Biomedical Research 2018; 29 (7): 1382-1385 *ISSN 0970-938X*
www.biomedres.info

Occupational injury study in jockeys in Turkey: Relationship between experience, type of injury and localization.

Bahadir Gokcen H*, Gurkan Gumussuyu, Sidar Ozturk, Bahattin Kemah, Engin Carkci, Olcay Guler, Osman Rodop

Department of Orthopaedics and Traumatology, Bahcelievler Medical Park Hospital, Istanbul, Turkey

Abstract

Equestrian sports are known as potentially dangerous sports that are vulnerable to damage to the spine and extremities. The aim of this study is to characterize the type and localization of injuries and evaluate their relationship with occupational experience. In-between 2015-2017, records of orthopedic injuries during horse riding in jockeys were retrospectively evaluated. Patients were divided into 2 subgroups according to their professional experience. Winners up to 100 races were classified as amateur (apranti jockey), more than 100 race winners were classified as experienced (jockey). Localizations of injury types were divided into bones and soft tissue, and their relationship between age and experience were statistically evaluated. Eighty-five patients were included in this study. The mean age was 24.6 (17-32). Thirty-nine patients were classified as amateur and 46 patients were classified as experienced. Thirty-two of 85 patients were treated conservatively. Of the eighty-five patients, 53 were treated with surgical methods. There is no statistically significant difference between experience, type and localization of injuries ($p>0.05$). The results of this study makes us think that horse sports are open to serious injuries that require surgical treatment and always requires high levels of attention independent from experience.

Keywords: Equestrian sports, Experience, Injury, Jockey.

Accepted on January 23, 2018

Introduction

Horse riding is world widely well recognized sports branch and has a high popularity. Injuries potentially occurring during horse riding have higher risks than injuries developed during motorbike riding [1]. Potentially dangerous position of rider on the horse may increase the risk of injury. The horse can also be effective at the mechanism of injury as well as the rider can. Although race horses are well trained, they may show unbalanced and irregular behaviour's and this makes the rider open to injuries. Therefore, this sport has unpredictable risks.

Injuries seen in equestrian sports usually involve head and extremities and may require surgical treatment [2,3]. In the literature, injuries in those who are involved in professional sports are described in details, however data on injuries in those who are involved in riding are limited [2,4-7]. Although it is a sport branch with high risk, epidemiological studies on injury patterns are rare [4]. We believe that this sport has a learning curve and requires labor; therefore, we evaluated the incidence of orthopedic injuries seen in jockeys during the race as well as their relationship with experience.

Our study is relevant as it is the first study about this sport in our country as well as searching the relationship with experience. The aim of our study is to evaluate to investigate the relationship with professional experience by characterizing the diagnosis according to injury types.

Materials and Methods

Records of jockeys who applied to our hospital in-between 2015 and 2017 after injury caused by equestrian sport during horse race were retrospectively evaluated. Patients were divided into 2 groups according to their occupational experiences. Winners up to 100 races were classified as amateur (apranti jockey) and those who won more than 100 races were classified as experienced (jockey). Localizations of injuries were documented as upper extremity, lower extremity and spine. Types of injury were divided into bone and soft tissue. Relationships between professional experience, localization and types of injury were evaluated statistically.

Statistical analysis

Descriptive statistics are used to describe continuous variables. (Mean, standard deviation, minimum, median, maximum) Ki-Square (or Fisher Exact test at appropriate locations) was used to examine the relationship between categorical variables. Mann Whitney U test was used to compare two independent variables with no normal distribution. Comparisons of two independent variables with no normal distribution fit were

made using the Kruskal Wallis test. Statistical significance level was determined as 0.05. Analyzes were performed using MedCalc Statistical Software version 12.7.7 (MedCalc Software bvba, Ostend, Belgium; http://www.medcalc.org; 2013).

