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Osteoporosis and Bone “Rebuilding”

Bone health is not just for women to be concerned about as men are increasingly diagnosed as well.

Lifetime osteoporotic related risk for fracture if over 50 years old:

50% of women
25% of men

Why is this important? Well, besides the increased risk of fractures and low quality of life, there is the real possibility of death. Yes, death. Meaning, the National Osteoporosis Foundation states that there is a **1 in 4 (25%) chance of dying in the following 12 months after a hip fracture if you are over 50 years old**. The death usually occurs from a hospital acquired pneumonia while undergoing or recovering from the fracture surgery.

Osteoporosis is a result of the interplay between lifestyle factors, nutritional-depletion, immune function and metabolic imbalance. It is said that for about 5 years surrounding menopause, the rate of:

Bone loss is between 2% and 3% per year.
Women lose about 53% of their bone mass by the age of 80 years.

For the “average” American the rate of bone loss is **approximately 1% per year every year after peak bone mass**. What can you do to improve bone health? First off- don’t be average. Average and normal are two different things. It is not normal to lose bone mass at the rate the average American experiences.

Traditional medicine and the outdated old school of thought would have you believe there is not much you can do to prevent the “common 1% average” bone loss per year. Sadly, many physicians and lay people still erroneously believe this bone loss to be inevitable. In part this carries some truth as the average person is dealing with what we term “low grade inflammation” and is not healthy to begin with so bone loss is a common result. Thankfully, there are pioneers in the health care space that have repeatedly shown there are options for slowing down, stopping, preventing and even reversing bone loss by improving this low-grade inflammation.

With the following steps, research suggests you could stop, reverse and potentially

Increase your healthy bone mass by 1 to 5% per year

Step 1: Reduce low-grade inflammation.

Low-grade inflammation is a result of many factors and is a major driver of osteoporosis, chronic disease, pain, diabetes, heart disease, headaches and much more. Think of it like a low grade chemical irritant that eats away at your bones like termites eating wood.

Step 2: Diet

Your provider and health coach can customize an anti-inflammatory diet for you as there is **no one size fits all**. In short, there are foods that can cause inflammation and foods that can reduce inflammation. You want to do both:

Remove inflammatory foods
Increase anti-inflammatory foods

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Diet discussion around acidic vs. alkaline foods is much different than inflammation and the two should not be confused. However, the same foods that typically increase your body's acidity, such as grains, bread, pasta, cereals, seeds, oats, etc. are both acidifying and pro inflammatory. Both an acidic and inflammatory diet can erode bones. Removing acid and inflammatory foods altogether is a good first step. Most importantly, this approach returns the balance of the omega-6/omega-3 essential fatty acid (EFA) ratio to <4:1. It's also a high alkaline diet and maintains a positive potassium/sodium ration >4:1. Both are crucial for proper bone health.

Having both an acidic and inflammatory diet can cause increased and accelerated bone loss.

Further, an anti-inflammatory dietary profile consists of a large proportion of potassium, magnesium and calcium rich plant foods, such as non-starchy vegetables, fruits, berries and herbs. Ideally, these foods should be locally grown and organic whenever possible. High phenolic unfiltered extra virgin olive oil, fish, shellfish, walnuts, green and black tea are also important. Wild game, organic grass-fed meats and free farmed poultry are acceptable.

Step 3: Specific "Bone" Movements (1)

Overview: As the bone rebuild plan emphasizes, effective osteoporosis support is based on optimizing bone density, quality, and micro-architecture. This plan targets the interplay between acid-alkaline balance, osteoblast activity (bone formation), osteoclast activity (bone resorption), osteocalcin activity, calcium absorption, parathyroid function, healthy inflammatory response, hormonal support, EFA balance, and vitamin/mineral nutrition and antioxidant protection. Thus, this plan delivers exceptional bone support not easily previously achieved with other nutrient combinations. The Key Factors below are recommended as the core components that have the most positive effects on bone. The Adjuvant Cofactors provide additional support for further optimizing the effects of the program. Both have been essential to the success of this program.

