

# Mineral and Bone Disorder



## Explain How Kidney Disease Affects Bones

- To keep bones strong and healthy new bone replaces old layers of bone every day. This is called “bone turnover.”
- Kidney disease changes the normal process of bone turnover. It affects how your body releases important hormones that help keep your bones strong.
- The kidneys also have a hard time keeping important minerals like phosphorus and calcium in balance.



## Explain How Calcium and Phosphorus Affect Bone Health

- Most of the body’s calcium and phosphorus are in bones.
- Healthy kidneys help to keep the right level of calcium in your body and get rid of the phosphorus you don’t need.
- Mineral and bone disorder happens when the kidneys cannot keep the right amounts of calcium and phosphorus in your blood.



## Explain Why Vitamin D Is Important For Bone Health

- Vitamin D helps your body balance phosphorus and calcium.
- Healthy kidneys change the vitamin D you get from sunlight and the foods you eat into active vitamin D.
- Kidney disease leads to low blood levels of active vitamin D.
- Without active vitamin D, people with mineral and bone disorder can’t keep the right balance of calcium and phosphorus in the body. Calcium will be too low and phosphorus will be too high.



## Explain Why Parathyroid Hormone Is Important For Bone Health

- Parathyroid hormone (PTH) is another hormone that helps to keep the right balance of calcium in the bones and in the blood.
- When the level of phosphorus in the blood goes up and the blood levels of vitamin D and calcium go down, your body makes too much PTH.
- High PTH causes calcium to leave your bones and go into your blood.
- As more and more calcium leaves your bones, they become weaker and more brittle. They may also be painful and break more easily.



## Explain How Mineral and Bone Disorder May Be Connected to Heart Problems

- Mineral and bone disorder may also cause minerals like calcium and phosphorus to build up in your heart and blood vessels.
- As a result, your heart and blood vessels can become stiff and narrow.
- This may cause or worsen heart disease or increase your chances for a stroke or even death.

## Explain Which Blood Tests are Important To Follow (Include individual goals and frequency)

Blood Test	Reference Range	CKD G3a-G3b	CKD G4
Calcium	9.0-10.5 mg/dL	6-12 months	3-6 months
Phosphorus	3.0-4.5 mg/dL	6-12 months	3-6 months
Intact PTH	10-65 pg/mL	as needed	6-12 months
25(OH)D	30 ng/mL or greater	measure and repeat testing depending on baseline	

## Explain How Mineral and Bone Disorder Is Treated

- Diet and certain medicines may help slow down the loss of bone and the buildup of minerals in blood vessels and the heart.
- Treatment will be based on the results of your blood tests and how quickly the results change. If the results change over time, your treatment may change.
- Finding and treating mineral and bone disorder early will help you keep your bones and heart healthy.

## Explain Which Treatments Replace Active Vitamin D

- There are several types of vitamin D choices available:
  - Nutritional vitamin D is found in drug stores or vitamin shops. This type of vitamin D works to increase blood vitamin D levels. Its effects may be limited depending on your level of kidney function.
  - Active vitamin D does not need the kidneys to make it active. This type of vitamin D works to decrease PTH levels. Because it is stronger it may cause higher blood calcium levels.
  - Extended release vitamin D is a prohormone that is changed to the active form of vitamin D. This type of vitamin D works to gradually increase blood vitamin D levels and decrease blood PTH levels.
- Because each type of vitamin D is a little different, we will help choose the type that is best for you.

## Explain Why a Lower Phosphorus Diet Is Important

- People with mineral and bone disorder need to choose foods that are lower in phosphorus. Check with your dietitian about what you need to do to change your diet.
- Limit foods naturally high in phosphorus, such as milk and milk products.
- Phosphate additives tend to raise blood phosphorus levels. This is because this type of phosphorus is easier for your body to “soak up” than the phosphorus found naturally in foods.
- Phosphorus additives are in most processed and fast foods. Avoiding these foods will help control your blood phosphorus level.
- Read food labels to see if they contain phosphorus additives. You might see words like “sodium phosphate” or “pyrophosphate.” Look for any ingredients that have a word with “PHOS” in it.
- Shop the outer aisles of your grocery store to select fresh foods that have not been processed.



National  
Kidney  
Foundation®

30 East 33rd Street, New York, NY 10016  
800.622.9010 | [kidney.org](http://kidney.org)

This education tool was supported by

**OPKO**  
Renal