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osteoporosis update

a practical guide
for Canadian physicians

Gut reaction

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osteoporosis update

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Calcium questions and concerns

Sophie A. Jamal, MD, PhD, FRCPC, is Director of Osteoporosis Research Programs at Women's College Hospital, and Associate Professor in the Departments of Medicine and Health Policy Management and Evaluation at the University of Toronto.

In this issue of *Osteoporosis Update*, the focus is on calcium as we hear from experts on various aspects to do with this mainstay of osteoporosis prevention and management. The feature article by nutritionist Dr. Wendy Joanne Dahl contributes to our understanding of lactose intolerance and discusses the importance of optimizing calcium and vitamin D intake in patients who suffer symptoms of this condition. Next, Dr. Stephanie Atkinson, expert in pediatric nutrition and bone metabolism, comments on calcium requirements during pregnancy and lactation as well as on short- and long-term effects of these states on maternal bone health. Also in the Q&A, pharmacist Dr. Anne Marie Whelan outlines the many potential interactions between calcium and other commonly prescribed medications, and directs us to databases providing further information on this important area.

As well, we present updated information on current osteoporosis drug coverage across Canada and links to online provincial formularies that we hope will prove useful.

Notice to our readers

As noted in the Summer 2009 issue, Osteoporosis Canada will be discontinuing the production of a free version of *Osteoporosis Update*. This change currently pertains to both the online and print versions of our magazine, and the Winter 2010 issue is the last free printed copy in circulation. Note that electronic archives of *Osteoporosis Update* are still accessible on our website, at www.osteoporosis.ca.

In an increasingly difficult economic climate where most charities are experiencing a sometimes dramatic decline in donor dollars, there is a constant financial risk as traditional sources of funding are disappearing or changing. In an effort to ensure the health and sustainability of Osteoporosis Canada as well as our valued products, a viability assessment on the current model of *Osteoporosis Update* will be performed so that we may present different and mutually beneficial alternatives to our readers.

We will keep you apprised of new options that will become available pertaining to this publication. Thank you for your loyalty. We look forward to connecting with you in the future and appreciate your continuing support.

Understanding and managing lactose intolerance

Make sure to keep bone health in mind

By Wendy Joanne Dahl, PhD, RD

Dairy products are important sources of nutrients, including calcium and vitamin D. Calcium plays an essential role in maintaining bone health and preventing osteoporosis. Vitamin D has dual roles, maintaining bone and contributing to the prevention of osteoporosis as well as benefiting muscle strength leading to fall prevention.[1] Dairy products also contain lactose, which causes unpleasant gastrointestinal (GI) symptoms in some individuals, a condition known as lactose intolerance. Avoiding milk and other dairy foods due to their lactose content can have serious effects, including lowering intakes of calcium and vitamin D and thus contributing to osteoporosis risk.[2,3] Whether avoiding lactose is necessary or beneficial for individuals who cannot digest lactose is a matter of much debate, however, and new research into the fate of undigested lactose in the gut is fueling this discussion.

To promote the consumption of dairy foods and optimize calcium and vitamin D intake, health professionals need to translate current research, dispel common myths and educate patients about lactose digestion and intolerance.

Lactase insufficiency

Lactose is the principal carbohydrate in milk, providing about half the calories in a glass of skim milk. As a disaccharide of glucose and galactose, lactose cannot be absorbed directly, but requires the enzyme lactase for digestion.[4] Whereas most infants have sufficient levels of the enzyme to digest lactose in breast milk or formula, for the majority of the world's population levels of lactase diminish dramatically during childhood.[5] Insufficient lactase enzyme (known as lactase non-persistence) reduces the ability to digest lactose and results in lactose maldigestion. The majority of individuals of Asian, African and Native American descent, as well as about half of Hispanic peoples, exhibit lactose maldigestion.[3] While most people of Northern European ancestry retain adequate lactase production throughout adulthood, damage to the intestinal mucosa, from a bout of gastroenteritis for example, may result in secondary lactose maldigestion.[6]

