SOLE ULCER

WHAT IS IT
Sole ulceration is one of the 3 most common causes of lameness affecting beef and dairy cattle. Sole ulcers occur beneath the flexor tuberosity P3 (third phalanx) of the outside claw in rear legs and are associated with varying degrees of changes in weight bearing.

HOW TO RECOGNIZE IT
Sole ulcers are recognized by the presence of severe hemorrhage or protrusion of the corium at the typical sole ulcer site. Severe hemorrhages with an associated pain withdrawal reflex upon pressure with hoof testers should be considered early sole ulcers and treated accordingly.

PATHOGENESIS
Sole ulcers are due to continuous pressure by the flexor tuberosity of P3 on the corium. This pressure is caused by changes in the suspending and supporting structures of P3 due to mechanical and or metabolic processes. This pressure initially leads to the corium leaking blood into keratinocytes at the dermal-epidermal interface. Over time this pressure from P3 leads to the destruction of keratinocytes and the interruption of horn growth resulting in the corium protruding through the horn defect. This pressure on the corium also initiates an inflammatory pathway resulting in long term structural changes to P3 and the corium.

HOW TO PREVENT IT
The prevention of sole ulcers consists of ensuring adequate lying time, minimizing negative energy balance and an appropriate hoof trimming schedule. To ensure a lying time of 12-14 hours cows should not be away from their pen for more than 3-4 hours. In addition, forced lying time should be kept to a minimum and effective cooling strategies to reduce the impact of heat stress on standing time should be implemented. It is important to make sure first lactation animals are adjusted to adult cow housing at least 60 days prior to calving. Finally the strategic use of an appropriately timed and correctly performed hoof trimming should be a key component of a prevention program.

HOW TO TREAT IT
Sole ulceration results in chronic changes and is a painful condition. Appropriate early treatment is critical to the successful resolution of symptoms and to minimize the impact of long term changes. The treatment of sole ulcers involves the removal of all loose horn around the corium. This removal should occur delicately with great care taken to minimize further damage to the corium. Once loose horn has been removed around the lesion pressure on the lesion should be reduced to maximize the speed of horn growth. The reduction of pressure on the lesion is achieved by the removal of horn around the lesion and by application of a properly sized hoof block to transfer weight to the sound claw. Cows with sole ulcers should be rechecked in 3-6 weeks to assess healing and to either remove or reposition the block if necessary. Although currently not available in the US the use of an NSAID in early sole ulcer cases should be considered to counteract the inflammatory changes.