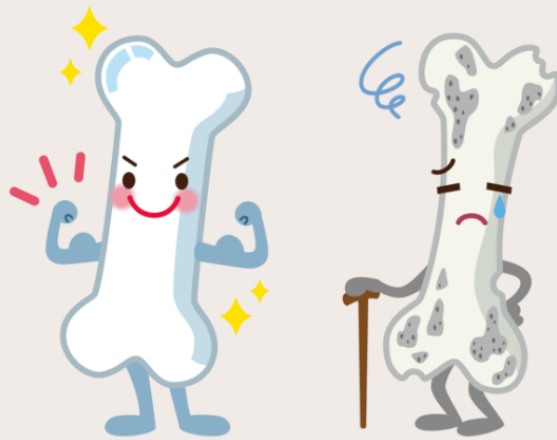


# Overview on Eating and Training for



## Building Strong Bones

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## The Overview

Bone is living tissue that is constantly being broken down and replaced. Osteoporosis occurs when the creation of new bone doesn't keep up with the loss of old bone, causing bones to become weak and brittle - so brittle that a fall or even mild stresses such as bending over or coughing can cause a break.

## The Stats

- The most common fractures associated with osteoporosis are in the hip, spine, wrist, and shoulder.
- At least 1 IN 3 WOMEN and 1 IN 5 MEN will suffer from an osteoporotic fracture during their lifetime
- OVER 80% OF ALL FRACTURES in people 50+ are caused by osteoporosis
- Women and men alike BEGIN TO LOSE BONE IN THEIR MID-30S
- 22% OF WOMEN and 33% OF MEN who suffer a hip fracture will die within one year
- ONE IN THREE HIP FRACTURE PATIENTS will re-fracture within one year
- Fractures from osteoporosis are more common than heart attack, stroke and breast cancer combined.

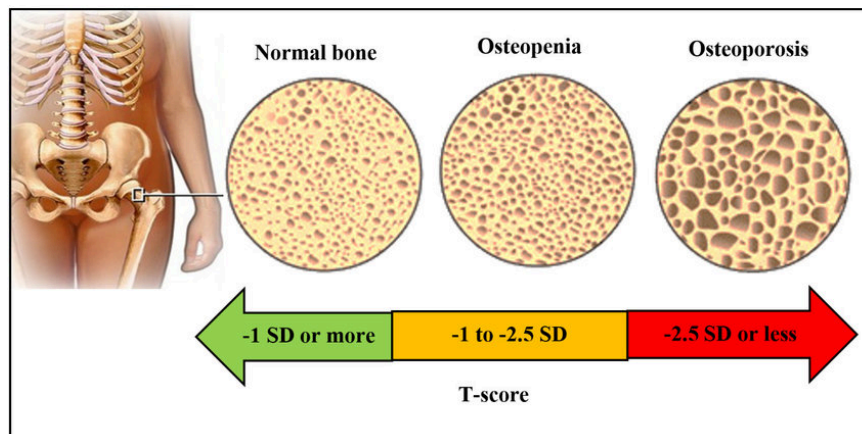
## Test for Bone Density

The tests are known as Bone Mineral Density (BMD) tests and the technology that they use is known as bone densitometry. The most common bone density test in use today is called dual energy x-ray absorptiometry (DXA), or a DEXA scan.

The result is what is called T-score, which represents **the difference between measured BMD and the peak bone mass of a healthy young adult**, typically defined as someone around 30 years old.

The T-score is expressed as a standard deviation. A score of 0 indicates density identical to the average healthy young adult. A negative T-score signifies lower bone density than this peak reference; the further the number is below zero, the lower the density.

A T-score of -1.0 or higher is considered within the normal range for bone density. When the T-score falls between -1.0 and -2.5, the condition is classified as osteopenia, representing low bone mass. A diagnosis of severe osteoporosis is made if the T-score is -2.5 or lower.



