

## The Relationship between Lameness and Nutrition

Nutritional practices are recognized as the most important factor responsible for herd problems with non-infectious foot lameness. Irrespective of the mechanism by which changes in rumen pH cause laminitis, the relationship between nutrition and chronic subclinical laminitis frequently goes unrecognized because of the time lag between the nutritional problem and the subsequent lameness. Any nutritional practice that results in a decrease of rumen pH below 5.5 can result in chronic sub clinical laminitis.

Under normal circumstances, the primary products of rumen fermentation are acetate, propionate, and butyrate. Two factors can facilitate an increase in lactic acid production in the rumen by *Streptococcus bovis*: (1) an increase in the concentration of substrate in the form of either starches or sugars or (2) a decrease in rumen pH below 5.5 will result in a shift of rumen fermentation from normal volatile fatty acids to lactic acid. Much of the adaptation of the rumen to high concentrate rations involves an increase in populations of lactilytic bacteria which convert lactic acid to propionic acid. The role of high concentrate diets as a factor predisposing dairy cows to lameness has been well established by the following kind of research:

Experiment One: Researchers fed one group of cows a low concentrate ration and one group a high concentrate ration from weeks 3 to 22 of lactation. The forage portion of the ration consisted of a grass silage. The concentrate mix was 17% crude protein and consisted of 24% barley and 20% wheat, both of which have rapidly fermentable starches. **Ten cases of clinical lameness were observed in the group fed the low concentrate rations while 37 cases were observed in the group fed the high concentrate rations.** The primary lameness observed in both groups was sole ulcers. Sole ulcers represented 7 of 10 clinical lameness cases in the low concentrate group and 28 of 37 cases in the high concentrate group. Clearly, feeding the higher concentrate ration resulted in a greater incidence of clinical lameness of which sole ulcers were the primary lameness.

Experiment Two: The same researchers evaluated the interaction of trimming hooves of cows fed either a low or high concentrate ration. As in the previous trial, feeding a higher concentrate ration resulted in a greater incidence of clinical lameness and sole ulcers. However, **whether cows were fed high or low concentrate rations, the trimming of hooves lowered the incidence of lameness and sole ulcers.** *by Jerry D. Olson, DVM, MS, Diplomate ACT. Presented at the Minnesota Dairy Health Conference, 1996.*