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Panosteitis vs Hypertrophic Osteodystrophy (HOD)

Panosteitis and Hypertrophic Osteodystrophy (HOD) are both metabolic bone diseases of young, mostly rapidly growing, larger breed dogs.

Both panosteitis and HOD affect the long bones, which include the humerus, radius, ulna, femur and tibia; thus any/all limbs can be affected all at once or intermittently. The etiology/cause of these conditions is unknown, but both may be self-limiting. For HOD seen in the Weimaraner, an inherited component is highly probable. Entire litters of Weimaraners, as well as closely related individuals, have been found to be affected.

The diagnosis of either of these diseases is largely based on age, breed and physical examination findings. Non-specific blood work changes indicating bone turnover and inflammation may be present. Radiographic (x-ray) findings tend to be more specific.

Depending on severity, treatment protocols may vary for either of these disease processes. We support them through the worst of it, while allowing the process to run its course. Treatment of panosteitis and HOD is supportive and symptomatic. Pain medications, non-steroidal anti-inflammatory (NSAID) and corticosteroid medications are key.

Panosteitis

Panosteitis is a specific and painful bone condition that affects the long bone diaphyses (shafts) of slightly older puppies at approximately 5 - 18 months of age and historically with no reported predisposition to sex. However, new research tends to indicate that males are more often affected.

Panosteitis can be quite painful during “flare-ups” but will ultimately resolve permanently as the puppy ages. Panosteitis is often referred to as growing pains because of the similarity to the human malady.

The main presenting complaint and clinical sign for panosteitis is lameness (often “shifting leg” lameness) without a history of injury, along with pain on deep palpation of the affected long bone shafts. These puppies are usually still eating/drinking, relatively active and otherwise systemically healthy.

What Causes Panosteitis
There are two types of bone marrow. Hemopoietic marrow which produces blood cells and fatty marrow.

In panosteitis the fatty marrow is replaced with fibrous tissue. This fibrous tissue is then replaced by a type of bone, called woven bone. Woven bone is seen as opacities or “cloudiness” on the radiographic image (x-ray).
Woven bone can be so plentiful that it “takes over” the marrow cavity. Eventually, as the puppy ages normal bone cells will remodel and build new bone appropriately and dissolve the inappropriate bone formation. Ultimately, the bone tissue is re-structured back to normal.

The etiology/cause of panosteitis is unknown. Despite extensive study, an infectious agent has never been isolated. However, there is some evidence of an infectious cause due to the fact that some dogs develop a fever and high white blood cell count along with bone issues. It is unclear if panosteitis could be caused by a bacterial or viral agent.

Another theory, since the correlation between puppies fed high protein diets and panosteitis has been reported, is that higher protein diets play a significant role. The reasoning for this theory is that protein accumulation in the bone marrow leads to swelling inside the bone.

Bone is a rigid structure and cannot expand. When the marrow swells, pressure is exerted on the blood vessels leading to tissue death, inflammation and the panosteitis phenomenon.

Since there is a breed predisposition for panosteitis, this implies a genetic component. It has often been noted that most of the breeds predisposed to panosteitis are also predisposed to Von Willebrand's Disease, a genetic blood clotting disorder. It has been suggested that dogs with panosteitis also be screened for Von Willebrand's Disease as part of their evaluation.

Clinical Signs
Puppies usually present as "adolescent large breed dog with long bone lameness". This lameness can shift from one leg to another and may be accompanied by a fever in some cases. Panosteitis is characterized by painful episodes that typically last 2 - 5 weeks and are recurring until the puppy outgrows the condition. Some dogs will experience a recurrence around two years of age.

With panosteitis, the medullary cavity/bone marrow cavity, down the shaft of the bone tends to look more opaque and mottled than normal and the cortex may be thickened. This characteristic "cloudiness" in the bone marrow cavities is visible on radiographs (x-ray). If there is question as to whether these lesions are present, the radiographs should be repeated in a few weeks, resulting in the lesions becoming more prominent. Radiographic changes usually resolve as the disease runs its course.

Diagnosis
Diagnosis is made via a detailed patient history, physical exam, blood work and radiographs (x-rays).

Treatment
As mentioned, treatment of panosteitis is supportive and symptomatic until the puppy outgrows the condition. Pain medications, non-steroidal anti-inflammatory (NSAID) are key. If pain is difficult to control, combinations of adjunctive therapy and pain relievers are often used.

