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Original Research

Prevalence of Radiographic Abnormalities of the Proximal Interphalangeal Joint of Young Thoroughbreds and Associations With Early Racing Performance

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ABSTRACT

Radiographic abnormalities (RAs) in the proximal interphalangeal (pastern) joint have several manifestations and can cause concern in young horses intended for racing. Our objective in this retrospective study was to describe the appearance and prevalence of pastern RAs in young Thoroughbreds and compare the racing outcomes of cases with sibling controls. All radiographic reports of young Thoroughbred racehorses born in 2003–2007 read by veterinarians in one Lexington, Kentucky, practice were searched for pastern RAs. Pastern RAs are described, and the 2- and 3-year-old racing records of affected horses are compared with siblings. Pastern RAs were detected in 1.3% of weanling and yearling Thoroughbred horses examined. Radiographic abnormalities detected included shallow (≤3 mm) indentations in joint contour, dorsal osteophytes or axial palmar and/or plantar enthesophytes (≥3 mm), osseous fragments, and subchondral lucencies (≥4 mm). Horses with fragments in the pastern joint tended to be less likely to start a race at 2 years of age. Horses with fragments and subchondral bone cysts in the distal first phalanx tended to be less likely to start a race at 2 or 3 years of age than control siblings. The importance of some pastern joint RAs to performance can be overemphasized; however, some RAs have a tendency to be associated with poorer racing outcomes than sibling controls and may be considered when reviewing the radiographs of young Thoroughbred racehorses.

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1. Introduction

Increasingly, young racehorses are subjected to radiographic scrutiny of selected joints because radiographic abnormalities (RAs) are perceived to impact future performance. To detect RAs, radiographs are made available by sellers at many auctions of Thoroughbred racehorses, and RAs are detected [1–4]. Radiographs of multiple joints are required and include all metacarpophalangeal or metatarsophalangeal joints (fetlocks). These images commonly include four to five projections and often include the proximal interphalangeal (pastern) joint. By convention, at central Kentucky auctions of Thoroughbreds, the pastern joint is always included on the dorsopalmar and/or plantar view of the fetlock to evaluate the joint space and subchondral bone. However, there is no description of the types of pastern RAs seen in young horses, and there is very little information regarding RAs prevalence and the impact on later racing performance.

Radiographic abnormalities have also been described in the pastern joint in radiographic surveys of other breeds of young horses including Quarter Horses, Warmbloods, and Standardbreds [5–9]. Pastern RAs described include subchondral cysts or lucencies in the first (P1) or second

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phalanx (P2) [2,3,7,8], fractures or osseous fragments [2,6], osteophytes on the dorsal-proximal aspect of the second phalanx [5], osteoarthritis [2], or juvenile degenerative joint disease [8].

Many authors have attempted to determine the impact of juvenile RAs in various joints on later racing performance [1,3,4,9,10]. These studies are limited by several factors, including a lack of clinical information about performance limiting conditions and treatment and wide ranges in continuous outcome data such as number of starts and money earned, an inability to stratify RAs by severity, and low statistical power for individual groups of RAs. However, these studies do provide descriptions of RAs and prevalence, and although a statistically significant impact on performance is often difficult to achieve, owners, consignors, buyers, and veterinarians can gain some understanding of the importance of RAs to racing performance. For the pastern joint, only one study has examined pastern joint lucencies in Thoroughbred yearlings and determined that some midline lucencies were associated with declines in racing performance, but those on the condyles and facets were not [10].

Uncommonly, the pastern joint in young horses can be a cause of lameness [11,12], and osteochondrosis is suggested to be the cause [11]. The purpose of this study was to review the radiographic reports, and radiographs where available, of a large number of Thoroughbreds to describe RAs of the pastern joint, report the prevalence of pastern RAs and determine any associations between pastern RAs and racing performance.

2. Materials and Methods

2.1. Study Population

The radiographs used for this study came from two groups: (1) obtained by Equine Medical Associates (EMA), Lexington, Kentucky, veterinarians for consignors before sales at two time periods, either 3–6 months (surveys) or 2–3 weeks (repository) preceding the yearling sale and (2) sets of images taken by other veterinarians and examined for buyers of racehorse prospects. Most radiograph sets were acquired for inclusion in radiograph repositories at the sales during January, September, October, and November. Additionally, “survey” sets (same joints and projections) are taken at approximately 12 months of age to detect problems that may impact sale in summer and fall. Radiographic reports were reviewed for Thoroughbred horses born in 2003–2007 that were written by experienced (>10 years of practice) veterinarians associated with EMA. Reports were entered into FileMaker Pro (FileMaker Inc, Santa Clara, CA) and include descriptions of RAs seen in 10 joints per horse (four fetlocks and both carpi, hocks and stifles). Reports were searched for the keyword “pastern,” and reports containing this word were reviewed by the first author to confirm an articular or subchondral irregularity. Pastern RAs were described on the fetlock joint descriptions. Only one set of radiographs were included of each horse. A small number of survey sets available were rereviewed for accuracy; radiograph sets read at auction were not available for further review.

Fig. 1. Irregular articular margin of medial condyle (arrow).

2.2. Radiographic Abnormalities

The RAs in the pastern joint detected were (1) shallow (≤3 mm) indentations in joint contour on P1 or P2 (Fig. 1); (2) osteophytes on the proximal dorsal aspect of the second phalanx (P2); (3) enthesophytes on the axial proximal palmar and/or plantar aspect of P2; (4) osseous fragments; and (5) subchondral lucencies; or (6) subchondral bone cysts (SBCs) in distal P1 or proximal P2. Lucencies are decreased subchondral bone density areas without marginal bone sclerosis, often lack an obvious communication with the pastern joint, and have an irregular shape and margin (Fig. 2). Focal midline lucencies projected through distal P1on a dorsopalmar and/or plantar radiograph represent the margins of the palmar or plantar intercondylar fossa and are not considered to be an RA (Fig. 3). Subchondral bone cysts were defined as a rounded central area of decreased bone density, a sclerotic margin of several millimeters that diminished in density away from the center, and an apparent connection to the joint (Fig. 4). Axial palmar or plantar enthesophytes are large (≥3 mm) bone projections on the midline of proximal P2 (Fig. 5). Horses with one of these six RAs were designated as cases.

The size of the RAs on a dorsopalmar projection (measured by multiplying the proximal-distal length in mm by lateromedial width), location of RAs in the pastern joint (lateral, axial, and medial), limb affected, and the presence of RAs in other joints were recorded for cases.

Fig. 2. Lucency in distal first phalanx. Note lack of sclerosis, lack of reaction on P1, and lack of obvious joint communication.

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