## Who Should Get A Bone Mineral Density Test?

- All women and men 70 years or older
- Postmenopausal women and men 65-69 with 1 risk factor for fracture
- Postmenopausal women and men age 50-64 with previous low trauma fracture or 2 or more risk factors
- Younger men or women (under 50) with a disease or condition associated with low bone mass or bone loss:
  - Fragility fractures
  - High-risk medication use (steroid use, aromatase inhibitors, androgen deprivation therapy)
  - Rheumatoid arthritis
  - Other chronic inflammatory conditions
  - Cushing's disease
  - Malabsorption syndrome
  - Uncontrolled hyperthyroidism
  - Primary hyperparathyroidism
  - Hypogonadism; Early menopause (< 45)
  - Other disorders associated with rapid bone loss/fractures
- BMD testing is not usually recommended in younger men or women (under age 50) unless there is a medical condition predisposing them to osteoporosis or when there are unexplained fragility fractures.

## Risk factors for fracture including:

- Fragility fracture after age 40
- Glucocorticoids (3 months or more in the last year, prednisone dose >5 mg per day)
- Falls, ≥ 2 falls in the last year
- Parent fractured hip
- Body mass index < 20 kg/m<sup>2</sup>
- Current smoking
- alcohol ≥ 3 drinks per day
- Conditions that contribute to bone loss: e.g. rheumatoid arthritis, medications

## Maintaining and Improving Bone Density

There are a number of routes one might take when trying to either improve bone density, prevent the progression of bone loss or to maintain bone density. Often a combination of modalities is best. These include taking medications that slow down the breakdown of bone, eating certain foods or supplementing with vitamins and minerals to provide the raw materials for and encourage the body to lay down new bone, and/or doing exercises that encourage the body to lay down new bones.

## Medications to Improve Bone Density

### Bisphosphonates

Bisphosphonates are the most common family of drugs used to treat osteoporosis. They are part of the group of osteoporosis medications known as anti-resorptives. There are three bisphosphonates currently approved for use in Canada: alendronate (Fosamax®), risedronate (Actonel®) and zoledronic acid (Aclasta®). Also available are: Actonel DR™ (DR = delayed release), Fosavance® (alendronate with vitamin D) and several generic versions.

The most common side effects are stomach problems and sometimes muscle pain.

### Denosumab

Denosumab is a type of osteoporosis treatment called a human monoclonal antibody that inhibits the development and activation of osteoclasts (the cells that eat away bone).

Prolia - given by injection once every six months. Side effects include back pain, skin issues and urinary issues.

## Nutrition & Supplements for Better Bones

It's probably no surprise if I tell you that calcium is an important nutrient when it comes to building better bones, but did you know that protein is just as important? In fact, the benefit is two fold. Dietary protein intake plays an absolutely critical role in contributing to a higher bone mineral density, but it also makes us less vulnerable to muscle weakness, sarcopenia and frailty, all contributing to increased risk of falling.

In other words, it helps make our bones strong AND it helps make our muscles strong so we don't fall and risk breaking a bone in the first place.

And in case you aren't able to get enough in your food, the three supplements that have the most evidence as being important for bone density are:

- calcium (citrate form if possible, no more than 500 mg at a time),
- vitamin D3 (600 to 800 IU minimum, more if you're deficient) and
- vitamin K2

## Too Fit to Fracture - Exercise for Better Bones

There is something called Wolffs Law, and it states that healthy bone adapts to the load placed upon it. If loading increases, bone remodels to become thicker and stronger; if load decreases, bone becomes less dense and weaker.

In essence, use your bones or lose your bones.

What's important to note here is that muscles attach to bones in order to create movement, and so how we use our bones is by using our muscles. And the more we use our muscles, the stronger our bones will be..but this

only applies to the bones that are attached to the muscle being used. For example, if I do a squat, my thigh bones might get stronger, but my spine and arm bones will not see any benefit.

This is the foundation of the findings of a landmark study, called the LIFTMOR study. It stands for Lifting Intervention for Training Muscle & Osteoporosis Rehab program. This study lasted 8 months and in that time the women were able to bring their bone density up by almost 3%!

