

**A 10 YEAR RETROSPECTIVE STUDY OF
CATASTROPHIC INJURIES AT PENN
NATIONAL RACE TRACK**

**J.D. Pack D.V.M. Commission Veterinarian, Pennsylvania State
Horse Racing Commission Harrisburg, PA 17110 U.S.**

**J.A. Summers D.V.M. Commission Veterinarian, Pennsylvania
State Horse Racing Commission Harrisburg, PA 17110 U.S.**

**N.K.Diehl V.M.D. Commission Veterinarian, Pennsylvania State
Horse Racing Commission Harrisburg, PA 17110 U.S.**

**B.E. Corson V.M.D. Pennsylvania Veterinary Laboratory
Harrisburg, PA 17110 U.S.**

Summary

Since 1996 the Pennsylvania Department of Agriculture State Horse Racing Commission Veterinarians that work at Penn National Race Track in Grantville Pennsylvania have been compiling data on catastrophic injuries. A catastrophic injury is here defined as a horse that has to be euthanatized on the race track or within 24 hours of the race due to an injury sustained while racing. A large amount of data has been collected in this study. In this paper we will attempt to identify some of the factors that we feel that may have led to the catastrophic injuries, and if the catastrophic injuries that are associated with our industries are preventable.

INTRODUCTION

Penn National Race Course, located in south central Pennsylvania, is the home to about 1200 thoroughbred horses, where racing is conducted 4 nights a week year round. The facility has a mile oval dirt track with a $\frac{3}{4}$ chute, and a $\frac{1}{4}$ mile chute (201, 1207 meters). The distance from the last turn to the finish line is 990 feet (301 meters). A $\frac{7}{8}$ mile (1408 meters) turf track is also part of the facility. The dirt track is built on a limestone base with $3\frac{1}{2}$ to 4 inches (6.7 to 10 centimeters) of cushion which is a mixture of clay, silt and sand. The percentage of each of the mixture changes depending on the time of year. The turf course is a fescue, rye and blue grass turf mixture. The grass is usually kept at about 5 to 6 inches in height (12 to 15 centimeters). Turf races are conducted from late May through September. The purse structure at Penn National over the last 10 years has ranged from \$57,000 to \$76,000 per night for a nine race card. The bottom claiming price for maidens is \$5000 and the bottom claiming price for winners is \$2500. This purse structure does not attract the better quality of horses to race at the facility.

There are four regulatory veterinarians that work at the race track. Three are Commission Veterinarians employed by the Pennsylvania Department of Agriculture State Horse Racing Commission, and the fourth is employed by Penn National Gaming. Pre-race inspections are not routinely done on all resident horses entered for the evening races, but all shipped in horses are inspected upon arrival. At least 2 of the regulatory veterinarians visually inspect the horses in the paddock and on the track before and after

each race. Based on this visual inspection, only 30 of 272 catastrophic breakdowns (14%) had ever been placed on our veterinary list for racing unsoundness noted during the immediate pre- or post-race period.

In fall of 1997 the Pennsylvania Department of Agriculture opened the Pennsylvania Animal Diagnostic Laboratory in Harrisburg, Pennsylvania. The lab is located 15 miles from Penn National Race Course. A working relationship between the lab and the racing commission was developed so that all catastrophic injuries could be sent to the lab for necropsy. Since February of 1998 all horses that are euthanized due to catastrophic injuries are submitted to the laboratory. All appendicular joints and organs (except spinal chord, unless requested for) are routinely examined on the submitted horses. In 100% of cases to date, necropsy has confirmed the clinically diagnosed injury. In virtually 100% of cases, additional lesions are found at sites other than the primary site of injury. The additional lesions that have been noted involve not only musculoskeletal system (degenerative joint disease) but also viscera (e.g. pulmonary hemorrhage, gastric ulcers, endometrial hemorrhage, colitis and hepatic fibrosis). Tissue and joint fluids are submitted to Pennsylvania Equine Toxicology and Research Laboratory, West Chester, Pennsylvania for testing for illegal medications.

The data base used to analyze this data was developed by the Commission Veterinarians in 1997. Additional criteria have been added through out the years to examine other factors possibly associated with catastrophic injuries

Discussion

The condition book is written with a 60-40 split of sprint and distance races (a mile or farther), with the higher per-cent being sprint races. Racing distances on the main track range from $\frac{1}{4}$ to 1-3/16 miles (402 to 1910 meters), and on the turf from 5/8 to 1-1/16 miles (1005 to 1709 meters). The gender of the races is also written with about a 60-40 split, with the greatest number of races for the geldings, colts and horses. The number of total break downs based on gender was 151 geldings, 46 colts and 86 females (Figure 1).

