

# Effect of Experience on Rodeo Injury

Dale J. Butterwick, MSc, and Willem H. Meeuwisse, MD, PhD

The University of Calgary Sport Medicine Center, Faculty of Kinesiology, University of Calgary, Calgary, Alberta, Canada

**Objectives:** To document injury rates, severity, and relative risk during five competitive seasons of Canadian professional rodeo, between experienced (saddle bronc [SB], bareback [BB], and bull riders [BR]) and inexperienced (novice saddle bronc [NSB], novice bareback [NBB], and boys' steer riders [BSR]) rough stock competitors.

**Design:** Prospective cohort study.

**Setting:** Canadian professional rodeo competition.

**Subjects:** Experienced competitors included professional cowboys from Australia, Brazil, New Zealand, the United States, and Canada. Inexperienced competitors included cowboys from Canada and the United States.

**Methods:** Data was gathered prospectively at 63 of 323 professional rodeos in Canada from 1995 to 1999, constituting 30.8% of all professional rodeo performances during this time period. Injury data (severity and body part affected) was included when the injury occurred to a registered contestant, at a Canadian professional rodeo, at which the Canadian Professional Rodeo Sport Medicine Team was officially present and providing services. Data were collected by certified athletic therapists.

**Main Results:** Inexperienced rough stock competitors had a lower overall rate of injury in comparison to experienced competitors. In addition, inexperienced rough stock competitors had a lower injury rate of severe injuries, and a lower rate of injury to most body parts when compared with experienced competitors. Inexperienced competitors had a high rate of injury to the hand, wrist, and forearm. Most of these injuries to inexperienced contestants occurred to NBB (46%) and BSRs (31%). The relative risk of injury to inexperienced competitors did not differ from experienced competitors in the horse riding events (NSB vs. SB, NBB vs. BB), but the relative risk of injury to BSRs was one-half that of BR (0.49).

**Conclusions:** Inexperienced competitors in rodeo rough stock events do not have increased rates of severe injury, or of injury to specific body parts (in general). Inexperienced competitors do have a greater rate of injury to the arm, hand, and wrist. The relative risk of BSR is one-half the risk of BR.

**Key Words:** Rodeo—Cowboys—Injury—Experience—Epidemiology.

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## INTRODUCTION

There is evidence that injury is common in professional rodeo.<sup>1–7</sup> Injuries are most common in rough stock events, which include two horse riding events (bareback [BB] and saddle bronc [SB]) and bull riding (BR).<sup>8</sup>

Brandenburg speculated that higher injury rates exist for children and youth who compete in rodeo events.<sup>5,9</sup> Presently, youth participate as novice competitors in novice bareback (NBB), novice saddle bronc (NSB), and boys' steer riding (BSR) events at locations that host professional rodeos in Canada. Professional rodeo contestants compete in bareback (BB), saddle bronc (SB), and bull riding (BR) events. Both groups of competitors compete at the same site, in their respective events. The objective of this 5-year prospective study was to compare these two groups of competitors through assessment of the effect of experience on injury frequency, injury rate, and relative risk in rodeo in Canada.

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Address correspondence and reprint requests to Dale J. Butterwick, MSc, University of Calgary, Faculty of Kinesiology, 2500 University Drive NW, Calgary, AB, Canada T2N 1N4. E-mail: Butterwi@ucalgary.ca

## METHODS

### Samples

Data were collected at 63 of 323 professional rodeos in Canada from 1995–1999. These rodeos had competitions for experienced rough stock contestants (BB, SB, BR) and inexperienced rough stock competitors (NBB, NSB, BSR). These rodeos represented 19.5% of all Canadian professional rodeos during the time period, including large and small indoor (23) and outdoor (40) rodeos. Environmental factors were not recorded at these rodeos. The selection of rodeos was based on a combination of factors, which included the number of contestants participating. This sample of rodeos includes 10 of the top 12 Canadian rodeos, in terms of prize money offered, for each of the 5 years of the study, thus attracting the top competitors. These 63 rodeos also accounted for 317 of 1,026 (30.8%) of all rodeo performances in Canadian professional rodeo during this time period. [One rodeo performance is a group of rodeo events consisting of approximately 10 contestants in each event, which collectively occur in the same setting and in a 2–4 hour time period.]

