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Fast Facts on Osteoporosis

Definition

Osteoporosis, or porous bone, is a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures of the hip, spine, and wrist.

Prevalence

Osteoporosis is a major public health threat for 25 million Americans, 80 percent of whom are women. In the U.S. today, 7-8 million individuals already have the disease and 17 million more have low bone mass, placing them at increased risk for osteoporosis.

80% of those affected by osteoporosis are women.

One out of every two women and one in five men have an osteoporosis-related fracture.

By age 75, one third of all men will be affected by osteoporosis.

While osteoporosis is often thought of as an older person's disease, it can strike at any age.

Osteoporosis is responsible for 1.5 million fractures annually, including:

- ▶ more than 300,000 hip fractures
- ▶ 500,000 vertebral fractures
- ▶ 200,000 wrist fractures
- ▶ more than 300,000 fractures at other sites

Cost

The estimated national direct expenditures (hospitals and nursing homes) for osteoporosis and associated fractures was \$10 billion (\$27 million each day) – and the cost is rising.

Symptoms

Osteoporosis is often called the "silent disease" because bone loss occurs without symptoms. People may not know that they have osteoporosis until their bones become so weak that a sudden strain, bump, or fall causes a fracture or a vertebra to collapse.

Collapsed vertebrae may initially be felt or seen in the form of severe back pain, loss of height, or spinal deformities such as stooped posture or dowager's hump.

Risk Factors

Certain people are more likely to develop osteoporosis than others. Factors that increase the likelihood of developing osteoporosis are called "risk factors." The following risk factors have been identified:

- ▶ Being female
- ▶ Thin and/or small frame
- ▶ Advanced age
- ▶ A family history of osteoporosis
- ▶ Early menopause
- ▶ Abnormal absence of menstrual periods (amenorrhea)
- ▶ Anorexia nervosa or bulimia
- ▶ A diet low in calcium
- ▶ Use of certain medications, such as corticosteroids and anti-convulsants
- ▶ Low testosterone levels in men
- ▶ An inactive lifestyle
- ▶ Cigarette smoking
- ▶ Excessive use of alcohol
- ▶ Caucasian or Asian, although African Americans and Hispanic Americans are at significant risk as well

Women have approximately 10 to 25 percent less total bone mass at maturity than men, making them more susceptible to osteoporosis. However, five million American men are affected by osteoporosis and one out of eight men age 50 and older will develop fractures.

White women 60 years of age or older have at least twice the incidence of fractures as African-American women. However, one out of five African-American women are at risk of developing osteoporosis.

Detection

Specialized tests called bone density tests can measure bone density in various sites of the body. A bone density test can:

- ▶ Detect osteoporosis before a fracture occurs
- ▶ Predict your chances of fracturing in the future
- ▶ Determine your rate of bone loss and/or monitor the effects of treatment if the test is conducted at intervals of a year or more

Prevention

Building strong bones, especially before the age of 35, can be the best defense against developing osteoporosis, and a healthy lifestyle can be critically important for keeping bones strong. So to help prevent osteoporosis:

- ▶ Eat a balanced diet rich in calcium
- ▶ Exercise regularly, especially weight-bearing activities
- ▶ Don't smoke and limit alcohol intake
- ▶ Talk to your doctor if you have a family history of osteoporosis or no longer have the protective benefit of estrogen due to natural or surgically-induced menopause.

Fractures

The most typical sites of fractures related to osteoporosis are the hip, spine, wrist, and ribs, although the disease can affect any bone in the body.

Forty percent of all women will have at least one spinal fracture by the time they reach age 80.

Spinal osteoporosis is eight times more likely to afflict women than men.

The rate of hip fractures is two to three times higher in women than men, however the death rate for men within one year after a hip fracture is 26% higher than that in women.

A woman's risk of hip fracture is equal to her combined risk of breast, uterine and ovarian cancer.

In 1988, about 250,000 Americans age 45 and over were admitted to hospitals with hip fractures. Osteoporosis was the underlying cause of many of these injuries.

Individuals suffering hip fractures have a 5 to 20 percent greater risk of dying within the first year following that injury than others in their age group.

