dynamic exercises (challenge balance while moving around) May need guidance.	15-20 minutes each day, or 120 minutes per week. Can be all at once, in short bouts throughout the day, or built into daily activities.	Improved mobility and balance. Fewer falls.
Weight bearing aerobic physical activity: walking, dancing, jogging, stair climbing, step aerobics, running	Most days of the week.	Moderate or vigorous intensity, 5-8 on a 0-10 scale. Moderate intensity: you'll sweat a little and breathe harder. Vigorous intensity: you'll sweat and are breathing hard - you couldn't say more than a few words without stopping to catch your breath.	20-30 minutes or more per day, for at least 10 minutes at a time. Accumulate 150 minutes or more per week.	Improved heart health and bone strength. Reduced fracture risk.
Posture training: safe movements, awareness of position and posture (and back muscle strengthening)	Practise proper position and good posture every day!	Be conscious of posture. Perform exercises targeting the muscles that extend your spine. Use mirrors when exercising.	Attention to posture during daily activities, as well as 5-10 minutes daily of exercises to improve posture.	Less pressure on the spine. Reduced risk of falls and fractures, especially spine fractures.

Your Action Plan for Change

Review the plans you made in the sections on strength, posture, balance and aerobic exercises and summarize them here. Then, tear this out and place it where you will see it each day so that you are reminded of your plans and goals. Having a detailed plan, and “triggers” that remind you to exercise or help you set habits, is an effective strategy for “sticking” with a program.

Which exercises will you do? Why?	What time of the day will you do it?	What “trigger” can you link it to?	How many repetitions?	What tools or support objects do you need?
Improve muscle strength				
Improve posture				
Improve balance				
Improve aerobic fitness				

Your physical activity tracking sheet

Month/year:

Goal for this month:

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	<input type="checkbox"/> Strength training						
	<input type="checkbox"/> Posture training						
	<input type="checkbox"/> Balance training						
	<input type="checkbox"/> Aerobic exercise						
Week 2	<input type="checkbox"/> Strength training						
	<input type="checkbox"/> Posture training						
	<input type="checkbox"/> Balance training						
	<input type="checkbox"/> Aerobic exercise						
Week 3	<input type="checkbox"/> Strength training						
	<input type="checkbox"/> Posture training						
	<input type="checkbox"/> Balance training						
	<input type="checkbox"/> Aerobic exercise						
Week 4	<input type="checkbox"/> Strength training						
	<input type="checkbox"/> Posture training						
	<input type="checkbox"/> Balance training						
	<input type="checkbox"/> Aerobic exercise						

Use the tracker for one month. Each time you perform strength, balance, aerobic or posture training, check it off on the day you did it. See if you are achieving your goals. Then review the “How active are you?” questions near the beginning of this booklet again to see where you can improve. If you are having trouble getting started or sticking to your plan, check out the “Sticking with your plan” suggestions below.

Sticking with your plan

Having a back-up plan for unexpected interruptions to your schedule will help you stick to your plan. Complete the following so that you have strategies to deal with things that get in the way of your plans.

Some things that could stop me from exercising are:

If something interferes with my exercise plan, I can change my plan by:

The people who can help me achieve my goals are:

And they can help by:

When this plan is not challenging enough for me, some of the things I can do to increase the challenge are:

Tips for addressing barriers to exercise

Getting started with an exercise program can be difficult, especially when something is stopping you. The best way to overcome barriers is to identify them, decide on your solutions and move on. Are any of the following barriers stopping you?

Fear of falling or fracturing

If you're worried about the risk of fractures and falling, take precautions when exercising. Choose exercises that you can do with the support of a chair, kitchen counter or wall. Exercise in the company of someone who can "spot" you. Start slowly and when your strength and balance improve, you can reduce the support you require.

Concerns about venturing outside

It makes sense to be cautious when heading outside. But you can do many of your important strength and balance exercises right at home. You can exercise at a community centre, exercise facility or mall if you prefer to be indoors. Always wear shoes with good traction when exercising. Use your cane, walker or other assistive devices if they have been prescribed for you.

Limited budget

Being active doesn't have to be expensive. Most of the activities we recommend can be done absolutely free of charge. You don't need fancy equipment; use exercise bands, food cans or bottles of water for your strength training. Incorporating exercises into your daily activities can work just as well as a structured workout routine.

Not enough energy or interest

The more active you are, the less tired, more energetic and more refreshed you'll feel! Having an "exercise buddy" (someone to exercise with) or even music to exercise along to will help increase your motivation to exercise.

Spine sparing techniques to help you prevent a spine fracture

If you've had or are at risk of a spine fracture, it's important to reduce the loads on your spine to prevent fractures in the future. All individuals with osteoporosis should learn how to practise "spine sparing" techniques.