The age range of our horses euthanatized due to catastrophic injury was from 2 to 13 years of age, with the median age of 5.5 years (Figure 1). The number of starts ranged from first time starters to 147 life time starts with the median number of starts of 30. (Figure 1).

The track condition was also recorded at the time of the break down. 198 were on a fast track, 23 on a good track, 31 on a sloppy track, 17 on a muddy track and 11 on the turf.

One of the factors we have looked at in our catastrophic injuries was the type of shoes the horse had on the front feet. We have data on 252 of the 272 horses. From the 252 shoe types, 64% were the low 2 millimeter toe grabs. This was the most common type shoe used from 1996 to 2000 according to the local blacksmiths. Since 2000 there has been a change to the Queens Plates™ or the outer rim shoe.

We also looked at the type of race the horse was running in the night of the catastrophic injury and what type of race their previous start had been. 149 of the 272 were running in the same condition as their prior race, 87 were running in a lower conditioned race and 36 were running in a higher conditioned race.

When we compiled all the data over the 10 years we have a large numbers to analyze. We have had 143,744 starters with 9,722 of these starters being on the turf. There have been 272 total breakdowns with 11 injuries being on the turf and the remainder on the dirt track. 177 of the breakdowns were horses that were running sprint races $\frac{3}{4}$ of a mile or shorter (> 1206 meters) the remainder being greater than or equal to 1 mile (1609 meters). The rate of catastrophic injuries per 1000 starters has ranged from 1.5/1000 to 2.5/1000 with a 10 year average of 1.9/1000 (**Figure 2**).

Table 1. Types of injuries and percent of total, mean number of starts and mean age.

Table 1

Fracture	Number of Fractures	% of total Fractures	Mean starts	Mean age
Cervical Vertebra	3	1.0	18	4.6
Scapula	3	1.0	46	7.7
Humerus	8	2.7	32.9	5.3
Radius	1	.004	24	5.0
Carpal	51	19	15.3	4.0
Metacarpal	31	12	21.7	5
Fetlock	167	61	30.2	5.2
P1	8	2.7	19	5.2

Racing Injuries 1996-2005

Cervical Vertebra (Necks)

During the 10 year study there has been 3 fractured necks with spinal cord damage and sudden death. All 3 have been due to a falls caused by clipped heels during the races.

Scapulas

There have been 3 scapulas fractured during the study. One was a bilateral fracture of the scapulas. All horses were running in sprint races. The injuries occurred at the ½ mile pole (804 meters), 1/4mile pole (402 meters), and the other post race.

Humeral Fractures

There were 8 humeral fractures from 1996 to 2005. Three (3) were the left fore and 5 of the right fore. Four of these occurred while running sprint races and the other four while running distance races. Two (2) of these fractures occurred at the finish line, with the other 6 occurring between the 1/6 and 3/8 (110 to 603 meters). Due to the large size of these bones we feel that these injuries may be due to undiagnosed micro fractures of the humeral bone. Pre-existing lesions have been identified in some of these cases during necropsy.

Carpal Joint

There have been 51 carpal fractures in the 10 year study. Seven (7) of these were bilateral carpal fractures. Forty-three (43) were the right carpus and 19 the left carpus. The majority of these injuries are between the 3/8 pole and the finish line (603 meters).

Metacarpal III (MCIII)

In our data base we have had 31 fractures of MCIII. The distribution of these fractures was eleven (11) of the right fore and 20 of the left fore leg with the greatest number of failures being between the 3/8 to the ¼ pole (603 meters to 402 meter).

This injury to us is the most devastating of all the injuries that we see. With this injury the horse is likely to fall with the jockey being catapulted over the horse's head. We feel that this injury maybe due to a pre existing micro fracture in MCIII. There has been a problem with diagnosis of this fracture using routine x-ray capabilities until just recently in North America. If you could not show a hair line fracture to the owner and trainer, in

their minds the fracture was not there. With the new digital x-ray equipment hopefully the diagnosis of this fracture will be easier to accomplish.

