

Lameness in Cattle

Leland C. Allenstein, D.V.M.,
Whitewater, Wisconsin, 53190

Disturbances in locomotion of the dairy cow are a common source of requests for help in a bovine practice. Problems of the foot and leg are intriguing and we as veterinarians have to be aware of their importance. These problems are revealing as they indicate the state of nutrition, sanitation, management, and, somewhat, the breeding in the herd. A differential diagnosis is the main reason why veterinarians are called to determine whether age or injury, an infection or a metabolic disorder, is involved. Was it acquired or was it due to a hereditary factor? A diagnosis must be made first and then therapy and prevention must follow.

Not one veterinarian today enjoys looking at feet as a life's occupation. I can also become irritable when 7 of my 10 scheduled calls deal with lamenesses. And then when I'm looking at that sick cow, the client will remark, "Oh yes, Doc, could you look at those 2 cows that are lame?" I'm sure we have all experienced that situation.

But yet, nothing is more gratifying than to pick up that foot on a cow that the dairyman has been injecting with penicillin for a week with no response and you find a nail in the sole! Or have you been caught or guilty of a similar missed diagnosis just because you did not examine the foot thoroughly? An accurate diagnosis is only established by picking up the foot, thoroughly examining it, watching her standing, and then in motion. Trimming the foot is almost a necessity.

Many ways are devised to lift a foot. Many instruments are used to do the trimming and the examination. Remember that 85 to 90% of all lamenesses are in the feet and 90% are in the back feet.

Trimming of feet is an art that is fast disappearing. It is the number one factor in the prevention of lamenesses and should be done in problem cows at a 6 month to a yearly interval. Confinement, housing on hard surfaces, large herds, and acidotic rations have made foot trimming a necessity.

Trimming may be done in many ways: standing on plywood with a mallet and chisel; putting the foot, flexed, on a wooden box; the foot may be pulled to a beam; or the cow may be cast on the floor or table.

Many instruments are used: hoof knives, chisels, clippers, sanders, files, etc.

In trimming the foot, one has to determine the length desired as well as where the sensitive tissue begins. Both toes should be approximately the same length unless a condition exists that requires more trimming on one toe or sole. The

outside wall should be a little higher or longer, than the inside wall. The sole should be basically flat or possibly a little concave so that weight bearing is on the wall of the foot. The consistency of the sole often governs the amount to remove. Care should be taken not to expose sensitive tissue. Generally one will find the outside toe of the rear foot and the inside toe of the front foot a little longer. This may be normal. However most lamenesses are found in these two places.

One should take care to straighten or correct the leg posture by foot trimming. Cow-hocked legs can be helped. Sickie hocks can be straightened. Cows with too-straight a leg may be corrected. Foot trimming is an art and would require a paper three hours long to fully describe all aspects. It is just as important in the cow as the horse in the prevention of problems.

The incidence of foot and leg problems is difficult to evaluate, but are increasing. Dr. Paul Greenough of Canada has done much writing and research of these conditions. He reported a 5.5% incidence in Europe with 88% of the lamenesses in the foot. Amstutz and Associates at Purdue reported a 4 to 14% incidence. My experience is higher than that as it ranks high in the frequency of calls to a dairy being surpassed only by mastitis, infertility, and metabolic diseases. The value of production loss due to lamenesses is greater than most dairymen and veterinarians realize. The loss from the disposition of lame cows is great. It ranks high in the reasons for culling and is often one of a group of factors in the judgment of a shipped cow.

Why are we seeing more lame cows?

1. *Nutrition and high production.*

A cow is in a stressed condition for high production. The advent of the acidotic ration has created more foot problems than any one other factor.

2. *Confinement.*

Most herds are confined to yards and barns with hard surfaces, usually cement.

3. *Husbandry.*

There is more concentration of manure, filth, and moisture in our housing areas.

4. *Large herds.*

There is an increased lack of attention to the preventive care such as trimming.

5. *Heredity.*

Care should be taken in considering not only Parent-Daughter in sire selection, but also the posture and structure of the foot and leg.

In considering the causes of foot and leg problems we could say they are either intrinsic or extrinsic.

Intrinsic has to be heredity. I feel this is definitely a factor and of considerable importance. Dr. Paul Miller with American Breeders Service has researched the literature on the inheritability of the foot and leg. His finding states that the foot structure is only 11% inheritable, and the leg only 15%. However, many traits when added together increase the percentage, especially bad traits such as straight legs - 39%, crampiness - 43%, etc. Combined traits can be selected for a positive improvement in overall feet and legs, stature, and udder structure. This work was reported by Dr. John White and Dr. W. E. Vinson, Virginia Polytechnic Institute.