Results

Eighty five patients with an average age of 24.6 (17-32) were included in the study. According to experience, there were 39 patients who were classified as amateur (winner<100 races) and 46 patients who were classified as experienced (winner>100 races). Thirty-two of the 85 patients were treated conservatively. Diagnosis of 2 patients in 32 was with non-displaced fractures (metatarsal fracture and distal radius fracture). Thirty of 32 patients have soft tissue injuries. The diagnosis of these patients were 10 ankle sprain, 8 finger capsule tear, 4 wrist sprain, 2 shoulder sprain, 4 lumbar sprain and 2 knee ligamentous injury.

Of the 85 patients, 53 were treated by surgical methods. The diagnosis of patients were 6 clavicle fracture, 6 ankle fracture, 3 distal radius fracture, 4 humerus fracture, 7 metacarp fracture, 4 metatars fracture, 6 anterior cruciate ligament rupture, 10 shoulders dislocation with Bankart lesion, 1 navicular fracture, 1 hip fracture, 1 femur fracture, 2 vertebrae fracture, 1 ulna fracture, 1 radial head fracture. Extremity injuries are numerically more common than axial skeletal injuries (spine) (Table 1).

Table 1. *The diagnosis of jockeys in this study.*

Diagnosis of conservative group	Number of patients	Diagnosis of surgically treated group	Number of patients
Metatarsal fracture (non-displaced)	1	Clavicula fracture	6
Distal radius fracture (non-displaced)	1	Ankle fracture	6
Ankle sprain	10	Distal radius fracture	3
Finger capsule tear	8	Humerus fracture	4
Wrist sprain	4	Metacarp fracture	7
Shoulder sprain	2	Metatars fracture	4
Lumbar sprain	4	Anterior cruciate ligament rupture	6
Knee ligament sprain	2	Shoulder dislocation with Bankart lesion	10
		Navicular bone fracture	1
		Hip fracture	1
		Femur fracture	1
		Vertebrae fracture	2
		Ulna fracture	1
		Radial head fracture	1
	32		53

Table 2. *Age and experience relationship. There is a statistically significant difference in terms of age according to experience. (Mann-Whitney U test p<0.05).*

Experience	Patient number	Average	Median	Standard deviation	Minimum	Maximum
Amateur (apranti jockey)	36	23, 4	22	4, 9	17	34
Experienced (jockey)	49	25, 5	24	4, 7	19	36

There was no statistically significant difference between age, injury type and localization (p>0.05). The localization of injury did not have statistical significance in terms of injury type including bone and soft tissue. The average age of experienced jockeys is higher than that of the beginner jockeys, and this difference is statistically significant (p<0.05) (Table 2), but there was no statistical significance between occupational experience and injury type and localization (p>0.05) (Tables 3 and 4).

Table 3. *Experience and type of injury relationship. There is no statistically significant difference between experience and type of injury (Chi-square test p>0.005).*

Experience	Bone	Soft tissue

Amateur (apranti jockey)	14 (38, 9)	22 (61, 1)
Experienced (jockey)	19 (38, 8)	30 (61, 2)

Table 4. *Localization and experience relationship. There is no statistically significant difference between localization types and experience (Fisher Exact test p>0.05).*

Localization	Amateur (apranti jockey)	Experienced (jockey)
Upper extremity	15 (41, 7)	21 (58, 3)
Spine	3 (50, 0)	3 (50, 0)
Lower extremity	18 (41, 9)	25 (58, 1)

Discussion

Injuries seen during riding may frequently require surgical treatment and they are mostly orthopedic injuries [2,4,8-10]. The need for more standardized and clearly defined approach has been suggested to establish the incidence of injury for this sport branch [2]. In the literature, the rate of injuries seen in riders are highly various and there is no consensus; the incidence of orthopedic injuries among all injuries was reported as 30% to 70% [2,3,11]. In our study, we evaluated specifically the orthopedic injuries and injuries of head and thorax does not include the patient group in our study. This approach may lead to obtain more clear data about the incidence of orthopedic injuries in riders. In addition, our study included not only trauma resulting from extremity and vertebral fractures, but also soft tissue injuries. In the literature, incidence of fracture due to trauma during horse riding was reported; however, data on the incidence of soft tissue injuries is limited [2]. In our study, history of trauma was fall of the horse in all riders and injury area was not statistically significant regarding bone and soft tissue; however, this could be related with the severity of trauma.

