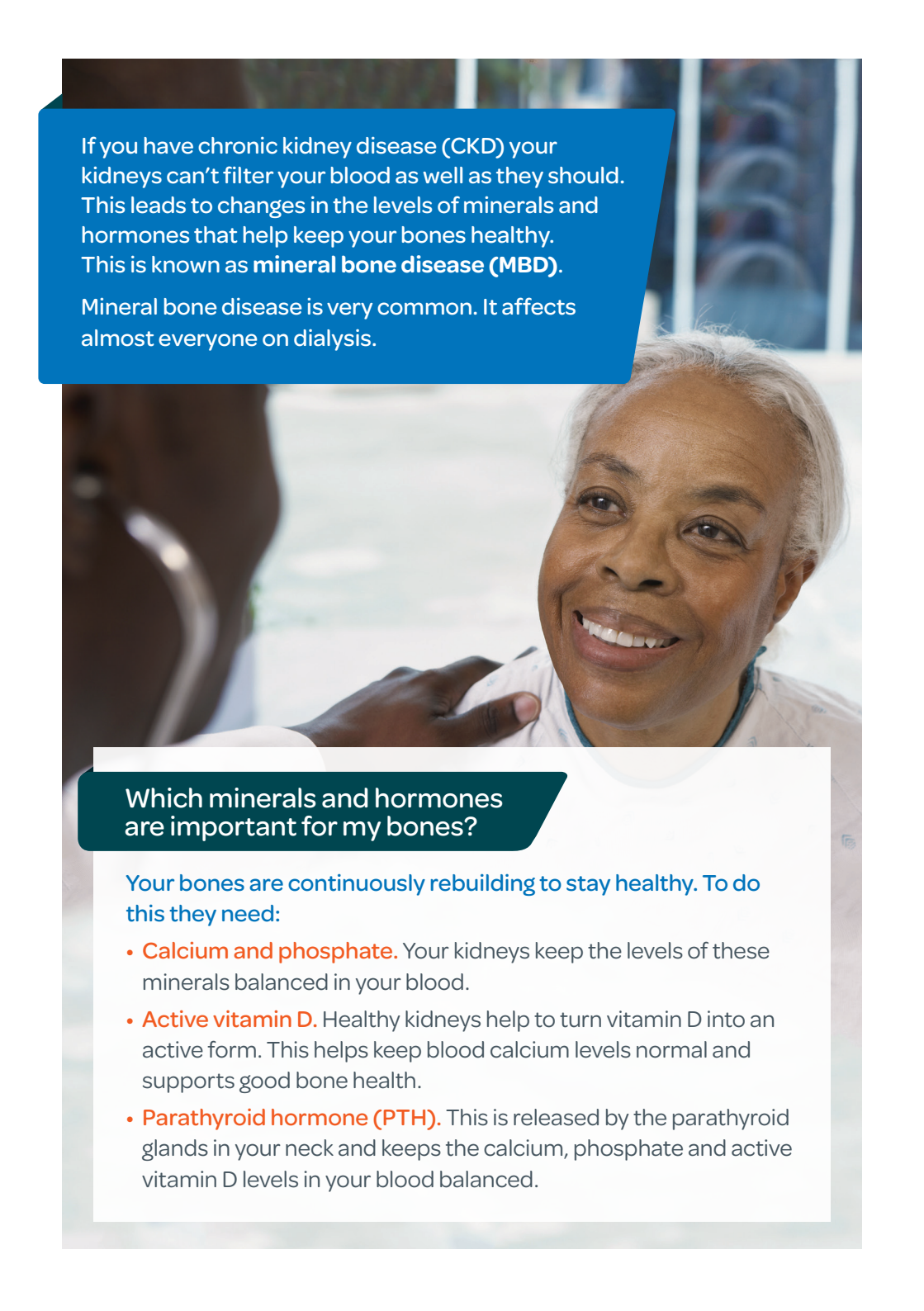


Mineral Bone Disease



Working together for better patient information



If you have chronic kidney disease (CKD) your kidneys can't filter your blood as well as they should. This leads to changes in the levels of minerals and hormones that help keep your bones healthy. This is known as **mineral bone disease (MBD)**.

Mineral bone disease is very common. It affects almost everyone on dialysis.

Which minerals and hormones are important for my bones?

Your bones are continuously rebuilding to stay healthy. To do this they need:

- **Calcium and phosphate.** Your kidneys keep the levels of these minerals balanced in your blood.
- **Active vitamin D.** Healthy kidneys help to turn vitamin D into an active form. This helps keep blood calcium levels normal and supports good bone health.
- **Parathyroid hormone (PTH).** This is released by the parathyroid glands in your neck and keeps the calcium, phosphate and active vitamin D levels in your blood balanced.

What happens to these minerals and hormones in CKD?

If your kidneys are damaged, they often struggle to balance the calcium and phosphate levels in your blood. Phosphate levels increase and draw out calcium from your bones, making them weaken.

