Treatment of Distal Tarsal Osteoarthritis Using 3-Drill Tract Technique in 36 Horses

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1. Introduction
Osteoarthritis and periostitis associated with the distal tarsal joints (bone spavin) is a frequent source of hindlimb lameness and reduced performance in equine athletes.1,2 A diagnosis of bone spavin is made through historical evidence, clinical findings, lameness examination, flexion tests, diagnostic intra-articular anesthesia, and/or radiographs. Typical radiographic findings involving the distal intertarsal and tarsometatarsal joints include joint space narrowing, osteophyte formation, sclerosis, lysis, and ankylosis.1,2

Treatment options for horses with bone spavin include systemic nonsteroidal anti-inflammatory drugs, intra-articular therapy, cunean tenectomy and joint fusion. Acceleration of joint fusion is indicated when other therapies are unsuccessful in controlling pain and lameness and can be achieved by intra-articular injection of sodium monooiodoacetate (MIA) or surgical arthrodesis.1,2,3 Previous reports have documented the success of using MIA in horses with bone spavin, but the technique has been associated with the progression of osteoarthritis in the proximal intertarsal and tarsocrural joints in some horses.3,4 The success of limited drilling of the tarsal joints to promote fusion has not been reported in horses. Therefore, the purpose of this study was to determine the clinical outcome of horses undergoing the 3-drill tract technique of distal tarsal arthrodesis, and to identify preoperative and operative factors, if any, associated with postoperative outcome.

2. Materials and Methods
Case records of 36 horses with bone spavin that underwent tarsal arthrodesis using the 3-drill tract technique were retrieved from the hospital records at Colorado State University and Young-Crawford Veterinary Clinic between 1990 and 1998. Information obtained from the medical record included signal-
ment, use, affected limb(s), severity and duration of lameness, diagnostic tests used, radiographic findings, and surgical technique.

All horses were treated with surgical arthrodesis of the distal intertarsal and tarsometatarsal joints using the 3-drill tract technique with less than 60% articular cartilage removed as described by McIlwraith and Turner. Variations in technique included size of drill bit, use of bone graft, and degree of radiographic or fluoroscopic control utilized during the procedure.

Follow-up information was obtained by telephone interview with the owner or clinical evaluation of the horse. A successful outcome required that the horse be able to attain sound performance at a level equal to or better than that achieved before surgery.

Statistical analysis utilized the $\chi^2$ Test for Independence with a significance level of $p < 0.05$ to test association between clinical, radiographic and surgical factors and outcome.

3. Results
Thirty-six horses were included in the study. Twenty-one horses were Quarterhorses and 27 were males. The mean age was 8.6 years with a range of 1–17 years. The right hindlimb was involved in 12 horses, and the left hindlimb was involved in 6 horses. Bilateral involvement was present in 18 horses, resulting in a total of 54 tarsi undergoing surgical arthrodesis. When recorded, the mean lameness grade was 2.5 ± 0.84 with a range of 1–4 and full hindlimb flexion tests elicited a positive response in all horses.

Radiographic findings were variable. Subchondral bone lysis was observed in 18 joints, variable degrees of ankylosis were evident in 9 joints and periarticular osteophytes or joint narrowing was observed in 25 joints. Tarsal bone collapse was present bilaterally in one horse. The decision to pursue surgical arthrodesis was based upon localization of the lameness to the distal tarsal joints during clinical examination and/or intra-articular anesthesia, and unsatisfactory response to other treatment options, such as intra-articular medication and nonsteroidal anti-inflammatory drugs.

Information on clinical outcome was obtained for 29 horses at 10 months to 9 years postoperatively (mean follow-up 49 months). Seven horses were lost to follow-up. A successful outcome was achieved in 19/29 horses (65.5%); 4/29 (13.8%) were improved; and 6/29 (20.7%) did not improve. Eight of 14 horses (57%) with unilateral bone spavin attained a successful outcome, while 11/15 horses (73%) with bilateral disease achieved a successful outcome.

No association was found between seizure, age of horse, radiographic findings, unilateral vs. bilateral disease, and clinical outcome using $\chi^2$ Test for Independence. There was no apparent benefit from bone grafting or using a specific drill bit size (3.2, 4.0, or 4.5 mm) for the drilling procedure, although limited numbers prevented statistical analysis.

4. Discussion
This study found that 66% of horses undergoing the 3-drill tract technique of tarsal arthrodesis were able to return to previous levels of performance. An additional 14% of horses improved after surgery, but did not meet the criteria to be considered successful. No clinical, radiographic or surgical factors were beneficial in predicting clinical outcome; however, there was a trend towards improved outcome when precise radiographic monitoring of the drilling procedure was performed at surgery. This suggests that joint arthrodesis may be maximized by precise location of the drill tracts within the joint plane. This study also suggests an improved prognosis associated with bilateral disease compared to unilateral disease, although not statistically significant. This may imply that previously subclinical disease may progress to become a clinical problem in the nonoperated limb.

This study supports that tarsal arthrodesis in horses can be achieved using the 3-drill tract technique. Progression of bone spavin to involve the proximal intertarsal or tarsocural joints did not occur and minimal complications of the procedure were reported. Although overall results identified reduced success rates compared to other reports of distal tarsal arthrodesis in horses, we did not consider horses that improved in lameness, but were unable to perform at previous levels of performance, as successful.

References