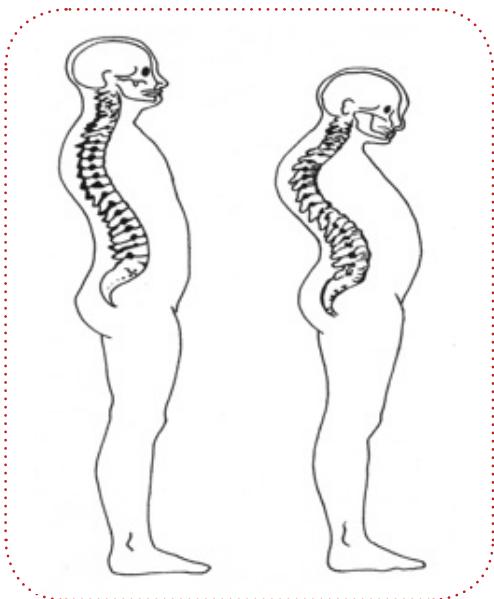
You can reduce the loads on your spine by keeping your spine in good alignment and paying attention to the alignment or position of your spine during daily activities. Movements that increase the loads on the spine include rapid/forceful, repetitive/sustained, end-range or weighted forward bending or twisting of the spine.

In this section, we focus on moving safely. For a full guide on day-to-day activities after a fracture, visit the 'After the Fracture' section of www.osteoporosis.ca

Neutral spine

It will help you to know a little about how your spine works so that you can understand the safest and strongest position for the spine. Think of your spine as a tower of bony blocks that are stacked one on top of the other.

There are 24 bones altogether and a break can happen to one or several of these bones. Every one of these 24 bony blocks has a different shape and size. When they are all stacked one on top of the other, they form three gentle natural curves that create a strong support post for the head. This alignment is called the neutral spine; it is the strongest and safest position for the spine. In neutral spine the head is positioned so the ear is directly over the shoulder.



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Your spine has to support your body weight. If you sit or bend forward, more weight is placed on the front part of each bony block (vertebra) than the back – this is called compression of the front part of the vertebra. If you hold a heavy box and bend forward, you have more body weight and the heavy box compressing the front part of the vertebra – now you see why “weighted” forward bending is not a good idea. Bending all the way forward, as if to tie up your shoes, compresses the front part of the spine A LOT. If you twist your spine, muscles pull on the vertebrae on one side more than another, and this can also contribute to fractures.

Your back extensor muscles can counteract compressive forces on the spine by keeping your spine in a neutral position. So by training your back extensor muscles, you can help to reduce the loads on your spine. Some people have a hunched or excessively curved spine that causes more of their body weight to be on the front part of their vertebrae – this is called a kyphotic spine, and it can also increase the loads on the front part of the vertebrae. Training the back extensor muscles can help you stand straighter. Even small corrections of alignment can help to reduce pain and spine loads.

Prolonged sitting means prolonged compression of the spine – get up and move around every 30 minutes!

Standing and walking puts less stress on the spine than sitting. Even people without osteoporosis should avoid sitting for prolonged periods – get up and move around every 30 minutes!

Challenge yourself to sit less. Every 30 minutes, get up and do something active. Do 10 sit-to-stand exercises. Walk around the room. Do one of your balance exercises.

Standing and sitting tall

Try to achieve as upright a spine as possible; know that some people may not be able to achieve perfect posture, which is fine. Use your mirror and the cues provided in the “Posture training” section to achieve as close to ideal spinal alignment as you can comfortably get.

Sitting tall in a perched position puts less stress on the spine than a slumped or slouched position. You may find it difficult at first to sit tall with a neutral alignment in a seated position. That is because our sitting bones at the bottom of the pelvic basin are shaped like a rocker and have a tendency to cause us to sit more on our tailbones than our sitting bones. It may help you to think of using your buttock muscles to help you sit tall on your sitting bones. Think of “sitting tall in the saddle.” Sitting tall on your sitting bones will help prevent your spine from rounding.

Use a straight-back chair with a firm seat, if possible one with arm rests on it so you can use your hands to help control the movement in and out of the chair. Once you are perched on the edge of the chair, stay upright, then slide to the back of the chair to get your buttock muscles in as tight as possible to the back. Place your feet flat on the floor while sitting. A small cushion or pillow may be necessary to help keep the spine as upright as possible and support the natural inward curve of the lower back.



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Bending with a neutral spine

When you bend over or lean forward to brush your teeth or wash your face at the bathroom sink or do other similar activities, use a movement known as the hip hinge. The **hip hinge** allows you to bend at the hips rather than at the spine, and it significantly reduces the strain on the spine.



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To do the **hip hinge**, bend your knees slightly while keeping your back straight from the hip to the shoulder with no bending or rounding of the lower back. Maintaining a neutral spine, stick out your tailbone behind you to bend forward from the hips. Your usual movement patterns will need to be retrained to learn how to use the hip joint and the strong buttock muscles along with the leg muscles to allow you to bend and lean over with less stress, or loads, on the spine. This movement may feel awkward at first but it will become more comfortable once you master the technique. Eventually, it will feel normal to bend this way without even thinking about it.

Also, a hip hinge is the same as performing a squat, which is a resistance training exercise. So making a hip hinge part of your daily activities is almost like integrating strength training into your day!

