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Medications That *Promote* Osteoporosis

Many common drugs can contribute to **osteoporosis** risk and bone loss, including:

- **Cancer-fighting drugs** that inhibit sex hormones, such as anti-androgen therapy (which reduces levels of testosterone) and aromatase inhibitors (which reduce estrogen activity).[31,32]
- **Corticosteroids** such as prednisone, hydrocortisone, dexamethasone, and many others.[33,34]
- **Warfarin** (Coumadin®), which is used to treat blood clots.[35,36]
- **Proton-pump inhibitors** such as Nexium®, Prilosec®, and Prevacid®, which are used to decrease stomach acid.[37,38]

Do *not* stop taking these drugs unless directed by your doctor. But people taking these medications may want to carefully monitor their bone mineral status.

Summary

As our bones become thinner and weaker with age, the risk of life-threatening **fractures** increases.

High-dose vitamin K2 has successfully and safely been used for decades in Japan to treat the bone disease **osteoporosis.**

Human trials demonstrate that daily intake of **45 mg** of vitamin K2 maintains or increases **bone-mineral density** and reduces the risk of **fractures.**

Along with other nutrients crucial for bone health, vitamin K2 can help build stronger, healthier bones. •

If you have any questions on the scientific content of this article, please call a **Life Extension** Wellness Specialist at 1-866-864-3027.

Vitamin K2 May Provide Cardiovascular Benefits

Vitamin K2 promotes new bone growth in part by increasing **calcification**, the buildup of calcium deposits, in the bone.

In soft tissues, however, **calcification** can be extremely dangerous. In blood vessels, it contributes to the buildup of atherosclerotic plaque associated with **cardiovascular disease**.

Research has shown that while vitamin K2 *causes* beneficial calcification in bones, it *prevents* harmful calcification in soft tissues, including blood vessels.[25,26] This occurs because it activates **matrix Gla protein**, which *inhibits* **calcification** of blood vessels.[27]

For this reason, vitamin K2 may be protective against cardiovascular disease.[26,28]

Vitamin K2 has been shown to be safe to use in healthy, older osteoporotic patients not taking oral **vitamin K antagonist** anticoagulants (**e.g. warfarin**), without having an adverse impact on clotting.[29]

Even studies with high doses of vitamin K have demonstrated its safety, without any adverse events.[7-9,30]

Still, anyone taking **warfarin**, a powerful anticoagulant, should consult a physician before taking *any* form of vitamin K.

Warfarin functions by blocking vitamin K activity in the body, which means warfarin users are to avoid vitamin K supplements and foods high in vitamin K. Newer drugs such as **Eliquis®**, **Pradaxa®**, and **Xarelto®** provide anticoagulant effects without the need to restrict vitamin K intake.

Vitamin K2 May *Enhance* Osteoporosis Drugs

Bisphosphonates are drugs prescribed to slow the bone loss of osteoporosis. They include medications such as **alendronate** (Fosamax®) and **risedronate** (Actonel®).

Vitamin K2 does *not* interfere with bisphosphonates and can safely be used at the same time.

Research even suggests that they may have an ***additive*** effect, protecting bone density better together than either one does alone.[17]

Nutrients That Support Vitamin K2

The powerful bone-rebuilding effects of vitamin K2 may be even greater when combined with other **nutrients** that support strong and healthy bones.