Among those who were living independently prior to a hip fracture, 15 to 25 percent are still in long-term care institutions a year after the injury.

Treatment & Care

Although there is no cure for osteoporosis, there are treatments available to help stop further bone loss and fractures:

- ▶ Studies have shown that estrogen can prevent the loss of bone mass in postmenopausal women.
- ▶ Alendronate, a bisphosphonate, has been recently approved by the Food and Drug Administration for treatment of postmenopausal osteoporosis.
- ▶ Calcitonin is another treatment used by both women and men for osteoporosis. This drug has been shown to slow bone breakdown and also can reduce the pain associated with osteoporotic fractures.
- ▶ Treatments under investigation include other bisphosphonates, sodium fluoride, vitamin D metabolites, and selective estrogen receptor modulators.

Medical experts agree that osteoporosis is highly preventable. However, if the toll of osteoporosis is to be reduced, the commitment to osteoporosis research must be significantly increased. It is reasonable to project that with increased research, the future for definitive treatment and prevention of osteoporosis is very bright.

The National Osteoporosis Foundation is the nation's leading resource for patients, healthcare professionals, and organizations seeking up-to-date, medically sound information on the causes, prevention, diagnosis, and treatment of osteoporosis. Please contact us to learn more about NOF, National Osteoporosis Prevention Week, or how to become a member.

National Osteoporosis Foundation, 1150 17th Street, NW, Suite 500, Washington, DC 20036

Building A Strong Foundation For You!

NOF

The National Osteoporosis Foundation (NOF) is the nation's leading resource for patients, healthcare professionals, and organizations seeking up-to-date, medically sound information and program materials on the causes, prevention, and treatment of osteoporosis.

Established in 1986 as America's only voluntary, nonprofit health organization dedicated to reducing the widespread prevalence of osteoporosis, the Foundation has grown to include a network of individuals, healthcare professionals and organizations who support its goals. In leading the attack on osteoporosis, NOF aggressively works to:

Advocate Increased Research Support

A top priority for NOF is to support a greatly increased federal research effort to discover the keys to preventing and treating osteoporosis. Through our work, we ensure that research on osteoporosis assumes a prominent place on the national health agenda.

Provide Direct Support for Research

NOF has established the country's only privately supported research grant program for osteoporosis. Through this program, we provide direct financial support to researchers. In addition, NOF supports a student fellowship program aimed at bringing new researchers into the field.

In conjunction with leading federal agencies, such as the National Institutes of Health and other scientific and medical organizations, the Foundation plays an important role in organizing and conducting national and regional scientific workshops to explore what is known about osteoporosis and to identify specific research directions.

Increase Public Awareness and Knowledge About Osteoporosis

Each year, hundreds of national organizations, federal agencies, corporations, and hospitals work with NOF to promote National Osteoporosis Prevention Week, the nation's major campaign aimed at educating the public and healthcare professionals about osteoporosis. The Foundation's Prevention Week information and media kits and poster, brochures, newsletters, and public service announcements are helping to heighten awareness and increase knowledge about this devastating disease.

Educate Physicians and Other Health Professionals

Because of the complexity of osteoporosis and the rapid changes brought about by research, physicians and other healthcare professionals are turning to NOF for the latest scientific information on the prevention and treatment of osteoporosis.

Through our regional and national educational conferences, Speakers Bureau, and the *Physician's Resource Manual on Osteoporosis*, we provide information and materials to physicians and other health professionals.

Inform Patients and Their Families

NOF serves as a national resource center linking patients and their families with information, resources and services. To ensure that patients receive all the information they need to make informed health care decisions, the Foundation has established the National Osteoporosis Patient Information Center.

We provide patient oriented materials containing up-to-date information on the diagnosis, prevention and treatment of osteoporosis, as well as strategies for recovering from fractures, and living with osteoporosis.

The Foundation is governed by a voluntary Board of Trustees and advised by a board of preeminent scientists.

NOF is supported in its efforts through membership dues, contributions and grants from federal agencies and private organizations, sales of materials, income from educational conferences and training programs, and through general fundraising activities. For more information, contact:

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National Osteoporosis Foundation
A 501(c)(3) nonprofit organization:
Member, National Health Council and
the Combined Federal Campaign.
Meets the standards of the National
Charities Information Bureau, Inc.