Crampiness is a problem in our cattle even though through breeding we are eliminating this trait. Proper trimming, comfort stalls, box stalls, proper temperature, and antispasmodic drugs such as tranquilizers, (dipyrone, and banamine) will all alleviate the symptoms but offer no permanent cure.

Too-straight legs result in injuries to the stifle and the hock. Stifle injuries are numerous and I have much trouble with them. I have no answer except to say rest and the use of aspirin and butazolidin. We need a surgical technique.

Distention of the tibio-tarsal joint capsule is common due to over extension of the joint predisposed by the straight leg.

Etiology.

- a. Heredity-straight legs.
- b. Trauma.
- c. Infection.
 - 1) *Hemophilus somnus*.
 - 2) *Mycoplasma*.
 - 3) *Chlamydia*.

Therapy.

- a. Cold for 48 hours on acute cases.
- b. Heat after 48 hours.
- c. Drainage - 18 g. needle.
- d. Intra-articular.
 - 1) 20 to 40 mg Depo-medrol.
 - 2) Penicillin and streptomycin.
- e. Tylosin Hydrochloride-I/M.
- f. Lincocin-Spectinomycin-I/M.
- g. Elastic bandage.

Prevention.

- a. *Hemophilus somnus* vaccine.
- b. *Chlamydia* vaccine.
- c. Bedding-box stall.
- d. Rubber mats.

Hygroma of the hock joint is very common. Trauma is the most common cause. Therapy - same as above. Surgery is often required to remove fibro-cartilaginous masses and is very successful. Care must be taken for the control of hemorrhage.

Intrinsic factors other than heredity may be involved. These are mainly created by some extrinsic conditions.

Extrinsic factors:

1. Nutrition.

- a. Laminitis.
- b. Deficiencies.
2. Infections.
3. Environment.
4. Trauma.

Many of these inter-relate to create these external factors.

Nutrition is the number one cause of foot problems creating or contributing to many lesions in the feet and legs. Laminitis is the foremost factor in nutrition. It is caused by several factors, namely, acidotic rations, too much protein, grain overload, improper concentrate to roughage ratio, too finely ground concentrate or roughage, too much fermented feed, not enough crude fiber, improper trimming, too much cement, and certain diseases.

Laminitis causes half of the lameness that I see. In the acute form the heifer or cow exhibits extreme sensitivity, arched back, marked edema of the coronary region, hyperemia with an increased digital pulse, refusal to move, often the back feet are forward, and general listlessness with a temperature rise. The exact etiology maybe somewhat different from the horse but there is histamine release from the lactic acid plus an allergy to protein. When this is seen in the fresh two year old heifer, she will refuse to get up and down in the stanchion because her feet are sore. The trauma to the hocks, knees, and body is intense. This is a common occurrence in our Wisconsin dairies. Examination of the feet will reveal hemorrhage at the sensitive corium of the soles and wall of the feet especially where it joins the horny tissue. Ulcers often develop on the outside toe of the rear feet and the inside toe of the front foot, at the junction of the posterior one-third and the anterior one-third of the sole—the exact location of the ulcer of Rusterholz. This also occurs at the white-line of the sole where it joins the wall and a separation is created. Early one will find only hemorrhage but as they progress this makes a place for dirt and manure to penetrate creating an abscess and then an ulcer. Often a cleft is formed on the sole that, as you trim, will proceed posteriorly and dorsally almost to the area of the insertion of the deep digital flexor tendon into the third phalanx. If this involves a septic condition and persists, a septic synovitis around the tendon or a septic arthritis of the joint develops, followed by an osteitis. Much of this will be seen as a chronic laminitis in these heifers or cows.

As chronic laminitis follows one will also see the deterioration of the protein of the foot exhibited by a crumbling mass, a hard horny layer on the outside, and a tremendous overgrowth. Here trimming is needed periodically.

Therapy of these ulcers and separations include trimming the sole basically flat, leaving no funnel-like area. Bandaging is necessary with iodine and glycerin, sulfa plus copper sulfate, di-chlorophene, or Koppertox. Severe involvement may require a toe board or plaster of paris cast. Systemic antibiotic treatment may be needed if *Fusiformis necrophorum* is involved. Foot baths of 3 to 5% copper sulfate are advantageous. The use of rubber mats in stall also

aids healing.

Prevention of laminitis - (many of Dr. Weaver's suggestions).

