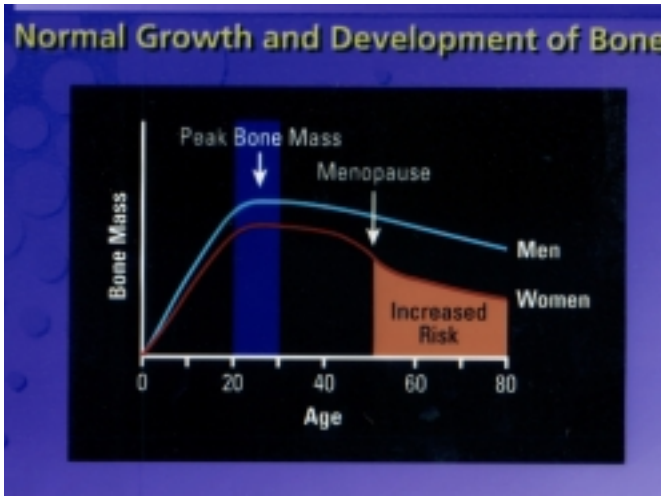
MODULE # 4 PREVENTION & TREATMENT OF OSTEOPOROSIS

While one in four women over the age of 50 has osteoporosis, it only appears to affect one in eight men. The difference is largely due to the important role the sex hormones (primarily estrogen) play in keeping women's bones healthy.

This module is designed to offer an overview of bone changes at menopause, diagnosis and current therapies for osteoporosis. At the end you will find sources for more detailed information plus a summary calcium message that goes beyond bone.

Menopause: In the years around menopause women experience "ovarian failure", when estrogen levels begin to fluctuate and drop (this is actually called *perimenopause).* With falling levels of estrogen the rate of bone resorption increases from the normal 0.5 - 1% a year associated with aging, to 2 – 5 % each year for five to ten years following menopause (see change in slope of line below). It's possible for a woman to lose enough bone that fractures occur with "minimal trauma"; she has osteoporosis.

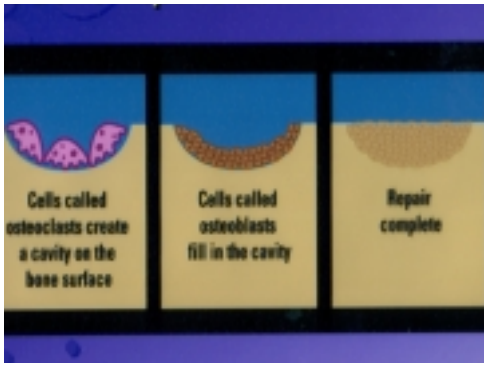


Accrual and loss of bone throughout the life cycle

Despite accelerated bone loss at menopause, not all women develop osteoporosis. A woman entering menopause with high bone mass is less likely to be affected by osteoporosis because she has more bone to begin with (the red line on the above chart indicating her peak bone mass, and slope of bone loss, would be higher). Other factors like diet and activity are important as is genetics - which not only determines peak bone mass, but affects whether one will lose bone quickly or slowly after menopause.

Menopause is not a medical condition and need not be "treated". But many women do choose hormone therapy at this time to alleviate menopausal symptoms – and stop bone loss.

THERAPIES FOR MENOPAUSE & OSTEOPOROSIS



In Module # 1 the process of bone remodeling was described: *osteoclasts* remove old bone and *osteoblasts* build new bone. Up to about age 20 osteoblasts are more active resulting in a net gain of bone. Osteoclast activity becomes greater after the mid 30's, leading to a gradual loss of bone of about 0.5 % a year with age. With osteoporosis, significant bone loss eventually leads to bones that are so thin and brittle that they break easily.

Estrogen and current drugs for osteoporosis treatment are "antiresorptive agents". All interrupt the activity of osteoclasts.

ESTROGEN AT MENOPAUSE

Research has shown that estrogen slows bone loss significantly and prevents fractures associated with osteoporosis. If therapy is started early, it can prevent osteoporosis. In cases where bone density is already low or fractures have already occurred, estrogen can stabalize or even improve bone density

Estrogen Facts & Figures:

- Estrogen or hormone replacement therapy (HRT) is intended to provide the lowest level required to protect bone, not to replicate a woman's premenopausal hormone levels.
- Neither calcium intake or physical activity can offset bone loss associated with menopause; hormone therapy can.
- The protective effect of estrogen lasts only as long as therapy continues.
- If therapy begins early and continues for 6 to 9 years, overall fracture risk decreases by 50 %.
- Side effects like headaches, breast tenderness, depression or menstrual-like bleeding vary with different doses and regimens. Trying different forms or dosages can minimize or eliminate symptoms.

Estrogen in what form?

HRT can be prescribed in a number of ways. Women with a uterus will always be prescribed a combination of estrogen and progestin to eliminate the risk of uterine cancer. There are various ways of combining these 2 hormones that should be discussed with a health care practitioner.

A dose of .625 mg estrogen is required to protect bone. Lower doses (.3 mg) combined with 1500 mg calcium intake may also protect bone, but more research is needed.