The prevalence of lactose maldigestion is significantly higher in older adults, especially those over age 70, and contributes to lower intakes of dairy products[7,8] (if dairy food intake is maintained, however, lactose maldigestion has little effect on bone density[7]). Recent research suggests that bacterial overgrowth may be involved in lactose maldigestion in the elderly and that, with treatment, lactose digestion may resume.[8]

Colonic metabolism of lactose

For individuals with lactose maldigestion, undigested lactose becomes substrate for fermentation by the bacteria in the gut (microbiota).[9] Dietary fibre from fruits, vegetables and whole grains, resistant starch found in pasta and legumes, and various fibre sources added to fortify foods also contribute carbohydrate substrate for the microbiota.[10] Lactose is fermented primarily in the colon by diverse bacterial species producing short chain fatty acids that provide energy and generate gas, which may result in bloating, flatulence and abdominal discomfort — the major symptoms of lactose intolerance. If fermentation is limited due to high lactose intake, fast GI transit time or reduced levels of bacteria (such as following antibiotic use), osmotic diarrhea may result.[11]

Symptom management: moderation vs avoidance

Not all people with lactose maldigestion experience the symptoms of lactose intolerance.[12,13] The degree to which an individual perceives abdominal discomfort, known as visceral sensitivity, may be a key determinant of whether lactose maldigestion leads to lactose intolerance.[14] For example, some people are much more sensitive to abdominal distention due to gas than others, and therefore may be more likely to complain of symptoms. Others may have significant lactose maldigestion but experience little gas, bloating or distention.

There are other explanations for the diversity of response to lactose intake. The dose of lactose is important.[15] Moderate intakes are less likely to produce significant symptoms compared to the larger oral doses that may be used to diagnose lactose intolerance. Intakes of 10–15 g per day or more (the amount of lactose in one glass of milk) are usually well tolerated.[16] Individuals should experiment to find the amount of lactose they can comfortably consume at any one meal.[12] Consideration of the time of day of intake may be helpful in understanding symptoms. Consuming lactose-containing foods in the evening vs morning may result in fewer symptoms, as any gas produced during the night may go unnoticed.

Avoidance of trace sources of lactose has been recommended by some[17] and is definitely pursued on many unreliable websites targeting people with lactose intolerance.

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The American Dietetic Association upholds that moderate consumption of lactose is acceptable,[18] as do the Dietitians of Canada evidence-based nutrition practice guidelines (www.dieteticsatwork.com/PEN/home.asp). For example, consuming lactose-containing medications does not result in symptoms of lactose intolerance, as the dose is too low.[19] Food sources that contribute low levels of lactose, such as sandwich meats and other processed foods, need not be avoided.

Consuming lactose with meals has been shown to reduce symptoms.[20] Also, daily consumption of lactose-containing foods can decrease symptoms within as little as three weeks.[21,22] The microbiota become accustomed to the lactose substrate and the level of gas produced may be reduced or simply expelled more efficiently. It is suggested that the bacteria in yogurt digest lactose, thus reducing the symptoms of lactose intolerance.[23] If tolerance to lactose in yogurt is better than in fluid milk, this may also be due to a smaller serving size or the slower transit of the semi-solid yogurt. When transit is slowed, gas is produced over a longer period of time. This may allow more gas to be absorbed and exhaled, minimizing bloating and flatulence.

Is it really lactose intolerance?

Many individuals mistakenly self-diagnose their GI symptoms as lactose intolerance.[24] Bloating, flatulence and abdominal discomfort may result from ingesting any undigested carbohydrate. For example, with a breakfast of oatmeal and milk, intestinal gas production and GI symptoms may be due to the significant fermentable fibre content of the oatmeal rather than to lactose. Further confusion stems from the expectation that symptoms of lactose intolerance will occur between 30 minutes and two hours after consumption.[17] When lactose intake is habitual and part of a mixed meal, gas may not be noted until four or more hours later.[10] Symptoms of gas and bloating closely following a meal are likely due to the fermentation of low-digestible carbohydrate from a previous meal. Diarrhea can result from a high intake of sugar alcohols found in high levels in certain diet foods, or from fructose maldigestion, and therefore may not be related to lactose intake.