National Osteoporosis Foundation

A Decade of Challenge and Achievement

The National Osteoporosis Foundation (NOF) is leading the effort to bring national attention and resources to bear on the problem of osteoporosis. Founded in 1986 by foremost researchers and clinicians, NOF strives to reduce and, ultimately to eliminate the widespread prevalence of osteoporosis through programs of public and professional education, research, patient information and advocacy.

The Foundation is governed by a 19-member Board of Trustees, a 27-member Scientific Advisory Board and an Honorary Board of national leaders and celebrities.

From the halls of Congress to statehouses, from community hospitals to hundreds of national organizations, NOF has gained national recognition for osteoporosis as a major public health problem. This dialogue has not yet been sufficiently translated into constructive and comprehensive national programs and policies to reduce the human and economic toll of the disease. As a result, tens of millions of women and men at risk for osteoporosis are empowered to prevent this debilitating disease.

Several recent developments, however, signal an increased Federal commitment to bring osteoporosis under control. These advances are, in great measure, due to the organizing and educational efforts of the Foundation.

► **The Osteoporosis and Related Bone Diseases National Resource Center -**

Through a competitive grant application process, the National Osteoporosis Foundation has received a \$2 million grant from the National Institutes of Health (NIH) to establish The Osteoporosis and Related Bone Diseases National Resource Center. The Resource Center's mission is to broaden the dissemination of information to the general public, patients and health professionals and enable NOF to conduct behavioral research aimed at the prevention of osteoporosis.

- NOF is presently working with a board of scientific experts to develop osteoporosis practice guidelines for physicians. This project is expected to be concluded in 1995.
- **Ten million dollars for osteoporosis research** was appropriated by Congress FY 95, including, for the first time, an earmarked appropriation in the

5 million in '96

Department of Defense (DOD)
Appropriations Bill.

- **Office of Technology Assessment Report -** NOF stimulated a Congressional request to the Office of Technology Assessment to evaluate the impact of osteoporosis in the United States and report on gaps in research, public and professional education and the cost effectiveness of bone mass measurement tests. The reports, *Public Information About Osteoporosis, What's Available, What's Needed, Hip Fractures, Outcomes In People Age Fifty And Over* were released in October 1994.
- NOF successfully waged a seven-year campaign to achieve **Medicare reimbursement for bone mass measurement**. Previously Medicare reimbursement was \$68, but as of January 1, 1995 that amount will increase to \$124. Currently Medicare covers DEXA tests in 41 states, but NOF continues to work toward a goal of reimbursement nationwide.



National Osteoporosis Foundation

A View To the Future

Strategic Goals: 1995 to the Year 2000

- ▶ Annual Federal funding for osteoporosis research to exceed \$200 million
- ▶ NOF's research program to exceed \$2 million annually
- ▶ 100% of Americans recognize osteoporosis causes/consequences and seek care
- ▶ 70% of patients with osteoporosis have access to quality medical care and supportive community services
- ▶ 70% of physicians diagnose and treat osteoporosis
- ▶ Bone mass measurement tests reimbursed and accessible to 75% of the population
- ▶ More than double approved drug therapies
- ▶ Education, service and supportive programs available in major cities
- ▶ NOF, as the nation's leading authority on osteoporosis
 - Expand Board of Trustees to 35 members
 - Continue role of Scientific Advisory Board as osteoporosis research and clinical authority
 - Expand Interspecialty Council
 - Expand Honorary Board of national leaders and celebrities
 - Develop budget of \$10-\$15 million
 - Establish 10+ regional offices and leadership councils

Four Myths About Osteoporosis: Knowing the Truth Will Help You Keep Your Bones Strong

1

Osteoporosis is not serious enough for me to worry about.

Osteoporosis is serious because it progressively and irreversibly weakens our bones to the point that any movement, even a bump or fall, can cause a painful, debilitating fracture of the hip, spine or other bones. Chronic pain and disability are lasting effects of osteoporosis which can permanently change the way you live, work and enjoy your free time. One frequent outcome of osteoporosis is hip fracture, which each year causes nearly as many deaths in the United States as all auto fatalities.