Professional competitors included the world's best rodeo contestants from Australia, Brazil, New Zealand, the

United States, and Canada. Non-Canadians are allowed to compete freely in Canadian professional rodeo provided that the contestant becomes a member of the Canadian Professional Rodeo Association (CPRA).

The definition of professional status in horse riding events requires a competitor to be at least 18 years old or "be in the top ten of the final standings in a recognized amateur rodeo association".<sup>10</sup> Bull riding requires a minimum age of 18 years and for the competitor to "be in the top ten of the final standings in a recognized amateur rodeo association".<sup>10</sup> Novice status in horse riding events requires a minimum age of 16 years and maximum of 21 years. Boys' steer riders must be a minimum of 11 years of age and under 14 years. Although these novice competitors are serious competitors, competing for Canadian championship titles, the volume of experience (number of rides per person per year) was not measured individually. A typical inexperienced rider would probably have an equivalent annual riding volume to the experienced competitors with lower annual volumes.

This 5-year prospective study was designed to assess the effect of experience on the frequency, rate, and relative risk of injury in specific rodeo events. The effect of experience was determined through comparison of rate of injury, injury severity, and risk of injury between rodeo events. These outcomes were compared between experienced and inexperienced competitors (NBB and BB events, NSB and SB events, and BSR and BR events). Livestock for this study was provided by CPRA-sanctioned Canadian professional rodeo stock contractors. This investigation protocol met with the standards of the University of Calgary Conjoint Medical Research Ethics Board.

The collection instrument and methodology have been described earlier.<sup>11</sup> Records were collected by the Canadian Professional Rodeo Sport Medicine Team (CPRSMT) through therapist/competitor interactions. These interactions were either prompted by competitors voluntarily seeking assessment and injury management, or as a result of traumatic injury that required attention in the rodeo arena. Inclusion of the data in this investigation required that the injury must have occurred to a registered contestant, at a Canadian professional rodeo, at which the CPRSMT was officially present and providing service. Injuries that occurred to contestants of the rodeo events of interest were recorded (BB, SB, BR, NBB, NSB, BSR). Contestant injury data was excluded when the injury occurred at a nonsampled rodeo but the patient

presented at a sampled rodeo. Data were also excluded when injury occurred at a practice session, or when the original cause of the injury was unknown. One entire set of data from one rodeo (Innisfail 1998) was lost.

### Exposure

Exposure data were compiled by rodeo event with the permission and assistance of the CPRA. Records were kept of the exact number of competitors in each event, at each professional rodeo. One competitor exposure (CE) was defined as each time that one competitor competed (attempted) in one event at a rodeo (i.e., one bull ride). This is the same definition that was reported in an earlier 1-year prospective study.<sup>11</sup> The injury and exposure data in the current study include all competitor attempts in all performances of the rodeos that were included in the data set.

### Study Design and Statistical Methods

Data were entered into a Microsoft Excel spreadsheet for descriptive analysis. Analyses were grouped by rodeo event, injury type, and rodeo location. The focus of the analysis was comparison of injury rates between inexperienced (NBB, NSB, BSR) and experienced (BB, SB, BR) competitors. Rate ratios and 95% confidence limits were calculated using Stata-Release 6.0 (Stata Corp., College, TX, U.S.A.) with the cohort study "immediate" command. The baseline for comparison was assigned to BSR (Table 1), as it had the lowest injury rate.

