Update on Clinical Guidelines for the Management of Osteoporosis

SUZANNE MORIN MD  MSC
DEPT MEDECINE, MCGILL UNIVERSITY
RESEARCH INSTITUTE MCGILL UNIVERSITY HEALTH CENTER
Disclosures

Research Grants paid to Institution: Amgen Canada and Merck
Advisory Board committee honorarium: Amgen Canada
Objectives

Summarize clinical Canadian guidelines for the management of osteoporosis and prevention of fragility fracture

- Long term care population
- Exercise guidelines for patients with osteoporosis or osteoporotic vertebral fractures
- Vertebral fracture screening guidelines

Review areas of uncertainties in the care of patients with skeletal fragility

Discuss post-fracture care strategies
Clinical Guidelines

2010 clinical practice guidelines for the prevention and management of osteoporosis in adults

Alexandra Papaioannou MD MSc, Suzanne Morin MD MSc, Stephanie Atkinson PhD, Jacques P. Brown MD, Sidney Felig MD, Anthony Hodsman MD, Sophie A. Jamal MD PhD, Stephen Kerry Siminoski MD, William D. Leslie MD MSc; for the Scientific Committee, Osteoporosis Canada

Key points
- The management of osteoporosis should be guided by an assessment of the patient’s absolute risk of osteoporosis-related fractures.
- Fragility fracture increases the risk of further fractures and should be considered in the assessment.
- Lifestyle modification and pharmacologic therapy should be individualized to enhance adherence to the treatment plan.
10 year absolute fracture risk assessment tools

Clinical Risk Factors: sex, age, BMI, prevalent fractures, family history, secondary causes, glucocorticoids, excess alcohol and smoking

in addition to BMD
Treatment targeted to category of Fracture risk

What about the moderate risk group? When do we screen for vertebral fractures? What about falls?
# 1st Line Therapies with Evidence for Fracture Prevention in Postmenopausal Women

## 1st line pharmacological therapies

<table>
<thead>
<tr>
<th>Type of Fracture</th>
<th>Antiresorptive Therapy</th>
<th>Denosumab</th>
<th>Raloxifene</th>
<th>Estrogen** (Hormone therapy)</th>
<th>Teriparatide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bisphosphonates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alendronate</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Risedronate</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zoledronic Acid</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**How long do we treat?**

**Drug holidays?**
Recommendations- Guidelines

COMPLETED OR ONGOING

Duration of bisphosphonate therapy

Exercise recommendations

Frail elderly - Long term care

Vertebral Fracture Screening assessment

Atypical Femur Fracture management recommendations

UPCOMING WORK

Special Populations

◦ CKD
◦ Oncology
◦ COPD

Update of the 2010 clinical guidelines
Clinical Review

Bisphosphonates for treatment of osteoporosis

Expected benefits, potential harms, and drug holidays

Jacques P. Brown MD  Suzanne Morin MD  William Leslie MD  Alexandra Papaioannou MD  Angela M. Cheung MD  PhD
Kenneth S. Davison PhD  David Goltzman MD  David Arthur Hanley MD  Anthony Hodsman MD  Robert Josse MD
Algis Jovaisas MD  Angela Juby MD  Stephanie Kaiser MD  Andrew Karaplis MD  David Kendler MD
Aliya Khan MD  Daniel Ngui MD  Wojciech Olszynski MD  PhD  Louis-Georges Ste-Marie MD  Jonathan Adachi MD
Exercise Recommendations

Osteoporos Int (2014) 25:821–835

CONSENSUS STATEMENT

Too Fit To Fracture: exercise recommendations for individuals with osteoporosis or osteoporotic vertebral fracture

L. M. Giangregorio • A. Papaioannou • N. J. MacIntyre • M. C. Ashe • A. Heinonen • K. Shipp • J. Wark • S. McGill • H. Keller • R. Jain • J. Laprade • A. M. Cheung
Evidence suggests:

- Multicomponent exercise programs and balance training can reduce falls
- Multicomponent exercise programs may improve BMD
- Aerobic exercise alone may not be sufficient for fall or fracture prevention
Too Fit To Fracture
Recommendations