There is also a lack of vitamin D and too much PTH, which can affect the health of your bones and make fractures more likely. In some cases, the extra calcium and phosphate in your blood can cause your blood vessels to harden which can limit blood flow.

What are the symptoms of mineral bone disease?

Most adults will not have any symptoms until mineral bone disease is advanced. Over time, your bones may become weaker. This can lead to bone and joint pain. It can also increase your chance of breaking bones.

High levels of calcium and phosphate can damage your blood vessels, making them hard, like bone. This can lead to heart disease and blood vessel disease.

High phosphate levels in the blood can also make your skin itchy. Although this is not dangerous, it can be very unpleasant. Talk to your kidney team if it becomes a problem.





How is mineral bone disease diagnosed?

Mineral bone disease is diagnosed by measuring the levels of phosphate, calcium and parathyroid hormone in your blood. Your kidney team will check these levels regularly.

How is mineral bone disease treated?

Treatment aims to protect your bones and blood vessels from further damage.

Diet

You may be advised to reduce your phosphate intake. Processed meats, processed cheese, baked goods and cola-style drinks all often have added phosphates, so try to limit these where possible.

Phosphate additives can be found on the ingredient lists on food labels. Here are some of the most common ones, but generally look for the letters “phos”.

E Number	Phosphate Additives
E338	Phosphoric Acid
E339	Sodium phosphates
E340	Potassium phosphates
E341	Calcium phosphates
E343	Magnesium phosphates
E450	Diphosphates
E451	Triphosphates
E452	Polyphosphates
E541	Sodium aluminium phosphates

Many healthy foods (such as wholegrains, legumes, nuts and seeds) contain natural phosphate. This is not absorbed very well, so these foods can still be included in your diet. A kidney dietitian can give you individual advice and dietary support.

Medications

Phosphate binders. These are tablets that you can take to soak up phosphate in food. This will reduce the amount of phosphate absorbed into the blood stream. Your binders will only work if taken around your meals. Some work best if taken before food, some during the meal and some after food. Follow the instructions carefully for the best effect.

Avoid taking iron tablets at the same time and check with your pharmacist or doctor if you are prescribed antibiotics, as the binders can affect how they are absorbed.

There are different types of phosphate binders. Some need to be chewed, while others are swallowed whole, dissolved in water or sprinkled on your food. Your doctor, dietitian or pharmacist will discuss which type might suit you.



Phosphate binder	When to take	Common side effects
Calcium acetate (Renacet [®] , Phosex [®])	Swallow whole 10-15 minutes before meals	Feeling sick, can raise calcium levels
Calcium carbonate (Calcichew [®])	Chew 10-15 minutes before meals	Chalky taste, can raise calcium levels
Lanthanum (Fosrenol [®])	Chew during, or just after, meals	Feeling sick if taken on an empty stomach
Sevelamer (Renvela [®] , 'Renagel [®])	Swallow whole just before meals	Feeling sick

Vitamin D tablets – alfacalcidol, calcitriol and paricalcitol. These help to balance your calcium levels and control your parathyroid hormone (PTH) level. They are usually taken once a day, or three times a week, after haemodialysis.

Note: these medicines can also cause the calcium level in your blood to increase. Side effects also include feeling sick – try taking with food. These are not the same as the vitamin D supplements you get from the chemist as they are specially made for kidney patients.

Cinacalcet – this medicine is used to bring down very high levels of parathyroid hormone level in your blood. It has the advantage of not raising calcium levels, but levels still need to be monitored.

Side effects include feeling sick and abdominal pain. It is best taken with food. Etelcalcitide is an intravenous (given straight into your blood stream) version of cinacalcet which may be used if you can't take cinacalcet.

Dialysis

Dialysis helps to remove phosphate from your blood. If your diet contains lots of phosphate, however, dialysis is not likely to be enough to remove all the phosphate from your blood.

Surgery

If diet, medication and dialysis are not effective, you may need an operation to remove one or all of your parathyroid glands (parathyroidectomy). This can lead to a drop in calcium levels so you may need to take extra vitamin D and calcium tablets.



Key points to remember

- Mineral bone disease is very common in people with CKD and affects almost everyone on dialysis.
- Mineral bone disease leads to bone weakness and blood vessel disease.
- It is caused by changes in the levels of minerals, vitamins and hormones in the blood.
- It can be treated with dietary changes, medications and dialysis.
- Surgery may be needed in severe cases.

Where can I find more information?

Talk to your kidney dietitian for individual dietary advice and for information about your specific dietary requirements.

- Kidney Kitchen from Kidney Care UK: www.kidneykitchen.org
Healthy, delicious multicultural food for every stage of kidney disease.
Approved by kidney dietitians and enjoyed by everyone.
- Kidney Care UK: Phosphates:
www.kidneycareuk.org/get-support/healthy-diet-support/natural-phosphate-and-added-phosphate-ckd/
- Medicines for anaemia and mineral bone disease:
www.kidneycareuk.org/kidney-disease-information/treatments/medicines-for-chronic-kidney-disease-ckd/medicines-for-anaemia-and-mineral-bone-disease/



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