Minimum an extremity fracture was reported in more than 60% of professional jockeys during their career [4]. In our study, we detected fracture in 55 of 85 jockeys and surgery was done in 53 of them due to fracture. In the literature, about 50% of injuries include upper extremities, 20% include lower extremities and the incidence is lower for vertebral column, body and pelvis [2]. In our study, 47 (55.2%), 32 (37.6%) and 6 (7.05%) of 85 injuries involved upper extremity, lower extremity and vertebral column, respectively.

In the literature, a study reported a remarkable difference in injury model between professional jockeys and amateur riders. The difference of equipment utilized was suggested to play a role in injury model. In this study, questions to injured persons were retrospectively evaluated and not included specifically orthopedic injuries [12]. Other studies also reported higher trauma risk in less experienced riders [3,13,14]. Grossman et al. reported no correlation between rider experience and trauma [15]. In our study, no significant difference was detected between experience of jockey and risk of orthopedic trauma. Our study group didn't also show any difference regarding the utilized equipment and this may indicates that we used more objective approach in evaluation of relationship between injury risk and experience. When considering injury rate of our study, upper extremity injuries were more predominant than other injury areas. This could be associated with the reflex of arm extension during fall to protect the body [3,15]. In our study, the most common diagnosis of upper extremity injury is shoulder dislocation and this may predict that the mechanism of upper extremity injury in horse riding is to fall with open hand position which was mentioned in the literature for shoulder dislocation [16].

Lower extremity injuries are second frequently seen injuries following upper extremity injuries [17]. In our study, this was reported as 37.6%. Among lower extremity injuries, 16 of 32 (50%) were at ankle. Six of them (37.5%) were fractures requiring surgery and 10 (62.5%) of them were soft tissue injuries. The reason of lower incidence of lower extremity injuries than upper extremity injuries can be explained by fall off pattern [2]. In our study, no pelvic trauma was reported. In the literature, there are studies indicating rate of pelvic trauma as zero. However there are other studies suggesting the rate between 3.7% and 17.5% [9,15,18,19].

Majority of vertebral fractures seen during riding usually involve at thoracolumbar area (T11-L2) and incidence is rare for mid thoracic area [20,21]. In our study, vertebral trauma rate was 7.05% (6 pts.), beyond upper and lower extremity trauma. Two of 6 vertebral injuries were vertebral fractures at T5 and L1 level and both were surgically treated. Four of 6 vertebral injuries were including soft tissue trauma.

Protecting equipment used during horse riding were considered to reduce trauma risk [11,12,22]. Hasler et al. suggested that wearing a protective vest during riding, could highly reduce the risk of injury [22]. Certain publications also recommend to wear upper extremity protecting equipment as standard [11,23]. In our country, the jockeys use protecting vest and head-guard during race, but they have no special protecting equipment for upper and lower extremities. The limitation of our study is lack of reporting the incidence for head and thorax traumas as we included specifically orthopedic injuries. Another limitation is the retrospective nature of the study as well as small sample size. Inclusion of only orthopedic injuries and monocentric nature of the study could lead to small sample size. We believe in that this first study on national jockey would offer an insight on future larger multi-central studies with greater sample size including all branches of horse riding.

Conclusion

Horse riding is open to all kind of injuries. Orthopedic injuries are frequently seen in this sport branch. Understanding the frequency and types of injuries may guide to protective measures to bring this sport to safer status. We consider that understanding the types of injuries can predict the injuries and can contribute to training process of jockeys. In addition, there is no reference articles on injuries related with this sport in Turkey and our study is the first in this respect.

Acknowledgement

None.

Conflicts of Interest

The authors have no conflicts of interest to declare.

