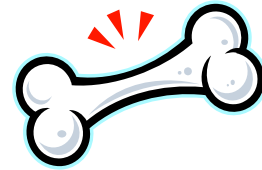


Bone Health

The Healthy Eating Tip of the Month topic for November is bone health! Building strong bones is important for reducing the risk of osteoporosis later in life. Good bone health practices need to begin at an early age and be maintained throughout one's lifetime.



How do I keep my bones healthy?

There are many practices that can help maintain and build strong bones. Certain nutrients consumed in the diet are very influential on bone health.

Calcium

Calcium is the most important mineral in relation to bone health. Calcium is one nutrient that is directly related to peak bone mass. Peak bone mass is the highest quantity of bone one can develop. On average, peak bone mass will reach its highest point when an individual reaches their thirties. After peak bone mass has been reached, the bone can no longer develop. Therefore, it is important to choose food sources that are high in calcium throughout life.



Food Sources High in Calcium

| Calcium Food Sources | |
|---|--------------------------------------|
| 1 cup milk (skim, 2%, whole, chocolate) | 1/2 cup cooked kale or okra |
| 8 oz. of yogurt | 1/2 cup cooked broccoli |
| 1 1/2 oz. cheese (cheddar, swiss, American, mozzarella) | 1 cup calcium-fortified orange juice |
| 10 oz milkshake | 1/2 cup calcium-fortified cereal |
| 1/2 cup cottage cheese | 1 cup cooked dried beans |
| 3 oz. canned sardines (with bones) | 3 oz. canned salmon (with bones) |

- Consume at least 3 servings of calcium rich foods daily
- Consume calcium fortified foods and drinks if calcium supplements are not tolerated

Adequate Intake (AI) of Calcium

An adequate intake (AI) is the average daily amount of a nutrient that is sufficient to maintain a healthy lifestyle.

The AI of calcium in different age groups does vary. The AI continues to increase from childhood through adolescence, where it peaks. AI decreases slightly in early adulthood and increases in the elderly population. Please refer to the table below.

| Adequate Intake of Calcium According to Gender & Age | |
|---|-----------------------|
| Gender & Age | AI for Calcium |
| Males & Females 1-3 years old | 500 mg/day |
| Males & Females 4-8 years old | 800 mg/day |
| Males & Females 9-18 years old | 1,300 mg/day |
| Males & Females 19-50 years old | 1,000 mg/day |
| Males & Females 51-70 years old | 1,200 mg/day |
| Males & Females Over 70 years old | 1,200 mg/day |

Vitamin D

Vitamin D is the primary vitamin affecting bone health. The major function of vitamin D is to maintain plasma levels of calcium. It does this by increasing absorption of calcium in the GI tract. Low levels of vitamin D are correlated with increased bone turnover rate, lower bone mass, and increased risk of falls and fractures in the elderly. Vitamin D can be made by the body or consumed through dietary sources.

Vitamin D Made Endogenously



Endogenously made vitamin D occurs as a result of sunlight exposure from ultraviolet rays reaching the skin.

Ten to fifteen minutes of sun exposure to the face, arms, and hands will meet daily needs. Those who are located in limited sunlight climates, above the 35th parallel north or below the 35th parallel south, experience extended periods of limited exposure during the winter months. This limits the production of vitamin D in the body.

The elderly often produce limited amounts of vitamin D and must rely more on food sources or supplements. Other factors that decrease vitamin D synthesis include sunscreen, darkly pigmented skin, and clothing.

Food Sources High In Vitamin D

Although vitamin D can be made in the body, it is also important to consume foods high in this vitamin.



| Foods High In Vitamin D |
|--------------------------------|
| Salmon |
| Canned Tuna |
| Fortified Milk |
| Fortified Cereal |
| Fortified Orange Juice |
| Whole Eggs |

Adequate Intake of Vitamin D

The adequate intake of vitamin D steadily increases after the age of fifty.

| Adequate Intake of Vitamin D According to Gender & Age | |
|---|-----------|
| Males & Females 1-3 Years Old | 5 µg/day |
| Males & Females 4-8 Years Old | 5 µg/day |
| Males & Females 9-18 Years Old | 5 µg/day |
| Males & Females 19-50 Years Old | 5 µg/day |
| Males & Females 51-70 Years Old | 10 µg/day |
| Males & Females Over 70 Years Old | 15 µg/day |



