

# The Prevention of Laminitis in Dairy Cattle

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## Introduction

Laminitis is a diffuse aseptic inflammation in the corium of the hoof. Severe acute laminitis presents a characteristic clinical picture, while milder forms may pass unnoticed in the peripartum period, uneasiness being attributed solely to local discomfort from the increased udder size and events directly associated with parturition. Acute laminitis may be a transient state, but is invariably followed by chronic laminitis of variable degree. A serious problem in itself, chronic laminitis is an important contributory factor to several other types of digital lameness including solar ulceration (pododermatitis circumscripta), white line abscessation and separation, and solear bruising and penetration. These secondary effects result from the change to a relatively flat wide bearing surface with poor strength at the important sole-wall junction area, the white line, and to poor quality horn. The development of these changes is illustrated diagrammatically in fig. 1.

## Etiology of Acute Laminitis

Acute laminitis has long been recognised as a metabolic disorder but the precise cause is not known. It is unlikely that a single factor is involved, and current concepts suggest a combination of factors including relative physical confinement leading to inadequate exercise, excessive feeding of both protein and carbohydrate in the peripartum period and the period to peak yield, inherited factors including the breed and type of animal, and seasonal effects.

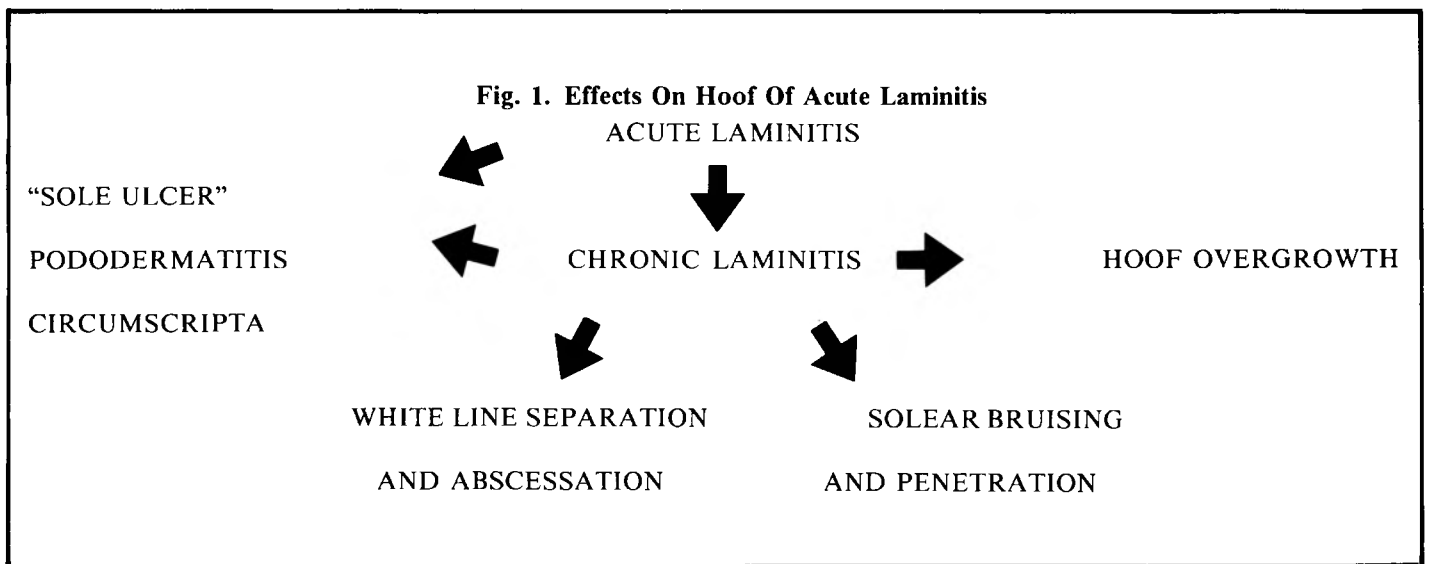
Recent experimental work in which lactic acid was given to lambs to produce a syndrome of acute laminitis within 24 hours confirms the suggestion that rumen acidosis arising as a result of a sudden increase in concentrates at the expense of a low quantity of roughage, which is probably fed some time after the concentrates, is important in the etiology of the acute syndrome.

The common observation that acute and chronic laminitis are more often encountered in heifers than cows can be attributed to the fact that the total intake of roughage for a heifer is likely to be much more restricted than that of a cow, while the reduction in concentrate intake is, relatively, not so great.

## Laminitis in the United Kingdom

Laminitis has been recognised for many years in both dairy and beef cattle in the U.K. About 8% of the national dairy herd becomes lame each year, and laminitis and its complications account for about half of this total. The proportion of beef cattle similarly affected is unknown but is very much less.