Table 1
Calcium and vitamin D requirements

Osteoporosis Canada (OC) currently recommends intake of the following amounts of calcium and vitamin D through diet, with supplements if necessary. OC and the Dietary Reference Intake committee are reviewing these requirements; subsequent vitamin D recommendations may be higher and calcium intakes, lower.

Age	Daily calcium*	Daily vitamin D
4 to 8 yrs	800 mg	–
9 to 18 yrs	1300 mg	–
19 to 50 yrs	1000 mg	400 IU
50+ yrs	1500 mg	≥ 800 IU
Pregnant or lactating women 18+ yrs	1000 mg	400 IU

* Amounts refer to total elemental calcium intake from diet and supplements. If calcium supplements are used, it is important to check for the elemental calcium content (the amount of calcium the body can absorb), typically indicated on the back of the bottle.

As well as a daily intake recommendation, 1500 mg should be considered as a tolerable upper limit, as taking too much calcium has no extra benefit and may be associated with side effects.

More research needed

While moderation rather than avoidance of lactose is recommended to manage symptoms of intolerance, the effects of unabsorbed lactose on health and disease require further research. Chronic lactose intake modifies the metabolic capacity of the colonic bacteria, increasing the fermentation of lactose.[9] Fermentation has been shown to increase colonic calcium absorption.[25] However, it has been suggested that lactose maldigestion may impair small intestinal calcium absorption.[26] Research is needed to determine the net effect of lactose maldigestion and fermentation on calcium absorption.

Rule out lactose maldigestion in self-diagnosed patients — a lactose breath test with measurement of H_2 and CH_4 in expired air may be the best diagnostic method

Practice points

Physicians, Registered Dietitians and other health professionals need to dispel myths surrounding lactose intolerance and promote dairy intake in their patients, stressing the importance of calcium and vitamin D (see recommended requirements in Table 1, above) for those with or at risk of osteoporosis.

- Communicate that tolerance to lactose varies with individuals and that daily consumption may improve symptoms over time.
- Dismiss the notion that small amounts of lactose are harmful and emphasize that food choices containing less than about 6 g of lactose per serving (e.g. hidden sources, cheeses, ½ cup of milk or yogurt) are unlikely to cause significant symptoms in individuals with

lactose maldigestion. Remind patients that avoiding dairy products completely is only necessary in the case of an allergic reaction to cow's milk proteins; this can be determined by an allergist.

- Rule out lactose maldigestion in many self-diagnosed patients — a lactose breath test with measurement of H_2 and CH_4 in expired air may be the best diagnostic method.[27]

Avoiding milk and other dairy foods due to their lactose content can lower intakes of calcium and vitamin D and contribute to osteoporosis risk

- Reinforce that gas production is a normal and unavoidable by-product of GI fermentation of all foods containing low-digestible carbohydrates. Even if one avoids all lactose, there will still be significant fermentation of carbohydrates from one's diet and digestive processes available to the gut microbiota each day.
- Encourage consumption of lactose-free milk, yogurt and other dairy products, or of alternate sources of calcium and vitamin D (see below) by individuals experiencing uncomfortable symptoms of lactose intolerance.
- Recommend the use of lactase drops/tablets for people who experience uncomfortable symptoms of lactose intolerance when consuming high-lactose foods.

Calcium and vitamin D: alternate sources

For people who do not eat any dairy products, other sources of calcium include:

- Sardines and canned salmon (with bones)
- Leafy green vegetables (broccoli, kale, bok choy, okra, turnip greens, collard greens)
- Dried figs
- Soybeans and other legumes
- Tofu processed with calcium sulfate
- Oatmeal (instant)
- Calcium-fortified orange juice, soy and rice beverages

Vitamin D is found in few foods. Besides fortified milk and margarine, other sources are:

- Fortified orange juice, soy and rice beverages
- Fatty fish (salmon, sardines, herring, mackerel and swordfish) and fish oils (halibut and cod liver oils)
- Egg yolks
- Chicken livers

Since it may be difficult to get enough calcium and vitamin D from food alone, supplements may be advised.