Optimized Osteoporosis Therapy Protocol:

- **Calcium:** up to 1,000 mg
- **Potassium:** up 400 mg three times per day at or between meals (may be contraindicated with ACE inhibitors or potassium sparing diuretics). (Discuss with provider.)
- **Magnesium:** up to 1,000 mg
- **Vitamin D₃:** 10,000IU daily in winter and 5,000IU daily in summer is good for most people. Blood levels of 60-100ng/ml are typically suggested.
- **Vitamin K:** synergistic combination of K1 500-1,000 mcg and K2 (MK-7) 45-90 mcg per day (contraindicated in warfarin use).
- **Omega 3- fatty acids in TG form:** 2-3g total of EPA/DHA
- **Multi-vitamin & Mineral Complex**

1. Comments:

- **Calcium:** Meeting daily calcium needs is vital, but does not translate to complete osteoporosis support. Calcium targets bone resorption, via effects on parathyroid (PTH) secretion. Calcium citrate, being mildly alkaline and more absorbable, is significantly more effective than calcium carbonate in this respect. The combination with potassium citrate confers an even greater alkali load and can partially offset the effects of an acid forming diet on bone.
- **Potassium:** Potassium supplementation is emerging as an important bone support component. The alkalinizing effect of potassium citrate reduces dietary acidity and urinary calcium loss. In the intestinal tract, it may help facilitate calcium absorption in acidic diets. In bone, alkali stimulates osteoclastic formation and lessens osteoclastic resorption. This supports healthy bone mass and bone quality. Potassium chloride or gluconate do not

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share this same effect. The bone health effects of potassium citrate and calcium citrate may be greater when combined together vs. either alone.

- **Magnesium:** Bone is one of the main magnesium pools in the body. Magnesium provides unique support that helps maintain normal levels of C-reactive protein (CRP) for a healthy inflammatory response. CRP related inflammation has a known inhibitory effect on osteoblast formation and studies suggest it negatively effects osteocalcin formation, bone turnover and bone micro-architecture at levels that also affect cardiovascular health and glucose metabolism. Thus, magnesium's inverse effects on CRP levels may have a central role in the tight interplay between the immune system, inflammation and bone quality.
- **Vitamin D₃:** The vitamin D deficiency epidemic is alarming and prevalent whether people live in a sunny climate or not. Fractures are reduced only when the serum 25(OH)-D concentration is maintained above the threshold for deficiency, 32 ng/mL (80 nmol/L). A minimum amount of 2000 iu per day is recommended. In some patients, even higher amounts in addition to sunlight may be needed to prevent deficiency. The Plan goal is to use enough vitamin D in individualized amounts based on 25 (OH)-D levels along with adequate sunlight to achieve and maintain a serum level of 50-60 ng/mL throughout the year. Vitamin D₃ has a wide margin for safety and toxicity is not a concern when taken below the newly proposed safe upper limit (SUL) of 10,000 iu/day.
- **Strontium:** Strontium supports the formation of new bone that is strong and healthy. It promotes normal osteoblast bone formation and lessens osteoclast bone resorption. Almost universally, I see positive influences on DEXA results following daytime calcium and potassium citrate administration along with nighttime strontium citrate supplementation. In my experience, there is an impressive and rapid improvement in the T-score.
- **Vitamin K:** Vitamin K promotes healthy bone quality, strength, and micro-architecture. Vitamin K₁, besides being a primary coagulation factor in the liver, activates osteocalcin in bone. Vitamin K₂ (as MK-7) primarily targets its activity outside the liver in bone and arteries where it helps maintain normal calcium metabolism. Its virtues are superior absorption and bioavailability, and sustained activity at physiological dosages. The Plan approach is to utilize this vitamin K₁/K₂ synergy along with co-support from vitamin D₃. Like vitamin D, the daily needs for vitamin K are not being met in most adults.
- **Omega-3 EFA's:** Healthy bone maintenance requires Omega-3. Patients with insufficient Omega-3 status or a high omega-6/3 EFA ratio lose more bone mass vs. individuals with a balanced intake. Eating more Omega-3 rich food sources, e.g.: fish, flax, and walnuts are important components of an anti-inflammatory diet. To achieve the optimal ancestral EFA profile, supplements supplying Omega-3 from both land and sea are also recommended.
- **Multivitamin/Mineral Complex:** A high quality supplement to complement an anti-inflammatory lifestyle is preferred. Products containing more than 5,000 I.U. of Vitamin A as retinol may have negative effects on bone density and may want to be avoided.

