

Exercises for Osteoporosis and Fall Prevention: Practical Tips for Clinicians

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Faculty/Presenter Disclosure

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Canadian Physical Activity Guidelines

FOR OLDER ADULTS - 65 YEARS & OLDER

Guidelines



To achieve health benefits, and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.



It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.



Those with poor mobility should perform physical activities to enhance balance and prevent falls.



More physical activity provides greater health benefits.

Cognitive
impairment

Visual impairment

Hyperkyphosis

Cardiovascular and
pulmonary changes

Sarcopenia

Obesity

Diabetes

Osteoporosis

Falls

Knee OA

Reduced mobility, ROM

**What impairments are present?
What is the person's goals?**

Prioritize physical activity and exercise goals
Provide tailored advice



Too Fit To Fracture Recommendations

For preventing bone loss and falls, recommend:

- Strength training for major muscle groups \geq 2x/week
- Balance challenges **daily**
- Moderate-to-vigorous aerobic physical activity \geq 150 min/week, or 20-30min per day

To reduce spine loads, recommend:

- Exercises for back extensor muscles daily
- Spine sparing strategies – hip hinge, step-to-turn instead of twisting, holding loads close to body

How do your recommendations change with the presence of chronic disease or risk of injury?

Mary is a 92 year old woman who lives in an assisted living setting.

- History of falls
- BMD: Spine - 3.4, FN -2.3
- Spine X-rays: two **vertebral fractures**



high risk



<http://www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/video-series-on-exercise-and-osteoporosis/>

Too Fit To Fracture: High Risk

Recommendations that are the same for high risk:

- Strength training $\geq 2x$ /week, balance challenges daily
- Back extensor exercises, spine sparing strategies

Revised recommendations for high risk individuals:

- Get up & move every 30min \rightarrow prolonged sitting compresses vertebrae
- Moderate intensity aerobic physical activity only (≥ 150 min/week, can break into 10 min bouts)
- Many need physical therapist referral re: safe movement and exercise, help beyond light ADLs
- Supine lying promotes spinal extension and may help with pain relief – 15+ min, 2-4 times per day



Alignment and Core Stability Cues

Target	Example Cues
Forward head posture	<ul style="list-style-type: none">● Gently bring head back so it is as aligned with shoulders as possible
Hyperkyphosis, rounded shoulders	<ul style="list-style-type: none">● Imagine there are weights hanging from your shoulder blades, pulling them toward your back pockets;● Lift your breastbone gently up to the ceiling;● Take a breath, fill the back of your lungs first.
Abdominal bracing to support the spine	<ul style="list-style-type: none">● Gently brace your abdomen as if someone were about to poke you in the stomach.

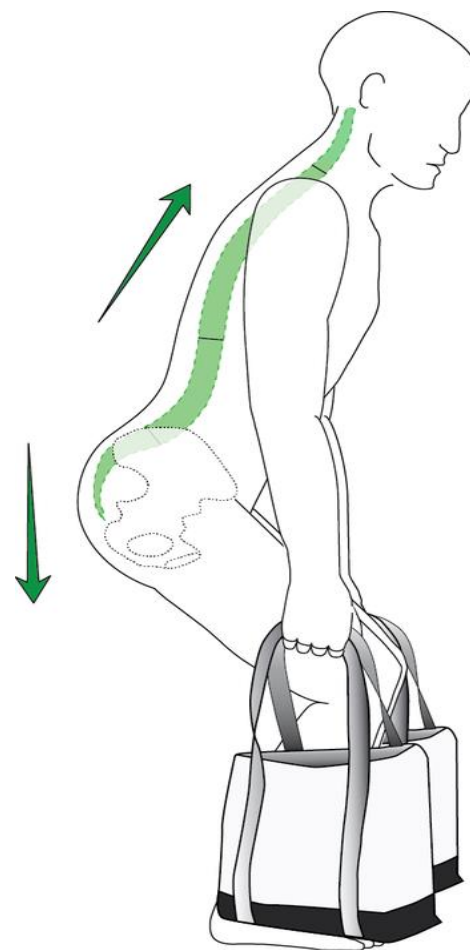


What is “spine sparing”?

Recommend that patient modify activities that apply *rapid, repetitive, weighted or end-range flexion* (forward bending) or *twisting* torque to the spine.

How?