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Should women who are pregnant or breastfeeding take extra calcium to offset bone loss? Does the alteration in calcium and bone metabolism during these periods have any long-term consequences?

Dr. Stephanie A. Atkinson comments: Calcium requirements during pregnancy total about 25–30 grams; they are highest (about 330 mg/day) during the third trimester, when fetal calcium accretion is greatest. During lactation, about 250 mg/day of calcium is secreted in milk. Owing to the very efficient physiologic adaptation that occurs in response to the pregnant and lactating states, however, such calcium needs of the fetus and breast-feeding infant do not translate into higher maternal dietary calcium requirements. Hormonal changes during pregnancy up-regulate intestinal calcium absorption via increased circulating active metabolite of vitamin D (1,25-dihydroxyvitamin D) to about 60% of dietary calcium, compared to about 35% in the non-pregnant state, and higher bone turnover stimulates mobilization of calcium from bone. We do not know whether the actual amount of maternal bone mineral is reduced during pregnancy — various studies report both no change as well as bone loss.

During lactation, bone loss amounts to about 3% to 5% of total bone mass (compared to annual losses of 1%–3% in the postmenopausal state), especially at axial bone sites, and occurs particularly in early lactation. Somewhat surprisingly, lactation-induced bone loss is not influenced by calcium intake, as demonstrated in several trials in which mothers were randomized to varying calcium amounts. Rather, it appears to result from higher bone turnover, with bone resorption exceeding formation, and physiologic changes that may be regulated by the estrogen-deficient state of lactation. Bone recovery seems to occur with return of menses (although it may not be complete until 6 months postpartum) due to enhanced intestinal calcium absorption (via 1,25-dihydroxyvitamin D) and reduced renal calcium excretion.

To address the second part of this question: Based on several observational studies in pregnancy and lactation, no detriment to maternal bone mass at later ages occurs, even for multiparous women (with 5 to 7 children) or those with closely spaced pregnancies. Most studies have been done in adult women, so the effect of bone loss in adolescents who are pregnant/lactating cannot be adequately evaluated. Further, while mothers who have a habitually low calcium intake (< 800 mg/day) may benefit from calcium supplements of 1000 mg/day in the postpartum period, the observed increase in bone density occurred irrespective of whether the women were lactating. Fracture risk in older women also does not appear to be influenced by multiparity. Indeed, hip fracture risk is reduced with parities of two or more by 9% to 10% per child.

In summary, pregnant and lactating women do not require additional calcium above that recommended for women who are not pregnant (1000 mg/day for women aged 19–50 years). Despite the normal physiologic bone loss that occurs with lactation, bone is restored once menstruation resumes and no long-term detriment to bone health is evident even for multiparous women.

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How does calcium interact with other prescription drugs, e.g. blood pressure medication, digoxin, antibiotics, anti-seizure medications? Is there a danger of calcium interfering with these medications or lowering their absorption, or vice versa?

Dr. Anne Marie Whelan explains: Adequate intake of calcium via diet and/or supplementation is essential for good bone health. However, clinicians should be aware that calcium supplements may interact with other medications. These interactions are summarized below:

1. *Calcium may decrease the absorption/effectiveness of some medications when taken concurrently.* There is good documentation that calcium may bind to the following medications in the gastrointestinal tract, decreasing their absorption and thus potentially lowering their efficacy: bisphosphonates, fluoroquinolone antibiotics, tetracycline antibiotics and levothyroxine. Although a similar interaction has been observed between calcium and beta-blockers (e.g sotalol, atentolol), no significant clinical effects have been noted as a result of these interactions. Calcium carbonate may decrease the absorption of phenytoin and azole antifungals (e.g. itraconazole) by changing the emptying

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While there is potential for many interactions between calcium and other medications, the amount and rigour of the evidence supporting these interactions vary

time or pH of the gastrointestinal tract. In addition, calcium carbonate may cause delayed-release bisacodyl tablets to release early before reaching the large intestine, resulting in decreased effectiveness as well as gastric irritation and/or cramps. Although the documentation is not as substantial, it has also been reported that calcium may interfere with the absorption of the following medications, and vice versa: phenytoin, carbamazepine, phenobarbital, primidone and ticlopidine.

