HEALTH BASICS

Calcium and bones

How calcium supports bones and how food, hormones, and health conditions affect it.

WHAT IT IS
A mineral that helps give bones strength

WHERE IT COMES UP
Food labels, supplements, blood tests, and bone health checks

WHY IT MATTERS
Supports bones, muscles, nerves, blood clotting, and heart function

WHAT IT IS NOT
Not a disease or direct measure of bone strength

WHO TO ASK
Primary care clinician, dietitian, pharmacist, or bone specialist

HOW IT IS CHECKED
Diet review, blood tests, or a DXA bone density scan

Overview

Calcium is a mineral. Most of the calcium in your body is stored in your bones and teeth, where it helps form a hard structure. A much smaller amount circulates in your blood and cells.

Your body needs calcium in the blood for muscles, nerves, blood clotting, and normal heart function. It therefore keeps blood calcium within a narrow range. If your diet does not provide enough, your body can release calcium from bone to protect these other functions.

This means a normal calcium blood test does not prove that your bones are strong or that your calcium intake is adequate. Blood calcium and bone strength are related, but they are not the same measurement.

Calcium and bones is not a diagnosis or disease. It is a way of understanding how diet, hormones, kidneys, digestion, physical activity, and some health conditions interact.

How it works

Bone is living tissue. It is constantly being broken down and rebuilt in a process called bone remodelling. Calcium combines with phosphate to form mineral crystals that make the bone

framework hard and resistant to pressure.

Several parts of the body control this process.

Vitamin D helps the intestines absorb calcium from food. The kidneys help control how much calcium leaves the body in urine. The parathyroid glands, which are small glands in the neck, produce parathyroid hormone, or PTH. PTH helps keep blood calcium stable by acting on bone, kidneys, and vitamin D.

When blood calcium starts to fall, these systems increase calcium absorption or reduce calcium loss. They can also release stored calcium from bone. When calcium levels rise, the body adjusts in the opposite direction.

Bones build up mineral during childhood and adolescence. They continue changing throughout adult life. Ageing, menopause, reduced activity, nutrition, medicines, and health conditions can shift the balance between bone formation and bone loss.

Calcium is only one part of bone health. Vitamin D, adequate protein, weight-bearing activity, hormones, and freedom from tobacco exposure also matter. Taking extra calcium cannot correct every cause of reduced bone strength.

Why it matters for your health

Your body needs a regular source of calcium because it cannot make the mineral itself. Sources include dairy foods, calcium-set tofu, some leafy vegetables, canned fish with edible bones, and foods fortified with calcium. "Fortified" means calcium has been added during production.

How much calcium you need is affected by age, sex, pregnancy or breastfeeding, and other health factors. Official intake targets are usually stated as the total calcium from food, drinks, and supplements combined.

Calcium intake may deserve closer attention if you avoid dairy products, eat a limited range of foods, have a condition that reduces nutrient absorption, or have had surgery involving the stomach or intestines. Some medicines and long-term kidney, thyroid, or parathyroid conditions can also affect calcium balance.

Bone density is one part of bone strength. A DXA scan uses low-dose X-rays to estimate how much mineral is present in certain bones, usually the hip and spine. It does not measure the exact amount of calcium throughout your skeleton.

A clinician may use a DXA result with your age, health history, medicines, and previous fractures to assess bone health. A blood calcium result alone cannot provide this information.

What can go wrong

Several different conditions or situations can involve calcium and bones.

Low calcium intake or poor absorption can reduce the calcium available from food. Blood calcium may remain normal because the body draws calcium from bone.

Osteoporosis is a disease in which bones become less dense and more likely to fracture. It has several causes and risk factors. Low calcium intake can contribute, but calcium intake alone does not determine whether someone develops osteoporosis.

Osteomalacia is softening of adult bone caused by poor mineralisation. It is often related to severe vitamin D deficiency, but other problems with minerals, kidneys, or metabolism can cause it. The equivalent problem in growing children is called rickets.