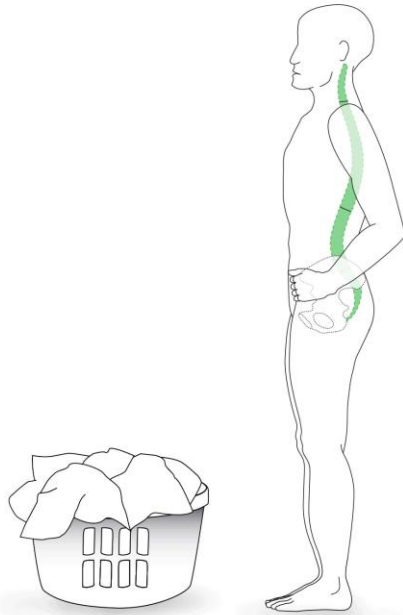
- Hip hinge
- Step-to-turn
- Avoid lifting from/lowering to floor
- Slow, controlled twist, not to end of range of motion
- Balance loads on either side of body
- Support trunk when flexing
- Hold weight close to body, not overhead



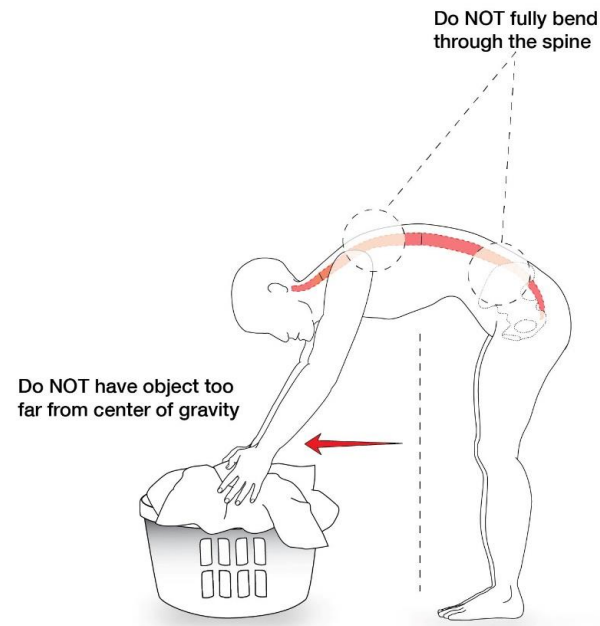
Teach “spine sparing” during ADL and physical activity

Recommend that patient modify activities that apply *rapid, repetitive, weighted or end-range flexion* (forward bending) or **twisting** torque to the spine.