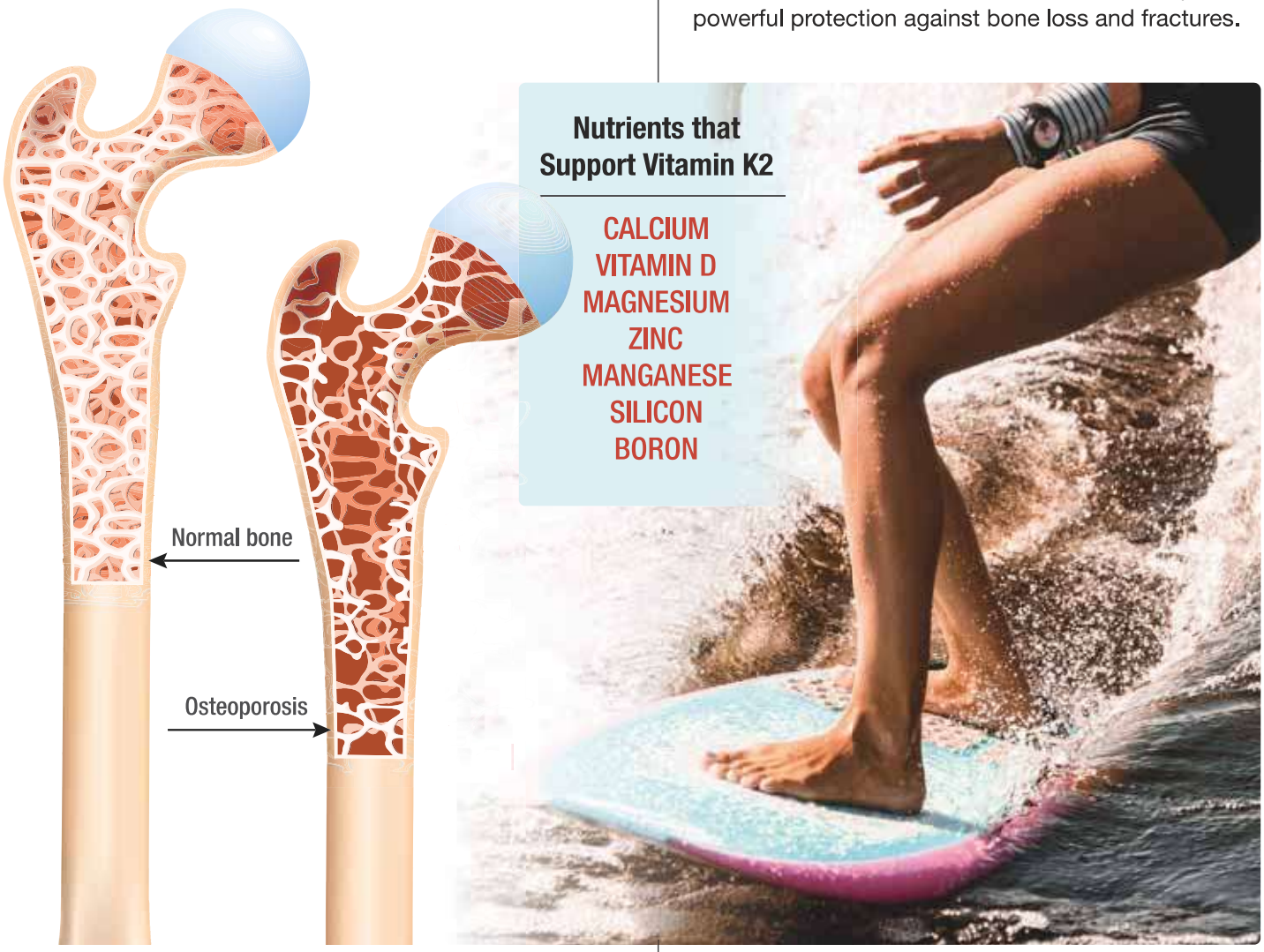
Calcium is the major mineral that forms the hard matrix of bone. Adequate calcium intake substantially *decreases* the rate at which bone breakdown and mineral loss occur.[20,21]

