Identification of risk factors associated with catastrophic injury during thoroughbred horse races

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Introduction

Catastrophic injury of horses has been an unavoidable cost to Thoroughbred racing around the world. Recent studies conducted in the United Kingdom have identified horse-, race- and course-level risk factors associated with fatal injury of Thoroughbreds competing in steeplechase, hurdle and flat races. This paper has two aims: to identify information that can be disseminated by veterinarians to horse trainers in an attempt to enhance the welfare of individual racehorses, and to identify information that can be used by Jockey Clubs to manage the risk of fatal injury to horses competing at race meetings.

Discussion

Parkin et al. (2004a) identified distal limb fractures as the most common cause of equine fatality on United Kingdom racecourses and conducted a case control study to investigate the aetiology of these injuries. One hundred and nine cases were included and three matched uninjured control horses were selected from the race in which the case horse was competing. Fracture of the distal limb was confirmed at post mortem for each case selected. Information was collected about previous racing history, horse characteristics and training schedules. Conditional logistic regression was used to identify the relationship between these variables and the likelihood of distal limb fracture. The authors identified that horses were at a greater risk of distal limb fracture if they did no gallop work during training, were trained on sand gallops and were in their first year of racing. Results from this study also suggest that short gallops of 4-10 furlongs per week can reduce the risk of fracture.

The identification of horse-level risk factors associated with fracture is useful to veterinarians advising trainers on the management of horses in preparation for racing. The association between horses doing no gallop work and fracture is in line with other studies showing that extreme strain placed upon the dorsal cortex of the third metacarpal bone during fast exercise stimulates bone remodelling, an adaptation that reduces deformation of the bone during subsequent exposure to fast exercise (McCarthy and Jeffcott, 1992; Boston and Nunamaker, 2000). The relationship between fracture and the use of sand gallops suggests that certain training surfaces might cause pathological changes to bone, resulting in a greater risk of fracture.

Horses in their first year of racing were identified as being at higher risk of fracture than horses in any other year. The authors noted that their results did not indicate any relationship between the age of the horse when it began racing and an increased likelihood of fracture. They suggested that it was not the age of the horse, but instead the increase in exercise intensity encountered when entering training that is responsible for the increased risk of fracture. While this hypothesis has value, it is perhaps a little oversimplified. A proportion of the races from which case horses were selected were open only to certain age groups. Therefore, the practice of selecting control horses from the same race as the case horse has resulted in a partial matching of data.

Parkin et al. (2004b) hypothesised that risk factors at the level of course or race might be partly responsible for variation in the rates of equine fatality at different racecourses. A case control study, similar to the study described above, was conducted using 109 case races in which one or more horses sustained a fracture to any bone distal to the radius or tibia. Information was collected about the race and racecourse.

Results of this study indicated that as tracks became firmer the risk of fracture increased. When compared to heavy and soft, a race in which the track was good to firm or firmer was 2.6 times more likely to include a fracture. This finding supports the work of Zebarth and

Sheard (1985), who concluded that harder tracks have less cushioning effect and exert greater forces on the limbs as the hoof hits the ground. A race meeting held within nine days of a previous race meeting increased the likelihood of fracture. The authors hypothesised that this may be attributable to a reduction in the time available for ground maintenance, resulting in a more uneven racing surface. Results also indicated that longer races with larger fields were more likely to include a fracture. The authors believe that the increase in risk associated with these two variables can be attributed to a greater total time at risk per horse.

Pinchbeck et al. (2004) conducted a study to identify the factors associated with the risk of horses falling in steeplechase races. Horse-, race-, jump- and course-level factors were examined. The authors described an inverse relationship between the number of times a horse had run on a steeplechase course and its risk of falling on that course. In addition, four factors were found to affect the risk of falling at a fence: the previous type of fence jumped, the gradient leading up to the fence jumped, the height of the takeoff board and the distance between consecutive fences. Fences jumped after a water jump and fences with a downhill approach were associated with the greatest risk. It was suggested that horses may misjudge a plain fence after jumping a low, wide water jump, and that horses galloping downhill may find it more difficult to adjust their stride. The risk of falling increases as distance between fences increases. However, if the previous jump is a water jump, increasing the distance between fences lowers the risk of a horse falling.

Conclusion

There are multiple factors affecting the risk of catastrophic injury to Thoroughbred racehorses in the United Kingdom. The factors identified by these studies, can be used as indications for further research under Australian racing conditions. Suggested topics for further research include: the relationship between track conditions and fatal injury; the incidence and nature of bone pathology after training on different surfaces; the relationship between jump design and falling during steeplechase racing; and the relationships between existing musculoskeletal injuries and fracture during training and racing. Further successful identification of modifiable variables will facilitate the development of a synergistic risk-management relationship between veterinarians, trainers and racetrack managers. This is vital to protect the welfare of racing horses and foster a positive public image for this multi billion-dollar industry.

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