How to pick up an object

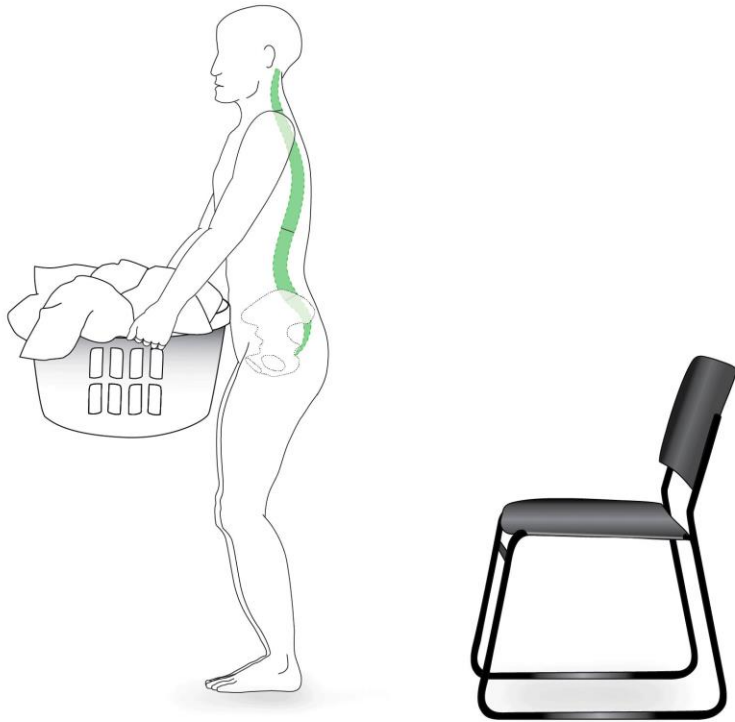


How **NOT** to pick up an object

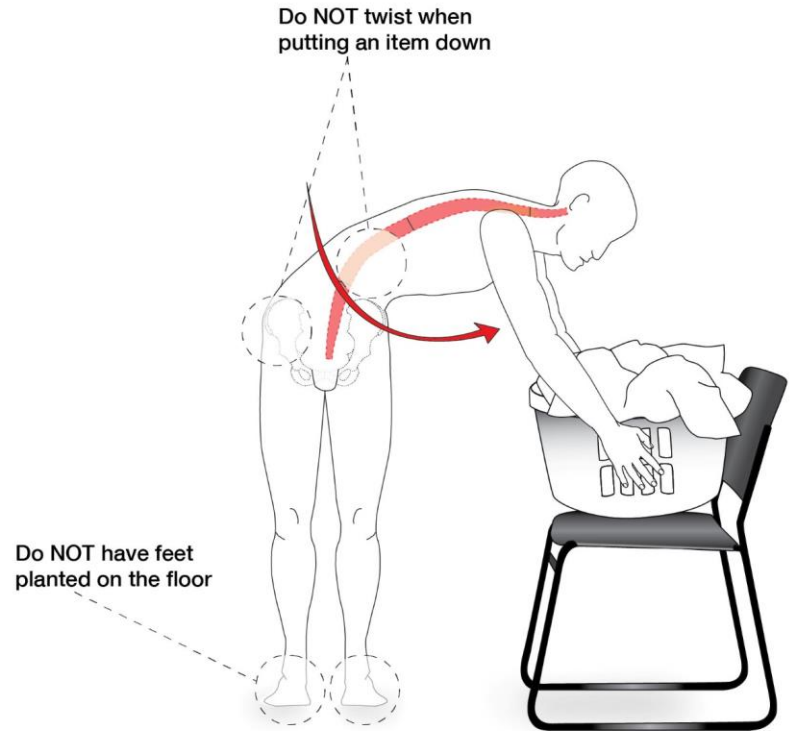


Saying “Don’t bend or twist” doesn’t teach them how TO move → instills fear, disincentive to physical activity.

How to move an object



How **NOT** to move an object

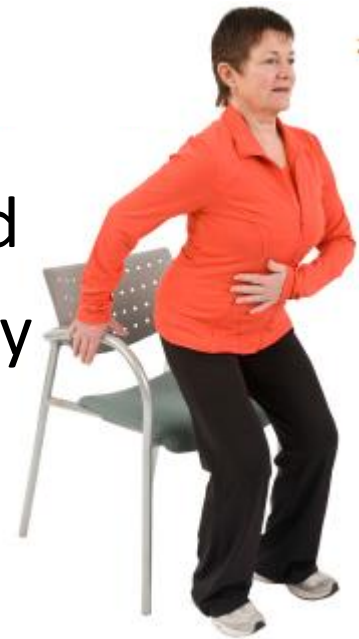


Strength Training

Features: major muscle groups, work to fatigue, <12 reps.
progression

Examples:

- Squats: sit-to-stand → standard → one-leg
- Step ups
- Calf raises
- Bow and arrow “pulls” with an exercise band
- Pushups: wall, counter, hands/knees, military
- Diagonal shoulder raises
- Thoracic extension
- Upright rows



Hint: google Too Fit To Fracture

Target	Standing	Seated	Supine
Legs/buttocks:	<ul style="list-style-type: none"> • sit to stand/squat • wall squat • step ups • plie squat • calf raises • walk on toes • half squat half lunge 	<ul style="list-style-type: none"> • glut squeezes/holds • leg extensions/holds • calf raises with weight on thighs • calf raise, one leg extension while holding calf raise **activate abs and sit erect prior 	<ul style="list-style-type: none"> • Bridging • Leg press



Side step squat



Bridging

Target	Standing	Seated	Supine
Chest/triceps:	<ul style="list-style-type: none"> • wall/counter pushup • theraband press 	<ul style="list-style-type: none"> • theraband press 	<ul style="list-style-type: none"> • theraband press
Back/biceps:	<ul style="list-style-type: none"> • standing lat pull • bow and arrow pull 	<ul style="list-style-type: none"> • Seated row • bow and arrow pull 	<ul style="list-style-type: none"> • bow and arrow pull
Shoulders:	<ul style="list-style-type: none"> • diagonal shoulder raise • upright row • bilateral shoulder raise 	<ul style="list-style-type: none"> • diagonal shoulder raise • upright row • bilateral shoulder raise 	<ul style="list-style-type: none"> • diagonal shoulder raise



Seated row



Standing upright row

Reduce your base of support

- Stand with feet together or on 1 leg (see photo).
- Balance on your heels only or on your toes only.
- Walk while you balance on your toes or heels only.
- Stand with 1 foot in front of the other. Your front heel touches your back toes.