Metacarpophalangeal joint (Fetlocks)

With this joint complex we have elected to include the suspensory apparatus, the sesamoids, and distal condylar fractures of MCIII. Rarely do we see just one entity being involved with this catastrophic injury. With this joint complex comes the largest number of catastrophic injuries. Fifty-nine per-cent (61%) of our total injuries are of the fetlock complex, with 93 of these being the left fetlock, 67 being the right fore leg, 1 left rear and 3 right rear fetlock. One individual fractured both front fetlocks. Again the greatest percent of these injuries are between the 3/8 and 1/4 pole (603 to 402 meters).

First Phalanx (P1)

There have been 8 P1 fractures all being compound and comminuted. There were 2 left fore, 2 right fore, 1 left rear, and 3 right rear.

Conclusion

Figure: Injury Distribution

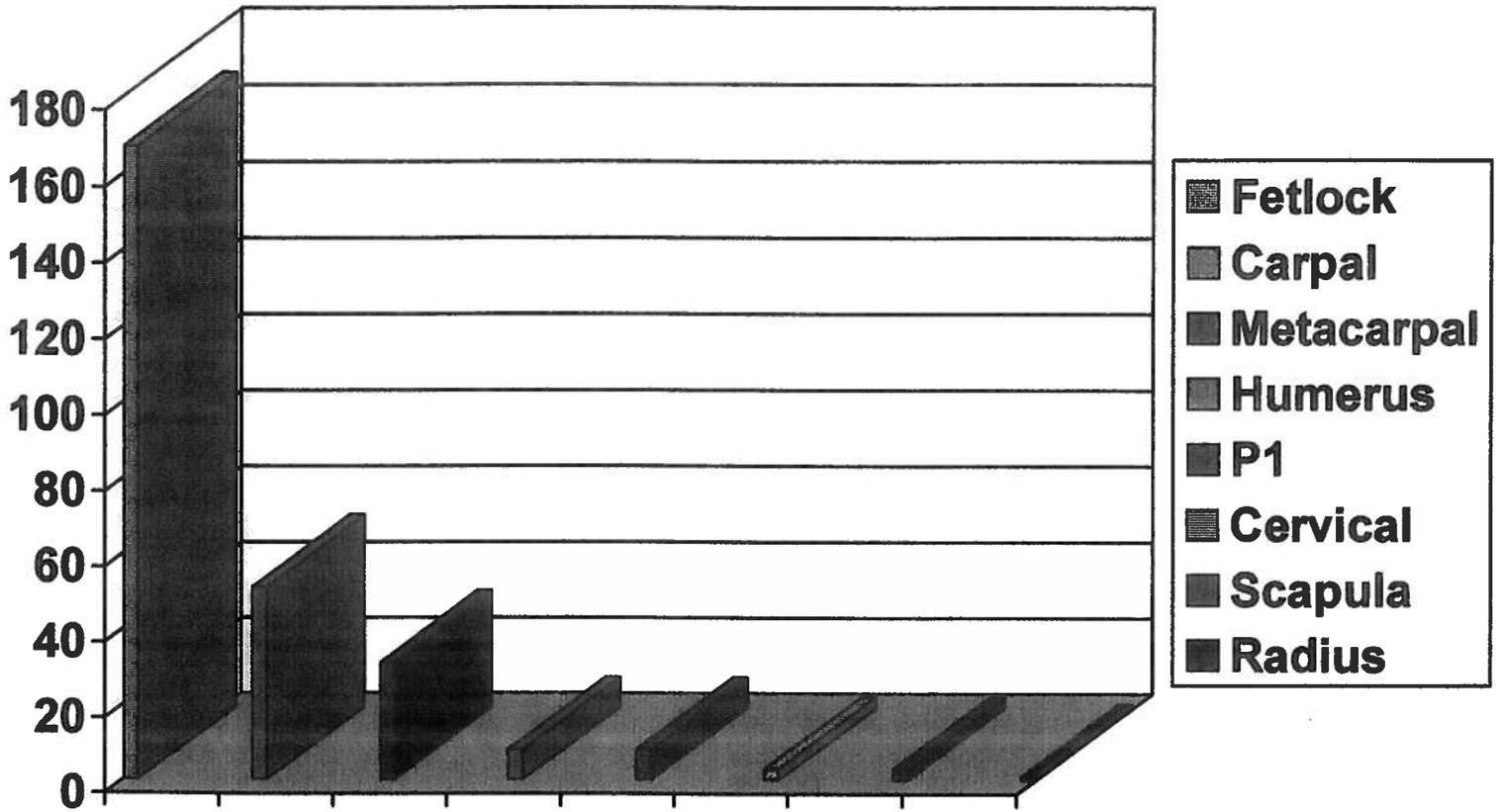
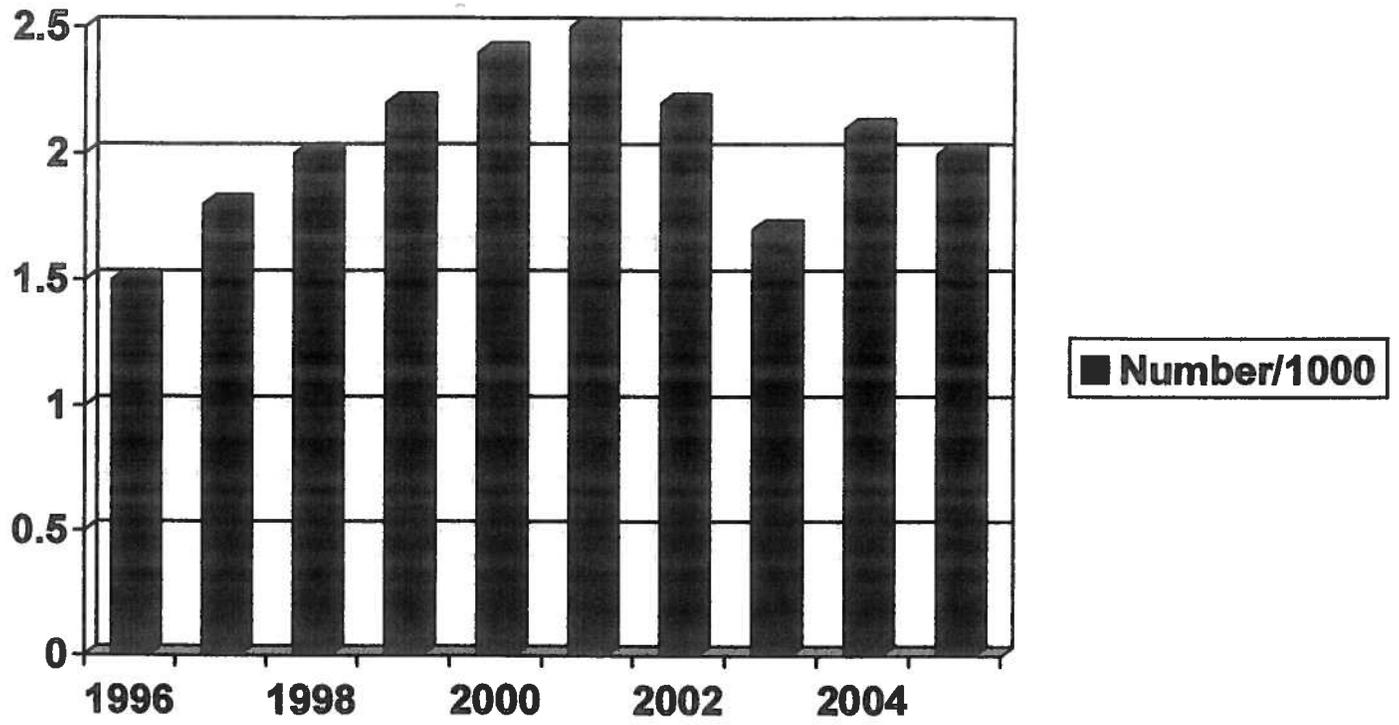