How did they do it? In a nutshell...they lifted heavy things and they did jumping movements with impact loading.

## Resistance Training for Better Bones

For the lifts they did deadlifts, squats and overhead presses. And all of them were done at what is called 85% of your one rep max, or 1 RM. Which simply means the weight is so heavy they could only lift it up to 5 times, while still maintaining good form, but the key was that those 5 reps have to be hard.

It's important to note, a lot of time was spent perfecting their form to ensure they didn't get hurt. Point being...if you want to try this and are not an experienced weight lifter, please, please, please get some professional guidance. Especially if you already have low bone density, or an existing compression fracture, poor form or too much weight and you risk getting very hurt, or making things worse.

### Deadlifts: The Foundation of Our Bone Health Programs

If we could choose only one exercise for bone density, it would be [the deadlift](#). This movement loads the entire posterior chain—your back, hips, and legs—through a full range of motion. Research shows deadlifts place significant mechanical stress on both the lumbar spine and femoral neck, the two sites where bone density matters most for preventing fractures

And just to repeat the caution above, get professional help if you aren't sure how to do this. Deadlifts are great, but easy to get wrong!

### Squats: Building the Hips and Legs

[Squats](#) complement deadlifts by loading the skeleton through a different movement pattern. Research examining the relationship between exercise and bone density found that squat strength showed a stronger correlation with hip bone mineral density than any other lift tested.

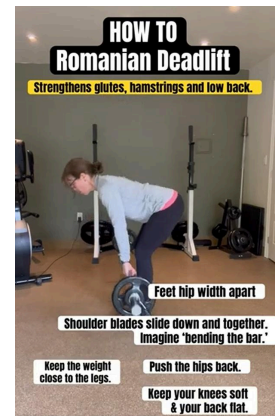
### Jump training for bone density.

Along with resistance training, jumping or impact is another great way to build up your bones. And the more impact, the greater the stimulus to build. Scientists measure impact using ground reaction force (GRF), the amount of force transmitted through your body into the ground. Research suggests that a GRF of around three times your body weight is needed to stimulate new bone formation (Turner & Robling, 2003).

Here's what different activities look like:

- Walking:  $\sim 1.5 \times$  body weight (Cavanagh & LaFortune, 1980)

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- Running: ~2.5 × (Novacheck, 1998)
- Jump rope: typically between walking and running
- [Drop jumps](#) / vertical rebound jumps: ~4.6–5.5 ×

Impact loading mainly benefits the hip and femoral neck, the upper thigh bone where many osteoporotic fractures occur. That makes sense as when you land, much of the force travels directly through the legs and hips.

But those same forces don't transfer as effectively to the lumbar spine. For spinal health, axial loading through lifting or resistance training is more effective (Kemmler & von Stengel, 2013; Guadalupe-Grau et al., 2009). Movements like deadlifts, weighted carries, and overhead presses place direct load through the spine and upper body in a way impact alone cannot.

### When to avoid jump training?

#### Spinal Conditions

- A history of vertebral compression fractures
- Kyphosis (forward head posture or poor spinal alignment)

#### Lower Body Concerns

- Difficulty performing weighted squats with proper form (must be able to squat at least 15 pounds)
- Existing foot problems
- Poor balance or stability issues

#### Pelvic Health Issues

- Pelvic floor prolapse
- Incontinence

### Alternatives to Jump Training

If you can't jump for any reason, then [heel drops](#) or stomping your feet are great alternatives.

### Balance Training

As much as we want to make sure your bones are strong so they can handle the impact of daily life, one of the best ways to not break a bone is to not fall in the first place. That's where balance training comes in.

While balance is influenced by several factors, muscle strength in the quads, glutes and core are by far the most important component. A [side plank](#) being one of the best exercises to help train all of these!

Balance exercises that test not only balance but agility and recovery are important.

- Leaning forward, backward, or side to side
- Unusual walking or dance patterns, such as walking heel-to-toe or sideways, or using an agility ladder
- Reacting to things that upset your balance, like stopping or changing directions
- Stepping down or up on a riser