## RESULTS

### Injury Frequency and Injury Rate

Individual event frequency of injury and exposure data are provided in Table 1. There were 53 reported injuries from 2,782 CEs for inexperienced rough stock riders, and 275 injuries from 10,912 CEs for experienced rough stock riders. The overall injury rates for inexperienced and experienced competitors were 19.1/1,000 and 25.2/1,000, respectively. Rough stock competitors accounted for 72% of all the injuries that occurred at these rodeos. Rough stock events with professional contestants accounted for 61% of all injuries in this series, while the similar events with novice contestants accounted for 11.75% of all injuries that occurred at these rodeos, including events that are not reported here.<sup>8</sup>

The baseline for comparison in Table 1 was assigned to boys' steer riding (BSR), as it had the lowest injury rate of 16.7/1,000 CE. The injury rate data show that BRs

TABLE 1. Relative risk comparison of rodeo events

Event	Class	Injury	CE	Injury rate (#/1,000 CE)	Relative risk compared with BSR	Confidence interval
Bull riding	Pro	141	4,375	32.2	1.92	(1.27-2.91)
Bareback	Pro	72	2,938	24.5	1.46	(0.94-2.28)
Saddle bronc	Pro	63	3,599	17.5	1.04	(0.66-1.64)
Novice bareback	Novice	12	474	25.3	1.51	(0.77-2.97)
Novice saddle bronc	Novice	15	759	19.8	1.18	(0.63-2.21)
Boys' steer riding	Novice	26	1,549	16.7	1.0	

CE, competitor exposure; BSR, boys' steer riders.

have the highest injury rate. NBB and NSB competitors' injury rates are not significantly different from professional BB and SB competitor injury rates.

The injury rate data in Figure 1 show that the inexperienced riders have a higher rate of contusions and subluxations/dislocations, but otherwise have a lower injury rate for other types of injury in rodeo. The injury rate data in Figure 2 show that the inexperienced riders also have a lower injury rate for most injured body parts sustained by experienced and inexperienced rough stock competitors. The hand, wrist, and forearm have higher injury rates for inexperienced competitors. The most common injuries for experienced competitors were the knee (36), concussion (30), and shoulder (28), whereas the most common injuries for inexperienced competitors were the knee (12), concussion (6), and hand (6).

**Relative Risk**

Table 1 illustrates that all of the events in this study have greater relative risk or higher injury rates than BSR. Bull riding has double the relative risk of BSR. In Table 2, comparisons were made by assessing the relative risk between novices and experienced, professional riders. In the NBB and NSB events, the relative risk of injury did

not differ significantly from the more experienced BB and SB events.

**Injury Type**

Specific injury type and injury severity are illustrated in Figure 1. Although the measurement or assessment of severity of injury in rodeo is difficult,<sup>8</sup> in this study injuries have been described by severity in a rodeo context. Injuries have been grouped as minor (first degree and second degree sprains/strains, contusions), serious (fractures, concussion, third degree sprains/strains, subluxation/dislocations), and other (wounds, overuse conditions, miscellaneous). Comparison of the severity of injury that occurs to experienced and inexperienced rough stock riders using injury rate showed that the majority of injuries to both groups were minor injuries. Inexperienced riders sustained some serious injuries, accounting for 22% of concussions and 18% of fractures to rough stock competitors, but the injury rate is much less than that of the experienced contestants. Interestingly there were no discrete complete ligament or tendon ruptures in the inexperienced group, although inexperienced riders sustained 23% of all subluxations/dislocations, 70% of which were to the glenohumeral joint. The injury rate information in Figure 2 also illustrates that there is

