

Chronic Kidney Disease-Mineral Bone Disease (CKD-MBD)

What is renal bone disease?

CKD-MBD (previously called renal bone disease) occurs when the kidneys fail to maintain the proper levels of calcium, phosphate, vitamin D and parathyroid hormone (PTH) in the blood. Calcium and vitamin D tend to be low, and phosphate and PTH high.

CKD-MBD affects most patients with kidney failure: predialysis patients with chronic kidney disease or those on dialysis. Transplant patients whose transplant is working well can control the problem, but it can worsen again if the transplant fails. CKD-MBD never goes away completely.

What causes CKD-MBD?

Healthy kidneys activate vitamin D into a form that helps the body absorb calcium from the bowel. If activated vitamin D levels drop too low, less calcium is absorbed from the diet, and blood calcium levels fall. The kidney also removes phosphate from the body, so in renal failure phosphate tends to accumulate, and levels rise in the blood. This means that calcium tends to be low and phosphate high, in renal failure. This causes four small glands in the neck – the parathyroid glands – to release a hormone known as parathyroid hormone (PTH). PTH draws calcium from the bones to raise blood calcium levels, resulting in weakened bones.

What are the symptoms?

In the early stages of CKD-MBD there may be no symptoms; only blood tests can diagnose the condition. If untreated, the bones become brittle and painful. Later on, fractures can occur, even after minor strains or injuries to the bones (e.g. after falling over). CKD-MBD can also affect the heart, when small blood vessels become furred up with calcium.



How is it diagnosed?

CKD-MBD can be suspected if:

- Blood calcium level is low
- Blood phosphate level is high
- Blood parathyroid hormone (pth) is high

Note: be sure to ask your doctor what your values for calcium, phosphate and PTH are, what they should be and how you can make them better if need be.

When does CKD-MBD begin?

CKD-MBD may develop in the early stages of kidney disease; for example, in CKD Stage 2 when you still have 60–90% of your normal kidney function. CKD-MBD worsens as kidney disease progresses. End-stage renal disease (ESRD), the point at which dialysis or a kidney transplant becomes necessary, doesn't occur until you have only about 10% of your kidney function remaining. Nearly everyone with ESRD has CKD-MBD, and will need treatment.

What's the treatment?

Reducing dietary intake of phosphate is most important in preventing CKD-MBD.

Also, tablets called phosphate binders – such as calcium carbonate, calcium acetate, aluminium hydroxide, lanthanum or sevelamer – are often prescribed. It is essential that these tablets are taken with meals (and snacks) to bind phosphate in the bowel. Phosphate is then removed in the stools.

If this does not work, a person can be prescribed a synthetic form of vitamin D such as alfacalcidol, calcitriol or paricalcitol. Newer drugs available now include cinacalcet.

Being on dialysis will also help to correct the problem, as it removes phosphate from, and puts calcium into, the blood. If this is not enough, increasing the amount of dialysis a patient receives can improve CKD-MBD control.

Parathyroidectomy

If PTH levels cannot be controlled, the parathyroid glands may need to be removed with an operation.