Bone health and HIV

As people living with HIV continue to age, a growing list of conditions has become a concern for those who try to manage their overall health. One of these is bone loss, which occurs more often in HIV-positive people. Research has not found the exact cause or causes for this higher rate.

The research and health service communities are trying to find answers to bone loss in people with HIV. We already know a good deal about it, much because of research done in postmenopausal women. Things can be done to improve bone health, and many of those are under the control of the patient.

Bone loss is a natural process that happens as you age. Older adults are more prone to bone problems because of aging and other factors like poor nutrition, lack of activity, lower levels of sex hormones, and taking medications.

The loss of bone mineral density, or BMD, can occur anywhere in your body. However, weight-bearing joints and bones are more prone than others including your hip, knee, ankle, shoulder, spine and wrist.

What is bone?

Bone is living tissue and is in constant change during your life. It’s made of several materials, mainly collagen and minerals. Collagen makes your bones flexible. Minerals, like calcium and phosphorus, help make it strong. Vitamin D is also important, as it helps the body absorb calcium and slows the kidneys from removing it.

To keep bones healthy, your body removes old bone (bone resorption) as it adds new bone (bone formation). The peak bone mass usually occurs around age 30. After that, bone density naturally declines over time. Ageing usually removes more bone tissue than it replaces — making it less dense, weaker and more prone to injury.

Who is at risk for bone loss?

Simply put, everyone, but the factors below can contribute to it.

- AGE—the older you are, the higher the risk.
- SEX—women face bone loss more often than men, though older men are at higher risk.
- RACE—Caucasians and Asians are more likely to face bone loss.
- LIFESTYLE—several things contribute to bone loss: smoking, alcohol, excess caffeine, and inactivity.
- DIET—not eating the right type or amount of foods that have calcium or vitamin D raises your risk.
- BODY SIZE—in general, the smaller your bones and the thinner you are, the more at risk you are.
- MENOPAUSE—this is a risk factor for all women, including those whose periods stop before menopause.
- HORMONES—bone loss can be due to low levels of testosterone, common in men with HIV.
- MEDICINES—certain drugs have been shown to increase bone loss, especially some that treat chronic health conditions and HIV.
- HIV—HIV’s activity in the body appears to increase bone loss.
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What is osteopenia?
Osteopenia is a loss of bone density, and over 18 million Americans have it. Having osteopenia doesn't mean you'll develop osteoporosis. In fact, most people do not.

While a diagnosis of osteopenia may be upsetting, it's perhaps a small wakeup call to do something about it. It likely can be stopped and even reversed. First, osteopenia may be due to having a natural lower bone density. Second, there are ways to improve your bone health, as outlined on page 4.

Generally osteopenia has no symptoms. The only way to know you have this condition is by getting a bone density test done. Although this bone loss is generally less severe, it still means the bone has weakened and may be prone to fractures.

What is osteoporosis?
Osteoporosis is a loss of bone mass and is the most common bone disease. Over 10 million Americans live with it, and 3 out of 4 of them are women. It causes over a million bone fractures each year, most in the spine and hip. Primary osteoporosis is the natural loss of bone, especially in women after menopause. Secondary osteoporosis occurs from taking medicines or having a chronic condition. This may be more of an issue for people with HIV because of chronic illness, weight loss, lengthy bed rest, etc.

Osteoporosis is a more serious condition, and people who have it are more prone to bone fractures and breaks. In this condition, holes (lacunas) develop in the bone further weakening its structure.

Osteoporosis is a condition that many older adults know. So its diagnosis at an earlier age, especially for those with HIV, can feel especially upsetting. You can help prevent it through better nutrition and staying active, as outlined on page 4.

Many men don't think they're at risk for osteoporosis, or osteopenia. In general, men have larger frames and their bodies start losing bone later in life and at a slower rate. However, they're still at risk, especially men with low levels of testosterone. Many men with HIV have low testosterone and may want to talk to their doctors about their bone health.

Symptoms of osteoporosis may not appear before a fracture happens. If they do, they may include joint pain and tenderness, backache, feeling of weakness and loss of height. After a fracture, the pain may be much more severe. The only way to know you have this condition is to get tested for it. Dental x-rays sometimes show bone loss, which may mean osteoporosis in other body parts.

What is osteonecrosis?
Osteonecrosis is the death of bone tissue. Bone can die if its blood supply is cut off. This is called avascular necrosis, a condition that has been seen in the hips of people with HIV. It may occur in any bone though it most often occurs at the ends of a long bone.

Symptoms of osteonecrosis may include pain—sometimes severe—in the affected area, especially in joints like the hip, wrist or spine. This may be constant or may occur only when you bear down on the bone or joint. Other signs are stiff joints, soreness, less range of motion, muscle spasms, a feeling of weakness, arthritis, and bone damage and collapse.