Respond to things that upset your balance

- Correct your balance after something upsets your balance. For example, catch a ball and correct your balance.
- Balance on an unstable surface. For example, a piece of foam or a BOSU ball. A BOSU ball has a flat bottom and a round top. It doesn't roll.

Do activities that require coordination or shifting weight while moving around

- Dance.
- Do Tai Chi.
- Walk heel to toe in a line or in a figure eight.



Shift your weight

- Move your weight more to 1 foot than the other.
- Lean side to side or front to back.
- Shift your weight from toes to heels.

Spine Fractures and Pain

Supine Lying 15-20 min, 2-4x/day for pain

Lie on your back, bend both knees to 90 degrees with feet flat on the floor. Use a pillow if your head does not touch the floor. Your chin should not be pointing toward the ceiling or tucked in to your chest.

Place both arms out from your side, about 30-45 degrees, with palms facing up.



When beyond acute stage, can begin to add exercises for back extensors.

Lift the breastbone while keeping your back in contact with the floor. Hold for 3-5 seconds and repeat 8-12 times.

Sarcopenia: Loss of muscle mass and strength with aging

- ↓# myocytes, protein content in remaining cells
- ↓protein synthesis
- disproportionate atrophy Type 2a fibres
- ↓ anabolic stimuli (hormones, protein intake, physical activity)

Practice tips:

- Multijoint, functional exercises, large muscle groups
- Sufficient intensity and progression
- Adequate protein intake post-exercise and throughout the day– 1.2g/kgBW/day or 25–30 g high-quality protein per meal (2.5 g of Leu)

Osteoarthritis:

- Pain, stiffness, limited ROM
- Low quad strength: ↑ incidence & progression of knee OA?
- Increased body weight: ↑ incidence & progression of knee OA
- Obesity or metabolic syndrome: proinflammatory, risk of underlying cardiovascular disease, hypoglycemia during exercise

Practice tips:

- Joint sparing e.g., water exercise, multijoint movements
- Core stability, alignment, functional exercises, mobility
- Increase strength and size of muscles surrounding joint to reduce impact on bones and cartilage
- Weight loss, limiting inflammation
- Cardiac rehab or exercise physiologist supervision

Alzheimer's Disease and Related Dementias:

- Impaired confrontation naming (word retrieval)
- Impaired ability to learn/recall new info
- Language disorder
- Impaired visuospatial skills
- Impaired executive function
- Apraxia with sequential motor tasks
- Loss of social inhibitions
- Impaired sleep/wake cycle

Practice tips:

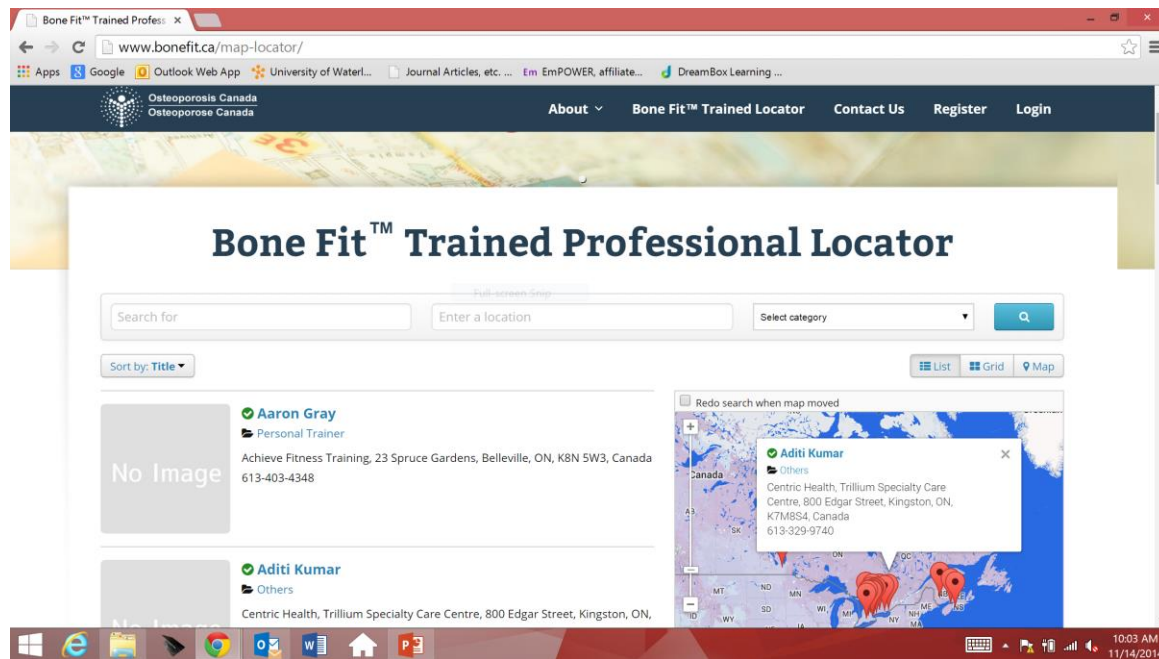
- Purposeful activity rather than exercise instruction
- Pictures with simple descriptions and large font
- Activities with rhythm, ingrained motor patterns, routine e.g., dancing, cycling
- Social support or group exercise with instruction