Because osteoporosis can be prevented and treated, if you learn what you can do now, you won't have to worry about it as you grow older.

2

I'm a healthy person. I do the right things. I'm not at risk.

Unfortunately, we can't feel how strong our bones are. That's why osteoporosis is called a "silent thief". Without knowing it, you could be losing bone tissue, even if you think you're doing the right things, including exercise and eating a calcium-rich diet. Osteoporosis is increasingly widespread. One in two women and one in five men have a lifetime risk of developing fractures from osteoporosis and experiencing the loss of vitality and independence that accompany this disease.

Your doctor and the National Osteoporosis Foundation can help you learn more about what factors place people at risk for osteoporosis and what you can do to stop excessive bone loss.

3

I'm too young to worry about osteoporosis now.

It's never too early to prevent osteoporosis. Building strong bones and keeping them strong gives you a head start when bone loss occurs. The fact is that bone is a living, growing tissue which constantly rebuilds. Bone strength increases during our youth until "peak bone mass" is reached in our 20's or early 30's. After that time all of us gradually lose bone mass because more bone tissue is removed than generated. When bone loss is excessive, such as when women lose the protective effects of estrogen following menopause, osteoporosis may develop. This is why women are at greater risk for osteoporosis and the fractures that result from it.

Many of the things you can do to build strong bones and prevent bone loss can also contribute to your overall health. Remember, osteoporosis doesn't just happen when you're "old," it gets started years, even decades earlier.

4

It's too late for me to do anything about osteoporosis.

Osteoporosis is defined as excessive loss of bone tissue. Bones break when they become too thin and too weak. Although bone loss is irreversible, it's never too late to take steps to slow or stop the further loss of bone. The time to detect osteoporosis is **now** before so much bone is lost that debilitating fractures occur. If you are diagnosed with osteoporosis, your doctor can prescribe a diet and exercise program tailored to your needs. There are also several medications like estrogen and calcitonin currently available to prevent further bone loss and help you preserve an active lifestyle and avoid the consequences of osteoporosis. Additional therapies are also being researched such as bisphosphonates.

Talk to your doctor and contact the National Osteoporosis Foundation. We can recommend steps you can take to maximize bone strength and minimize bone loss.



PERCENTAGE OF WOMEN WHO IDENTIFIED CONSEQUENCES OF OSTEOPOROSIS

Permanent disability		32%
Hip fractures		18%
Curvature of the spine		20%
Bones fracture easily		14%
Restricts mobility/crippling		13%
Loss of height		7%
Death due to injury		6%
Don't know		24%

Osteoporosis leads to 300,000 hip fractures annually. Twenty-five percent of those who fracture a hip after age 55 are not able to walk again without assistance, and 15 to 20 percent are in long-term institutions one year after the injury. Osteoporosis leads to 50,000 deaths annually, mostly as a result of complications associated with hip fractures. Loss of height and stooped posture often result when vertebrae, the small bones that make up the spine, fracture or collapse.

PERCENTAGE OF WOMEN WHO IDENTIFIED RISK FACTORS FOR OSTEOPOROSIS

Race (caucasian)		27%
Slender build		24%
Family history		39%
Early menopause		49%
Poor diet (lack of calcium)		61%
Lack of exercise		72%
Smoking		52%
Alcohol consumption		40%

Source:
A Gallup survey of 750 women, ages 45- to 75-years-old. The survey has a margin of error of ± 4 percentage points.