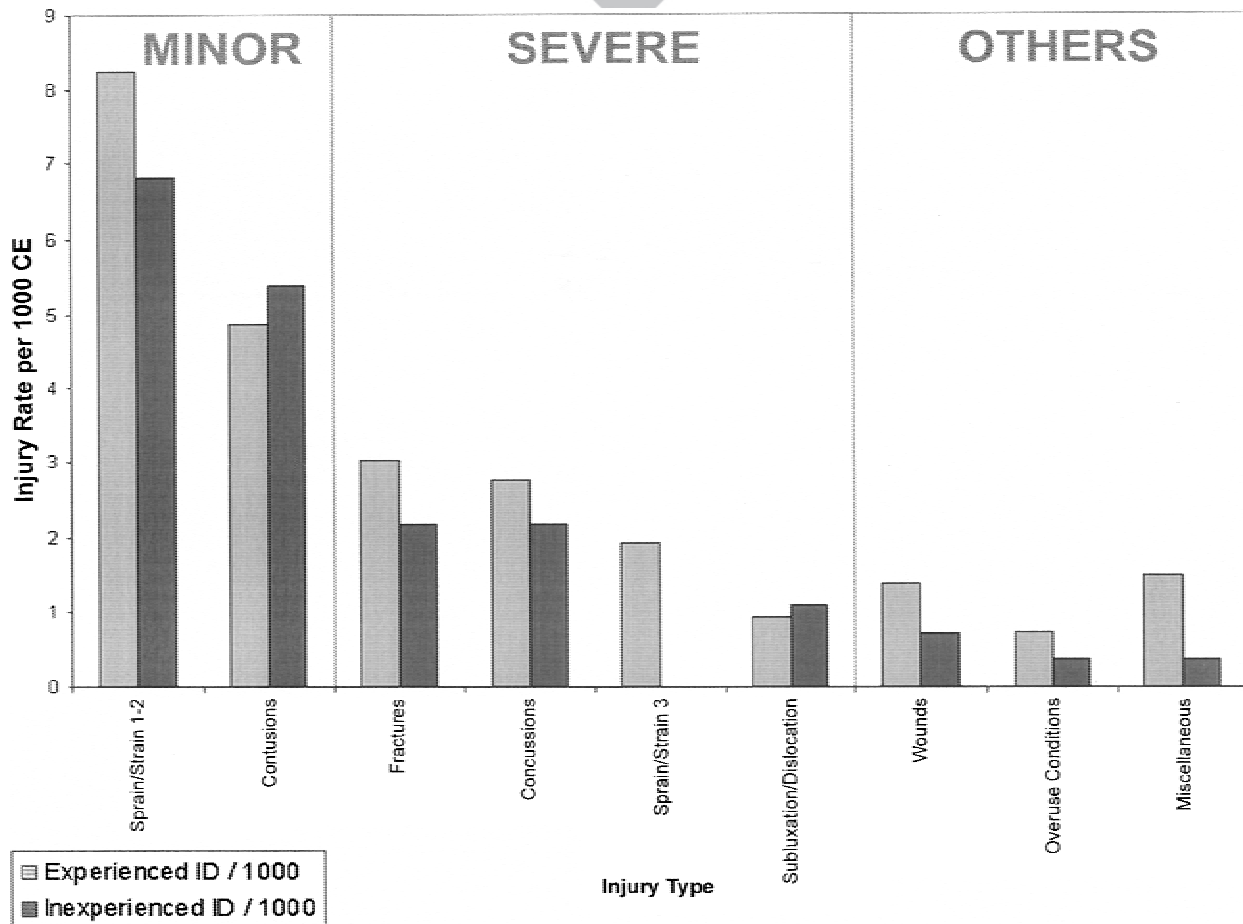


FIG. 1. Injury rate by injury type.

