

Bone Sarcomas

Information for people with cancer

This information should not be used to diagnose yourself or in place of a doctor's care.

Bone sarcomas are cancers that start in the bone. They are also called primary bone cancers.

There are 206 bones in the human body. They give the body structure and protection. Bone sarcomas can develop in any bone in the body but are most common in the leg and arm bones.

Cancer that has spread to the bone from another part of the body is called secondary bone cancer. For more information: www.bccancer.bc.ca/health-info/types-of-cancer/bone-soft-tissue/bone-secondary

Diagnosis and Staging

What are the signs and symptoms of bone sarcomas?

Diagnosing bone sarcomas is difficult because the symptoms are similar to those for bone injuries, bursitis (inflammation of fluid-filled sacs called bursae), arthritis (inflammation of joints) and non-cancerous bone tumours.

Symptoms will be different depending on the type of sarcoma and where it is in the body.

Bone sarcoma symptoms can include:

- Pain in bone or joint.
- Swelling.
- Fever.
- Bone fractures (cancerous tumours can make bones weak).

If you have any signs or symptoms that you are worried about, please talk to your family doctor or nurse practitioner.

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How is bone sarcoma diagnosed?

Tests that may help diagnose bone sarcoma include:

- **Physical exam**
- **X-ray:** to help find the tumour.
- **Chest X-ray:** to see if cancer has spread to the lungs
- **CT (computed tomography) scan:** to show the tumour in more detail and to check if cancer has spread to your lungs.
- **MRI (Magnetic Resonance Imaging):** to show the tumour in more detail.
- **Biopsy:** a small amount of tissue from the tumour is removed so that a specialist (pathologist) can examine it under the microscope and see if it is cancer.
- **Bone scan:** to show the tumour and see if cancer has spread.

For more information on tests used to diagnose cancer, see our Recommended Websites - Screening and Diagnosis section: bccancer.bc.ca/our-services/services/library/recommended-websites/screening-and-diagnosis-websites

What are the types of bone sarcoma?

Bone sarcomas are named after the tissue type they most look like.

More common bone sarcomas:

Osteosarcoma

- Most common.
- Often develops in the growing ends of the long bones of the arms and legs, such as at the knees or shoulders.

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- Most commonly found in adolescents (children who are about 10-19 years old). May be related to growth spurts.
- Slightly more common in males than females. [See note below, Statistics]
- Can also affect older adults.
- Can spread to the lungs and other parts of the body through the bloodstream.
- Does not usually spread to the lymph nodes.

Chondrosarcoma

- Grows in cells that make cartilage.
- Most often found in older adults.
- Most common symptoms are bone swelling and pain.

Ewing's sarcoma

- Tumours that develop in the bone or soft tissue.
- Ewing tumour of the bone is a specific type of Ewing's sarcoma.
- Very aggressive.

Less common bone sarcomas:

Chordoma

- Rare
- Grows at the end of the spinal cord or near the base of the skull.
- Pain near the end of the spinal cord is a common symptom for tumours in that area.
- Tumours growing at the base of the skull may affect the cranial nerves. Most commonly, this can affect your vision.
- Symptoms may last for many months before a diagnosis.
- Grow very slowly.

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Malignant Fibrous Histiocytoma (MFH) of the bone

- Rare.
- Can sometimes grow from an osteosarcoma.

Peripheral Neuroectodermal Tumour (PNET)

- More common in children.
- Same genetic change as Ewing's sarcoma of the bone.

Myeloma, Lymphoma

- Cancers of the bone marrow.
- For more information on these cancers: www.bccancer.bc.ca/health-info/types-of-cancer/blood-lymphoid

What are the stages of bone sarcoma?

Staging describes the cancer. Staging is based on how much cancer is in the body, where it was first diagnosed, if the cancer has spread and where it has spread to.

The stage of the cancer can help your health care team plan your treatment. It can also tell them how your cancer might respond to treatment and the chance that your cancer may come back (recur).

The grade of bone cancer describes how the tumour cells look under the microscope:

- **G1:** Low grade. The tumour looks more like normal bone.
- **G2:** Intermediate grade – treated as high grade
- **G3:** High grade. The tumour looks very different from normal bone.