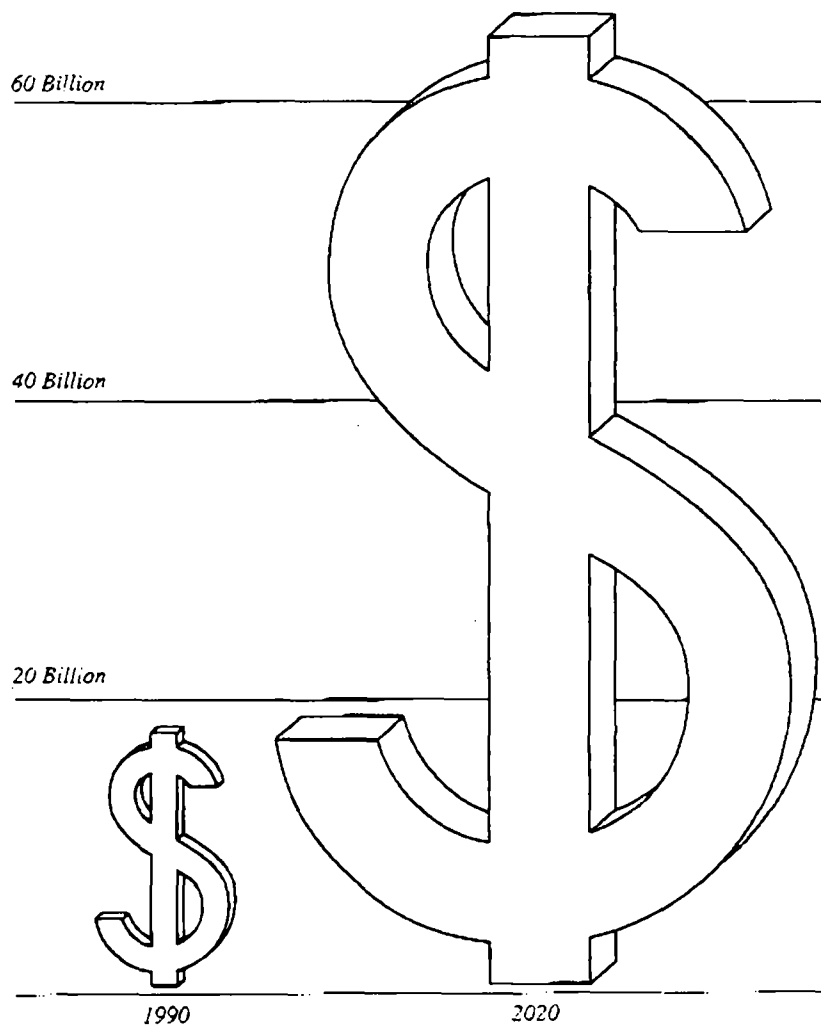
OSTEOPOROSIS FACTS

Financial Costs

The economic impact of osteoporosis is enormous. In the United States, the medical, nursing home, and social costs of fractures resulting from osteoporosis and its consequences are currently estimated to be \$10 – 18 billion a year. These costs are expected to grow to more than \$60 billion by the

year 2020 unless more aggressive steps are taken to prevent and treat the disease. As the US population ages, the number of persons likely to develop osteoporosis and the accompanying financial costs for managing the disease will increase dramatically.

