Bone disease and chronic kidney disease
People with chronic kidney disease commonly develop problems with their bones. The bones tend to become weak, which causes them to break easily or to begin to hurt. Fortunately, there are some effective methods of treating bone disease, or preventing or minimizing its effects.

Who is at risk?

It is common for people with chronic kidney disease to have problems with their bones, particularly as kidney function declines. Bone problems may also be present in older people and in women who have had their menopause. In these cases, other factors besides kidney disease may also affect the bones.

Are there different types of bone disease associated with kidney disease?

Yes. Normal bone is continually replacing itself. The two types of bone disease are high turnover, where bone is too active and low turnover, where bone is not active enough to keep the bones healthy.
The most common types of bone disease occur when the levels of phosphorus, calcium and Parathyroid hormone (PTH) in your body are not properly balanced. This can happen for a number of reasons such as a change in the way the body processes Vitamin D and removes phosphorus. Let us look at these conditions in more detail.

1. **Phosphorus levels are too high**

Phosphorus is found in most foods you eat and whatever is not needed by the body is usually removed by your kidneys. When your kidney function decreases, the levels of phosphate in the body start rising. Too much phosphorus in your blood is a major factor in causing bone disease in people with kidney disease.

To help prevent phosphorus from building up in your blood, you can eat foods that are low in phosphorus. Your doctor can refer you to a renal dietitian who can advise you about healthy food choices, including a diet that is low in phosphorus. Your doctor may also prescribe phosphate binders – these are medications that are usually taken with your meals to bind the phosphate in your food to keep it from being absorbed.
2. **Parathyroid glands are too active**
While phosphorus stays in your body when your kidneys can no longer remove it, calcium levels of the blood tend to drop. The combination of high phosphate and low calcium causes the parathyroid glands (four small glands in your neck) to become overactive and secrete too much hormone which affects bone. When this happens over a long period of time it may cause your bones to weaken or become painful.

This problem can usually be helped by changes in your dialysis treatments, by following an eating plan that is low in phosphorus, and by taking calcium, Vitamin D, or certain medications to decrease the PTH levels. Sometimes surgery is needed to remove some of these PTH glands.

3. **Your body uses Vitamin D differently**
Vitamin D is a mineral that is important to healthy bones because it affects your calcium balance. Normally, Vitamin D from the action of sunlight on your skin, the food you eat, and vitamin and mineral supplements is changed by the kidneys into an "active" form that can be used by the body. When your kidneys are no longer working well, they cannot do this important job. Fortunately, “active” forms of Vitamin D are available as a medication and can be prescribed by your doctor if needed.
4. Aluminum in your bones

In the past, people with chronic kidney disease were given aluminum to bind phosphate. In some, the long-term use of aluminum-containing medications led to bone problems. Now, aluminum-containing phosphate binders are not used as much, but can still be good at decreasing phosphorous levels on occasion. Your doctor can provide you with more information if you need to take aluminum-containing phosphate binders.

■ How do I know what type of bone disease I have?

Your doctor will find out what type of bone disease you have by examining you and doing certain blood tests. In some cases, a bone biopsy may also be needed. A bone biopsy involves taking a small sample of your bone, usually from a hip, and checking it under a microscope. These tests help the doctor decide what type of bone disease you have and what treatment is best for you.
What are some of the treatments?

Treatment may include one or more of the following:

- Reducing the amount of phosphorus you eat
- Taking medications called phosphate binders
- Taking medication with the active form of Vitamin D
- Taking calcium supplements
- Changes in your dialysis treatment
- An exercise program approved by your doctor
- Taking a medication to decrease the PTH level, or an operation to remove some of the parathyroid glands

How can I help prevent or minimize the effects of bone disease?

Make healthy food choices

You can help to prevent the amount of phosphorus in your blood from becoming too high by reducing the amount of phosphorus you eat. Foods high in phosphorus include dairy products such as milk and cheese, dried beans and peas, nuts and peanut butter, and beverages such as cocoa, colas and beer. A good way to reduce the amount of phosphorus you eat is to use non-dairy creamers and recommended milk substitutes. Your renal dietitian will help you make a healthy
eating plan to reduce phosphorous and to ensure you have good overall nutrition.

**Exercise**
Many people with kidney disease have found that an exercise program helps to increase strength and energy. In some people, exercise helps to strengthen bones, so exercise may be important to help you maintain healthy bones. You should speak to your doctor before beginning an exercise program. Your doctor can recommend an exercise program that is right for you.

**Use the medications as recommended**
In order to prevent and treat bone disease, it is important for you to take phosphate binders and “active” Vitamin D, and other medications as they are prescribed.

■ Will a kidney transplant help my bones?
A successful kidney transplant may help your bones to heal from damage that might have occurred when your kidneys were not working well. However, the cortisone-like medication taken by people with kidney transplants can cause serious problems for the bones. Your doctor will carefully monitor how your bones are doing after a kidney transplant by performing different tests, such as X-rays.
The Kidney Foundation

OUR VISION
Kidney health, and improved lives for all people affected by kidney disease.

OUR MISSION
The Kidney Foundation of Canada is the national volunteer organization committed to reducing the burden of kidney disease through:

- funding and stimulating innovative research;
- providing education and support;
- promoting access to high quality healthcare; and
- increasing public awareness and commitment to advancing kidney health and organ donation.

Since 1964, our fundraising campaigns have allowed us to contribute millions of dollars to research, and to provide services to individuals living with chronic kidney disease and related conditions.

For further information, or if you wish to help us in our efforts, please contact The Kidney Foundation of Canada office in your area. You can also visit our Web site at www.kidney.ca.

This brochure has been adapted with permission from the National Kidney Foundation Inc., (USA), from their publication entitled "Bone Disease and Chronic Kidney Disease"©. With acknowledgement to Dr. Steven D. Soroka, Medical Director of Hemodialysis and Associate Professor at Dalhousie University in Halifax, Nova Scotia, for his assistance in reviewing this information.

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