



Animal Health Fact Sheet



BENT LEG OF RAMS

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Bent leg has long been a problem that occurs in rapidly growing rams. In recent years there have been increased complaints from ram producers about the incidence of this condition. Perhaps the forage quality or content of mineral elements has changed or the genetics and growth rate of the rams has made them more vulnerable.

Bent leg is actually a form of rickets and is due to a malfunction of bone metabolism during growth. It usually occurs in one or both front legs during the rapid growth phase of the young animal, usually between 6 and 12 months of age. It usually occurs in rams, primarily because of the feeding and growth rate, but it can occur in ewes. It is much more common in Rambouillet and related breeds, but can occur in any breed. Similar conditions occur in cattle, horses, dogs, poultry and man.

A nutritional deficiency can affect the epiphyseal line (bone growth plate) and result in a slight, beginning distortion of bone growth. Then the pressure of weight bearing begins to restrict one side while allowing the other side to grow and soon there is a greater deviation. Muscle tension and continued growth increase the deviation. If the problem were detected in the early stages, it could be corrected with casting, splints or surgery. But usually it is not evident until the deviation becomes so severe and the growth process is almost over, so that particular epiphyseal line is permanently damaged. Any extra weight from the animal being over-weight contributes to the problem.



NUTRITIONAL GOALS FOR PREVENTION OF BENT LEG

1. Provide a balanced ration, in all aspects, especially during the rapid growth phase from 6 to 16 months of age.
2. Avoid feeding too much high energy or high protein feeds and over-conditioning rapidly growing rams.

3. Provide a calcium to phosphorus ratio of 1.5 to 1. If alfalfa hay is being fed, this will probably require the use of a supplement such as monosodium or monoammonium phosphate. These will supply 25-26% phosphorus without giving any additional calcium. If dicalcium phosphate or bonemeal is used, it will provide twice as much calcium as phosphorus and further distort the ratio. This phosphorus should be supplied as part of the concentrate portion of the ration or mixed into a palatable supplement and top-dressed onto the grain, daily.

4. Supplement the ration with 300 IU of vitamin D, per 100 pounds of bodyweight per day. An oral supplement provided on a daily basis is preferred, but if that is not feasible then an injection could be used. Some potential sources of supplements are listed in the following table for use or for comparison with other products.

Vitamin D Supplements

Form	Name	Company	Content	Dose
Feed	Clovite	Fort Dodge	50,000 U/# (110 U/gm)	1-2 TBS/day
Water	High D	Alpharma	2 million IU/ounce	1 oz/250 gal
Inject	A & D	Butler	75,000 IU/ml	1-2 ml IM

(Probably need to repeat injections every 2 months.)

5. Provide adequate magnesium. Recent research related to human osteoporosis has shown the great importance of magnesium in bone development and strength. Magnesium is involved in calcium metabolism (it regulates active calcium transport). It is also involved in the synthesis of vitamin D, and thus in maintaining bone integrity. Normal blood serum levels of magnesium should range from 2.2 to 2.8 mg/100 ml. Feed content should range from 0.2 to 0.3%. High levels of sodium, potassium and aluminum reduce the availability of magnesium.

6. Shear wool from the young rams in early winter to allow more skin surface for vitamin D conversion and during winter provide housing that provides good exposure to the sun.

ELEMENTS INVOLVED IN BONE GROWTH

In order to allow for bone growth there is an epiphyseal line or “growth plate” across each long bone, such as those bones in the legs. This area (growth plate) is composed of cartilage in young animals and growth is the result of this growth plate moving forward while becoming mineralized on the backside.

Eventually the body hormones act on these epiphyseal areas, they fill in entirely with bone in place of the cartilage and bone growth ceases. This area is extremely vulnerable to any problems with mineral metabolism during the rapid growth phase. One of the most rapid growing bones is the metacarpal (cannon) bone and it is a common site of rickets (bent leg) problem in all species.

Proper bone growth is dependent primarily on calcium, phosphorus and vitamin D. The ratio of calcium to phosphorus is as important as is the amount ingested. A ration with too much calcium and too little phosphorus will result in impaired bone metabolism. A deficiency of magnesium or a major excess of other elements, such as iron and sulfur, may also impair bone growth. A pronounced copper deficiency also has an effect on bone growth and will cause enlarged epiphyseal lines in the fetlocks of calves. But sheep are very susceptible to copper toxicity so any copper supplementation must be carefully monitored. Other elements should be present in appropriate, but not excessive, amounts; however, there is little documentation of their actual effect on bone growth.

FEED CONTENTS

Alfalfa is very high in calcium, so when large amounts of alfalfa are fed it may result in a relative phosphorus deficiency. Grains are the reverse and are higher in phosphorus than calcium, but the amount present cannot compensate for the imbalance resulting from alfalfa.

Vitamin D is provided by sun-cured alfalfa hay and by action of the sun on vitamin D precursors on the sheep's skin. But these sources may not be adequate during winter and during the rapid growth phase for rams. Early shearing of the rams and locking them out of sheds so they get more exposure to the sun will help, but even that may not be sufficient. Magnesium tends to be low in grains and may be marginal in forages.

OTHER FACTORS

Rapid growth and nutritionally "pushing" animals for growth is a factor in all species for increased incidence of rickets. Both high energy and high protein rations have an effect. Excessive carotene present in green feeds or even alfalfa may tie up vitamin D. Phytates present in grains may tie up a significant portion of the phosphorus so it can't be used. The calcium present in alfalfa tends to be higher in the leaves than in the stems, so if the rams are eating mostly the leaves and wasting the stems, this may increase the disparity in the calcium to phosphorus ratio.

FURTHER DIAGNOSIS

If these nutritional adjustments have been made and cases of bent leg still occur, then blood samples should be taken as soon as a current case is recognized. The blood should be analyzed for calcium, phosphorus, magnesium and copper content. The ration should also be evaluated for the same elements as well as sodium, potassium, aluminum, iron and sulfur content. Also check the water for sulfur content. This information should enable your veterinarian or a nutritionist to design a ration that is better balanced for the prevention of bent leg.

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