Medical, Nursing Home and Social Costs of Hip Fractures



Source: National Osteoporosis Foundation, 1993

OSTEOPOROSIS FACTS

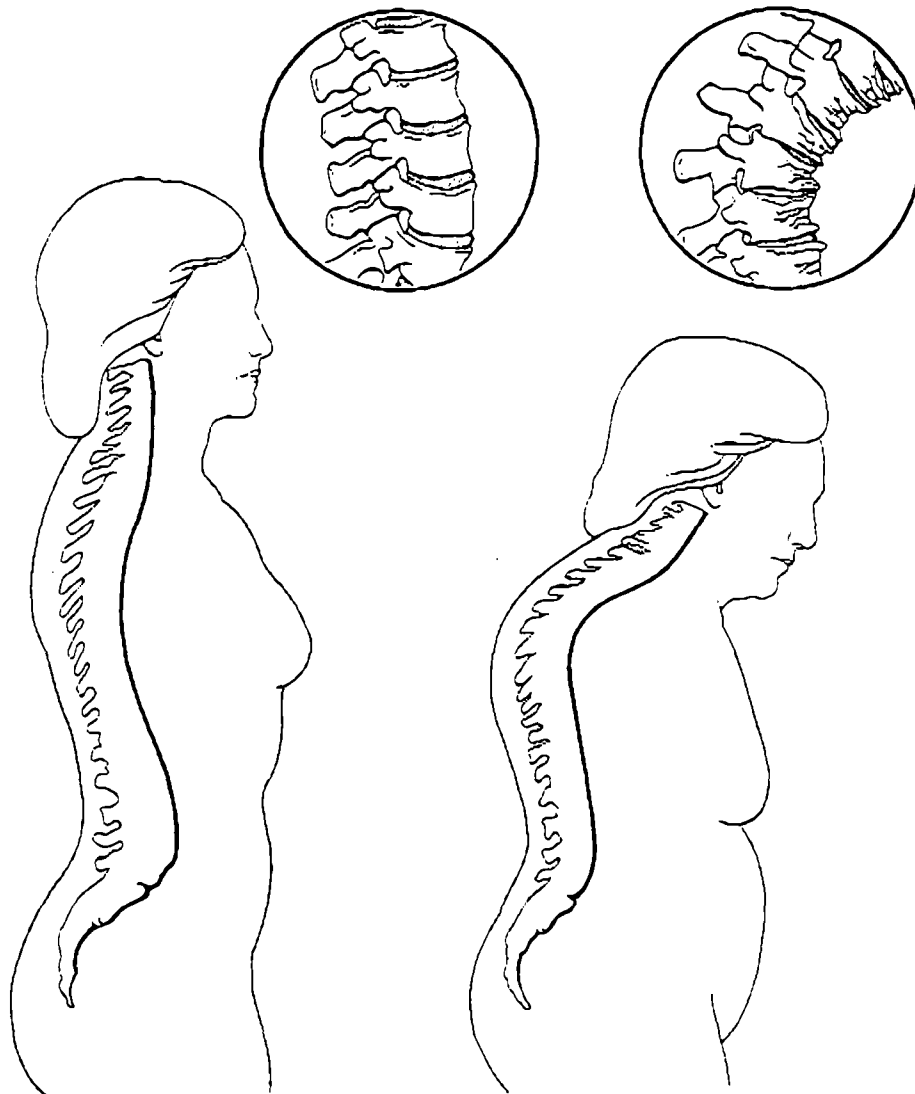
Causes of Stooped Posture and Loss of Height

Osteoporosis weakens the bones, making them more likely to fracture. Osteoporosis-related fractures occur most often in the hip, wrist and spine. The spine is made up of a series of small connected bones called vertebrae (left). While vertebral fractures do heal, the bones do not go back to their original shape. Healed vertebral fractures become compressed

(flattened) or may mend in a wedge shape. Over time, multiple fractures of the spine can result in stooped posture, a loss of height and continual pain (right). Preventing osteoporosis is important since bone loss is irreversible. An early diagnosis is critical. Osteoporosis is symptomless. The first sign of the disease is often a fracture.

Normal Spine

Osteoporotic Spine



Calcium-Rich Foods

Food Item	Serving Size	Calcium (mg)	Fat (g)	Calories
Milk				
Whole	8 oz.	288	8.0	150
1% milk	8 oz.	300	2.6	102
2% milk	8 oz.	297	4.7	121
Skim milk	8 oz.	302	0.4	86
Yogurt				
-Plain fat-free (w/added milk solids)	8 oz.	452	0.4	127
Plain low-fat (w/added milk solids)	8 oz.	415	3.5	144
Fruit low-fat	8 oz.	314	2.6	225
Cheese				
American Cheese	1 oz.	124	8.9	106
Cheddar Cheese	1 oz.	204	9.4	114
Cottage Cheese, 1% low-fat	1 cup	138	2.3	164
Mozzarella Cheese, part skim	1 oz.	147	6.1	80
Muenster Cheese	1 oz.	203	8.5	104
Parmesan Cheese, grated	1 tbsp.	69	1.5	23
Ricotta Cheese, part skim	1/2 cup	337	9.8	171
Ricotta Cheese, whole milk	1/2 cup	257	16.1	216
Ice Cream, Vanilla				
10 % Fat	1 cup	176	14.3	269
16 % Fat (Rich)	1 cup	151	23.7	349
Orange Sherbet	1 cup	103	3.8	270
Ice Milk, Vanilla				
Hard	1 cup	176	5.6	184
Soft Serve	1 cup	274	4.6	223
Fish and Shellfish				
Oysters, raw	12	76	4.2	116
Sardines, canned in oil, drained, <u>including bones</u>	4	184	5.6	100
Salmon, pink, canned, <u>including bones</u>	3 oz.	181	5.1	118
Shrimp, canned, drained	3 oz.	50	1.7	102
Vegetables				
Bok Choy, raw (Chinese Cabbage)	1 cup	74	0	9
Broccoli, cooked, drained, from raw	1 cup	178	0.4	46
Broccoli, cooked, drained, from frozen	1 cup	94	0.2	50
Soybeans, mature, boiled	1 cup	175	15.4	298
Collards, cooked, drained, from raw	1 cup	148	0.3	27
Turnip greens, cooked, drained, from raw (leaves and stems)	1 cup	198	0.4	30
Tofu	1 cup	*260	11.8	366
Orange (Naval)	1 whole	56	0.1	63
Almonds (Dry Roasted)	1 oz.	80	14.7	167