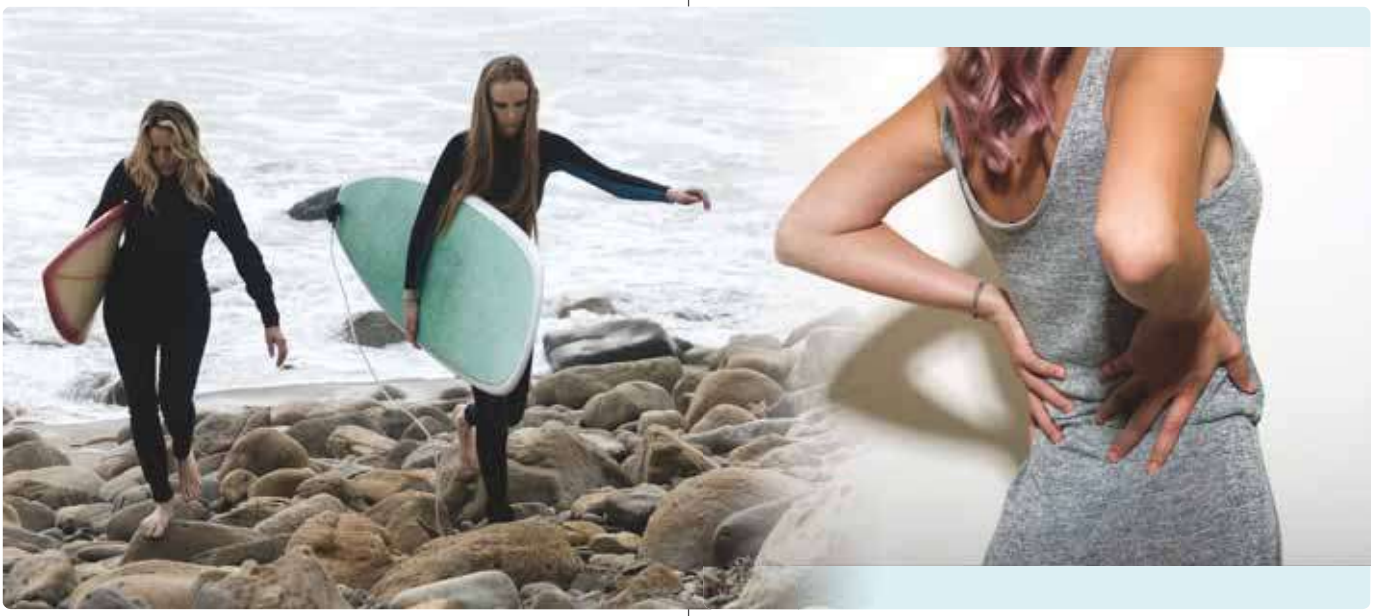
Vitamin D helps the body absorb calcium from the gut after a meal and stimulates the production of **osteocalcin**.[19] Research suggests vitamin D also facilitates the transfer of calcium to the bones, which may further support bone strength.[22]

Magnesium, like calcium, makes up the mineral matrix of bone and is needed to maintain healthy bone density.[23] About **half** of all magnesium in the body is stored in bone.[23]

Zinc, manganese, silicon, and **boron** are minerals that play important roles in optimal bone formation and health. *Low* levels of each of these minerals may contribute to bone *loss*, and increased intake improves bone health in animal and/or human studies.[24]

Taken with these nutrients, **vitamin K2** can provide powerful protection against bone loss and fractures.





Preventing Fractures

The same study also assessed the effect of **high-dose vitamin K2** on the incidence of bone **fractures.**

During the two-year study, the group receiving calcium alone sustained **35** fractures, compared to only **14** fractures in the vitamin K2 group.[10] And these study subjects were not treated with other critical bone supporting nutrients like **magnesium**, **boron**, and **vitamin D**.

In another clinical trial on postmenopausal women with **osteoporosis**, taking **45 mg** of oral vitamin K2 daily:[6]

- Maintained mineral **density** to a significantly greater degree than in control women, and
- Reduced the incidence of vertebral **fractures** to a degree similar to the drug etidronate.

Bisphosphonate drugs like risedronate (Actonel®) and alendronate (Fosamax®) are medications commonly used to treat **osteoporosis.**[14]

These medications are associated with various, though rare, side effects. These include osteonecrosis of the jaw, low blood calcium, reflux, ulcers, and more.[15,16]

Vitamin K2, on the other hand, is *not* associated with significant side effects, even at high doses.

How Vitamin K2 Keeps Bones Strong

Vitamin K2 works by restoring a healthy balance between the two types of bone cells that influence **bone density.**

Osteo*clasts* break down old bone, while **osteo*blasts*** build new bone. Healthy bone relies on a *balance* of activity between these two types of skeletal cells.

As we age, osteo*clast* activity begins to outstrip osteo*blast* activity. Bone is broken down faster than new bone is built up. Bone density drops and **osteopenia** and **osteoporosis** develop.