Hypocalcaemia means the calcium level in the blood is too low. Possible causes include parathyroid problems, severe vitamin D deficiency, kidney disease, some medicines, and serious illness. It is not the same as simply eating too little calcium.

Hypercalcaemia means the blood calcium level is too high. It may be caused by an overactive parathyroid gland, certain cancers, some medicines, or excessive use of particular supplements. It is not usually caused by ordinary calcium-containing foods.

Kidney stones can contain calcium, but calcium in the diet is not automatically the cause. Stone type, fluid intake, salt intake, bowel conditions, medicines, and supplement use may all be relevant. Cutting out calcium without advice may not help and could affect bone health.

Routine follow-up is appropriate if you are concerned about your diet, have a mildly abnormal test without severe symptoms, or want to discuss bone-density screening.

Seek urgent medical advice for new muscle spasms, marked weakness, repeated vomiting, or increasing confusion, especially with an abnormal calcium result. Call emergency services for a seizure, collapse, severe breathing difficulty, or loss of consciousness. These symptoms have many possible causes and need prompt assessment.

What you can do

You can start by finding out how much calcium your usual food provides. Keep a food and drink record for several typical days. Check labels for the amount of calcium per serving, especially on plant-based drinks and other fortified products.

Useful actions include:

If you use a supplement, check the label for the amount of elemental calcium. This is the

amount of calcium the product actually provides. Do not assume that a higher amount is better.

A pharmacist or clinician can check for interactions with medicines. Calcium can affect the absorption of some thyroid medicines, antibiotics like amoxicillin or doxycycline , iron products, and other treatments. Kidney disease, previous kidney stones, or abnormal blood calcium may also change whether a supplement is suitable.

There is no single test that measures all calcium stored in your bones. A blood calcium test checks circulating calcium. It may be interpreted with albumin, a blood protein that carries some calcium. In some situations, an ionised calcium test measures the calcium that is not attached to protein.

Testing everyone is not necessary. Whether you need blood tests or a DXA scan is based on your health history, age, fracture risk, symptoms, medicines, and previous results.

- Ask what calcium intake target applies to your age and life stage
- Bring a list of foods, supplements, and medicines to appointments
- Ask whether vitamin D, kidney function, or PTH testing is relevant
- Keep copies of calcium blood results and any DXA reports
- Ask whether a supplement is needed to fill a confirmed dietary gap

Common questions

Does a normal blood calcium result mean my bones are healthy?

No. The body tightly controls blood calcium and may release calcium from bone to do so. Bone density, fracture history, diet, and other risk factors provide different information.

Can I get calcium without dairy products?

Yes. Options include fortified plant drinks, calcium-set tofu, canned fish with edible bones, and some vegetables. Calcium content and absorption differ, so check labels and consider asking a dietitian to review a restricted diet.

Is more calcium always better?

No. Once your needs are met, extra calcium does not automatically make bones stronger. Excessive supplemental intake can cause problems, including high blood calcium in some situations.

What does vitamin D have to do with calcium?

Vitamin D helps your intestines absorb calcium. Low vitamin D can reduce calcium absorption

and affect bone mineralisation even when calcium is present in your diet.

Do calcium supplements prevent fractures?

Not in every situation. Their benefit depends on your usual intake, vitamin D status, age, fracture risk, and the cause of any bone loss. Supplements do not replace assessment or treatment for osteoporosis or another bone condition.

Should I stop calcium if I have had a kidney stone?

Do not make that change based only on the word "calcium." Ask what type of stone you had and whether your diet, fluids, salt intake, medicines, or supplements should change.

Sources

- National Institutes of Health Office of Dietary Supplements: Calcium - Fact Sheet for Health Professionals
- National Institutes of Health Office of Dietary Supplements: Vitamin D - Fact Sheet for Health Professionals
- National Institute of Arthritis and Musculoskeletal and Skin Diseases: Bone Mineral Density Tests-What the Numbers Mean
- National Academies: Dietary Reference Intakes for Calcium and Vitamin D
- Endotext: Hypocalcemia-Diagnosis and Treatment
- Endotext: Approach to Hypercalcemia