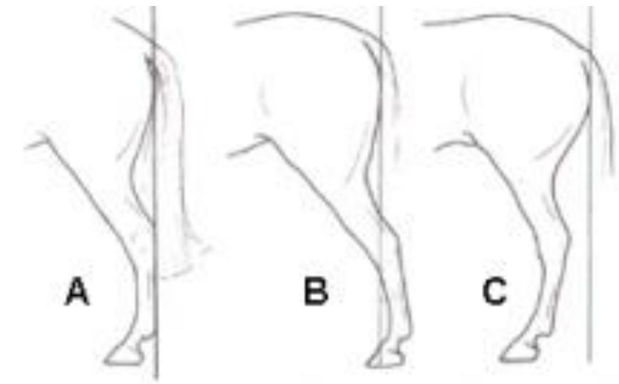
LECTURE 1 - THE ANATOMY AND FUNCTION OF THE HOCK



The three functions of the hock are to;-

1. absorb energy in the early stance phase
2. provide propulsion in the late stance phase, thus driving the horse forward
3. raise and lower the height of the hoof during the swing phase

The hock is a complex joint consisting of six bones and the joints between them. The majority of motion occurs at the tarsocrural joint, where the tibia rotates around the trochlea of the talus. This joint allows a considerable amount of flexion/extension and, since the trochlea is set at an angle to the bony column of the limb, small amounts of abduction and external rotation occur in synchrony with flexion. In addition, a small amount of motion may occur at the distal hock joints (proximal intertarsal joint, distal intertarsal joint and tarsometatarsal joint), which are the sites of bone spavin. The amount and type of movements at these joints may be important in the aetiology of bone spavin and in the clinical manifestations of the disease.

Previous studies of hock motion have focused on measuring flexion and extension. During the stance phase of the stride, the hock flexes through 11o, abducts (lower part of the cannon bone rotates away from the midline) through 3 degrees and internally rotates through 1.5 degrees.

As the hock flexes, the cannon bone slides forward and outward relative to the tibia. During the swing phase of the stride, the hock joint undergoes a considerably larger range of motion than during the stance phase. The joint flexes through 45o, abducts through 10o and externally rotates through 5o, and the cannon bone slides forward and outward relative to the tibia. Since the distal hock joints are the site of bone spavin, the ability to differentiate motion at these joints from the overall joint motion represents a significant advance in our understanding of hock joint function.

Effects of Hock Joint Synovitis on the Stride of Trotting Horses

Synovitis is inflammation of the synovial lining of the joint capsule that may progress to degenerative joint disease. Gait analysis of horses with synovitis in the distal tarsal joints showed reductions in hock flexion and forward sliding of the cannon bone relative to the tibia during stance. The distal hock joints were the source of approximately 25 percent of the reduction in sliding motion.

In addition to the kinematic changes, synovitis was associated with reductions in weight-bearing by the affected hind limb and the diagonal front limb. This is indicative of a general unloading of the lame diagonal, not just the lame hind limb. It might be anticipated that there would be a compensatory increase in weight-bearing by the limbs of the opposite diagonal, but this was not found to be the case. We interpret this finding as being indicative of the horses moving with less vertical displacement, giving them a flatter or less bouncy gait. Thus, by moving with less ‘lift’ in the trot stride, the horses were able to reduce the load on the hock joint (and the entire lame limb) without increasing the load on the compensating limbs.

An important practical implication of these findings is that the earliest sign of hock pain may be a reduction in the quality of the gaits, rather than an overt asymmetry or lameness.

Effect of Conformation and Training on Hock Function

In evaluating the results of our studies of hock joint movements and functions, it has become obvious that there are large differences between individual horses in the range of motion and the ability of the joint to absorb concussion and generate propulsion. In an attempt to understand the source of these variations, a study is in progress that will analyze and compare horses with different types of hock conformation and different levels of fitness/training.