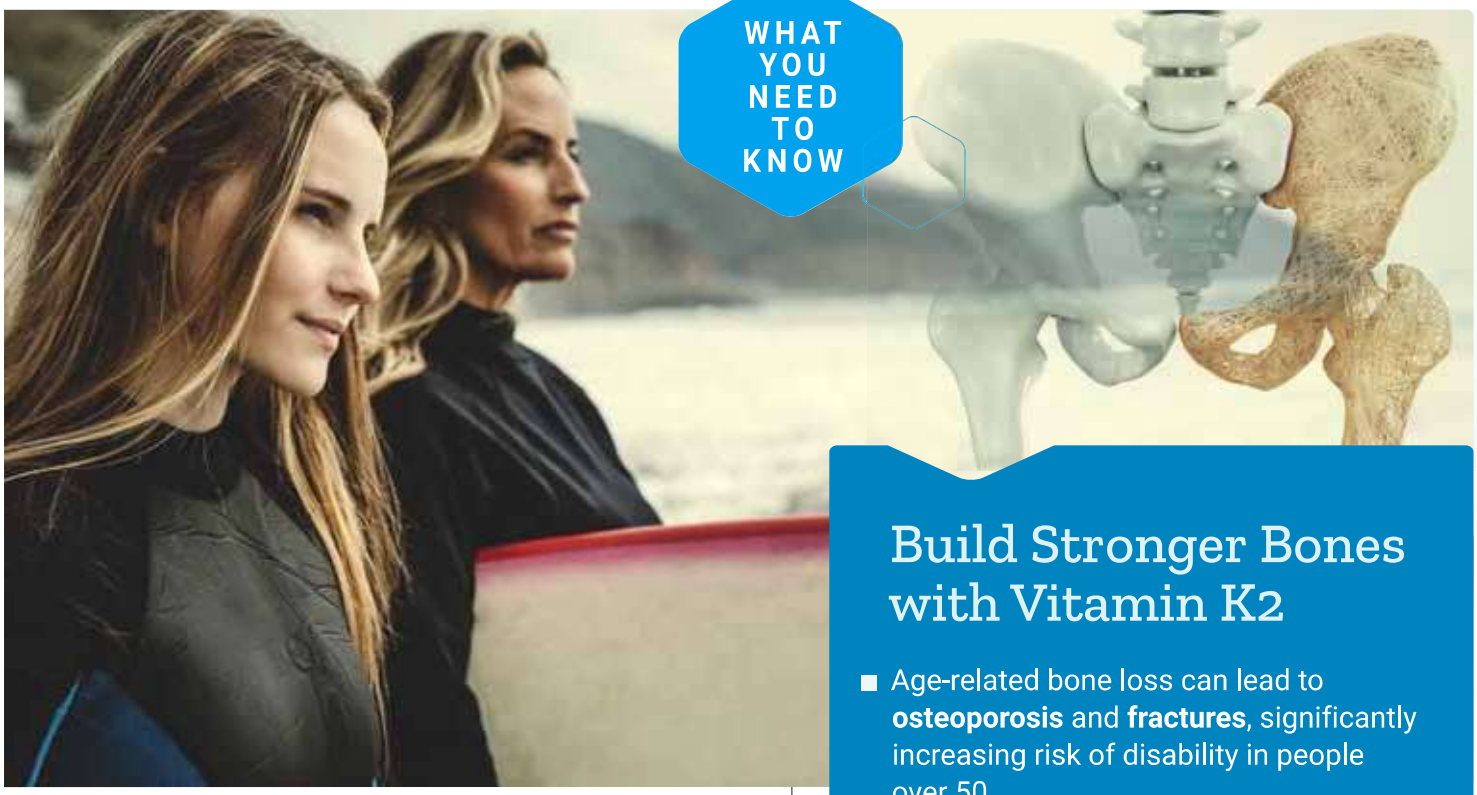
In preclinical studies, **vitamin K2** was shown to promote:[17,18]

- An increase in bone-building osteoblast activity, and
- A reduction in bone-destroying osteoclast activity.

With this balance restored, more bone is built, less is destroyed, and **bone mineral density** is maintained or even *increased*.

Additionally, in order to build bone, osteoblasts need a protein called **osteocalcin.** This protein binds to **calcium**, helping osteoblasts turn this mineral into healthy new bone. Vitamin K2 helps convert **osteocalcin** into its *active* form, which is required for its bone-building activities.[18,19]

In the Japanese study of older osteoporosis patients, the group receiving vitamin K2 had a significant *increase* in levels of **active osteocalcin,** which may be a mechanism by which the vitamin reduced fracture incidence.[10]



Boosting Bone Density

To study **vitamin K2** under the most challenging circumstances, scientists tested high doses on older people who had already developed **osteoporosis**.

In one study, Japanese researchers randomized older osteoporosis patients into two groups. One received **150 mg** a day of **calcium** alone. The other received the same calcium dose plus **45 mg** of **vitamin K2** (as **MK-4**) daily.[10]

Over a two-year period:[10]

- Patients who received only calcium continued to lose bone density in their lumbar spine, which dropped by about **3%**.
- Patients also receiving **45 mg** of vitamin K2 plus 150 mg of calcium maintained their bone mineral density.

That's a ***life-saving difference***.