Figure 4: Number of Injuries per 1000 Starts



Location of injuries (meters) and distance of race

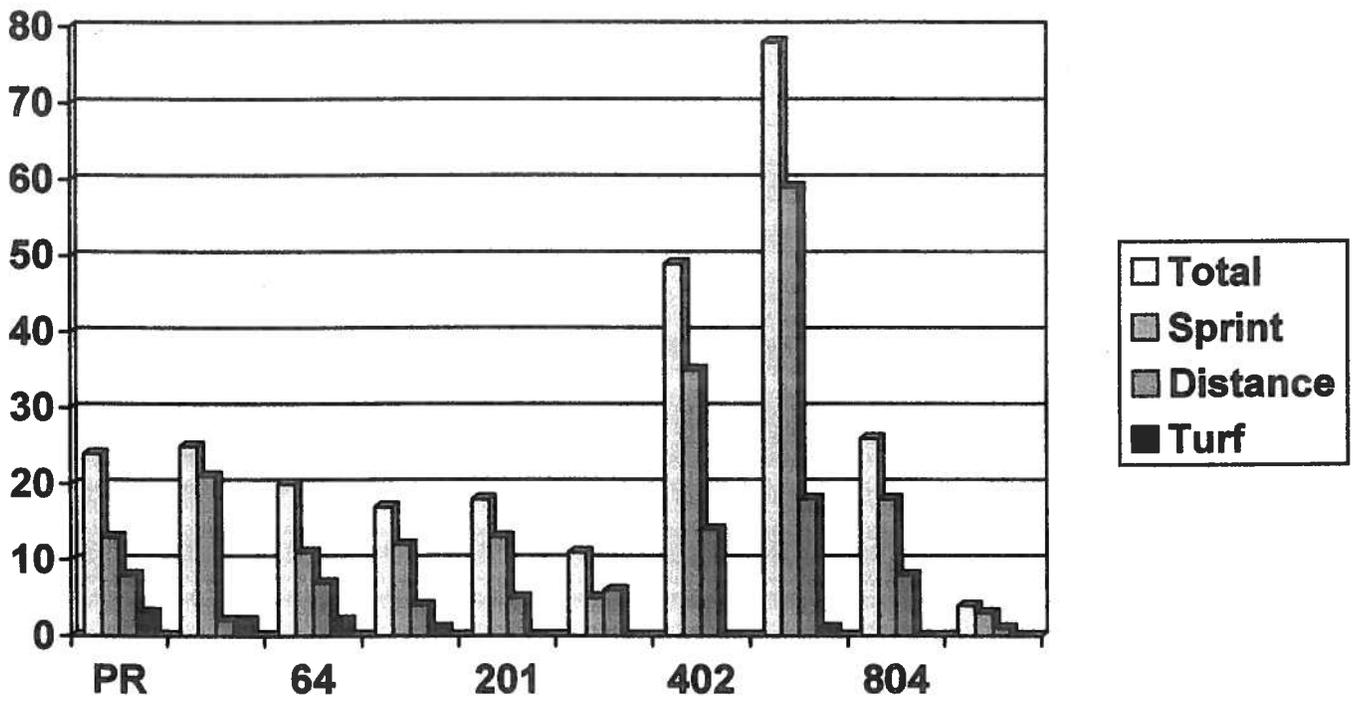


Figure 1: Gender and age