Hypertrophic Osteodystrophy (HOD)

Hypertrophic osteodystrophy is a developmental, auto-inflammatory disease that affects the metaphyses (flared regions of long bones) of younger puppies. It is usually first seen between 7 weeks and 8 months of age, where males seem to be more often affected. The Weimaraner, in particular, appears to be predisposed to HOD. Generally, most cases will appear for the first time after vaccination at 8 or 12 wks. Relapses have been known to occur, some until 24 months of age or later.

HOD can affect more than one leg at the same time, is usually very painful and can permanently damage the growth plates. In HOD, blood flow is decreased to a part of the bone that is adjacent to the joint thus interrupting bone formation. This interruption means that the bones do not harden appropriately, nor do they grow as strong as those of a healthy puppy.

Clinical Signs
Puppies with HOD usually present for limping or reluctance to move, swollen, warm and painful joints, decreased/absent appetite, weight loss, fever, depression and lethargy. Painful swellings around the metaphyseal regions are usually found on physical examination. Body temperature can be very high, even up to 106 degrees F. In some cases, swollen muzzles, excessive salivation, diarrhea and radiographic changes in the jaw, spine, ribs, shoulder, and eye sockets have been reported.

Diagnosis
Diagnosis is made via a detailed patient history, physical exam, blood work and only conclusive upon radiographs (x-rays).

Radiographs (x-rays) of the legs and joints show there is often a radiolucent (dark) line/band at the metaphysis of the bone, adjacent to the cartilaginous growth plate, and soft tissue swelling. As the HOD process progresses, a rough collar of new bone becomes apparent at the metaphysis. After several months, these changes may resolve or completely disappear, but some residual thickening may remain indefinitely.

Treatment
HOD carries a relatively worse prognosis due to the systemic signs of illness and severe discomfort. In the Weimaraner HOD can be very serious, requiring a very aggressive treatment protocol.

The Weimaraner HOD treatment protocol was developed through many years of research at the University of Davis, California, led by Dr. Noa Safra.

DRUG	DOSE/ADMINISTRATION	DURATION
Prednisone	1.5mg/kg/24 hrs/divide to 2 administrations	5 days
	1mg/kg/24 hrs/divide to 2 administrations	5 days
	0.5mg/kg/ hrs/divide to 2 administrations 24	5 days
	5mg/kg/24 hrs	5 days
	5mg every other day	14 days
Clavamox	12.5mg/kg/12 hrs	14-21 days
Pepcid	0.5mg/kg/12 hrs	7–10 days

Puppies may need to be hospitalized for IV fluids, intervention to lower body temperature, electrolyte supplementation, aggressive pain control and corticosteroid administration. Some puppies may need immunosuppressive doses of corticosteroids for up to one year or even longer. Antibiotics, antacids and probiotics may also be prescribed in cases requiring long term corticosteroid administration.

Prognosis
It has been reported that recurrences are common, and that puppies with affected litter mates are more likely to relapse. Complete recovery is expected once the leg bones are finished growing, but relapses have been reported in adult dogs after experiencing a particularly stressful situation/event or when the immune system has been significantly challenged.

Unfortunately, some cases of HOD are so severe, painful, and uncontrolled by treatment that euthanasia is required.

Again, the specific etiology/cause of HOD is still unknown. However, for HOD seen in the Weimaraner an inherited component is highly probable, and is most generally seen one to several days after vaccination.

Therefore, an altered vaccination protocol for the Weimaraner is strongly recommended by the Weimaraner Club of America:

https://weimaranerclubofamerica.org/puppy_protocol.php

More information about HOD and the recommended treatment protocol for the Weimaraner can be found through the link to the Weimaraner Club of America:

https://weimaranerclubofamerica.org/hod.php

2022 WCA Calendar Sneak Peek

Congratuations to the winners!

1st - Lani Jones
2nd - Esteri Hinman
3rd - Tina Poarch
4th - Katie Fellows
5th - Brenda Bonifas
6th - Rosi Adams
7th - Rosi Adams
8th - Michelle Nowacki
9th - Lance Larson
10th - Lani Jones
11th - Stacey Zaleski
12th - Angela Sarra

Purchase early to allow for potential shipping delays.

Honorable Mention:
Gwen Wojewodka
Brenda Muoio
Michelle Nowacki
Brigid Shea
Rachel Parker
Brenda Bonifas
Theresa Milan
Debra Lampers
Taleather Silvers
Hermine Wilkins
Ellie Dodge
Ben Timpson
Toni Fow
Ben Timpson
Pam Kirschner

Calendar sales will open October 1st - stay tuned to your email for updates!

If you have any question, please feel free to reach out to Brenda at weimcalendar@gmail.com.