PEDIATRIC ORTHOPEDICS
COURSE 7540

Musculoskeletal Deformities in Foals

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The most important aspect of treating foals with musculoskeletal deformities is early recognition and repeated evaluations. Foals are plastic. They slowly change their conformation and maintain the shape. The amount of weight bearing and our intervention has an enormous impact on the eventual outcome as an adult. We should always assess the foal with the eventual outcome, not just the present status, in mind. It is extremely rare for a foal to be born "correct." It is the veterinarian's responsibility to assess the site of the deformity, the degree of deformity, and estimate the amount of correction, which can be achieved, with different methods of treatment to determine which route is the best way to proceed. The earlier the assessment is made, the less serious intervention is required, and the better the outcome. Owners should be encouraged to have their foals evaluated on a regular basis.

Angular Deformities - This is the most common type of deformity, and the carpal valgus should be considered a norm in the newborn foal. Periarticular laxity is a major contributor at this stage. The medial collateral structures are not as well developed as the lateral collateral structures, leading to a relative weakness on the medial side. With time and exercise this is self-correcting. Other causes of carpal valgus include: an imbalance of medial to lateral growth at the distal radial physis or epiphysis, incomplete cuboidal ossification, or excessive trauma or weight bearing leading to cessation of endochondral ossification. A history including the progression of the deformity and previous care will assist in determining the etiology, in conjunction with a thorough physical examination and radiographic examination. A normal foal should slowly self correct to within 5-7 degrees by four months of age, and should be almost straight by 8-10 months of age. Deformities, which are severe, are more likely to have underlying serious pathology such as cuboidal bone crush. Those, which are not improving, fast enough for the amount of growth potential left should be considered surgical candidates.

The second most common angular deformity is the fetlock varus. It is most often seen in the rear limbs, particularly the left rear. Because the distal cannon bone physis stops growing much sooner than the distal radius, the problems need to be addressed much earlier. While there is relatively rapid growth of the distal radius for up to 6 months of age, the distal cannon bone has very little growth after 3 months of age. With standard surgical intervention the most correction which can be achieved is 6-8 degrees at the fetlock and 15-20 degrees at the carpus.

Treatment options for angular deformities include controlled exercise and benign neglect, surgery (periosteal transection, transphyseal bridging), or external coaptation. External coaptation is the least frequently used. It is only recommended in cases of incomplete ossification where there is risk of cuboidal bone crush. A cast encompassing the foot should **not** be employed. This would lead to severe flexor laxity. A sleeve cast from the proximal radius to the distal cannon

bone is recommended. When the cast is removed there will likely be some degree of flexor laxity at the carpus, and this should be treated by gradually weaning down the amount of support with splints.

Controlled exercise and benign neglect is the most common method of treatment. Cyclic loading of bone is an important growth stimulant. The response of the growth plate to stress is the mechanism by which foals correct their deformity. If the stress is excessive, the growth may be arrested actually causing the deformity to become stagnant or worsen. This is why frequent observation and controlled exercise is critical. Just separating the mare and foal from the rest of the herd in a small paddock for a period of time may be enough. If the deformity is not making enough progress with conservative management before the rapid growth phase ends, surgery is recommended.

The main surgical treatments are periosteal transection (PTs) and transphyseal bridging. While PTs accelerate the growth of the concave side of the limb, transphyseal bridging stops growth on the convex side. Step osteotomies can be considered for the very severe deformities when the remaining growth is not sufficient to make the correction. PTs are relatively inexpensive and have minimal surgical risks. There can be no overcorrection. The growth is accelerated for 6-8 weeks, and the procedure can be repeated if necessary. Transphyseal bridging has an increased expense and requires a second surgery to remove the implants before overcorrection does occur. These procedures are often done in combination to get a large amount of correction faster. Yet, the earlier the deviation is noted, the more likely it can be corrected with just a PT.

Flexural Deformities - Flexural deformities can be either congenital or acquired. They also should be separated as flexural contracture or laxity. While flexor laxity is very common in the newborn, strong intervention or support is often more detrimental. Controlled, limited exercise is the most beneficial route. In cases of severe laxity, in which the palmar fetlocks are contacting the ground, only light coverings should be employed unless skin lesions develop. Swimming may be beneficial. In cases with more mild laxity, shoeing is the best route of treatment.

While most contractural deformities of the coffin joint develop in the young foals (< 4 months), most fetlock deformities develop in older animals (8-16 months). There are several theories on flexural deformities including: rapid bone growth with disproportionate tendon growth, flexors stronger than extensors and pain associated with a lameness or possibly subclinical physitis. The latter theory is the most likely although none have been truly proven or disproven. The pain theory is important in terms of management, since rest and judicious use of analgesics provide a significant benefit in the acquired conditions. Also decreasing the amount of high-energy feeds will diminish the rapid growth and hopefully any associated physitis.

Medical management has been very effective in the congenital cases in young foals. Intravenous oxytetracycline (44 mg/kg SID for three consecutive days) has been used extensively. The mechanism of action is unclear, but is suspected to act as a calcium chelator on the skeletal muscle or as a neuromuscular blocker. Caution should be exercised because of the

risk of renal damage, particularly in foals with concurrent sepsis or hypovolemia. Renal function should be checked prior to initiating treatment and during treatment. It should also be recognized that the oxytetracycline would not only affect the area of interest, but all parts of all limbs.

Medical management is usually combined with bandaging, splinting, casting and shoeing. As previously stated, supporting the flexor tendons in the young animal will lead to increased laxity. Whenever bandaging or splinting a young foal, secondary soft tissue problems should be foremost in your mind, and the bandage should be changed relatively frequently. A "loose" fit is not the best fit since it will often slide and create more rubs than a tight fit.

Surgical intervention is considered in the nonresponsive or more severely effected cases. An inferior check ligament desmotomy is performed for the coffin joint contractures (clubby feet) while a superior check ligament desmotomy can be performed for the fetlock contractures (posty legged). Much better success is achieved when the inferior check ligament surgery is performed in foals less than 5 months of age, and the evidence is more immediate than with the superior check ligament surgery for the older horses. The approach for the inferior check ligament surgery can be performed from either the lateral or medial side, but the medial is preferred to "hide" the post-operative fibrosis, which often occurs.