A **10%** drop in bone density more than ***doubles*** the risk for **fractures** of the vertebra and hip.[13]

Patients in this study treated with calcium-only had an increased **risk of fracture**.

Adding **vitamin K2** largely arrested bone loss, reducing **fracture risk**.[10]

Build Stronger Bones with Vitamin K2

- Age-related bone loss can lead to **osteoporosis** and **fractures**, significantly increasing risk of disability in people over 50.
- **High-dose vitamin K2** (in the form of **MK-4**) has been used as a prescription treatment for osteoporosis in Japan for decades. These doses are available in the U.S. *without a prescription*.
- Vitamin K2 improves **bone health** by restoring balance to the process of bone breakdown and formation, favoring new bone growth.
- Human trials show that daily intake of **45 mg** of **vitamin K2** maintains or *increases* bone density while *reducing* fracture risk. In a two-year study on older adults with osteoporosis, it cut the number of new **vertebral** fractures by more than **half**.
- Other nutrients, including **calcium** and **vitamin D**, support bone health by other mechanisms and can be taken with vitamin K2.

Osteoporosis Increases Mortality Risk

The impact of osteoporosis-related **bone fractures** is staggering. After suffering one fracture, the risk of *future* fractures increases by a whopping ***86%***.[2]

Fractures of the **hip** and **vertebra**, in particular, are associated with loss of mobility and risk of death. People who suffer a **vertebral fracture** have an **eight-fold** increase in mortality compared to other individuals their age.[2]

But almost *any* kind of broken bone increases the risk of death in older people.[11] That's why it is imperative not just to slow, but to ***reverse*** bone loss as soon as it begins.

Creeping Bone Loss

When we're young, our bones are tightly packed with calcium and other minerals in an intricate structure that looks like a honeycomb.[1]

Even before age 40, **bone density** starts to ***decrease***.[12] This decline continues into old age. In women, the speed of bone loss accelerates with the onset of menopause.

This drop in bone-mineral density causes bones to become weak, brittle, and prone to **fractures.** Bone breaks may result from minor injuries. **Stress fractures** may even occur during normal movement.

The early stage of weakening bones is called **osteopenia.** As bone density continues to fall, **osteoporosis** develops. Osteoporosis means "***bone full of pores or holes***."

Suffering a fracture, especially if it occurs during normal movement, is when many people first discover they have **osteoporosis.**

The good news is that we can do something to prevent age-related bone loss and risk of fractures.

High-Dose Vitamin K2

In *low* doses, vitamin K promotes normal blood clotting. This small amount of vitamin K is normally obtained from dietary sources.

But as far back as **1999**, scientists at **Life Extension** recognized that *higher* doses of vitamin K could better keep **calcium in bones** and help prevent **calcification** of soft tissues such as heart values, arteries, and brain cells.

It's important to understand that high doses of vitamin K do *not* cause greater coagulation.

Japanese doctors have long been treating **osteoporosis** by prescribing a specific form of **vitamin K2** called **menaquinone-4** (or **MK-4**), without any clotting issues.[7]

In high doses of ***45,000 mcg*** or **45 mg**, they have found that vitamin K2 safely improves bone health and helps prevent **fractures** in older adults.[5,6,8-10]

Prevent Bone Loss *with* High-Dose Vitamin K2

BY MICHAEL DOWNEY

You slip and take what seems like a minor tumble—and feel pain and possibly hear a crack.

For adults over age 50, it's a shockingly common occurrence, and often the first sign they have the bone disease **osteoporosis**.[1]

About **50%** of American women and **25%** of American men over 50 will break a bone due to osteoporosis.[1]

Fractures are a leading cause of disability in older adults.

Within a year of suffering a **hip fracture**, more than ***20% of patients may die***.[2,3]

For decades, physicians in **Japan** have used **high doses** of **vitamin K2** to prevent bone loss and protect against **fractures**.[4]

Vitamin K2 is available in the U.S. at the same doses—*without* a prescription.

Clinical trials show that **45 mg (45,000 mcg)** of **vitamin K2** helps to:[5-10]

- **Slow bone loss,**
- **Reduce fracture risk, and**
- **Build new bone.**

A study of older **osteoporosis** patients showed that **high-dose** vitamin K2 cut the number of new vertebral **fractures** by more than **half**.[10]

Other nutrients taken with vitamin K2, such as **vitamin D** and **calcium**, provide further support for skeletal health.