

## OSTEOSARCOMA

Osteosarcoma is a very common bone tumor found most frequently in large and giant breed dogs. The most common locations for these tumors include the distal radius (“wrist”), the shoulder, or just above or below the stifle (“knee”). These tumors are locally aggressive and cause significant bone pain. The weakened bone can also break (fracture) and this diseased bone cannot heal even with repair of the fracture. We often have a very high suspicion for osteosarcoma based upon the commonness of this tumor, the breed, and the location and appearance of the tumor on x-rays. Fungal infection of the bone can appear similar on x-rays, although this is rarely seen.

These tumors also have a high metastatic rate (very likely to spread), most commonly to the lungs and rarely to other bones or skin. Chest x-rays and a thorough orthopedic examination are recommended to rule out metastasis. Other tumor types that can appear similar and affect the bone are chondrosarcoma, fibrosarcoma, histiocytic sarcoma, and multiple myeloma.

Regardless of the tumor type, the primary treatment to alleviate pain and limping is with limb amputation. A biopsy would then be performed on the tumor once it is removed to determine the tumor type, and thus determine the best therapy and prognosis. A biopsy can be performed first (before amputation) to confirm our suspicions, but this procedure can be very painful, can result in a pathologic fracture of the diseased bone, and often does not change our recommendations for the amputation in a painful and limping patient.

The primary treatment recommendations for patients with osteosarcoma is limb amputation and follow-up chemotherapy. Although an amputation surgery appears very aggressive, our canine patients tolerate this adjustment very well. The vast majority of dogs will adapt very well after limb amputation and most will return to normal activities, often including playing, running, and swimming.

Even though amputation removes the tumor and the pain, it will not prevent spread of the disease to the lungs or other bones. While the chest radiographs (x-rays) prior to surgery may not show any signs of metastases, approximately 90-95% of dogs with osteosarcoma have micrometastases (microscopic spread of disease) at the time of diagnosis, and it is therefore highly likely that lung metastasis will become apparent in the future. A small percentage of dogs (less than 10%) can also have metastasis to other bones. We attempt to slow the growth of these metastatic cells by giving chemotherapy after the amputation surgery. The most commonly used chemotherapy drugs are carboplatin and doxorubicin. With amputation in addition to chemotherapy, the average survival time is approximately one year. Without chemotherapy and only surgery, most dogs will have metastatic disease to their lungs in 4-6 months after amputation.

The other option for osteosarcoma patients is opting not to amputate the limb and pursue palliative therapy, which is centered on treating the pain associated with the cancer and maintaining a good quality of life for the pet. These therapies can only provide temporary relief from the pain. The palliation of pain

can be with medications and/or palliative radiation therapy. Oral pain medications can be prescribed to provide a temporary benefit (weeks to a few months), although these may not be effective at fully controlling the pain and maintaining mobility. Intravenous treatments such as bisphosphonates (i.e. zoledronate) have been given to dogs to help control pain, but with variable responses. Palliative radiation therapy can sometimes reduce the size of the tumor by slowing growth of the cells and killing some cancer cells. It also can reduce pain by killing some of the periosteum (bone lining nerve cells) which is a strong source of pain. This treatment option is temporary though, and the pain often returns when the tumor and the periosteum begin to regrow. Chemotherapy is used to delay the onset of metastatic disease, but chemotherapy treatments do not help control pain or slow the progression of the large bony tumors if amputation is not elected. The overall prognosis for pets on palliative treatment is variable, but usually ranges from 2-4 months depending on severity of pain, limitations on mobility, and presence of metastasis.

Additionally, if an amputation is not elected, there is a risk of fracture of the diseased bone at any time due the severe weakening from the cancer. If this were to happen, it would necessitate emergency amputation or humane euthanasia since the fracture cannot heal and living with a broken bone is severely painful.

Please remember that each patient is an individual and can have variable presentations of their cancer and responses to treatment. Specific details and recommendations for your pet can be discussed in detail during a consultation with the oncologists at the Animal Cancer Center of Texas.