References

1. Ball CG, Ball JE, Kirkpatrick AW, Mulloy RH. Equestrian injuries: incidence, injury patterns, and risk factors for 10 years of major traumatic injuries. Am J Surg 2007; 193: 636-640.
2. Young JD, Gelbs JC, Zhu DS, Stacey EG, Sutton KM, Blaine TA. Orthopaedic injuries in equestrian sports: A current concepts review. Orthop J Sports Med 2015; 3.
3. Havlik HS. Equestrian sport-related injuries: a review of current literature. Curr Sports Med Rep 2010; 9: 299-302.
4. Press JM, Davis PD, Wiesner SL, Heinemann A, Semik P, Addison RG. The national jockey injury study: an analysis of injuries to professional horse-racing jockeys. Clin J Sport Med 1995; 5: 236-240.
5. Sobrino FJ, Guillén P. Overuse injuries in professional ballet: Influence of age and years of professional practice. Orthop J Sports Med 2017; 5.
6. Sandlin MI, Taghavi CE, Charlton TP, Anderson RB. Lisfranc Injuries in the elite athlete. Instr Course Lect 2017; 15: 275-280.
7. Ciccotti MG, Pollack KM, Ciccotti MC, D'Angelo J, Ahmad CS, Altchek D, Andrews J, Curriero FC. Elbow injuries in professional baseball: epidemiological findings from the major league baseball injury surveillance system. Am J Sports Med 2017; 1.
8. Bixby-Hammett DM. Horse-related injuries and deaths in North Carolina, 1995-1999. N C Med J 2006; 67: 161-162.
9. Carmichael SP, Davenport DL, Kearney PA, Bernard AC. On and off the horse: mechanisms and patterns of injury in mounted and un-mounted equestrians. Injury 2014; 45: 1479-1483.
10. Turner M, McCrory P, Halley W. Injuries in professional horse racing in Great Britain and the republic of Ireland during 1992-2000. Br J Sports Med 2002; 36: 403-409.
11. Loder RT. The demographics of equestrian-related injuries in the United States: injury patterns, orthopedic specific injuries, and avenues for injury prevention. J Trauma 2008; 65: 447-460.
12. Whitlock MR, Whitlock J, Johnston B. Equestrian injuries: a comparison of professional and amateur injuries in Berkshire. Br J Sports Med 1987; 21: 25-26.
13. Mayberry JC, Pearson TE, Wiger KJ, Diggs BS, Mullins RJ. Equestrian injury prevention efforts need more attention to novice riders. J Trauma 2007; 62: 735-739.
14. Newton AM, Nielsen AM. A review of horse-related injuries in a rural Colorado hospital: implications for outreach education. J Emerg Nurs 2005; 31: 442-446.
15. Grossman JA, Kulund DN, Miller CW, Winn HR, Hodge RH Jr. Equestrian injuries. Results of a prospective study. JAMA 1978; 240: 1881-1882.
16. Kroner K, Lind T, Jensen J. The epidemiology of shoulder dislocations. Arch Orthop Trauma Surg 1989; 108: 288-290.
17. Sandiford N, Buckle C, Alao U, Davidson J, Ritchie J. Injuries associated with recreational horse riding and changes over the last 20 years: a review. JRSM Short Rep 2013; 4.
18. Hobbs GD, Yealy DM, Rivas J. Equestrian injuries: a five-year review. J Emerg Med 1994; 12: 143-145.
19. Barone GW, Rodgers BM. Pediatric equestrian injuries: a 14-year review. J Trauma 1989; 29: 245-247.
20. Siebenga J, Segers MJM, Elzinga MJ, Bakker FC, Haarman HJTM, Patka P. Spine fractures caused by horse riding. Eur Spine J 2006; 15: 465-471.
21. Triantafyllopoulos I, Panagopoulos A, Sapkas G. Mid-thoracic spinal injuries during horse racing: Report of 3 cases and review of causative factors and prevention measurements. Case Rep Orthop 2013; 2013: 715409.
22. Hasler RM, Gyssler L, Benneker L. Protective and risk factors in amateur equestrians and description of injury patterns: a retrospective data analysis and a case-control survey. J Trauma Manag Outcomes 2011; 5: 4.
23. Moss P, Wan A, Whitlock M. A changing pattern of injuries to horse riders. Emerg Med J 2002; 19: 412-414.

*Correspondence to

Bahadir Gokcen H

Department of Orthopaedics and Traumatology

Bahcelievler Medical Park Hospital

Istanbul

Turkey