

Balancing calcium and phosphate for healthy bones and safe kidneys

Meet your vitamins and minerals

Calcium, phosphate, and vitamin D are essential nutrients for a healthy body. They help build strong bones and teeth and play a role in nerve, muscle, and cell function.

- **Calcium** is a mineral that makes up your bones and teeth. Calcium helps your heart to beat, your blood to form clots, and your muscles to move. You get calcium through the foods you eat, like milk, cheese, and leafy green vegetables.
- **Phosphate** is a mineral that binds with calcium to build our teeth and bones. Your body uses phosphate to produce energy and help with nerve function. Phosphate comes from your diet and is found in cheeses, processed meats, and certain nuts and beans.
- **Vitamin D** helps you take up calcium for strong bones. You absorb most of your vitamin D from the sun through your skin. You also get small amounts of vitamin D from the food you eat.



Calcium and phosphate balance in your body

Your kidneys and your parathyroid glands work together to balance phosphate and calcium. The parathyroid gland makes **parathyroid hormone (PTH)** when calcium levels drop. Parathyroid hormone is a chemical message that:

- releases calcium from your bones
- keeps your kidneys from getting rid of too much calcium
- controls phosphate levels.

Vitamin D needs to be activated or 'turned on' by the kidneys to be useful in the body. The active form of vitamin D is called **calcitriol**, which helps:

- your gut to take in more calcium
- keep calcium in your body instead of losing it in urine (wee)
- lower your parathyroid hormone levels.

What happens in kidney disease?

Chronic kidney disease (CKD) causes your minerals to get out of balance, especially as kidney disease progresses to kidney failure. When your kidneys start to fail, they cannot remove the excess phosphate from your body. This imbalance can lead to **mineral and bone disorder in CKD (MBD-CKD)**, which affects your bones, blood vessels and heart. In later stages of kidney disease:

Your body reacts to this imbalance by increasing the amount of parathyroid hormone in the blood.

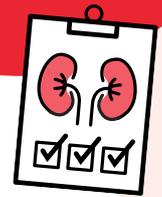
Phosphate rises in your blood

- Damaged kidneys have trouble removing phosphate, causing higher levels in the blood.
- High phosphate causes weak bones, itching, painful joints, and hardened blood vessels.



Calcium lowers from your bones

- Your body has trouble using the calcium in your food.
- Your body takes calcium from your bones, making them weak.



MBD-CKD can cause brittle bones making them weak and more likely to break. When calcium and phosphate end up in your blood vessels, they can stiffen and increase your risk for heart problems.

How is calcium and phosphate imbalance treated?

Treatments used in MBD-CKD aim to restore balance by:

- lowering phosphate levels
- balancing calcium levels to prevent bone disease
- reducing the release of parathyroid hormone.

To identify and diagnose MBD-CKD, your doctor may order:

- blood tests to check your calcium, phosphate, parathyroid hormone, and vitamin D levels over time
- a bone density scan to measure the strength of your bones.



Treating the imbalance

Your doctor and your healthcare team will work together to find the best treatment for you. Balancing your minerals reduces this risk of bone loss, heart damage, stroke and other complications. Treatments can include:



Medicines

- **Phosphate binders** act like 'sponges' to soak up phosphate from the food you eat. They work best taken right before a meal or straight after a meal to trap the phosphate from food in your stomach.
- **Calcitriol** is an active form of vitamin D that helps to increase calcium absorption from your stomach.
- **Calcimimetics** help to control high parathyroid hormone levels.
- **Osteoporosis** medicines prevent and treat bone loss.
- **Calcium and vitamin D** supplements are needed if you don't get enough from your diet.

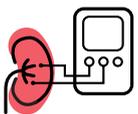


Diet Changes

In later stages of kidney disease or kidney failure, your doctor may tell you to **lower the amount of phosphate** in your diet. Phosphate is in a wide variety of foods, so it is impossible to have a phosphate-free diet. Common foods with high levels of phosphate include:

- processed meats like ham, salami, and corned beef
- processed cheeses and cheese spreads
- cola
- condiments like gravy powder, Vegemite, Nutella, and soy sauce
- chocolate milks and coffees.