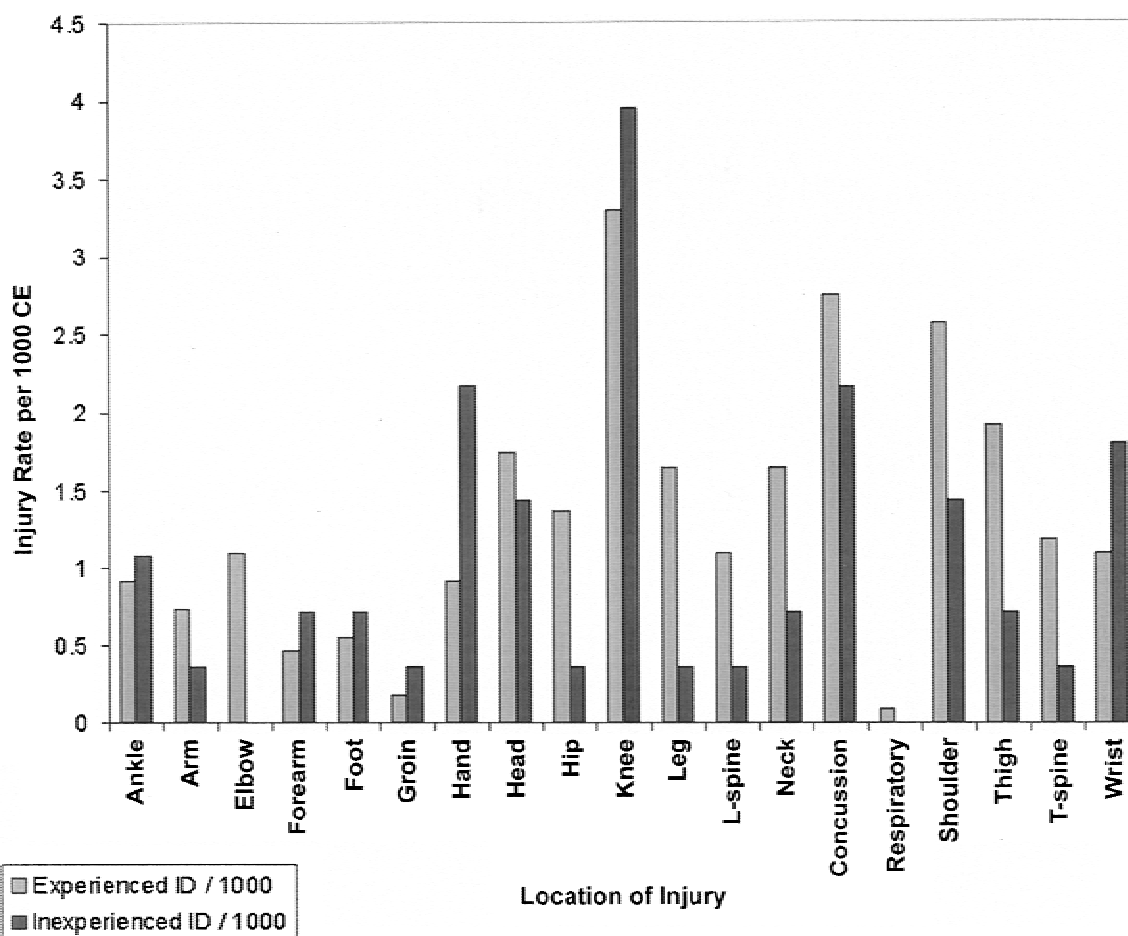


FIG. 2. Injury rate by injury location.

no increase in incidence to less experienced contestants when examining injury to most specific body parts. There was an increased injury rate of hand, forearm, and wrist injuries to inexperienced contestants. These occurred primarily to NBB (46%) and BSR (31%) competitors.

Concussions have been reported as a separate type of head injury in this study. They occurred in these rough stock contestants 34 times during this 5-year period. The injury rate of concussions to inexperienced contestants was less than that of the experienced contestants.

Over two-thirds of all injuries to the inexperienced riders (64%) were minor sprains, strains, and contusions, whereas these injuries accounted for about one-half (52%) of all injuries sustained by the experienced riders. These data do not suggest an increased risk of serious or minor injury for inexperienced rough stock competitors in comparison with experienced rough stock competitors, nor do they suggest an increased incidence of injury to any particular body part.

## DISCUSSION

### Injury Type and Body Part

The combined data of both the inexperienced and experienced contestants show that minor injuries made up

53.9% of all injuries to rough stock contestants, while serious injuries account for 30.6% of all injuries in the study. Serious injury in the rodeo context is comprised of rupture of ligaments or tendons (7%), fractures (11%), concussion (8.6%), and subluxation/dislocation (4.8%). Although wounds can be dramatic in professional rodeo, they only represent 5% of the injury total, while overuse and chronic injury (tendonitis) accounted for only 3.1% of all injuries.