The goals for treating the condition are to stop any more damage and to improve the person’s ability to move. A person with less severe osteonecrosis may be given pain killers or medicines to improve bone density as well as support tools like a cane or crutches. In more severe cases, a person may need surgery, which could include reshaping, grafting or replacing the bone or joint.
How is bone loss diagnosed?

Several bone density tests are available. Most are painless and vary in cost and length of time to take. However, there are few standards of care for using them in people with HIV.

**MRI**
The MRI (magnetic resonance imaging) scan uses magnets and radio waves to create detailed pictures of the bone. It’s painless and can last up to 45 minutes.

**DEXA SCAN**
The DEXA (dual energy x-ray absorptiometry) scan is a kind of x-ray and is the most common and accurate way to measure BMD. It can detect as little as 2% of bone loss per year. It’s painless and takes 10–15 minutes.

**CT SCAN**
The CT (computer tomography), or CAT, scan uses x-rays and a computer to make images of the bone. It can detect osteopenia, osteoporosis and osteonecrosis. It’s painless, gives more detail than an x-ray, and can last from 5–30 minutes.

**X-RAY**
A standard x-ray is used mostly to detect osteonecrosis, showing the amount of bone damage. It’s painless and quick to take, though it uses radiation.

**Bone biopsy**
A biopsy is usually done to detect osteonecrosis. A sample of bone is removed during surgery or with a needle and local anesthesia. This invasive test takes time, causes discomfort, and may need recovery time.

**Bone density test results**
Your test result is written as a T-score and Z-score. The T-score compares women and men to a “normal” healthy person of their own sex. A normal T-score is a number above -1.0. A score for osteopenia will be between -1.0 and -2.5, while osteoporosis is less than -2.5. The Z-score compares your BMD to someone of your own age, sex, weight and ethnic origin.

Preventing bone loss
Almost 80% of your bone density is determined by heredity. The other 20% can be affected by changes in lifestyle. Currently, the ways to prevent bone loss in people with HIV are the same for postmenopausal women.

**Lifestyle**
Keeping a normal body mass is one important way to prevent bone loss. Smoking and drinking alcohol also contribute to bone loss, as well as excessive caffeine use. So reducing tobacco, caffeine and alcohol will help keep your bones healthy.

Bone loss can also occur from injuries to the bone, like a fracture or break. Adults may need to safeguard their lives as they get older.
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DIET
In general, Americans do not get enough calcium or vitamin D. This also applies to people with HIV of all ages. Most adults should get between 1,000–1,200mg of calcium a day. Pregnant and postmenopausal women should get 1,500mg. Daily amounts should not exceed 2,000mg. You can get calcium from eating milk products, tofu, and vegetables and leafy greens like broccoli and spinach. Some foods are enriched with added calcium, like orange juice.

The daily amount of vitamin D for most adults is 200 IU. For men and women 50 and above, the amount should increase to 400–600 IU a day. People with osteoporosis may need up to 800 IU daily.

Vitamin D is found in eggs, liver, some fish oils, and fish like salmon and swordfish. What also helps is getting more than 30 minutes of sunlight each day, as your body makes it from the contact of sun to your skin. This may be harder for people with less physical activity or during winter months.

Phosphorus is another mineral important to maintain bone health. It’s found in milk products, peanuts and beans, though most people do not need to take extra amounts of it.

EXERCISE
Being active day to day and exercising helps make bones denser and stronger. Weight-bearing activities force your body to work against gravity. These include power walking, jogging, climbing stairs, dancing or running, where your legs and feet support your body’s weight. Resistance exercises include stretching and lifting weights to help strengthen your muscles and bones.

SUPPLEMENTS
Supplements can help support your body’s ability to stop and reverse bone loss. Many drugstores and health food stores sell calcium tablets, and some come packaged with vitamin D. Talk with your doctor about all supplements you take or want to take to ensure you’re getting the right daily amount. High levels of calcium and vitamin D can cause problems of their own. Many multivitamins already contain calcium and vitamin D.

PRESCRIPTIONS
Certain prescription drugs can increase bone loss, especially when used over time or at high doses. Avoiding or switching from these medicines can help. Talk to your health provider or pharmacist about which increase bone loss and discuss your options.

Medicines used for hormone therapy
In postmenopausal women, short-term hormone therapy is used to prevent bone loss and fractures and improves bone density. Many brands come as a pill or skin patch.

Estrogen therapy is usually given with progesterone, which lowers the risk of uterine cancer. Its long-term use can increase the risk for heart attack, blood clots, stroke and breast cancer. Therefore, weigh the pros and cons of hormone therapy with your doctor when considering hormone therapy.

