



HIV and your bones - Osteopenia and Osteoporosis

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Background information

For reasons not yet fully understood, higher rates of bone disease are starting to be seen in people living with HIV. These bone diseases include osteopenia and osteoporosis. These are usually seen in the general community as people age but are being recognised amongst people living with HIV at earlier ages than expected.

Like most medications, HIV treatments have side effects. Some of these are still being discovered as people live longer on treatments. HIV medications are believed to be linked to bone disease. Some theories suggest that certain antiretroviral medications may play a role, including the nucleoside reverse transcriptase inhibitor tenofovir and some protease inhibitors. Other theories suggest that the HIV virus itself causes an inflammatory reaction by the release of chemicals known as cytokines that stimulate the bone to breakdown. Risk factors for osteoporosis are more common in HIV patients as well (smoking, alcohol intake, reduced physical activity levels). There may also be additional risk factors that people have which causes these bone diseases which have not yet been identified. Again, as it is a newly occurring health issue, not all is known at this point in time and research is underway to attempt to identify the causes.

Your Bones

If they were cut in half, the bones in your body would look like honey-comb. They are made up of minerals and collagen which give each bone their shape, strength and movement. Bone is continually being broken down and reformed by the body. The average adult replaces 15% of the overall bone in their body each year. As people get older more bone breaks down than is replaced or reforms, which leads to people having bones which are more brittle and results in them fracturing more easily.

Assessing Bone Strength

The strength of bones is measured on the scale of Bone Mineral Density (BMD) via an x-ray type machine called a DEXA scan (Dual energy x-ray absorptiometry). The value from the DEXA scan is compared to that of a healthy individual of the same gender. This can give an indication of the risk of having a bone fracture.



Bone Diseases

Osteopenia

Osteopenia is diagnosed when the bone mineral density is lower than average. This is not considered 'severe' but is a risk factor for developing a more serious bone disease called osteoporosis. The difference between the two conditions is the measure of bone density. Osteoporotic bones have a lower density, therefore are weaker.

Osteoporosis

Osteoporosis is a loss of bone mass resulting from a deficiency in bone minerals. It can lead to a loss in height, humpback and severe pain.

Who is at risk?

Not everyone will develop bone disease. However there are certain risk factors that can increase the likelihood that a person will have moderate to severe loss of bone mass, including the following:

- Race - Asian and Caucasian women, especially those who are small-boned, are at highest risk
- Family history - patients with a family history of low bone mass have a 50%-85% higher risk of developing osteoporosis
- Age - most people (men and women) lose about 0.5% of bone mass every year after the age of 50
- Lifestyle choices - poor diet with a lack of calcium and vitamin D, smoking, excessive use of alcohol or caffeine, and lack of exercise contribute to a loss of bone mass
- Long-term use of medications such as corticosteroids, used for rheumatoid arthritis and asthma, and glucocorticoids (steroid-based anti-inflammatory and immunosuppressive agents, eg prednisolone and hydrocortisone)
- History of HIV related illnesses

Some conditions place people at a higher risk of osteoporosis. These conditions include:

- Thyroid disease or an overactive thyroid gland
- Rheumatoid arthritis
- Chronic liver and kidney disease
- Conditions that affect the body's ability to absorb nutrients, such as Crohn's disease, coeliac disease and other inflammatory bowel conditions

Possible risk factors for people living with HIV

As mentioned earlier, the specific reasons why there are increasing rates of osteopenia and osteoporosis amongst people living with HIV are still unclear. There have been studies that link decreased bone mineral density with certain HIV medication drug classes such as protease inhibitors (PIs) and nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs). However other studies have not found this.



Researchers are investigating the role of HIV medication and the HIV virus itself. Other causes in the general population that may be seen earlier in people living with HIV are also being looked at such as vitamin deficiency, low sex hormone levels, decreased physical activity, malnutrition and lipodystrophy. Researchers seem to agree on one thing; the risk of bone disease increases with the length of time someone has been infected with HIV.

What can I do to prevent bone disease?

Tips and recommendations

Osteopenia and osteoporosis seen in people living with HIV are managed similarly to that seen in older, non-positive populations. These are based on scientific studies and include;

- maintaining ideal body weight
- minimising consumption of coffee
- minimising alcohol intake
- stopping smoking
- hormone replacement therapy
- regular weight bearing exercise

Diet and sun

Some other recommendations involve dietary and medication changes. Sun exposure and a balanced diet allow the body to be exposed to calcium and vitamin D, which are key minerals in bone. Calcium is vitally important in sustaining bone mass whilst vitamin D helps to maintain normal blood levels of calcium in the body. Recommendations suggest that 15 minutes of sun exposure three times a week will ensure adequate intake of vitamin D. Dietary sources of vitamin D include; fish-liver oils, egg yolks and milk. Once again, all dietary changes, no matter how small they seem, should first be discussed with your doctor or dietician as some changes can interact negatively with HIV medications.

Weight bearing exercise

The importance of weight bearing exercise for maintaining healthy bones has long been documented. Weight bearing exercise puts healthy stress through bones, stimulating bone formation, which increases bone strength and reduces the risk of fracture. Weight bearing exercise involves movements that exert the body against gravity such as running, walking, jumping, and lifting weights. Improving bone mineral density reduces the risk of sustaining bone injuries or developing bone disease. Numerous studies have shown that weight bearing exercises can either reduce the rate of natural breakdown of bones or lead to an increase in bone formation. As a primary prevention strategy, physical activity, especially strength training, has the best effect on BMD by preventing bone breakdown. Benefits appear to be load and site specific, so exercises that load the highest risk areas provide the best protection against fracture. For example, walking, aerobics and resistance work benefit the spine and hips.



General exercise

Regular exercise involving cardiovascular training, strengthening and balance work all help to reduce the risk of falls. People with osteopenia are about 2 times more likely to have a fracture compared to healthy adults while those with osteoporosis are about 5 times more likely. Bones most commonly fractured during a fall are the wrist, hip, spine and ankle. Although these fractures can be effectively managed, they often require hospitalisation, which can reduce independence.

Getting started exercising

Commencing exercise for the first time or renewing your current program should always be done in consultation with your HIV specialist and with specific advice from your physiotherapist. The Alfred Hospital offers HIV specialised physiotherapy services and exercise classes.

Medication

Consulting with your doctor about the possibility of changing your ARV regimen is also a possibility. This may not always be possible.

Medication can be used in those at particular risk of developing osteoporosis. Bisphosphonates are a class of drugs that can be used to treat osteoporosis. More recently, the drug Alendronate, has shown promise as an adjunct to Vitamin D and calcium supplements in reducing bone resorption in HIV associated osteopenia/osteoporosis when compared to just Vitamin D and calcium supplementation alone.

Who to talk to

Speak to your HIV specialist. Specialist dieticians can also help regarding diet and The Alfred's HIV physiotherapists can assist in developing specific exercise programs.

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