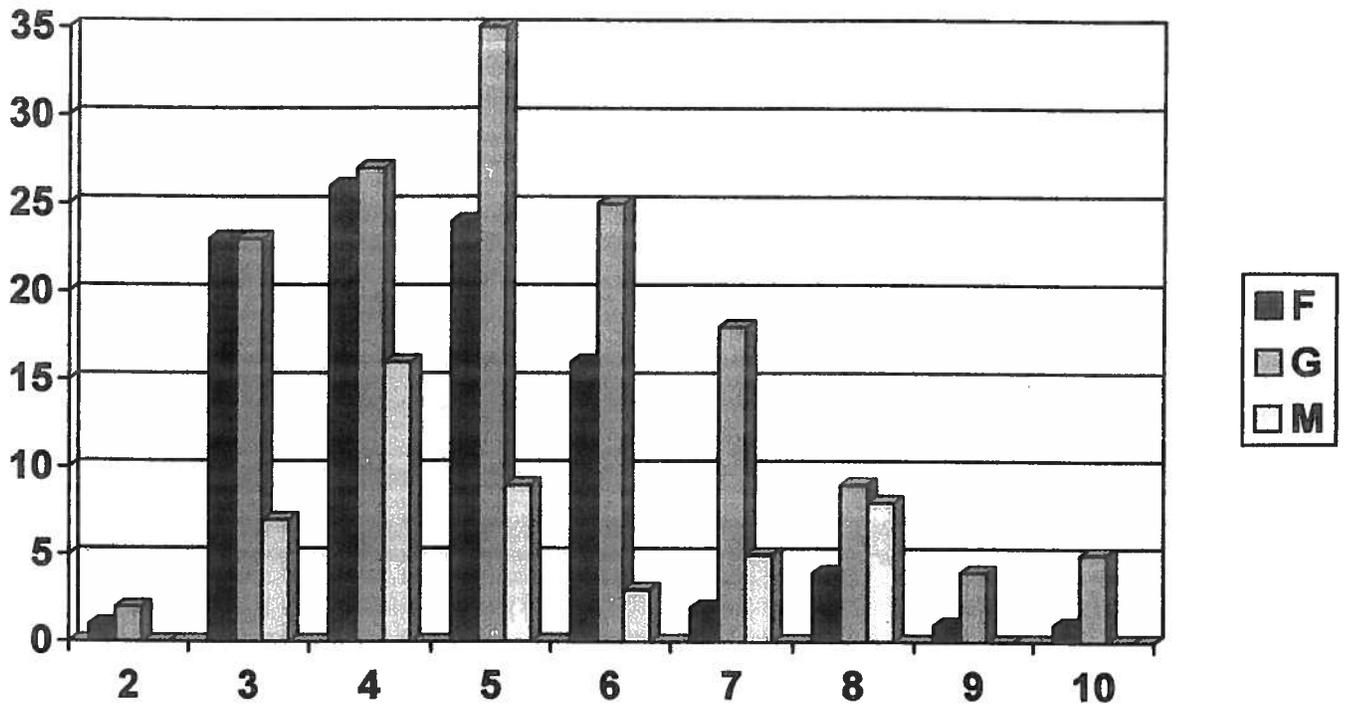


Figure 2: Gender of injuries

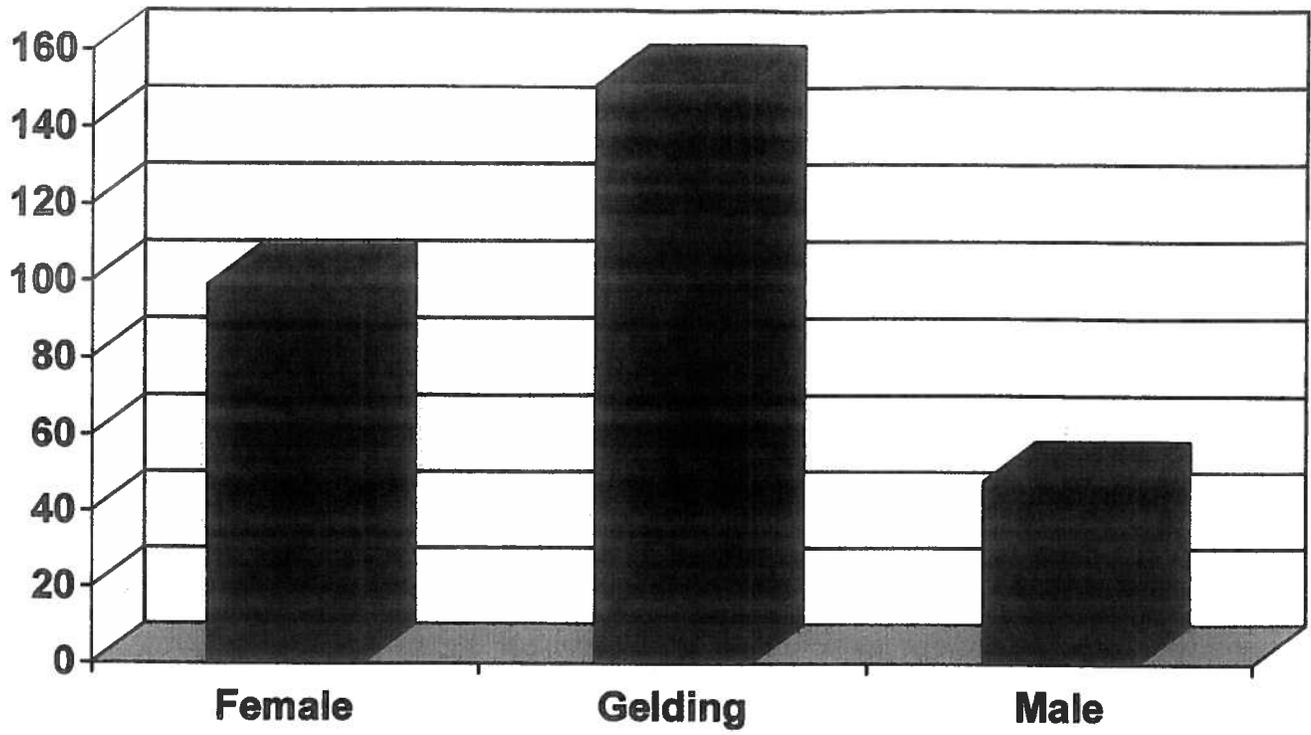


Figure 3: Track condition in relation to catastrophic injuries