TOOLS for Patients:

www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/

Tell your patients about free booklet, 20+ videos on exercise:

- How to do strength and balance exercises
- How to modify golf game
- Incorporating balance training into daily home activities
- Exercises for older adults with higher fall risk, spine fractures



Locate: ON, SK, AB, NS, NB. Or, arrange for a workshop in your town!

www.bonefit.ca

Too Fit to Fall or Fracture

Strength Training At least 2 days/week

- ▶ Exercises for legs, arms, chest, shoulders, back
- ▶ Use body weight against gravity, bands, or weights*
- ▶ 8 - 12 repetitions per exercise

Try these to get started:

- Classes at YMCA/community centre
- Consult a physical therapist/kinesiologist
- Contact Osteoporosis Canada



Squat



Wall Push Up



Seated Row

Balance Exercises Every day

- ▶ Tai Chi, dancing, walking on your toes or heels
- ▶ Have a sturdy chair, counter, or wall nearby, and try (from easier to harder): shift weight from heels to toes while standing; stand heel to toe; stand on one foot; walk on a pretend line

Stand on one foot

Heel to toe stance



Posture Awareness Every day

- ▶ Gently tuck your chin in and draw your chest up slightly
- ▶ Imagine your collarbones are wings - spread your wings slightly without pulling your shoulders back



Aerobic Physical Activity At least 150 mins/week

- ▶ Bouts of 10 mins or more, moderate to vigorous intensity*
- ▶ You should feel like your heart is beating faster and you are breathing harder
- ▶ You might be able to talk while doing it, but not sing

Examples:

- Brisk walking
- Dancing
- Jogging
- Aerobics class

*If you have a spine fracture, consult a physical therapist/kinesiologist before using weights, and choose moderate, not vigorous aerobic physical activity

Questions? Want a free physical activity booklet? Contact Osteoporosis Canada: English 1 800 463 6842 / French 1 800 977 1778 or www.osteoporosis.ca

Locate a Bone Fit™ trained instructor: English 1 800 463 6842 / French 1 800 977 1778 or www.bonefit.ca



Strength Training (more examples) At least 2 days/week

Other exercises include:

- ▶ Upright row
- ▶ Step up



Upright Row



Step Up

What are spine sparing strategies?

Spine sparing strategies help “spare” the spine from injury. Injuries to the spine can occur when we bend forward or twist the spine quickly or repeatedly, or if we lift something heavy, bend far forward (e.g., tying shoes) or twist the torso all the way to the side. Bending or twisting while holding a weighted object (e.g., groceries, grandchild) is also risky.

Spine sparing strategies:

- ▶ Bend with your hips and knees, not your spine
- ▶ Turn your whole body rather than twisting your spine



Using a stool to tie shoes



Do

Don't



Step-to-turn

Ready to learn more?

Osteoporosis Canada has developed tools to help you get too fit to fracture!

- ▶ Download a free booklet, one-page summary, and other tools
- ▶ Watch videos about exercise, balance training, and safe physical activity
- ▶ Watch webcasts by expert researchers

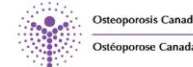
<http://www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/>

Not online? No problem! Just call the hotline number below to order a free booklet.

The information contained in this guide is not intended to replace health professional advice. Consult your healthcare provider or a physical therapist about what exercises are right for you.

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Too Fit To Fracture Summary



Recommend:

- Strength training $\geq 2x/week$
- Balance & posture exercises daily
- Moderate/vigorous physical activity, $\geq 150min/week$
- Spine sparing strategies

Resources:

- Use Osteoporosis Canada's tools: videos, booklet, one pager for EMR
www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/
- Bone Fit Trained Physiotherapist or Kinesiologist www.bonefit.ca
- Identify community programs that teach strength and balance exercises

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