

# Osteosarcoma: Bone Cancer in Dogs

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One of the most disheartening diagnoses I encounter is osteosarcoma. It's a painful and aggressive form of [bone cancer](#) that has an affinity for growing within the leg bones of large and giant-breed [dogs](#). Less commonly, osteosarcoma occurs within the bones of the skull or spine. Although older dogs are primarily affected, dogs of all [ages](#) can develop osteosarcoma.

While I have the ability to improve my patient's quality of life for a period of time, with rare exception, a cure for this [disease](#) will not be possible. By the time the dog begins favoring the [painful leg](#), microscopic cancer cells will have already spread, typically to the lungs or other bony sites. Sooner or later these tiny clusters of cells will grow into metastatic [tumors](#) that will ultimately become life ending.

### Symptoms of bone cancer

The most common symptom associated with osteosarcoma is [lameness](#). Lameness caused by osteosarcoma is typically mild at the onset, but then progresses over time. The level of [pain](#) can morph quickly from mild to severe if the diseased bone suddenly develops a crack (microfracture) or a full, bony break.

### Diagnosis of bone cancer

The diagnosis of osteosarcoma is suspected based on characteristic changes seen on [x-rays](#) or a computed tomography scan (CT) of the affected body part. A definitive diagnosis is made based on bone biopsy results.

### Treatment options for bone cancer

Once the diagnosis of osteosarcoma has been made, there's a great deal to be gained from consulting with a [veterinarian who specializes in oncology](#) to discuss the overall treatment plan. If [surgery](#) is part of your dog's therapy, you may be referred to a surgical specialist. Surgery is the key component treatment for osteosarcoma. Treatment options for bone cancer

include the following:

#### Surgical amputation

The most commonly recommended treatment for osteosarcoma is amputation (surgical removal) of the affected limb. For the uninitiated, amputation may seem like an overwhelmingly radical next step. However, those experienced with [three-legged dogs](#) know that most of them adapt quickly and amazingly well, both physically and emotionally, to their newfound tripod status. The caveat here is that in order for amputation to be successful, the dog's other three limbs must be strong, sturdy and free of disease such as significant [arthritis](#).

- **Why perform such an aggressive surgery, when the result will not be curative?** The answer is simple. Osteosarcoma is a dreadfully painful disease. A primary goal of therapy is elimination of that pain with restoration of a good quality of life. Amputation has the ability to accomplish both of these objectives.
- **Is amputation the right choice for every patient with osteosarcoma?** No way! The elderly [German Shepherd](#) who has been a couch potato, because of severe arthritis in multiple joints, is very unlikely to adapt well to life as a three-legged dog. Conversely, the older [German Shorthaired Pointer](#) who has been a lean, mean, running machine will very likely be back to all of his usual tricks within a couple of weeks following surgery.

If ever you must consider amputation for your dog, it is imperative that together, you and your veterinarian do some significant soul searching to determine if this surgery makes good sense.

#### Limb-sparing procedure

Another surgical option for the treatment of osteosarcoma is referred to as limb sparing. This involves removal of the portion of the bone that contains the tumor, without removal of the entire limb. Not all dogs are appropriate candidates for this surgery, as the tumor must be located in just the right spot within the bone. Compared to amputation, limb-sparing surgery is technically more difficult, significantly more expensive and requires a longer period of recovery and confinement. Limb-sparing surgery is certainly worthy

of discussion as an alternative to amputation.

### Chemotherapy

Chemotherapy (the administration of cancer fighting drugs) is recommended as treatment, only following surgery. It can stave off the growth of the microscopic metastasis, those cancer cells that have already managed to spread by the time of diagnosis. As a "stand alone" treatment (administered without surgery), chemotherapy is woefully ineffective at battling the primary cancerous growth.

The chemotherapy drugs most commonly used to treat osteosarcoma following surgery are carboplatin and doxorubicin. Average survival time following the administration of either drug is approximately 290 days, [according to a journal of veterinary internal medicine article](#). For surgery alone (no chemotherapy), the average survival time is approximately six months.