1. Get your heifers accustomed to hard surfaces (concrete) 2 to 3 months before calving.
2. Provide plenty of exercise both before and after calving. Don't put the heifers in the stanchions and leave them for days.
3. Use rubber mats and plenty of bedding in the stalls.
4. Do not create sudden changes in their diet 3 to 4 weeks before calving and after. Bring them up on feed gradually.
5. Watch for acidotic rations. Watch the concentrate: roughage ratio. Stay between 40:60 or 50:50 range. Be cautious of overfeeding a fermented silage as the only roughage source.
6. Bring on concentrate feeding slowly; take up to 6 weeks to get them on full feed.
7. Provide immediate access to roughage after grain is fed. This practice is important since eating too much grain alone creates an acidosis of the rumen.
8. Free access to salt often will stimulate the flow of saliva and this creates more sodium bicarbonate. This is also why a higher ratio of roughage is important.
9. Feed 2 or more feeds (concentrate and roughage) together. Better yet, a complete ration with a crude fiber content of 16 to 19% fed in a bunk.
- 10 Watch overeating of silages or haylages which may be acid or acid producing. The amount of moisture, coarseness of cut, and age when harvested will have an effect. Lignin is absent in early haylage and hay.
11. Consider feeding some long stem hay, at least 1 pound to 100 pounds of body weight.
12. Control all metabolic and infectious disorders at calving. These often create secondary laminitis.
13. If enough roughage is not available, consider the use of a buffering agent, such as sodium bicarbonate (up to 1% of the grain ration); magnesium oxide (up to 0.5% of grain ration) or sodium bentonite.

Therapy of individual cases of laminitis may include anti-histamines, steroids (may create other problems), control any infection in the body (mastitis, metritis), and a drug to relieve the pain— aspirin (anti-prostaglandin effect) and butazolidin.

Deficiencies often exist. Proper levels of calcium, phosphorous, magnesium, zinc, selenium, copper, vitamin D, vitamin A, and vitamin E are recommended.

Rickets may occur when calcium, phosphorous, or vitamin D is lacking. Epiphysitis in fast growing heifers results when a deficiency or improper ratio exists.

Nutritional muscular dystrophy is seen frequently when selenium or vitamin E is deficient. Many areas require more than the legal 0.1 ppm. Often 0.3 to 0.5 ppm are needed. Injectable Mu Se is of great value.

Infectious causes.

Foot rot is the most over-played diagnosis today among

dairymen, but I hope not among veterinarians. I do not mean that a necrophorus infection does not exist. It is seen as a primary infection often in the spring as an interdigital phlegmon and as a secondary infection with interdigital dermatitis, ulcers, white line separations, puncture wounds and trauma. Systemic penicillin or sulfa is excellent in the treatment of foot rot. Many times an interdigital injection of penicillin with a steroid is of value.

Moist interdigital dermatitis is an infection caused by *Fusiformis nodosus*. Secondary factors of stress (calving), vitamin A deficiency, zinc deficiency, lack of protein and other nutritional elements definitely predispose this condition. This develops into cracked heels and is a common condition seen during winter and early spring. Trimming out the cracks and shortening the toe often alleviates the condition. If they are deep, an astringent dressing of phenol-formalin, Koppertox, or copper sulfate plus sulfa powder with a bandage may be necessary.

Other infections of mycoplasma, hemophilus, and chlamydia were mentioned previously.

Environment.

Confinement, housing, cement, overcrowding are all factors. Cement and confinement definitely predispose to laminitis. Once I preferred cement but now I prefer a dirt yard or pasture. However only 3 of my herds were on pasture last year. The good Lord made the cow to be on pasture. The excessive wearing of the sole causes laminitis and then ulcers. But more important yet is the overgrowth it creates. This is the reason for the rubber mats in the stalls.

Filth predispose to foot rot. I also see a mycobacterium infection of the lymph channels causing a granuloma.

Trauma creates many leg problems, especially at calving.

Calving paralysis with involvement of the obturator nerve and more important a branch of the tibial is often seen.

Tibial nerve paralysis also is seen commonly after the cow has been in a recumbent position for sometime. The nerve usually is injured where it crosses the trochanter major or near the tendon of Achilles. This can be confused with a partial rupture of the gastrocnemius muscle. Paralysis results in the extensor muscles of the hock and the flexor muscles of the digit.

Peroneal nerve paralysis is also common. It is injured where it crosses the fibula head right next to the lateral condyle of the femur. Here there is a paralysis of the flexors of the hock and the extensors of the digit, with a knuckling of the fetlock. The use of a cast may be necessary in these conditions.