There are some high phosphate foods that are best to be avoided. Reducing the amount of ultra-processed packaged foods, fast-foods and takeaway foods can help lower the phosphate in your diet. Some people with later stages of kidney disease may need to follow a stricter low-phosphate diet. Speak to your doctor or an Accredited Practising Dietician for more specialised instructions if you've been told to restrict phosphate in your diet.



Adjusting Dialysis

If you are on dialysis, your doctor can balance calcium and phosphate by changing the time or frequency of dialysis. If you are on haemodialysis, the dialysate fluid can also be adjusted.



Surgery

If your PTH levels stay too high despite medicines you may need surgery. You may need surgery to remove your parathyroid glands to control high phosphate and parathyroid levels. Your healthcare team will decide if surgery is necessary and review the risks and benefits of this treatment option with you.



Things to remember:

- ✓ **Your kidneys and parathyroid gland work together to balance calcium and phosphate. These minerals build strong bone and teeth.**
- ✓ **Damaged kidneys can lead to mineral and bone disorders. This increases your risk for weakened bones, hard blood vessels, heart disease, and stroke.**
- ✓ **There are treatments to help balance calcium and phosphate - these include medications, diet changes, and sometimes surgery.**

What does that word mean?

Accredited Practising Dietitian (ADP) – A person who is professionally qualified to give practical diet and nutrition advice.

Calcium – The most common mineral in your body. Calcium is essential for healthy bones and teeth. It is also important for regulating heart function, blood clotting, and muscle functioning, such as contraction and relaxation. Calcium levels are often abnormal in people with kidney disease. Raised calcium levels may cause headaches, nausea, sore eyes, aching teeth, itchy skin, mood changes, and confusion.

Dialysate/ Dialysis Fluid – Special fluid that is used during dialysis to help clean the waste and excess fluid from your blood.

Parathyroid glands – Produce parathyroid hormone (PTH). PTH helps to control calcium, phosphorus, and vitamin D levels within your blood and bone. Kidney failure can cause your parathyroid glands to produce too much PTH.

Parathyroid hormone – Helps control calcium, phosphorus, and vitamin D levels within the blood and bone.

Phosphate – A mineral that, together with calcium, keeps your bones strong and healthy. When your kidneys are not working properly, high levels of phosphate build up in your blood. Too much phosphate causes itching and pain in your joints, such as knees, elbows, and ankles.

Phosphate binder – If your phosphate level is too high, you may be prescribed medicine called phosphate binders. They combine phosphate in your intestines so it can pass out of your body with the faeces (poo). It is important to take phosphate binders with your meals and snacks.

Supplement – Usually a tablet or drink that you take to provide your body with additional nutrients that you are not getting from the food you eat.

Vitamin D – A nutrient that helps your body absorb calcium, which is important for strong bones and teeth.

 **Kidney Health**
Australia

Free Kidney Helpline 1800 454 363
kidney.org.au

If you have a hearing or speech impairment, contact the National Relay Service on 1800 555 677 or relayservice.com.au. Have them connect you to the Free Kidney Helpline - 1800 454 363 



**WANT TO
LEARN MORE?**

Kidney Health 4 Life is a health and wellbeing program equipping people, and those that care for them, with the knowledge and resources to take more active management of their kidney health or kidney disease.



**Join Kidney Health 4 Life
by scanning the QR code**

This is intended as a general introduction to this topic and is not meant to substitute for your doctor's or health professional's advice. All care is taken to ensure that the information is relevant to the reader and applicable to each state in Australia. It should be noted that Kidney Health Australia recognises that each person's experience is individual and that variations do occur in treatment and management due to personal circumstances, the health professional and the state one lives in. Should you require further information always consult your doctor or health professional.

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