HRT can be taken as tablet, worn as a patch or a gel that is rubbed into the forearms, inner thighs or abdomen.

HRT is not recommended for individuals with:

- history of unexplained vaginal bleeding
- active liver disease
- breast cancer
- active vascular thrombosis

HRT Benefits & Risks:

Ongoing research indicates that HRT helps prevent heart disease and may protect against Alzeimer's disease and stroke. Questions remain about HRT and breast cancer risk. The majority of studies show that lifetime risk of developing breast cancer increases from 10 in 100 women to 11 in 100 women when hormones are taken for more than 5 years. Most experts feel hormones are safe in the short term – 5 to ten years, and consider the risk to be minimal even for longer term use.

If there is no reason to stop hormone therapy, the Osteoporosis Society of Canada (OSC) recommends it be continued up to 15 years or longer to gain maximum effect on bone density.

"DESIGNER ESTROGEN" – AN ALTERNATIVE

A new category of drugs called "selective estrogen receptor modulators" (SERM's) are sometimes called designer estrogens. They act just like estrogen in some parts of the body, but block the effects of estrogen in others – thus the term "selective". The drug currently on the market is Raloxifene or *"EVISTA™".*

Research on Evista has demonstrated that it slows the rapid loss of bone associated with osteoporosis, increases bone density at the hip and spine, and led to a 50% reduction in spinal fractures in women with low bone mass. It may also decrease the risk of breast cancer in some women.

Effects of Evista vs HRT:

- Both are effective in preventing and treating osteoporosis
- HRT is usually effective in reducing severity and frequency of hot flashes and other menopausal symptoms – Evista does not alleviate hot flashes and may in fact increase them
- Evista does not cause the bloating, breast tenderness or breakthrough bleeding often experienced as the side effects of HRT
- Both hormone therapy and raloxifene have a positive impact on several risk factors for heart disease

Side effects of Evista:
Leg cramps and worsening of hot flashes are the most commonly reported side effects of Evista. Like HRT, Evista may increase the risk of blood clots in the legs.

Do not take Evista if:
- You can or might become pregnant
- You have liver problems
- You have blood clots requiring doctor's care

Individual therapies should always be discussed with your physician or health care provider.

DIAGNOSIS OF OSTEOPOROSIS

Osteoporosis doesn't develop overnight – assessment of risk (Module # 1) is an important first step in alerting individuals to their chances of developing osteoporosis. Certain risk factors (family history, prolonged use of glucocorticoids, amenorrhea, overactive thyroid and early or surgical menopause) are stronger predictors than others.

Bone Mineral Density (BMD)Test:

A risk factor assessment alone cannot predict whether an individual's bones will become porous and fragile. Many people who develop osteoporosis have few risk factors – that's why testing is so important.

A BMD test is safe, painless and accurately measures the density (strength) of bones. The most common bone density test is called *dual energy x-ray absorptiometry* (DEXA). The test involves lying on a table for a few minutes while a small detector scans the hip and/or lower spine (see below).

A BMD test in progress

A bone densitometer uses a detector to measure the transmission of a small amount of x-rays through bone. The amount passing through bone is measured and provides the radiologist with a picture indicating bone density. The test involves very little exposure to x-rays …about the same amount as flying between Toronto and Vancouver.

In BMD testing a score describes bone density compared to what is considered "normal" peak bone mass; and helps identify bone loss that exceeds what is expected for a given age. The results are classified according to how far the score deviates from normal. Results are expressed as follows in units called "standard deviations" (SD):

- A score not more than –1 SD below normal is considered normal
- A score between –1 and –2.5 SD below normal indicates low bone mass (called osteopenia)
- A score that is more than - 2.5 SD below normal indicates osteoporosis

Like other diagnostic tests, you must have a physician's referral for BMD testing. There are 2 testing site in Manitoba – Brandon and Winnipeg. Physicians must complete a test requisition that takes into account various factors related to increased fracture risk.

CURRENT THERAPIES FOR OSTEOPOROSIS

Bisphosphonates:

Bisphosphonates are a family of non-hormonal drugs used to treat and prevent osteoporosis. There are 3 products currently approved in Canada: Fosamax™, Didrocal™ and Actonel™. All require a prescription.

Bisphosphonates bind permanently to the surfaces of the bone and slow down the osteoclast (bone eroding cells) activity. This allow the osteoblasts (bone building cells) to work more effectively. The result is usually a slowing or halting of bone loss, or an increase in bone mass, accompanied by a reduction in the risk of fractures. It takes time to see the effects of these medications. Bone density testing is usually done every 2 to 3 years in order to detect measurable improvement.

Bisphosphonates target bone specifically and do not provide any relief of menopausal symptoms or protect against heart disease. They also do not have any serious side effects (most common are nausea, abdominal pain and a small risk of esophagus ulcers if Fosamax™ is taken according to directions).

Bisphosphonates and HRT may be prescribed together for patients who are not responding to either treatment.

Bisphosphonates are the only medication proven effective for treating osteoporosis in men.