Osteoporosis



Osteoporosis is a major health concern both in the United States and worldwide. Currently, osteoporosis-related fractures affect 50% of women and 25% of men 50 years old or older. Osteoporosis is defined by the World Health Organization (WHO) as a bone mineral density (BMD) T-score that is -2.5 or less. The most common nutritional recommendations for preventing osteoporosis include adequate consumption of calcium and vitamin D, as they

are important nutrients in bone development and maintenance.

Prevalence/Incidence of Osteoporosis

25 million individuals currently have osteoporosis in the United States. The National Osteoporosis Foundation (NOF) has stated that 1.5 million osteoporosis related fractures occur each year in the United States. The elderly population is increasing in number worldwide; therefore, the estimated number of osteoporosis related fractures will increase considerably. This increase has been predicted to be as high as 6.3 million hip fractures in 2050.

Risk Factors

There have been many identified risk factors for osteoporosis and osteoporosis-related fracture. The following table identifies these risk factors.

| Risk Factors For Osteoporosis | |
|---|---|
| <ul style="list-style-type: none">• Genetics• Parental history of fracture• Female sex• Caucasian• Low BMD• 65+ years of age• Menopause at < 45 years of age | <ul style="list-style-type: none">• Amenorrhea• Smoking• Excessive alcohol abuse• ↓ Calcium intake• ↓ Vitamin D intake• Malabsorption related diseases• Physical inactivity |

Prevention

One of the most critical ways to prevent osteoporosis is by consuming nutrients that improve bone health. As previously mentioned, calcium and vitamin D are two significant nutrients that aid in osteoporosis prevention. However, diet is not the only way to prevent osteoporosis and osteoporosis-related fracture.

| Preventing Osteoporosis-related Fractures | |
|--|---|
| Environmental Strategies <ul style="list-style-type: none">• Open/uncluttered living areas for increased ease of mobility• Assess and rearrange tripping hazards<ul style="list-style-type: none">○ Cords, boxes, magazines, loose carpet, and other objects• Equipment to Prevent Falls<ul style="list-style-type: none">○ Stair railings, sufficient lighting, bathtub mats | Other Strategies <ul style="list-style-type: none">• Routine eye examinations<ul style="list-style-type: none">○ Determine poor depth perception as fracture risk increases 50% with poor depth perception• Hip Protectors<ul style="list-style-type: none">○ Reduces risks of fracture by absorbing energy due to fall |

Exercise



Exercise is another important factor in preventing osteoporosis. It not only strengthens muscles and bone, but results in better balance. This reduces the risk of falling and fracture. Weight-bearing exercises are very important in helping to build bone mass. This type of exercise makes you move against gravity while staying upright. Types of exercises that are categorized as weight-bearing include, but are not limited to: walking, jogging, tennis, aerobics classes, volleyball, basketball and dancing. Stair-step machines and elliptical trainers also provide a form of low-impact weight bearing exercise. Remember, always check with your doctor before beginning any new exercise routine.

A regular exercise program has been shown to increase bone mineral density (BMD). Although improvement in BMD is possible across all age groups, the most beneficial time to improve BMD with exercise is before and during puberty. This is a critical time period for adolescents because of the potential increase in bone mass of 25% to 30%.

Related Websites

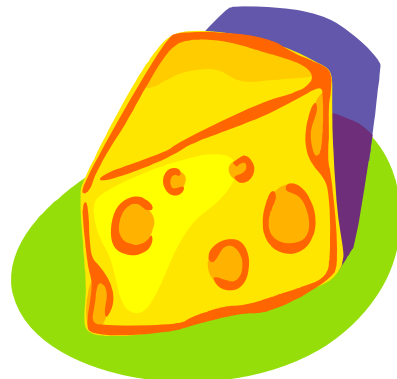
For more information please visit the following websites:

- www.nationaldairycouncil.org
- www.nichd.nih.gov
- <http://ods.od.nih.gov/factsheets/calcium.asp>
- www.niams.nih.gov/Health_Info/Bone/
- www.nof.org/

What's New in the News?