In order to minimize the effect of the above interactions, it is generally recommended to separate the dosing of the calcium from these medications by two to six hours. Specific recommendations may vary for individual products.

2. *Medications may decrease the absorption of calcium when taken concurrently.* Bile acid sequestrants (e.g. cholestryamine) may interfere with normal calcium absorption and increase the loss of calcium in the urine. Doses of the medications should be separated. Although data is conflicting, it has been reported that proton pump inhibitors and H_2 blockers may lower acid levels in the stomach, resulting in a decreased absorption of calcium. To avoid this potential interaction, calcium supplements may be taken with food (to stimulate stomach acid production) or calcium citrate may be used (as it does not require an acidic environment for absorption).
3. *Medications may increase blood levels of calcium.* Thiazide diuretics (e.g. hydrochlorothiazide) reduce the amount of calcium that is excreted renally. This may raise serum levels of calcium, leading to risks associated with hypercalcemia. When thiazides and calcium are used concurrently, monitor for toxic effects of calcium (e.g. nausea, vomiting, constipation, confusion, muscle weakness, lethargy and fatigue) and adjust the dose as needed.
4. *Medications may lower blood levels of calcium.* Loop diuretics (e.g. furosemide) are potent diuretics that may lead to electrolyte depletion. Electrolytes should be monitored and doses of medications adjusted as needed.
5. *The effects of some medications may be affected by calcium levels.* It has been reported that low levels of calcium may result in digoxin being ineffective, while high levels of calcium may increase the risk of toxic reactions with digoxin. In particular, intravenous administration of calcium in patients on digoxin has been reported to increase the risk of cardiac arrhythmias.

As can be seen above, there is potential for many interactions between calcium and other medications. The amount and rigour of the evidence supporting these interactions vary and readers are referred to drug interaction databases (e.g **www.thomsonhc.com; https://online.lexi.com**) for more detailed information.

provincial formularies

Osteoporosis drug coverage in Canada

Provinces provide selective drug coverage for eligible groups, including individuals over 65 years of age and those on social assistance and disability. Provincial formularies list which drugs are available, either as general or restricted benefits:

- General benefits (open listing) require no special criteria or paperwork.
- Restricted benefits require that individuals meet certain clinical criteria. In general, the physician must submit a special form along with the patient's prescription.

Certain osteoporosis medications (e.g. the bisphosphonate etidronate [Didrocal®] and hormone [estrogen] replacement therapy) are listed as general benefits in most provincial formularies. The table on page 8 outlines

the status of the newer osteoporosis therapies on provincial formularies across the country. In general, where generic versions of a drug are available, these will be substituted and the lesser cost reimbursed. The whole cost may be covered if the physician specifies the brand version only, but in this case the prescription must be accompanied by a completed special authorization request form.

This chart reflects listings for use in osteoporosis patients. Listings of these drugs may differ for other conditions. Coverage is under constant review and is subject to change.