For Individuals with Osteoporosis:
◦ Strong recommendation for multicomponent exercise program that includes resistance training in combination with balance training.
◦ Recommendation that individuals do not engage in aerobic training to the exclusion of resistance of balance training

For Individuals with Osteoporotic Vertebral Fractures:
◦ Consultation with a physical therapist is suggested to ensure safe and appropriate exercise
◦ Strong recommendation for multicomponent exercise program that includes resistance training in combination with balance training.
◦ Recommendation that individuals do not engage in aerobic training to the exclusion of resistance of balance training
## Exercise Prescription

<table>
<thead>
<tr>
<th>Type</th>
<th>How often per week?</th>
<th>How hard should it be?</th>
<th>Examples</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance training</td>
<td>2 days a week minimum&lt;sup&gt;a&lt;/sup&gt;</td>
<td>One exercise for each major muscle group, 2 sets per exercise, 8–12 repetitions maximum&lt;sup&gt;b&lt;/sup&gt;. If &gt;12 reps can be performed → too easy, if &lt;8 reps → too hard</td>
<td>Exercises that result in work being performed against resistance (e.g., body weight relative to gravity, or external resistance)</td>
<td>Individuals who are previously sedentary, with concomitant conditions that affect activity participation, at high fracture risk or unfamiliar with resistance training may need to train at a lower intensity, at least initially.</td>
</tr>
<tr>
<td>Balance training</td>
<td>15–20 min per day, accumulating 2 h per week.</td>
<td>Start with static balance exercises and progress to dynamic</td>
<td>Table 5</td>
<td>Can be performed in short bouts throughout the day, or embedded in daily activities. Consultation with a health care provider on exercise selection and progression is recommended</td>
</tr>
<tr>
<td>Aerobic exercise&lt;sup&gt;ab&lt;/sup&gt; (for general health benefits)</td>
<td>3–5 days per week for 30–60 min per day</td>
<td>Moderate to vigorous intensity</td>
<td>Weight-bearing e.g., dancing, walking</td>
<td>Shorter, more frequent bouts (e.g., 10 min at a time) are acceptable and may be preferable for individuals with vertebral fractures, with concomitant conditions that limit activity participation, or who were previously sedentary.</td>
</tr>
</tbody>
</table>

Total exercise time = minimum of 150 min of moderate- or vigorous-intensity exercise per week<sup>a,c</sup>
Balance training

Table 5. Example balance training exercises that have been used in clinical trial interventions for fall prevention

<table>
<thead>
<tr>
<th>What is balance training?</th>
<th>Example exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance training is defined as &quot;...the efficient transfer of bodyweight from one part of the body to another or challenges specific aspects of the balance system (e.g., vestibular system)&quot; and balance retraining is defined as &quot;...from the re-education of basic functional movement patterns to a wide variety of dynamic activities that target more sophisticated aspects of balance.&quot; <a href="http://www.profinex.org/taxonomy.html">http://www.profinex.org/taxonomy.html</a></td>
<td>Reducing base of support in static stance: One-legged stand Tandem or semi-tandem stand Standing on heels only Standing on toes only Shifting weight, moving to limits of stability Shifting weight between heels and toes Dynamic balance exercises Walking on toes only Walking on heels only Tandem walk Figure 8s Sit-to-stand or squat Walking backwards Three-dimensional movement Tai Chi Dancing Additional ways to progress balance challenges Gradually reduce contact with support objects Add weight shifting to activities with reduced base of support Close eyes during static tasks Dual-tasking—doing another activity or mental challenge at the same time</td>
</tr>
</tbody>
</table>
Locate professionals in ON, SK, AB, NS, NB. Or, arrange for a workshop in your town! 
www.bonefit.ca

Tell your patients about 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

Order one page handout, or download PDF for EMR. Order or tell patients about FREE booklet.