In the wet north-west of England (Lake District) dairy cow lameness has become an increasing problem for a number of relatively high yielding herds which are housed about six months of the year in yards and cubicles. Three herds had incidence rates of 50%, 30% and 20% of all cows lame in the year starting October 1977. Most cases were seen in the indoor housed period, and many tended to become



chronic cases. On one of these farms twelve of ninety Friesians had gross purulent infection of one or both lateral hind digits and were culled after some months. The problem was to advise on management in the next autumn down-calving period to avoid this type of problem.

#### Preventive Medicine Advice

Nine suggestions were put forward. Several of them were simple points of good husbandry, others were alterations to feeding patterns which were hitherto deemed acceptable practice. It was hoped that many of these rules would be put into effect by the farmers concerned.

1. Downcalving heifers should enter concrete floored yards several weeks beforehand in order to become accustomed to the surfaces.
2. There should be plenty of exercise for stock in the prepartum month and the immediate postpartum period.
3. There should be no sudden feeding changes in the four weeks before and four weeks after calving.
4. There should be a relative reduction of the rate of concentrate feeding after calving so that peak yield was reached at about 6 weeks, and not at three to four weeks.
5. There should be immediate and adequate access to forage and bulk after concentrate feeding.
6. Free access to iodised or rock salt should be ensured to increase the saliva flow and improve the pH buffering capacity of the rumen.
7. The provision of grass cubes or lucerne nuts in rations fed pre- and post-partum will ensure a further increase of the rumen buffering capacity.
8. The increase of sodium bicarbonate at the rate of approximately 1% of the home-mixed ration will improve the rumen pH.
9. The feeding of concentrates in a number of feeds (i.e. more than 2 daily) to freshly calved cows will, like the other suggestions, minimise the risk of rumen acidosis, while ideally, the system of complete diet feeding brings the risk to an absolute minimum.

Several of these suggestions may be expanded. In the U.K. heifers frequently have no experience of concrete till the time of first parturition, having spent the previous summer at grass, and the previous winter housed in a straw yard. It is crazy to expect heifers at point of calving to adapt well to concrete floors with a minimal exercising area.

**Calculations by individual farmers on the financial implications of a delayed peak yield showed that losses from reduced yield were offset by the savings in concentrate usage.**

Forage and bulk are often first consumed some minutes after leaving the milking parlour where a considerable volume of concentrates is rapidly eaten. The suggestion 5 above is implemented by having a volume of good quality roughage only a few paces from the exit to the parlour to which recently calved cows can be directed by a suitable arrangement of gates, or alternatively by allowing all cows to take a few mouthfuls en route to their normal loafing and feeding area which may be one or two hundred yards and five minutes walk distant. In yards access to a number of

different feed areas encourages cattle to walk a greater distance. In the U.K. this is simply devised by arranging two or even three silage faces with suitable partitions to ensure that an adequate distance is covered between milkings.

In the U.K. it is useful in all cases, regardless of the weather conditions, to put dairy cattle outside into a yard for one or two hours in winter, steps being taken to ensure that the surface is not dangerously slippery.

**The use of sodium bicarbonate as a feed supplement must be adopted with care since increases too much in excess of the stated level (1%) may lead to problems of palatability.**

The ideal answer to prevention of laminitis, in so far as a feeding problem involving the risk of rumen acidosis is concerned, lies in the adoption of complete diet feeding, with a more or less continuous consumption of material with a constant concentrate: roughage ratio, albeit with a loss of control of the individual concentrate intake.

#### Results Of Advice For The Prevention Of Acute Laminitis

Farmer A (50% lameness incidence) adopted suggestions 3 and 5 only, coupled with use of a footbath of formalin and regular foot-trimming, since many feet were grossly overgrown, and reported a considerable reduction in incidence.

Farmer B (30% lameness) adopted suggestions 1, 2, 3, 5, 6 and 9, by rearranging his animal accommodation so that downcalving stock had more space and were put out for exercise daily, and made the appropriate feeding changes. He reported a lameness incidence of less than 4%.

Farmer C (20% lameness) by changing to complete diet feeding (9 above) also in effect adopted 3, while 4 was no longer applicable. He also practised suggestion 8. The lameness incidence was less than 5% in the succeeding winter-spring period.

#### Discussion

**It is evident that management practices play an important part in the occurrence of laminitis. In Israel, home of the cattle with the world's highest national average yield, complete diet feeding is the rule, and cases of laminitis are almost unknown despite the vast quantities of concentrates consumed. In one of the 3 high incidence farms, adoption of a similar feeding routine, albeit with other measures, controlled the serious problem at once.**

When dairy cattle are managed in yield groups, heifers are frequently mixed with older cattle with a similar calving date and, just as when the herd is treated as a unit, bullying is liable to occur. One result of bullying is an inability of heifers to reach the silage face to feed soon after their concentrate intake and if ever they do reach the face, they may be quickly pushed away by heavier cows. This factor can also contribute to the greater risk experienced by heifers. The answer - adequate feeding space for all stock - is obvious.