Dogs tend to tolerate chemotherapy far better than we do. Rarely do they experience significant [hair loss](#), [vomiting](#) or [loss of appetite](#).

### Other treatment options for bone cancer

When surgery is not an option, other therapies may effectively reduce the pain associated with osteosarcoma. A few treatments of [radiation](#) therapy can do wonders and nonsteroidal anti-inflammatory [medications](#), narcotics and a class of drugs called biphosphanates are all reasonable options for mitigating discomfort and enhancing quality of life.

### Prevention of bone cancer

Several dog breeds are highly predisposed to developing osteosarcoma. Breeders of [Rottweilers](#), [Irish Wolfhounds](#), [Great Danes](#), [Saint Bernards](#), [Doberman Pinschers](#), [Labrador Retrievers](#), [Golden Retrievers](#), [Greyhounds](#), [Samoyeds](#), [Akitas](#) and [Siberian Huskies](#) should pay close attention with the hopes of altering any inheritance patterns of this deadly disease.

Some fascinating research, available through the [American Association for Cancer Research](#), involving Rottweilers documented that individuals [neutered](#) before one year of age had significantly increased risk

of developing osteosarcoma later in life<sup>5</sup>. This information is truly compelling and gives rise to a number of other questions. Does this data apply to other breeds? Does the timing of neutering affect development of other types of cancer? When is the ideal time to neuter Rottweilers and other large and giant breeds? Future research may answer some of these questions.

Keep in mind that neutering early could also potentially offer health benefits. Before making a decision, you should have a thoughtful discussion with your veterinarian about the pros and cons.

### Osteosarcoma vaccine

[Dr. Nicola Mason](#) from the [University of Pennsylvania School of Veterinary Medicine](#) has been using cancer immunotherapy to treat dogs with osteosarcoma. She devised a [vaccine](#) consisting of modified bacteria, [according to the Penn State page](#).

Dogs who have been treated with the osteosarcoma vaccine have experienced a median survival time of between 200 and 300 days. Of the first five dogs vaccinated, four are still alive and have survived between 500 and 590 days. There have been no complications observed with the vaccine<sup>3</sup>. Based on these promising results, the clinical trial using this vaccine will be extended to the veterinary teaching hospitals at [Colorado State University](#) and the [University of Florida](#). To learn more about the clinical trial, contact Dr. Mason's research team<sup>4</sup>.

### Questions to ask your veterinarian

- Is it certain that my dog has osteosarcoma?
- Is there already clear evidence of cancer spreading?
- What are the pros and cons of the various treatment options as they pertain to my dog?
- What can we do to ensure that my dog is comfortable?
- Can you refer me to an oncologist for consultation?

*If you have any questions or concerns, you should*

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*always visit or call your veterinarian -- they are your best resource to ensure the health and well-being of your pets.*

## Resources:

1. [Selmic L.E., Burton J.H., Thamm D.H., Withrow S.J., and Lana S.E. "Comparison of Carboplatin and Doxorubicin-Based Chemotherapy Protocols in 470 Dogs after Amputation for Treatment of Appendicular Osteosarcoma." \*Journal of Veterinary Internal Medicine\*. 10 Feb. 2014](#)
2. [Mason, Nicola, Dr. "Osteosarcoma Vaccination Research at UPenn." \*Penn Vet Working Dog Center\*.](#)
3. ["Dr. Nicola Mason Bone Cancer Vaccine Update." \*Webcanine.com\*. 01 Nov. 2013. Web.](#)
4. ["Canine Osteosarcoma." \*Penn Vet. Web\*.](#)
5. [Cooley, Dawn M., Benjamin C. Beranek, Deborah L. Schlittler, Nita W. Glickman, Lawrence T. Glickman, and David J. Waters. "Endogenous Gonadal Hormone Exposure and Bone Sarcoma Risk." \*Cancer Epidemiology, Biomarkers & Prevention\*. 04 July 2002.](#)