2. Suggested Screening and Monitoring:

- **Dual-energy x-ray absorptiometry scanning (DEXA)** is the screening tool of choice for measuring bone density for the diagnosis of osteoporosis and to monitor treatment. A T-Score of -2.5 SD below the young adult mean is diagnostic for osteoporosis.
- **Urinary collagen cross-linked N-telopeptides (NTx)** measures the rate of bone resorption from osteoclast activity.
- New bone formation from osteoblast activity can be measured by **bone-specified alkaline phosphatase (BAP, BSAP).**
- **25(OH) D** is the indicated test for measuring vitamin D status. Insufficiency = <32 ng/ml (80 nmol/L). Optimal = 50-69 ng/ml (133-150 nmol/L). the 1-25(OH) D test is not recommended.
- Other useful adjuvant tests are: **vitamin B₁₂ (as MMA), folate, DHEA, testosterone, estrogen, ferritin, lipids, TSH, and parathyroid values.**

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3. Summary:

The anti-inflammatory lifestyle provides a broad-spectrum bone support program for women and men; it goes beyond the basic calcium/magnesium/vitamin D rationale in order to more effectively achieve complete osteoporosis risk-reduction and support. The rationale is to maintain normal bone composition, strength, and resiliency and to lessen fragility. With proper patient adherence and monitoring, the expected outcome of strong and healthy bones is likely to be achieved. The "fully optimized" effects of an anti-inflammatory lifestyle also extend beyond the bone matrix and skeletal system to support a healthy heart, mind, and immune system.

Can you Guess?

1. Bone loss is unavoidable and you will always lose about 1% per year?
 - a. True
 - b. False

2. If you have a hip fracture and are over the age of 50, what are your odds of dying in the next 365 days?
 - a. 25%
 - b. 10%
 - c. 5%
 - d. 1%

3. What are some of the best habits for improving bone health?
 - a. Reducing inflammatory foods
 - b. Increasing weight bearing activities
 - c. Taking at least the "Core 4" supplements
 - d. Swimming
 - e. All of the above but d

Note: The information contained here is not intended to be prescriptive. Any attempt to diagnose or treat an illness should come under the direction of a physician who is familiar with nutritional therapy.

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

1. **Exercise for Osteoporosis Prevention** Slawta, Jennifer N. Ph.D.; Ross, Roberta M.S. ACSM's Health & Fitness Journal: [November/December 2004 - Volume 8 - Issue 6 - pp 12-19](#)
Features: CEC Self-Test
2. CDC.gov



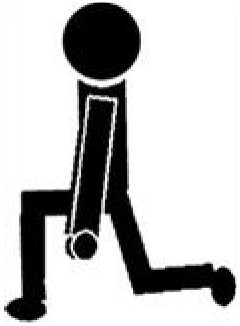
The following exercises could increase bone mass density 1 to 5%.

A. Forward Lunge

1. Start in a standing position with feet shoulder-width apart.
2. Take a large step forward with the right leg, keeping the upper body straight.



3. To perform the forward lunge, bend the back knee (left) until the back knee almost touches the floor. Knees should be aligned with the feet and not extend beyond.



4. During the lunge, the upper body should remain straight in an upright position, not bending forward or backward.
5. Return to the upright position and repeat lunge for 8 to 15 repetitions.
6. Return to the initial starting position and repeat the forward lunge with the other leg by taking a large step forward with the left leg, repeating the lunge on that leg for 8 to 15 repetitions.

1. Start in a standing position with legs in a wide stance.
2. Feet and knees should be angled slightly outward with the knees pointing the same direction as the feet.



4. To perform the squat, the legs should bend at the knees, keeping the back straight, until a 90° angle is reached.
5. Rise quickly back to the starting position.
6. Never bend at the waist or upper back during the squat. Always keep the back straight.
7. Repeat the squat for 8 to 15 repetitions.

C. Sideway Lunge

1. Start in a standing position with the feet shoulder-width apart.



3. The weight shifts to the right as the foot lunges right.
4. Use the right leg as a spring to bring the right leg back to the starting position.
5. Do not turn or twist the upper body.
6. The knee should track in line with the foot during the sideway lunge.



7. After 8 to 15 repetitions with the right leg, repeat the sideways lunge with the left leg for 8 to 15 repetitions.

D. Chair Raise

1. Start in a standing position with legs in a wide stance.
2. Feet and knees should be angled slightly outward with the knees pointing the same direction as the feet.
3. Keep the back straight and lean slightly forward, bending at the hip (not bending at the waist or upper back).
4. To perform the chair raise, lower the body towards an armless chair by bending at the knees, keeping the back straight until a 90° angle is reached barely touching the chair (the movement is the same as a squat).



5. Rise quickly, coming back to the starting position.
6. Never bend at the waist or upper back during the chair raise. Always keep the back straight.
7. Repeat the chair raise for 8 to 15 repetitions.

E. Heel/Toe Raise

1. Start in a standing position with the feet shoulder-width apart.
2. Lift both heels off the floor, standing on the toes and balls of the feet. Arms extend upward.