Another type of estrogen is called SERM (selective estrogen receptor modulator). Evista (raloxifene) prevents and treats postmenopausal osteoporosis, improving density at the spine and neck. It’s less likely to cause cancer of the uterus. Side effects can include hot flashes, leg cramps, blood clots, vaginal dryness, swelling, pain or tenderness, muscle and joint aches, and weight gain.

As for men, taking testosterone will help prevent or treat bone loss, especially in the spine. It’s not used in women. One small study in men with HIV showed that the density of the spine had significantly improved.

Several brands come as an injection (taken every 2–3 weeks), gel (rubbed on skin daily) or skin patch. Many men report feeling better and having more energy, though it should not be
Medicines used to form bone tissue
Parathyroid hormone helps your body store a healthy amount of calcium and phosphorus in your bones. A rather new form of this, Forteo (teriparatide), improves bone density in men and women. Given by injection once a day, it’s currently only used for 24 months, and costs more than other bone loss therapy.

It’s used for treating postmenopausal osteoporosis, and for primary osteoporosis and secondary osteoporosis caused by low testosterone in men. No studies have been done in people with HIV. The most common side effects include headache, nausea, vomiting, leg cramps and dizziness.

Access to medicines
The medicines used to treat bone loss are available by prescription through a health provider. People who lack coverage for meds may get them through the manufacturers’ Patient Assistance Programs. Check www.rxassist.org, though you must sign in for the service. Another online resource is www.pparx.org.

Research on bone loss
Much of what we know about bone loss has come from the research done in postmenopausal women and older men. Although this helps, it doesn’t answer the unique issues that people with HIV face, especially as they begin to confront bone loss earlier. The results so far have tended to contradict one another.

People with HIV face more bone loss than HIV-negative people of the same sex and age. Why this happens is not clear. HIV activates the immune system, which in turn may affect bone health. Since it infects different cells in the body, it may also affect bone marrow cells which may then affect bone health. HIV can also increase the level of proteins which may add to the loss of bone tissue.

Another belief is that HIV drugs help cause bone loss, specifically protease inhibitors. A couple of studies have reported this, but others have not. Protease inhibitors also tend to deplete the body of vitamin D. Recent research showed that Viread (tenofovir) contributed to some bone loss, but it’s not confirmed by other studies. Some data point to NRTIs in general. Yet another study compared two different HIV class regimens and found that neither affected bone loss.

These studies stress the need for more research on finding the underlying reasons for bone loss and other bone disorders in people with HIV. This will help people with HIV and their doctors get ahead of this issue before serious bone damage occurs.
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Treating bone loss

Pain killers
Your doctor may prescribe pain killers to help control any discomfort you have though they won’t correct actual bone loss.

Medicines used for resorption problems
A few medicines called bisphosphonates lower the rate of bone loss. Little is known about how they affect people with HIV. Side effects can include difficulty swallowing, inflammation of the esophagus, and gastric ulcer.

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<th>DRUG</th>
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<tr>
<td>Actonel (risdro-nate)</td>
<td>5mg once a day or 35mg once a week, taken on empty stomach and remain upright for 30 minutes.</td>
<td>Prevent and treat postmenopausal osteoporosis and osteoporosis in women and men due to using corticosteroids. Lowers the rate of spine, hip and other fractures.</td>
<td>No studies have been done in people living with HIV.</td>
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<td>Boniva (ibadronate)</td>
<td>150mg once a month on the same day of the month, taken on empty stomach and remain upright for 30 minutes. An injection is also available, given once every 3 months.</td>
<td>Prevent and treat postmenopausal osteoporosis. Lowers the rate of spine fractures.</td>
<td>No studies have been done in people living with HIV.</td>
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<td>Fosamax (aledronate)</td>
<td>Prevention: 5mg once a day or 35mg once a week; treatment: 10mg once a day or 70mg once a week, taken on empty stomach and remain upright for 30 minutes.</td>
<td>Prevent and treat postmenopausal osteoporosis; treat osteoporosis in men; treat osteoporosis in women and men due to using corticosteroids. Lowers the rate of spine, hip and other fractures.</td>
<td>Only one study has been done in people with HIV. The results showed, over a one-year period, that the BMD of the spine had significantly improved while other body parts stayed about the same.</td>
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<tr>
<td>Prolia (demosum-ab)</td>
<td>Prevention: injected dose given twice a year.</td>
<td>Prevent and treat postmenopausal osteoporosis; treat and prevent bone loss in hormone-treated prostate and breast cancer patients. Lowers the rate of spine, hip and other fractures.</td>
<td>No studies have been done in people living with HIV.</td>
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