The injury rate information in Figures 1 and 2 clearly indicate that there is no overall trend for increasing frequency of injury or severity of injury to inexperienced

TABLE 2. Relative risk comparison of rough stock events

Event	Injury	Exposure	Injury rate	Relative risk	95% Confidence interval
BR	141	4,375	32.2		
BSR	26	1,549	16.7	0.49	(0.33–0.75)
SB	63	3,599	17.5		
NSB	15	759	19.8	0.95	(0.54–1.65)
BB	72	2,938	24.5		
NBB	12	474	25.3	0.94	(0.518–1.72)

BR, bull riders; BSR, boys' steer riders; SB, saddle bronc; NSB, novice saddle bronc; NBB, novice bareback; BB, bareback.

rough stock competitors. Experienced competitors have increased rates of injury to most body parts when compared with inexperienced competitors. An exception is that the rate of injury to the hand, wrist, arm, and forearm was about double to inexperienced contestants compared with experienced contestants. Most of these injuries occurred to NBBs and BSRs. It is possible that muscular development and experience with riding apparatus (the bull rope and bareback riding rig) may be related to this pattern.

### Experience As a Risk Factor

No significant difference in injury rates or risk was found between NSB and SB riders, nor were there significant differences in injury rates or risk between NBB and BB riders. Boys' steer riders were at half the risk of the more experienced bull riders. Considering all factors, younger contestants who compete in age-appropriate events in rodeo do not appear to be at an increased risk of injury when compared with experienced competitors in similar events. This evidence does not support the speculation by Brandenburg<sup>9</sup> that children must have a higher rate of injury than experienced rodeo contestants.

### LIMITATIONS

Injury information comparing experienced with inexperienced riders must be assessed carefully. Bucking stock, experience (skill), age, and previous medical history are factors that could influence these comparisons. In this study the inexperienced riders were riding a completely different quality of stock. The boys' steer riding stock is subjectively very different from the "rank" bulls that professional bull riders ride. The novice bareback and novice saddle bronc stock also differs from the stock of their professional counterparts in two typical ways. First, novice riders often ride unproven horses, with the "best" stock graduating for the professionals to compete on. This results in inexperienced stock and inexperienced riders in combination. The effects of this combination on injury rate and risk are speculative. Secondly, during the Canadian Finals Rodeo and in other rodeos, the horses for the novice events are mature. This stock may have been selected from stock that is proven in order to provide a more predictable opportunity for competition to the rider. Again, the effects of inexperienced riders and less competitive stock must be compared with the major event with care. To the best of our knowledge this is the first epidemiological comparison of inexperienced to experienced rodeo contestants, albeit with unequal stock.

Competitor skill is assumed to increase with experience. Generally the comparison is between competitors with different skill, experience, and ages. However, there is a potential age crossover of competitors in the horse riding events (i.e., between NSB and SB), but the BSR and BR remain discrete. Despite the definition of novice status in the horse riding events, there is no obligation for a competitor who qualifies as a professional to either give up his novice status, or to become a professional

competitor. The effect of this potential crossover is unknown, and is a limitation of the current study.

Previous medical history of contestants in this study is unknown. Consequently any influence of previous injury has not been accounted for.

Lack of agreement regarding the definition of a serious injury in rodeo remains a limitation of rodeo epidemiological information. Time loss cannot presently be adopted as a measure of injury severity in rodeo. Thus we have chosen to accept a definition of injury that addresses injury severity in a rodeo context.

Although one CPRSMT member was in charge of ensuring that the entire team was vigilant and reminded of the importance of careful assessment and record keeping, voluntary injury reporting and reporting to a caregiver/data collector who is not always the same person remain as limitations. It is assumed that the percentage of those injured and self-reporting would be equivalent by both the inexperienced and experienced competitors. These limitations most likely result in an underestimation of the frequency of injury, and therefore event-specific risk also may be underestimated.

### CONCLUSION

The knowledge gained from assessment of this 5-year prospective study gives us a baseline in the description of the effect of experience on injury, rates, and risk in rodeo rough stock events. The findings indicate that inexperienced competitors do not have an increased risk of minor or severe injury in rodeo rough stock events. Experienced competitors have an increased rate of injury to most body parts when compared with the injury rate of inexperienced competitors. Experienced BB and SB riders have similar injury rates and relative risks of injury in comparison with NBB and NSB riders. The relative risk (RR 0.49) of injury to inexperienced BSRs is one-half that of the more experienced bull riders. Future investigations could attempt to determine if differences in the quality of bucking stock, age differences, or previous medical history influence the types of injury and relative risk of participation for competitors.

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