Provinces	Bisphosphonates					Selective estrogen receptor modulators (SERMs)	Calcitonin	Teriparatide (PTH)
	Alendronate (Fosamax®): oral 10 mg/d; 70 mg once/wk	Alendronate 70 mg plus vitamin D3 5600 IU weekly (Fosavance®)	Risedronate (Actonel®): oral 5 mg/d; 35 mg once/wk	Actonel® 35 mg + calcium 500 mg tablets	Zoledronic acid (Aclasta®): 5 mg/100 mL once/yr injection**	Raloxifene (Evista®): oral 60 mg/d	Miacalin®: nasal spray 200 IU/d	Forteo®: subcutaneous injection 20 mcg/d
BC	SA	SA	SA (75 mg, 150 mg* under review)	NL	Under review	SA	NL	NL
AB	SA	SA	SA	NL	NL	SA	SA	NL
SK	EDS	EDS	EDS (75 mg, 150 mg also listed)	NL	NL	EDS	EDS	NL
MB	EDS (Part 3)	NL	EDS (Part 3)	NL	NL	EDS (Part 3)	EDS (Part 3)	NL
ON	General benefit	General benefit	General benefit (150 mg also listed as general benefit)	NL	LU	LU	Miacalcin NL; (calcitonin solution listed as general benefit)	NL
QC	Open	Open	Open	Open	EMS	Open	Open	EMS
NB	SA	NL	SA	NL	NL	SA	SA	NL
NS	ESD	NL	ESD	NL	NL	ESD	ESD	NL
PE	SA	NL	SA	NL	NL	NL	SA	NL
NL	SA	SA	SA	NL	NL	SA	SA	NL
YT	Open	NL	Open (75 mg also listed)	NL	NL	Open	EDS	NL
NIHB	LU	NL	LU	NL	NL	LU	LU	NL

* Health Canada approved a 150 mg dosing for Actonel® in June 2009, making it the only once-a-month option in Canada for the treatment of postmenopausal osteoporosis; reimbursed as a general benefit on the Ontario Drug Benefit Formulary (ODBF) effective June 23, 2009.

** Aclasta® was approved in Canada for the treatment of postmenopausal osteoporosis (PMO) in October 2007. As of March 2009, Aclasta is also approved to treat men with osteoporosis and for the treatment and prevention of glucocorticoid-induced osteoporosis in men and women. It is reimbursed in Québec (since October 1, 2008) for the treatment of PMO in women who cannot tolerate oral bisphosphonates, and is now covered for "Limited Use" under the ODBF to treat male osteoporosis and PMO in women who are ambulatory and unable to take oral medications.

EDS: Exception drug status
EMS: Exceptional medications status
ESD: Exception status drug
LU: Limited use
NIHB: Non-Insured Health Benefits, a federal health benefit plan for First Nations and Inuit people in Canada
NL: Not listed in the formulary (i.e. not a benefit)
SA: Special authorization

For information on provincial drug benefit programs or to consult online formularies, visit the following websites:

BC: www.health.gov.bc.ca/pharmacare/formulary/index.html# (drug review results & process); www.health.gov.bc.ca/pharmacare/sa/criteria/restricted/restrictedtable.html (limited coverage drug program)
AB: www.ab.bluecross.ca/dbl/idbl_main1.html
SK: http://formulary.drugplan.health.gov.sk.ca
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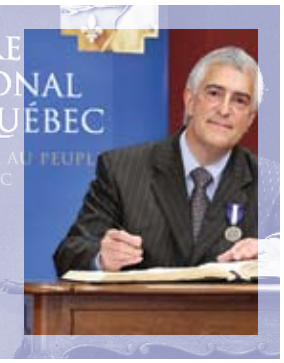
NL: www.health.gov.nl.ca/health/nlpdp/#Formulary
YT: www.hss.gov.yk.ca/professionals/
NIHB: www.hc-sc.gc.ca/fniah-spnia/nihb-ssna/benefit-prestation/drug-med/index-eng.php

BC expands coverage of alendronate

Effective November 18, 2009, alendronate daily (10 mg) and weekly (70 mg) are available for PharmaCare coverage through the Special Authority Program, as partial benefits for patients who have suffered osteoporotic fractures. Patients do not have to have failed with etidronate to be eligible.

Patients who currently have Special Authority approval for alendronate are also automatically covered for the newly listed combination product Fosavance® (70 mg alendronate/5600 IU vitamin D_3). Effective January 18, 2010, Fosavance® is covered as a full benefit under Special Authority, in the Low Cost Alternative category. Approval is subject to specific criteria, which can be found at http://www.health.gov.bc.ca/pharmacare/sa/criteria/restricted/restrictedtable.html, along with the Special Authority request forms. (See also osteoporosis drug coverage in Canada chart on page 8.)