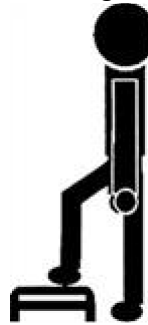


3. Hold position for 3 to 4 seconds.
4. Lower heels to floor slowly and rock back onto to the heels, lifting toes off of the floor. Arms extend forward.



5. Hold position for 3 to 4 seconds.
6. Lower toes to floor slowly, returning to the starting position.
7. Repeat the heel/toe raise for 8 to 15 repetitions.

1. Start in a standing position with feet shoulder-width apart.
2. Step up onto an 8-inch step with the right leg, following with the left leg.



3. Step down to floor with right leg, followed by left leg.

5. Always maintain good posture with back straight when stepping.

Alternating Forward, Sideway, and Backward Lunge

1. Perform a sequence of forward, sideway, and backward lunges, always returning to the center after each lunge.
2. With the backward lunge, take a step backward and perform the lunge the same as the forward

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lunge (*i.e.*, bend the back knee until the back knee almost touches the floor).
3. Perform the sequence for 8 to 15 repetitions with the right leg leading and then with the left leg leading.

G. Jumping!!!

!!! NOTE: Jumping exercises should not be started until 1 to 3 months after beginning the other exercises. Individuals with osteoporosis should not participate in the jumping exercises.!!!

1. Start in a standing position with feet shoulder-width apart.
2. Bend the knees, bring the arms back, and lean the body slightly forward.



3. Jump as high as possible, swinging arms forward and upward.



4. Land on both feet, bending the knees upon impact with the weight distributed toward the heel.
5. Repeat the jump 8 to 15 times.



Table. Progression of Exercises: Sets, Repetitions, and Weight

Exercises	Sets	Repetitions	Intensity
Week 1			
Forward Lunge	1	8	No Vest
Squat	1	8	No Vest
Sideway Lunge	1	8	No Vest
Chair Raise	1	8	No Vest
Heel/Toe Raise	1	8	No Vest
Stepping	1	15	No Vest
Week 2			
Forward Lunge	1	12	No Vest
Squat	1	12	No Vest
Sideway Lunge	1	12	No Vest
Chair Raise	1	12	No Vest
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	6	No Vest
Stepping	1	20	No Vest
Week 3			
Forward Lunge	1	12	No Vest
Squat	1	12	No Vest
Sideway Lunge	1	12	No Vest
Chair Raise	1	12	No Vest
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	10	No Vest
Stepping	1	20	No Vest
Week 4			
Forward Lunge	2	8	No Vest
Squat	2	8	No Vest
Sideway Lunge	2	8	No Vest
Chair Raise	1	12	No Vest
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	10	No Vest
Stepping	2	20	No Vest
Week 5			
Forward Lunges	2	12	No Vest
Squat	2	12	No Vest
Sideway Lunge	2	12	No Vest
Chair Raise	1	12	No Vest
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	12	No Vest
Stepping	2	20	No Vest
Jumping ^a	1	8	No Vest

Table. Continued

Exercises	Sets	Repetitions	Intensity
Week 6			
Forward Lunge	2	12	No Vest
Squat	2	12	No Vest
Sideway Lunge	2	12	No Vest
Chair Raise	1	15	No Vest
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	12	No Vest
Stepping	2	25	No Vest
Jumping ^a	1	12	No Vest
Week 7			
Forward Lunge	2	12	2–4 pounds
Squat	2	12	2–4 pounds
Sideway Lunge	2	12	2–4 pounds
Chair Raise	1	15	2–4 pounds
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	12	2–4 pounds
Stepping	2	25	2–4 pounds
Jumping ^a	2	8	No Vest
Week 8			
Forward Lunge	2	12	4–6 pounds
Squat	2	12	4–6 pounds
Sideway Lunge	2	12	4–6 pounds
Chair Raise	1	15	4–6 pounds
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	12	4–6 pounds
Stepping	2	25	4–6 pounds
Jumping ^a	2	12	2–4 pounds
Week 9			
Forward Lunge	2	15	4–6 pounds
Squat	2	15	4–6 pounds
Sideway Lunge	2	15	4–6 pounds
Chair Raise	1	15	4–6 pounds
Heel/Toe Raise	1	12	No Vest
Alternating Lunges	1	12	4–6 pounds
Stepping	2	25	4–6 pounds
Jumping ^a	2	12	2–4 pounds
Week 10+			
Sets and repetitions stay the same. Continue to increase weight every 2 weeks up to 15% of body weight			
^a Jumping is contraindicated for individuals with osteoporosis. Jumping with a weighted vest is contraindicated for postmenopausal women with osteopenia.			