I have a picky eater, what are some creative ways to increase their calcium?

- Sometimes it is difficult to think of new ways to incorporate calcium into the family's diet. Try these suggestions to give calcium a new look in your family:
 - Add powdered milk to mashed potatoes, soups, and cereals
 - Top vegetables with low-fat cheeses



- Add shredded cheese to scrambled eggs
- Mix yogurt with fresh fruit to make a parfait
- Switch it up by offering a flavored low-fat milk, such as chocolate or strawberry

*Are calcium and vitamin D
the only important bone
nutrients?*

- Current research is looking at vitamin B12 and its relationship with bone health. One study looked at the relationship between vitamin B12 and osteoporosis in the elderly. The researchers found that the prevalence of osteoporosis increased in those with lower serum vitamin B12 levels. The RDA for vitamin B12 for adults is 2.4 micrograms per day. Vitamin B12 is primarily found in animal foods. It can also be found in fortified food sources such as cereals and some grain products.



Are calcium and vitamin D supplements beneficial?

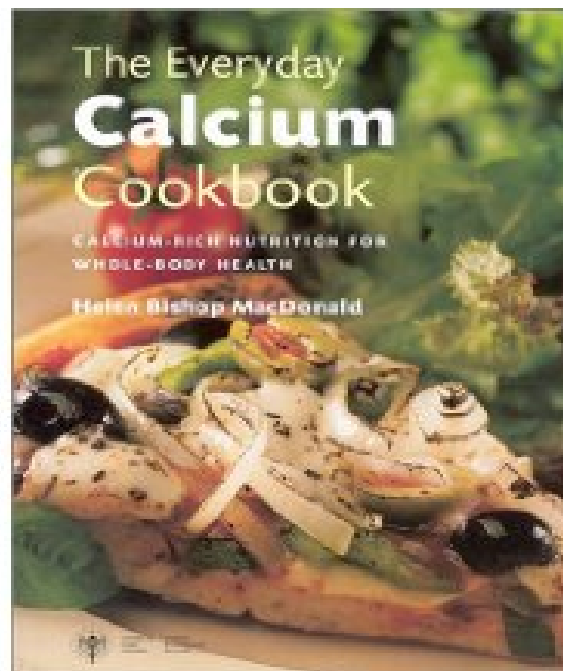
- A recent study looked at the effect of calcium and vitamin D supplementation on BMD. The study consisted of 120 women that were at least 45 years of age. Peri- and post-menopausal women were included in this study. The women were split into two groups. The first group received a 500 mg calcium supplement along with a 200 IU vitamin D supplement. The second group received a placebo. The study concluded that the women receiving the calcium and vitamin D supplements had improved BMD. The women in the placebo group showed an opposite effect, with a decrease in BMD. This study showed a positive correlation between supplementation and BMD in peri- and postmenopausal women.



Do Not Forget!



- Stop by the Healthy Eating Tip of the Month bulletin board in the cafeteria to enter to win a new cookbook! This cookbook offers great recipes to increase the calcium in the diet.
- Just enter your name, phone number, and address and leave it in the envelope provided. Good luck!



Resources:

Daniele N, Carbonelli MG, Candeloro N, et al. Effect of supplementation of calcium and vitamin D on bone mineral content in peri- and post-menopause women. A double-blind, randomized, controlled trail. *Pharmacological Research*.2004:50;637-641.

Fewtrell MM. Osteoporosis: is primary prevention possible? *Nestlé Nutr Workshop Ser Pediatr Program*. 2006:57;135-151.

Jackson RD, LaCroix AZ, Gass M, et al. Calcium plus vitamin D supplementation and the risk of fractures. *N Engl J Med*. 2006:354;669-683.

Morris MS, Jacques PF, Selhub J. Relation between homocysteine and B-vitamin status indicators and bone mineral density in older Americans. *Bone*. 2005:37;234-242.

National Dairy Council.

<http://www.nationaldairycouncil.org>. Accessed October 5, 2008.

Sambrook P, Cooper C. Osteoporosis. *Lancet*. 2006:367;2010-18.