It is tempting to consider that particular strains of cattle are susceptible to laminitis, but an inherited form has only been demonstrated in Jersey cattle.

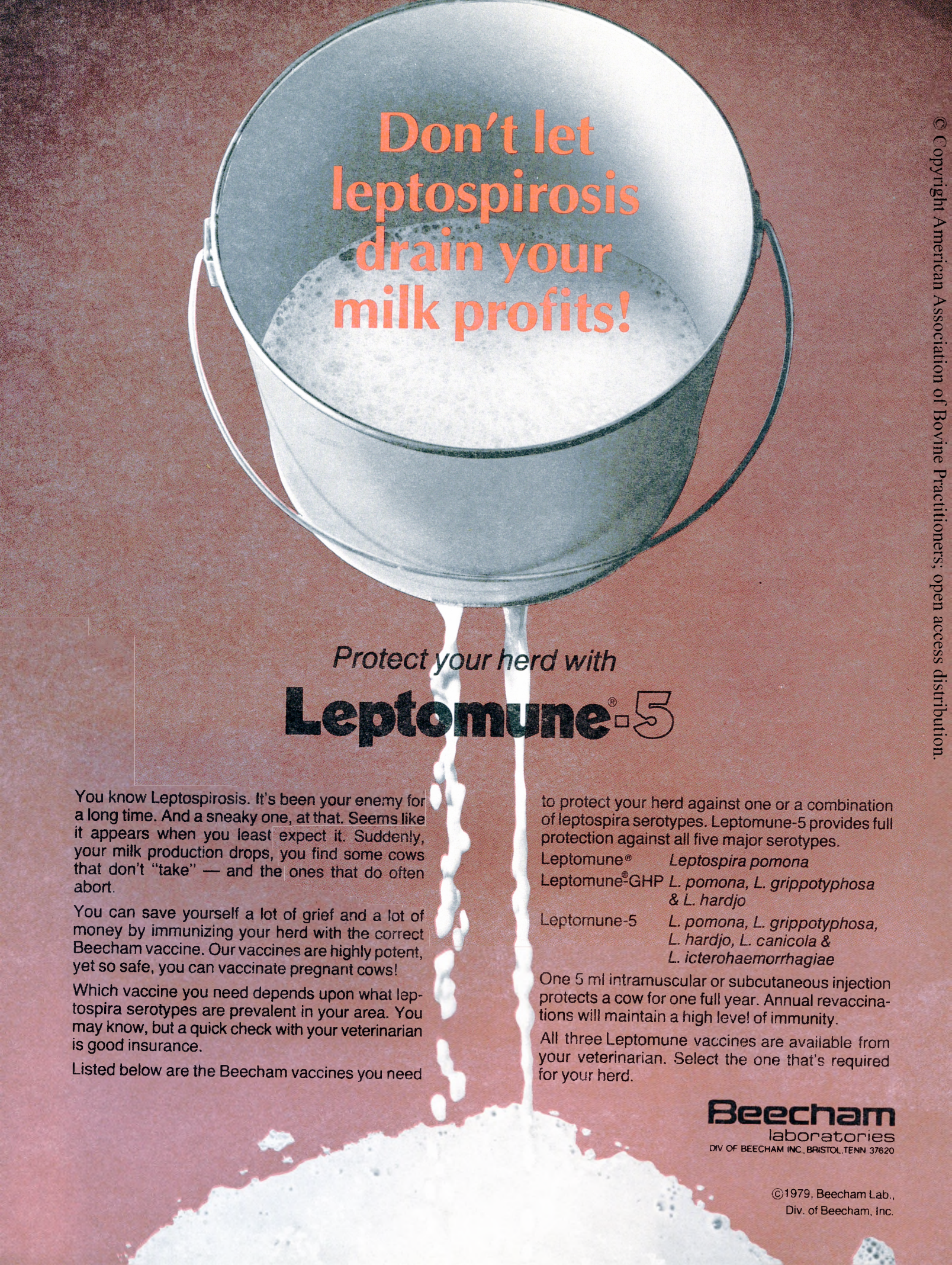
In putting forward these suggestions it must not be overlooked that foot-trimming is always a necessary prophylactic measure in cases where chronic laminitis has developed and where an elongated and wide hoof is liable to

undergo secondary changes leading to pain and lameness at the next time of stress, i.e. parturition.

It remains to be seen whether the relative reduction of the rate of concentrate feeding has any adverse effects on

conception rate and viability of the embryo and fetus.

**The suggestion has been put forward that the feeding of methionine may help to prevent laminitis by favoring production of horn of better quality but no experimental work has been carried out to confirm this possibility.**



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