Dr. Jacques Brown
Photo by François Nadeau – O.N.Q.

Québec honours Dr. Jacques Brown

Osteoporosis Canada is pleased to announce the appointment of Dr. Jacques Brown to the prestigious rank of Knight of the National Order of Québec. Québec Premier Jean Charest presented the honour to Dr. Brown at a ceremony held last June 2009 at the Hôtel du Parlement in Quebec City.

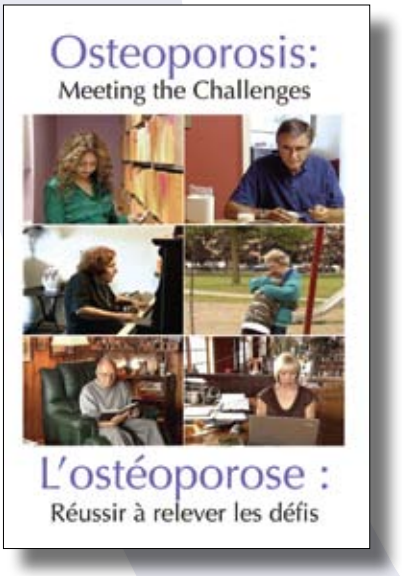
Dr. Jacques Brown is a rheumatologist and internationally recognized authority on metabolic bone diseases. He is a Clinical Professor in the Department of Medicine at Laval University and Head of the Division of Rheumatology at Le Centre hospitalier universitaire de Québec. His main research interests include osteoporosis and Paget's disease of bone, and he has published widely in both areas. He is a Past Chair of the Scientific Advisory Council for Osteoporosis Canada.

Please join us in congratulating Dr. Brown!

Educational DVD

Osteoporosis Canada is proud to present a new educational DVD entitled *Osteoporosis: Meeting the Challenges*. Intended for the general public (especially those newly diagnosed with osteoporosis and their caregivers) as well as healthcare professionals, this 20-minute bilingual DVD contains information on osteoporosis and its management and is an indispensable, informative tool. Highlights include inspirational stories from an authentic patient cast, along with key sections such as diagnosis, nutrition, treatment, disease and lifestyle management, all designed to help individuals meet the challenges of living well with osteoporosis. In the words of Larry Funnell, Chair, Canadian Osteoporosis Patient Network (COPN), the video is "an excellent resource for all who are affected by osteoporosis. I wish this was there for me and my family when I was first diagnosed."

To see select chapters or to purchase the DVD online, please visit the Osteoporosis Canada website: www.osteoporosis.ca.



Osteoporosis Canada

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about Osteoporosis Canada

Osteoporosis Canada is a national, not-for-profit organization dedicated to educating, empowering and supporting individuals and communities in the risk reduction and treatment of osteoporosis. The organization, guided by its Scientific Advisory Council (SAC) made up of osteoporosis experts from across the country, works with healthcare professionals to make the latest prevention, diagnostic and treatment options available to Canadians.

www.osteoporosis.ca

CLINICAL OSTEOPOROSIS 2010: AN ISCD–NOF SYMPOSIUM

March 10-13, 2010
Grand Hyatt San Antonio
San Antonio, Texas

The International Society for Clinical Densitometry (ISCD) and the National Osteoporosis Foundation (NOF) combine efforts in one premier meeting, offering clinicians and technologists a cutting-edge and comprehensive program on the prevention, diagnosis and treatment of osteoporosis.

For more information, please visit www.clinicalosteoporosis.org/2010.

IOF–ECCEO 10 WORLD CONGRESS ON OSTEOPOROSIS

May 5-8, 2010
Florence, Italy

Jointly organized by the International Osteoporosis Foundation and the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO), under the auspices of the Group for the Respect of Ethics and Excellence in Science (GREES)

For scientific program and registration details, please visit www.iofwco-ecceo10.org.

ISCD BONE DENSITOMETRY COURSES

The ISCD offers courses for clinicians, technologists, scientists, researchers and healthcare providers.

For information and locations around the world, contact Anabela Gomes:
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