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Bone sarcoma staging:

- **Stage 1A:** Tumour is 8 cm or smaller and low grade.
- **Stage 1B:** Tumour is larger than 8 cm or there are tumours in many parts of the same bone (discontinuous tumours). Low grade.
- **Stage 2A:** Tumour is 8 cm or smaller and high grade.
- **Stage 2B:** Tumour is larger than 8 cm and high grade.
- **Stage 3:** Tumours in many parts of the same bone and high grade.
- **Stage 4:** Cancer has spread to other parts of the body such as the lungs, brain other bones or lymph nodes. Metastatic bone cancer. Can be low or high grade.

For more information on staging, see our About Cancer page:

bccancer.bc.ca/health-info/types-of-cancer/about-cancer

Treatment

What is the treatment for bone sarcoma?

Cancer treatment may be different for each person. It depends on your particular cancer. Your treatment may be different from what is listed here.

The most important treatment is to try and remove the entire tumour with surgery. If possible, the part of the bone that is removed will be reconstructed so that the limb (arm or leg) does not have to be amputated (removed by surgery).

Some tumours, such as osteosarcomas and Ewing's sarcomas, may be treated with systemic therapy (chemotherapy). The goal of systemic therapy is to stop the cancer from spreading to other parts of the body. Systemic therapy is often given before surgery.

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For more information about systemic therapy go to:

[bccancer.bc.ca/our-services/treatments/systemic-therapy-\(chemotherapy\)](http://bccancer.bc.ca/our-services/treatments/systemic-therapy-(chemotherapy))

What is the follow-up after treatment?

- Follow-up testing and appointments are based on your type of cancer.
- Guidelines for follow-up after treatment for Bone Sarcoma are on our website: www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-management-manual/musculoskeletal-cancer-sarcoma/musculoskeletal-and-sarcoma
- These are guidelines written for your doctor, nurse practitioner or specialist. You can look at them to see what appointments and tests you might need after treatment.
- After treatment, you may return to the care of your family doctor or specialist for regular follow-up. If you do not have a family doctor, please talk to your BC Cancer health care team.
- **Follow-up tests and appointments for low risk bone sarcomas:**
 - For the first 5 years after treatment, you should see your doctor every 4 to 6 months. You may also need a chest x-ray or a CT scan.
- **Follow-up tests and appointments for high risk bone sarcomas:**
 - For the first 2-3 years after treatment, you should see your doctor every 3 to 4 months. After that, you should see your doctor every 6 months. After 5 years, you should see your doctor one per year.
- The BC Cancer Life after Cancer page has information on issues that cancer survivors may face: bccancer.bc.ca/lifeaftercancer

More Information

What causes bone sarcoma and who gets it?

These are some of the risk factors for this cancer. Not all of these risk factors may cause this cancer, but they may help the cancer start growing.

- Past radiation therapy.
- Paget's disease: a non-cancerous bone condition where parts of the skeleton grow quickly, break down and then re-grow very fast.
- Having an abnormality in tumour suppressor genes, such as the retinoblastoma (Rb) gene or the p-52 (p-glycoprotein) gene. Tumour suppressor genes stop cells from dividing too quickly. If these genes are not working properly, cells can grow out of control and lead to cancer.
- Fibrous dysplasia: bone disease that destroys and replaces bone with fibrous bone tissues.
- Familial endochondromatosis: non-cancerous growth in the cartilage of hands and feet.

Statistics on bone sarcoma:

- B.C. statistics: www.bccancer.bc.ca/health-info/disease-system-statistics/statistics-by-cancer-type
- Canada statistics: www.cancer.ca/en/cancer-information/cancer-type/bone/statistics/?region=bc

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Note: Available statistics do not have information about the inclusion of transgender and gender diverse participants. It is unknown how these statistics apply to transgender and gender diverse people. Patients are advised to speak with their primary care provider or specialists about their individual considerations and recommendations.

Can I help prevent bone sarcoma?

There is no known way to prevent bone sarcoma.

Is there screening for bone sarcoma?

There is no screening program for bone sarcoma.

Where can I find more information?

- If you have questions about bone sarcoma, please talk to your health care team.
- Our librarians can help you find the information you need. Visit our Library page: bccancer.bc.ca/our-services/services/library
- BC Cancer Library Recommended Bone Sarcoma Websites: bccancer.bc.ca/our-services/services/library/recommended-websites/types-of-cancer-websites
- Managing Your Symptoms: www.bccancer.bc.ca/health-info/coping-with-cancer/managing-symptoms-side-effects
- Emotional Support: www.bccancer.bc.ca/health-info/coping-with-cancer/emotional-support