I would like to mention a few conditions seen frequently. *Screw toes* are seen when the lateral toe of the hind foot and the medial toe of the front foot curls around and the wall becomes the bearing surface. Heredity may be involved but I feel laminitis with a wall separation is the basic cause. Trimming is constantly required.

Horizontal fissures on all toes with a shedding of the whole wall and sole are seen following a severe laminitis or infectious disease. Here again trimming and bandaging may

be required.

Sand cracks with a vertical fissure into the coronary band can be extremely painful. Dry weather and sandy soils predispose their occurrence. Moist bandages of an oil with an antiseptic are often required.

Interdigital fibromas are common. If lameness results, then deep surgical removal into the interdigital cushion is required. A wire between the toes with a supporting bandage is preferred following removal.

Toe amputation is not as common as it once was in our practice. Toe boards and a plaster of paris supporting cast have many times alleviated the use of amputation in septic joint involvement. I use the open method (no skin flap) employing a wire O-B saw to remove the toe. It is done standing with the leg restrained. Anesthesia is produced with 10 to 20cc of lidocaine in the digital vein after a tourniquet is

applied just below the knee or hock.

This is a brief summary of common foot and leg problems in cattle. It is not complete but represents conditions I see in a Wisconsin practice.

References

1. Troutt, H. Fred: Pathology Associated with Rations. Proceedings - AABP 1973, 68-73. -2. Weaver, A. D.: The Prevention of Laminitis in Dairy Cattle. Bovine Practitioner, AABP, Nov. 1979, 70-72. -3. Greenough, Paul R.: The Practical Overview of the Bovine Foot. Seminar, University of Minnesota, Nov. 1977. -4. Amstutz, H. E. et. al.: Lameness in Cattle - Survey. Bovine Practitioner Nov. 1975, 39-49. -5. White, John M. and Vinson, W. E.: Type in the Holstein Breeding Program. 91st Holstein Convention, Philadelphia, 1976. -6. Weaver, A. D.: Disease of the Bovine Stifle Joint. Bovine Practitioner, Nov. 1972, 41-45. -7. Greenough, Paul R.: MacCallum, F. J.: Weaver, A. D.: Book - Lameness in Cattle. Lippincott, 1972.

For Your Library

BOVINE AND EQUINE UROGENITAL SURGERY

by **D. F. Walker, D.V.M.,** and
J. T. Vaughan, D.V.M., M.S.

This is an excellent veterinary surgical text that deals specifically with current reconstructive, extirpative and physiologic procedures in male and female urogenital organs, both equine and bovine. The authors are eminently qualified and experienced in the field, and have provided detailed, yet easy to understand directions for performing all procedures described. The book is extremely well-illustrated to aid in thorough understanding of the text matter. Of particular appeal to undergraduate and graduate students and practitioners are the simple, conservative techniques as well as highly sophisticated surgical approaches. Most chapters are divided on an anatomic basis, with additional chapters on examination and anesthesia providing complete coverage of conditions peculiar to the urogenital system. Specific topics are discussed by diagnosis, preoperative preparation, operative procedures, postoperative care and complications. Alternate procedures for various conditions are provided to allow optimum choice for particular economic and environmental situations.

The text is presented in two sections, bovine and equine, with each section covering both the male and female of the species. The bovine section places major emphasis on conditions affecting the reproductive organs of the male. Many of the procedures in this section were originated by the author, and some are published for the first time in this text. Several approaches to the correction of urethral calculi are described in the chapter dealing with urinary blockage. Those chapters dealing with the female cover cesarean section, vaginal and uterine prolapse, hysterectomy, ovariectomy, pubic symphysiotomy, embryo transplantation, and many minor procedures.

In the equine section, chapters on the male horse give detailed discussions on techniques of castration, cryptorchidectomy, and complications as well as reconstructive and revisional surgery of the prepuce and penis. Other topics cover scrotal hernia, congenital anomalies, and surgical oncology. Surgery of the urinary tract embraces urolithiasis, laparocystidotomy, persistent urachus, and rupture of the bladder. Chapters dealing with the female provide extensive coverage of breeding and foaling injuries including reconstructive and revisional procedures of the perineum, rectum and vagina. Colpotomy and laparotomy techniques are described. Also treated in detail are organ displacements, anomalies, neoplasms, and surgical infections.

277 pages, illustrated. \$30.00 per copy. Lea & Febiger, 600 South Washington Square, Philadelphia, Penn. 19106.