* The calcium content of tofu may vary depending on processing methods. Tofu processed with calcium salts can have as much as 300 mg calcium per 4 oz. Often, the label or the manufacturer can provide more specific information.

NOTE: You may also increase the calcium in foods by following these suggestions:

1. Add non-fat powdered dry milk to all soups, casseroles, and drinks.
2. Sesame seeds provide 60 mg of calcium per oz. and sunflower seeds provide 33 mg of calcium per oz. These can be sprinkled on casseroles or salads.
3. Buy juices, cereal and bread that are fortified with calcium.
4. Replace whole milk and cream with skim and low-fat milk in recipes.
5. Replace sour cream with yogurt in recipes.
6. Some bottled waters contain calcium, so check the labels for more information.

Medications Used to Treat Osteoporosis

Currently, there are three medications that are approved by the Food and Drug Administration (FDA) for the treatment of postmenopausal osteoporosis. All three of these medications are classified as anti-resorptive medications; they slow or stop the bone resorbing portion of the bone remodeling cycle but do not slow the bone forming portion of the cycle. As a result, new formation continues at a greater rate than bone resorption, and bone density may increase.

Bone remodeling consists of two distinct stages: bone resorption and bone formation. During resorption, special cells on the bone's surface dissolve bone tissue and create small cavities on the bone surface. During formation, other cells fill the cavities with new bone tissue. Usually, bone resorption and bone formation are linked so that they occur in close sequence and remain balanced. When a disease such as osteoporosis is present, the link is damaged and bone loss occurs.

Estrogen replacement therapy (ERT) and Hormone replacement therapy (HRT)

ERT has been proven to not only reduce bone loss but to also reduce the number of hip and spinal fractures in postmenopausal women. ERT is administered most commonly in the form of a pill or skin patch and is effective even when started after age 70. Today, most physicians prescribe the hormone progestin along with estrogen (HRT) for those women who have an intact uterus. ERT/HRT has been shown to have beneficial effects on both bone health and cardiovascular health and relieves menopause symptoms. Side effects may include nausea, bloating, breast tenderness, and high blood pressure. The question of whether ERT/HRT increases the risk of breast cancer is still being studied by medical experts.

Calcitonin

Calcitonin is a naturally occurring hormone involved in calcium regulation and bone metabolism. It slows bone loss and has been known to have an analgesic or pain killing effect. Calcitonin is a protein which means that it can cause an allergic reaction, and it cannot be taken orally because it would be digested before it could work. Calcitonin may be taken as an injection or by nasal spray. It does not affect other organs or systems in the body, but injectable calcitonin may cause unpleasant side effects including flushing of the face and hands, urinary frequency, nausea, and a skin rash. The only side effect reported with nasal calcitonin is a runny nose.

Alendronate

Alendronate (brand name Fosamax) is a newly approved medication from the class of drugs called bisphosphonates. Bisphosphonates also slow or stop bone loss. Results from two three year trials in postmenopausal women with osteoporosis found that alendronate resulted in small increases in bone density in both the spine and hip. Side effects are uncommon but may include abdominal or musculoskeletal pain, nausea, heartburn, or irritation of the esophagus. Like all bisphosphonates, alendronate must be taken on an empty stomach. The manufacturer recommends taking this medication with a glass of water first thing in the morning and then waiting at least one-half hour, and preferably one hour, before the first food, beverage, or medication of the day with a full glass of plain water.

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