Types of movements that load the spine in risky ways:

Forward bending, or flexing of the spine:

- if the bending is to the end of the range of motion, like bending all the way forward to reach a shoe or lift something from the floor,
- if the bending is “weighted”, like if you are bending while holding a weight in your hands,
- if the bending is repetitive, like during sit-ups, or
- if the bending is rapid, like bending quickly to retrieve something that dropped.

Twisting of the spine:

- if the twisting is to the end of the range of motion, like turning to reach something behind you, or shoulder checking while driving,
- if the twisting is “weighted”, like if you are twisting while holding a load in your hands (e.g., picking up a box and turning to the side to put it down without turning your whole body),
- if the twisting is repetitive, like if you are vacuuming and you twist your upper body repeatedly but keep your lower body in one place, or
- if the twisting is rapid, like turning quickly to answer the phone.

Movements that Can Increase the Risk of Fracture and Ways to Reduce the Risk

Risky Movement	Example Activity Using the Movement	Alternative Ways to do it Safely if Indicated
End-range trunk flexion	<ul style="list-style-type: none"> Picking up object from floor Yoga/Pilates movements that involve forward bending of the trunk or spine 	<ul style="list-style-type: none"> Bend with knees and hips, not spine, or use grabber tool Supported flexion, not to end-range e.g., modified downward dog with hip hinge and chair, rather than flexing with spine motion
End-range trunk rotation	<ul style="list-style-type: none"> Sweeping, getting out of a car Trunk rotation machine Yoga/Pilates twisting postures 	<ul style="list-style-type: none"> Step to turn, slow, controlled twisting, not to end-range Side plank on wall or floor Slow, controlled twist in supine, not to end-range
Precarious balancing	<ul style="list-style-type: none"> Standing on unstable footstool, chair or ladder 	<ul style="list-style-type: none"> Use a step stool with a wide base of support and non-slip materials on the stepping surface and interface with floor.
Lifting objects into or lowering from high storage areas	<ul style="list-style-type: none"> Lifting heavy objects into cupboards Placing luggage in overhead storage 	<ul style="list-style-type: none"> Step stool to reduce lift/lower height, hold load close to body Ask someone to do it for you, check in luggage
Lifting objects into low storage areas	<ul style="list-style-type: none"> Placing objects in low cupboards Putting laundry on floor 	<ul style="list-style-type: none"> Avoid lowering or lifting from the floor – store at waist height Bend with knees and hips not spine, stand close to load when bending, hold load close to body
Lifting using maximal strength	<ul style="list-style-type: none"> Moving furniture 	<ul style="list-style-type: none"> Avoid – get someone else to lift it always
Rotation with feet planted	<ul style="list-style-type: none"> During vacuuming or raking 	<ul style="list-style-type: none"> Step to turn, so that leading foot and torso face same direction
Walking or stepping onto slippery surfaces	<ul style="list-style-type: none"> Wet bathroom or kitchen floor, entryway, pool decks 	<ul style="list-style-type: none"> Wear shoes or slippers with good traction, even in pool areas Walk slowly, look and take test step before you walk
Twisting or bending in combination with lifting	<ul style="list-style-type: none"> Bend and lift mattress to make bed Shovelling 	<ul style="list-style-type: none"> Bend with knees and hips, not spine, use lower body to help lift, stand close to load Leading foot and torso face same direction while task performed, step to turn
Transitions – Lying	<ul style="list-style-type: none"> Getting out of bed 	<ul style="list-style-type: none"> Slide arm out alongside ear, log roll onto side, bend knees 90°

Summary

After reading this booklet, you will have evaluated how active you are and learned how to incorporate strength training, posture training, balance training and aerobic training into your routine. Remember, strength training twice a week or more, balance and posture training every day, and aerobic training on most days of the week can build muscle strength, prevent falls and bone loss, and spare your spine.

Spine sparing tips will help prevent spine fractures. Your action plan will help you take action and become too fit to fracture!

Helpful Resources

The information contained in this booklet is not intended to replace individual medical advice. For more information on developing an exercise program that is suitable and safe for you, contact your physician, physical therapist or certified kinesiologist. Also, check out:

Bone Fit™

Exercise training workshop for certified exercise and health professionals working in clinics and community. Visit: www.benefit.ca

Use the Bone Fit™ Trained Professional Locator to find a trained professional in your community: www.benefit.ca/map-locator

Canadian Osteoporosis Patient Network (COPN) E-Newsletter

8- Part Exercise Series “Boning Up on Exercise”

Available at:

www.osteoporosis.ca/osteoporosis-and-you/copn/coping-archives/

4-Part Fall Prevention Series -“You Can Prevent Falls and the Injuries they Cause”

Available at:

www.osteoporosis.ca/osteoporosis-and-you/copn/coping-archives/

After the fracture

Intended especially for those who have had a fragility fracture from osteoporosis, this resource offers self-help guidelines for basic movements like standing, walking, sitting and bending, as well as helpful hints for how to perform common daily activities.

Available at: www.osteoporosis.ca/after-the-fracture