Miacalcin™:

Miacalcin™ is a nasal spray anti-resorptive (decreases osteoclast activity). It also helps relieve bone pain in the first few weeks associated with healing of vertebral fractures. It can cause nasal irritation and is often used only for the first 8 weeks following a fracture; patients then take one of the tablets described above.

Estrogen/HRT and Evista™ are also appropriate treatments for osteoporosis.

Other medications that increase the activity of the osteoblasts to encourage increased bone formation are currently in clinical trial research.

As recently as 20 years ago osteoporosis was thought to be an inevitable part of aging. Even with the understanding that osteoporosis was preventable, it has only been n the past decade or so that treatments have been widely available and research ensures there will be more effective medications to come. A with any other chronic disease, prevention is always better than a cure. While medications may decrease the risk of future fractures, they cannot straighten a curved spine or replace height lost to compression fractures.

CALCIUM COUNTS! Continuing Education EVALUATION

The following quiz includes points from each of the 4 modules …review to find the information you need. Complete & submit for continuing education credits.

1. Cells that build new bone are called _____. Cells that "resorb" old bone are called _____. Which are more active up to 20 years of age?

2. How much of our lifetime bone mass is built and consolidated during adolescence?

3. What is osteoporosis?

4. What did **you** identify as personal risk of developing osteoporosis? What do you plan to do to change your risk?

5. How do different types of activity affect bone?

6. Are you active enough to benefit your bones? If not, what are you planning to do?

7. In addition to keeping us upright, what purpose do bones serve?

8. How much calcium and vitamin D do **you** need each day?

9. What is the best way to meet daily calcium needs?

10. Do you consume enough calcium containing foods and vitamin D to meet your needs? If not what are you planning?

11. What is lactose intolerance? Does it mean eliminating milk product?

12. Why do more women than men experience osteoporosis?

13. How do estrogen and osteoporosis medications benefit bone?

14. What would a BMD score of –1.5 SD below normal mean?
    What might the individual and her physician decide to do as a result of this score?

SUMMARY of KEY POINTS
Calcium Counts!
Calcium (and other important nutrients), activity and osteoporosis prevention

Bone loss is a normal part of aging for both men and women – osteoporosis is not!

Genetics is the most important predictor of how much bone the body is able to build, how much bone will be lost with age and the rate of bone loss.

Consuming calcium rich foods and being active for a lifetime:
- maximizes the body's ability to build bone in childhood
- helps maintain bone mass during adult years
- helps prevent fractures and falls in senior years

Estrogen loss at menopause increases bone loss for a number of years increasing the risk of osteoporosis for women relative to men

Hormone replacement (or Evista) can eliminate the bone loss associated with menopause during the course of therapy

Bone mineral density testing is the only accurate method of measuring bone density and identifying individuals with or at risk of osteoporosis

Current therapies can slow or stop osteoporotic bone loss and significantly reduce associated fractures.

FOR MORE INFORMATION ABOUT BONE HEALTH:

Manitoba Chapter, Osteoporosis Society of Canada	772 3498
Osteoporosis Society of Canada	www.osteoporosis.ca
Mature Women's Program/menopause clinic	975 7720

VOLUNTEER OPPORTUNITY !!

The Osteoporosis Society needs you! The Manitoba Chapter relies almost completely on volunteers for it's organizational and educational activities. If you would like to become involved in public speaking with our education programs, staffing displays at health fairs or helping in the office (on Provencher) please call JANET @ 772-3498, or contact the office at: osteoman@mts.net . We do a comprehensive 5 week volunteer training program twice a year.

Check the next page for some exciting new research about

calcium, milk and good health!

CALCIUM COUNTS - and MILK MATTERS!

FOR MORE THAN HEALTHY BONES

Drink your milk! Children hear from mothers for years …recent research indicates that adults gain more than strong bones with adequate intake of milk.

Weight loss: Research by scientists Dr. M. Zemel and Dr R. Heaney indicates that drinking enough milk helps both with weight loss and prevention of fat storage. Wit sufficient calcium in the system, the body releases a hormone that affects fat cells and increases the body's ability to break fat down. Dietary calcium also helps the body decide if calories will be stored as fat or burned. Calcium from supplements is not as effective as dairy calcium.

Reduced risk of breast cancer: A recent study of nearly 50,000 Norwegian women High milk showed that those who drank at least 3 glasses of milk a day had half the rate of breast cancer of those who didn't drink milk. A researcher with the National Cancer Institute (US) says "experimentally there is evidence that dairy foods have anti cancer properties …the only question is what component is most helpful".

Lower blood pressure: Calcium-rich lower fat dairy foods (3 servings a day) combined with a diet high in fruits and vegetables can lower hypertension as much as some blood pressure medications. This is the DASH DIET (Dietary Approach to Stop Hypertension).
Order information about the DASH DIET at: nutritioninfo@milk.mb.ca

Reduced colon cancer risk: Adequate calcium intake appears to reduce the risk of colon tumors both forming and recurring.

PMS Relief: Studies have determined thatr consuming 1200 mg calcium a day can curb premenstrual symptoms like food cravings, mood swings and bloating.