



MLO in Dogs

What is MLO?

- MLO stands for “multilobular osteochondrosarcoma”. It is also sometimes called multilobular osteochondroma, or multilobular tumor of bone.
- This is a kind of cancer that starts in the bone.
- MLO can occur in dogs of any age or breed, but is most commonly seen in middle-aged to older dogs, and is more common in large breed dogs.
- MLO most commonly grows on the head, including skull bones, and the jaws. It can also occur on in other places, like the ribs.
- Symptoms depend on where the tumor is growing, but commonly include pain, a noticeable bump, difficulty eating, excessive salivation, and neurologic symptoms (such as seizures).
- Because these tumor contain bone, they usually feel very firm. MLO is usually suspected based upon its typical location, and appearance on imaging studies [such as X-rays and CAT scans] (these tumors are sometimes called “popcorn ball tumors” due to their appearance). Diagnosis can be confirmed with a biopsy.
- Usually symptoms are due to the tumor that is growing on the head. But MLO can also spread to other parts of the body (through a process called metastasis). The lungs are the most common side of spread. This can be detected with chest X-rays, or a CAT scan (also called a CT scan). Such testing should be performed before devising a treatment plan for your pet.

Can MLO be removed with surgery?

Surgery is the most effective treatment option for some MLO. Usually they need to be relatively small in order to be safely removed by surgery. Significant growth that compresses the brain can also make surgical removal difficult.

- When tumors are removed by surgery, samples will be sent to the lab. The lab will evaluate 2 things:
 - Grade: low grade tumors can often be cured with surgery alone. Intermediate and high grade tumors have a higher risk of growing back after surgery. They also have a higher risk of spreading to other parts of the body.
 - Margins: if the margins are ‘clean’, then surgery may be all your pet needs to prevent local tumor regrowth, and continued monitoring of the area for the remainder of your pet’s life may be all that is recommended. If the margins are ‘narrow’ or ‘dirty’ (meaning that some tumor cells are likely remaining in your pet), the tumor is more likely to grow back and additional treatment to try to prevent regrowth may be recommended.

- **Adding Full-Course Radiation Therapy After Surgery**

Full-course radiation therapy is typically delivered once a day, 5 treatments per week (Monday through Friday), for 3.5 - 4 weeks (total 18-20 treatments). A CT scan will help to map out the radiation. This treatment may be recommended after surgery when margins are 'narrow' or 'dirty', and in some cases, when the grade is high. This treatment is intended to clean up microscopic (invisible) cancer cells left behind after surgery that could otherwise be the source of tumor regrowth.

- **Adding Chemotherapy After Surgery**

- Chemotherapy may be recommended for intermediate-to-high grade MLO, to decrease the risk of metastasis. Chemotherapy is typically started after surgery and/or radiation therapy.
- Chemotherapy has not been studied as either an alternative to surgery, or radiation therapy.

What if I don't want to do surgery, or if surgery isn't possible for my dog?

SRT (Stereotactic radiation therapy, also commonly referred to as SRS, radiosurgery and/or Cyberknife-type therapy) is the newest and most convenient treatment available for treatment of many bulky (visible) cancers.

- SRT is considered to be treatment of choice for dogs with MLO if the cancer is not going to be removed with surgery.
- SRT is typically delivered by 3 daily treatments, and requires a CT scan for treatment planning.
- SRT is safe for most dogs. Side effects are uncommon.
- SRT doesn't cause all MLO to shrink, but even if that doesn't happen, SRT can halt the tumor's growth for a period of time.
- In our experience, the average MLO will start to grow again, about 8 months after SRT.
- If you're interested, be sure to ask your radiation oncologist whether they think SRT could be a safe and effective option for your pet.
- Note that SRT cannot be used after surgery; it can only be used in lieu of surgery!

Facts about radiation therapy

Performed on an outpatient basis.

- Patients typically arrive at the hospital in the morning. Families are called and come pick their pet up after they have received that day's treatment. This is often in the afternoon.
- If you are coming from a distance, talk with our nursing staff to discuss the logistics of having your pet board at the hospital during radiation therapy. Please note that this type of treatment requires a time commitment of approximately 7-12 business days (note the time required for radiation treatment planning, above) and that treatments will NOT be started on the day of the appointment.

Short-term side effects are usually mild and temporary.

- Thanks to the new radiation technologies and techniques used in SRT, patients treated with SRT typically experience none or very mild short term side effects.
- When patients are treated with full-course radiation therapy (after surgery), side effects may include temporary discomfort, irritated skin, and hair loss, but the doctors and nursing staff will make sure your pet is as comfortable as possible during and after treatment. Also, those short term side effects typically heal with appropriate care in several weeks after completion of radiation therapy.

Long-term side effects are possible, but quality of life is usually very good.

- These long-term side effects are uncommon, and they take many months (or even years) to develop.
- The exact types of side effects that might occur depend on where the tumor is located. If you opt to proceed with radiation therapy, your radiation oncology team will discuss these risks, in depth.

How much does it cost?

- The total cost is different for each patient.
- Treating MLO with one of the radiation therapy protocols involves:
 - Consultation with a radiation oncologist (in-person, this is the day of your initial appointment)
 - Tests to help map out the treatment, including a CT scan of the affected area (typically performed within a day or two of your initial appointment).
 - Treatment planning, performed by the radiation oncologist (takes 2-5 business days, after the CT scan has been acquired).
 - Quality assurance testing, performed by a medical physicist (performed after the plan is completed, usually within 1 day),
 - Anesthesia and treatment delivery.
- The total cost is usually between \$6,000 and \$7,000.
 - It may be higher if your radiation oncologist recommends any additional tests. All fees are also subject to periodic review/change by hospital administration.

About Us

Board-Certified Radiation Oncologists: Veterinarians on faculty at NC State College of Veterinary Medicine who have extensive training in cancer diagnosis/management, and radiation therapy. The radiation oncologists directly oversee all activities relating to your pet's cancer care.

Radiation Oncology Residents: Veterinarians who are training to become radiation oncologists.

Medical Physicists: Physicists who assure the safe and effective delivery of radiation to patients.

Radiation Therapists: Allied health professionals who operate radiation therapy equipment and deliver treatments.

Nursing Staff: Licensed veterinary technicians assist the radiation oncologists and therapists in almost aspects of your pet's cancer care, and are a vital part of the team.

Anesthesiology Staff: Our anesthesiologists are licensed veterinary technicians who work with board-certified veterinary anesthesiologists to make sure your pet is as safe as possible while anesthetized for radiation therapy.

Hours: 7:30am to 4:30pm, Monday through Friday

Consultations: Call (919.513.6690) or visit our reception desk to make an appointment.

Scheduling: Your radiation oncology team will work with you to develop a plan, but we generally ask that patients are:

- Dropped off between 7:30 and 8:30am
(except Wednesdays, when it is 7:30am - 8:05am, or 9:15am - 9:45am)
- Picked up by 4:30pm

Radiation Oncology

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