TOOLS for Patients on Osteoporosis Canada’s Website: www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/
Frail elderly

Recommendations for preventing fracture in long-term care

Alexandra Papaioannou MD MSc, Nancy Santesso RD PhD, Suzanne N. Morin MD MSc, Sidney Feldman MD, Jonathan D. Adachi MD, Richard Crilly BSc MD, Lora M. Giangregorio PhD, Susan Jaglal PhD, Robert G. Josse MBBS, Sharon Kaasalainen PhD, Paul Katz MD, Andrea Moser MD MSc, Laura Pickard MA, Hope Weiler RD PhD, Susan Whiting PhD, Carly J. Skidmore MSc, Angela M. Cheunq MD PhD; for the Scientific Advisory Council of Osteoporosis Canada

KEY POINTS

- In older adults living in long-term care (residents), fractures cause pain, agitation, immobility and transfers to hospital.
- Residents identified as being at high risk of fracture include those with prior fracture of the hip or spine, those with more than one prior fracture and those with one prior fracture and recent use of glucocorticoids.
- Recommendations for preventing fracture in long-term care were developed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach, with consideration of the quality of the available evidence, the balance between benefits and harms, the preferences of residents and their care providers, and the resources required to implement the recommendations.
- Strategies to prevent fractures, including vitamin D and calcium supplementation, use of hip protectors, exercise, multifactorial interventions to prevent falls and pharmacologic therapies, should be tailored to each resident’s level of fracture risk, mobility, life expectancy, renal function and ability to swallow.
Goal of Fracture Prevention
Fractures are associated re-fracture, decreased quality of life, long term care admissions and mortality
Guidelines apply to individuals who have a life expectancy of one year or more.

Reduce immobility, pain, transfers to hospital and improve quality of living of residents
Residents at high risk for fractures

Box 1: Factors indicating high risk for fracture*
Residents in long-term care with any one of the following factors:
- prior fracture of the hip or spine OR
- more than one prior fracture† OR
- recent use of systemic glucocorticoids and one prior fracture† OR
- identified as high risk and/or receiving osteoporosis treatment before admission to long-term care

*Adapted from the 2010 Osteoporosis Canada guideline.†
†Excluding fractures of the hands, feet or ankles.
Residents at high risk

For Elderly LTC Residents at HIGH RISK of FRACTURE

**STRONG RECOMMENDATIONS**
- Calcium supplementation up to 500mg daily if they cannot consume 1200mg of calcium through diet
- Vitamin D supplements of at least 800 UNITS daily
- Hip protectors for those who are mobile

**CONDITIONAL RECOMMENDATIONS**
- Multifactorial interventions that are individually tailored to reduce the risk of falls and fractures
- **BALANCE, STRENGTH AND FUNCTIONAL TRAINING EXERCISES** be provided only when part of a multifactorial intervention to prevent falls and fractures

**USE ONE OF THE FOLLOWING:**
- Aclidronate (weekly)
- Risedronate (weekly or monthly)
- Denosumab for those who have difficulty taking oral medications
- Zoledronic Acid for those who have difficulty taking oral medications

*These recommendations apply to the elderly with life expectancy greater than one year. Alendronate and Risedronate are not recommended for elderly with severe renal insufficiency (CrCl <30ml/min or <30mL/min respectively). Zoledronic Acid should not be administered in people with severe renal impairment (CrCl <30mL/min). Exercise caution for people who receive other medications that could affect renal function. Creactive should be monitored before and periodically after treatment.*

- Teriparatide
- Etidronate and Raloxifene **NOT** be used
Residents not at high risk

For Elderly LTC Residents NOT at High Risk of FRACTURE:

**CONDITIONAL RECOMMENDATIONS**

- Fracture prevention strategies depending upon resources and resident’s (or their caretaker’s) values and preferences:
  - Calcium supplementation up to 500mg daily, for those who cannot meet Recommended Dietary Allowance for calcium through food
  - Vitamin D supplementation to meet the Recommended Dietary Allowance, 800 – 2000 UNITS/day
  - Balance, strength and functional training exercises to prevent falls
  - Hip protectors for those who are mobile
Screening for Vertebral Fractures

**WHY**
Prevalent
Domino effect
Kyphosis, Height loss, Pain, Falls, Morbidity

Alter treatment if diagnosed
Vertebral imaging should be performed:

- In all women age 70 and older and all men age 80 and older if BMD T-score is ≤−1.0 at the spine, total hip, or femoral neck
- In women age 65 to 69 and men age 70 to 79 if BMD T-score is ≤−1.5 at the spine, total hip, or femoral neck
- In postmenopausal women and men age 50 and older with specific risk factors:
  - Low-trauma fracture during adulthood (age 50 and older)
  - Historical height loss (difference between the current height and peak height at age 20) of 1.5 in. or more (4 cm)
  - Prospective height loss (difference between the current height and a previously documented height measurement) of 0.8 in. or more (2 cm)
  - Recent or ongoing long-term glucocorticoid treatment
- If bone density testing is not available, vertebral imaging may be considered based on age alone.
## Patient representative survey

<table>
<thead>
<tr>
<th>Main results: Estimated support for VF screening in Canada</th>
<th>Online participants (n=681)</th>
<th>Osteoporosis clinic patients A (n=62)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought it is important to look for silent spinal fractures among Canadian adults</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>94%</td>
<td>94%</td>
</tr>
<tr>
<td>No</td>
<td>0.4%</td>
<td>2%</td>
</tr>
<tr>
<td>Unsure</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would be willing to have a spine x-ray to look for a silent spinal fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>94%</td>
<td>90%</td>
</tr>
<tr>
<td>No</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Unsure</td>
<td>4%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Vertebral Screening guidelines

Grade approach

Questions identified

Factors that predict vertebral fractures:
  - Age (70), BMD, Height loss, glucocorticoid use, prevalent fracture, self report of VF

Evidence reviewed

Patient survey

Finalisation
Other guidance
Choosing Wisely (Canada)

Don’t repeat dual energy X-ray absorptiometry (DEXA) scans more often than every 2 years.

The use of repeat DEXA scans at intervals of every 2 years is appropriate in most clinical settings, and is supported by several current osteoporosis guidelines.

Because of limitations in the precision of testing, a minimum of 2 years may be needed to reliably measure a change in BMD. If bone mineral densities are stable and/or individuals are at low risk of fracture, then less frequent monitoring up to an interval of 5-10 years can be considered.

Shorter or longer intervals between repeat DEXA scans may be appropriate based on expected rate of change in bone mineral density and fracture risk.
Choosing Wisely (Canada)

Don’t prescribe bisphosphonates for patients at low risk of fracture

There is no convincing evidence that anti-osteoporotic therapy in patients with osteopenia alone reduces fracture risk.

The 2008 Cochrane Reviews for three bisphosphonates (Alendronate, Etidronate, Risedronate) found no statistically significant reductions for primary prevention of fracture in postmenopausal women.

Fracture risk is determined using either the Canadian Association of Radiologists and Osteoporosis Canada risk assessment tool (CAROC) or FRAX®, a World Health Organization fracture risk assessment tool. Both are available as online calculators of fracture risk. Given the lack of proven efficacy, widespread use of bisphosphonates in patients at low risk of fracture is not currently recommended.
30. Take into account the possibility of lower overall benefit of continuing treatments that aim to offer prognostic benefit, particularly in people with limited life expectancy or frailty.

31. Discuss with people who have multimorbidity and limited life expectancy or frailty whether they wish to continue treatments recommended in guidance on single health conditions which may offer them limited overall benefit.

32. Discuss any changes to treatments that aim to offer prognostic benefit with the person, taking into account:
   - their views on the likely benefits and harms from individual treatments
   - what is important to them in terms of personal goals, values and priorities (see recommendation 24).

33. Tell a person who has been taking bisphosphonate for osteoporosis for at least 3 years that there is no consistent evidence of:
   - further benefit from continuing bisphosphonate for another 3 years
   - harms from stopping bisphosphonate after 3 years of treatment.

Discuss stopping bisphosphonate after 3 years and include patient choice, fracture risk and life expectancy in the discussion.
Challenges in Osteoporosis Management

Figure 1: Temporal change in the proportion of BMD testing, osteoporosis diagnosis and osteoporosis treatment in the year following the fracture

P-for-trend = 0.2562
P-for-trend = 0.0003
P-for-trend < 0.01
A call to action?

Identify those at high risk

Convey impact of fractures on clinical and patient-important outcomes (and on healthcare resource utilization)

Answer concerns regarding potential harms of medications

Strongly encourage lifestyle habits that enhance musculoskeletal health
Questions?

Osteoporosis Canada
www.osteoporosis.ca

suzanne.morin@mcgill.ca