

# Kiteboarding Injuries

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## **ABSTRACT**

The aim of this paper was to determine the type and frequency of injuries and to define causes of injuries in recreational athletes engaged in kiteboarding. The research was conducted on the sample of 93 kiteboarders, of which 74 were male and 19 were female. Online questionnaire was applied with clearly defined completing instructions. In overall sample of examinees (93), there were 51 who were injured during kiteboarding. Out of total percentage of injured (54.8%), as many as 30.1% had more than one injury. Depending on the method of initial learning and training, 70% of examinees who were self-taught were injured, among those who were taught by a friend with kiteboarding experience 68.18% were injured, then there were 58.82% of injured among those who passed the kiteboarding course with an instructor without a valid license, and, finally, the smallest percentage of injured, 43.18%, among those who took the kiteboarding course with an instructor having a valid license. The most frequent injuries are foot and knee injuries (59.65%) and more than half of injuries (57.91%) is related to strains of ligaments and muscles. Most of the injuries happen during the performance of more advanced technical elements, particularly jumps (33.3 %), while the second most frequent cause of injuries is insufficient kite control (23.7%). Kiteboarders taught by licensed instructors had the smallest risk of injury, while the greatest risk of injury was for self-taught individuals. Mentioned data clearly suggests how important it is to take a verified course with educated instructors to reduce the risk of injuries to a minimum.

**Keywords:** kiteboarding; kitesurfing; injuries; prevention

## INTRODUCTION

Kiteboarding or kitesurfing is one of the water sports and presents an activity that is sometimes performed in specific weather conditions. It is regarded as an extreme water sport in which an athlete uses the strength of the wind to move the kite and corresponding board and other equipment, and it combines elements of kite flying and surfing. Kite was used throughout the history as a mean of transport on the land and sea both, but modern versions of kite emerged at the end of 20th century. It facilitates beginner training and perfecting of technique in advanced kiteboarders. Two types of board are used, symmetrical (twintip) or asymmetrical (it is used for surfing on the waves). Twintip is used mainly for classic ride, but in falls caused by fast and uncontrolled ride, feet often stay in straps, which causes injuries in these extremities. During the last 30 years the equipment for kitesurfing went through some gradual changes, but in the last few years greater changes and developments occurred due to the increased interest of different groups in this sport. Kiteboarding often includes, not only classic ride, but also different tricks and acrobatics, and due to its attractivity and quick acquiring of basic maneuvers kiteboarding attracts ever greater number of recreationalists. Injuries are sometimes unavoidable part of learning of a new sport, so the importance of expert teaching in controlled working conditions to minimize the possibility of injuries is greatly stressed. Also, regarding the injuries in the context of professional sport, they influence psychological a physiological state of the athlete. Concerning the abovementioned facts, it is important to secure all the optimal conditions to avoid and minimize the injuries. The source of the injury in the kitesurfing is mostly mechanical. Injuries in most cases affect locomotive system—even up to 80% of all sports injuries. Such an injury is usually some kind of trauma (distention, strain, sprain, rupture, laceration) (Rolf, 2007). The occurrence of injuries is most often attributed to overtraining (22.4%), while the second most common cause is inadequate warm-up (19.4%) (Peeri et al., 2011), but injuries in kiteboarding are mostly acute, caused by a fall or trauma (Došen, 2019). Exadaktylos et al. (2005) point out that in some cases there is a need for rescue missions in kiteboarding. During 7 months, 30 rescue missions were recorded, of which injuries were recorded in 5 missions. Turk (2008) states that during a 10-year study, 1 death was recorded in kiteboarding. Therefore the importance of safety is emphasized. Considering that kiteboarding is the sport beginnings of which can be placed in the recent history, there is a problem of insufficient number of scientific research in that field. Although the safety of this sport is on a much higher security level today than in the beginning of its development, due to the implemented security systems, there is still room for improvement in a professional and recreational regard both. In order to decrease and prevent injuries in kiteboarding, new insights are needed that are practically applicable/ could be applied in praxis.

The aim of the paper is to determine the type and the frequency of sport injuries in kiteboarding, and to identify the causes of injuries in individuals practicing kiteboarding recreationally. Acquired data can be used in the future in forming the Recommendation for preventive actions for the injuries that show the highest frequency rate.

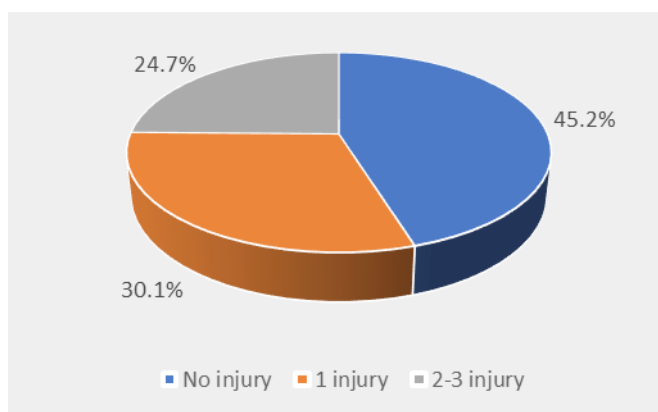
## METHODS

The sample of examinees consisted of 93 kiteboarder, of which 74 were men and 19 women. Average chronological age of the sample is  $33.75 \pm 8.87$  years. The research was conducted on 2 professional kiteboarders (2.2%), 77 recreational kiteboarders (82.8%), and 14 kiteboarding instructors (15.1%). The questionnaire was sent to all the examinees electronically. The questionnaire consisted of 23 parts. The questions covered general information, the method of acquiring beginner level skill of kiteboarding and kiteboarding experience, and also some questions covered sports injuries. The examinees got very elaborate guidelines for filling in the questionnaire. For this research methods of basic statistics were used (descriptive statistics, frequencies). The electronic questionnaire was made in Google Forms program, and the data was placed into comprehensive tables of Microsoft Excel program.

## RESULTS

### *Examinees*

Out of 93 examinees, 44 (47.3%) gained their basic knowledge through the kiteboarding course with the certified teacher, 17 (18.3%) gained their knowledge through kiteboarding course but with uncertified teacher, 22 (23.7%) gained their knowledge with the help of a friend with the kiteboarding experience, and 10 (10.8%) learned on their own. Depending on the manner of gaining of first and basic knowledge and training, 70% of examinees that gained knowledge on their own were injured, 68.18% of those learning with the help of a more experienced friend were injured, 58.82% were injured among those who passed the kiteboarding course with uncertified teacher, and the least percentage 43.18% were injured among those who passed the kiteboarding course with the certified teacher. Out of total sample of examinees (93), 51 (54.8%) were injured during kiteboarding, 43 male and 8 female examinees. Out of total sample, 28 (30.1%) examinees had only one injury, 23 (24.7%) suffered 2-3 injuries, while the rest of the subjects (45.2%) had no injuries (Figure 1).

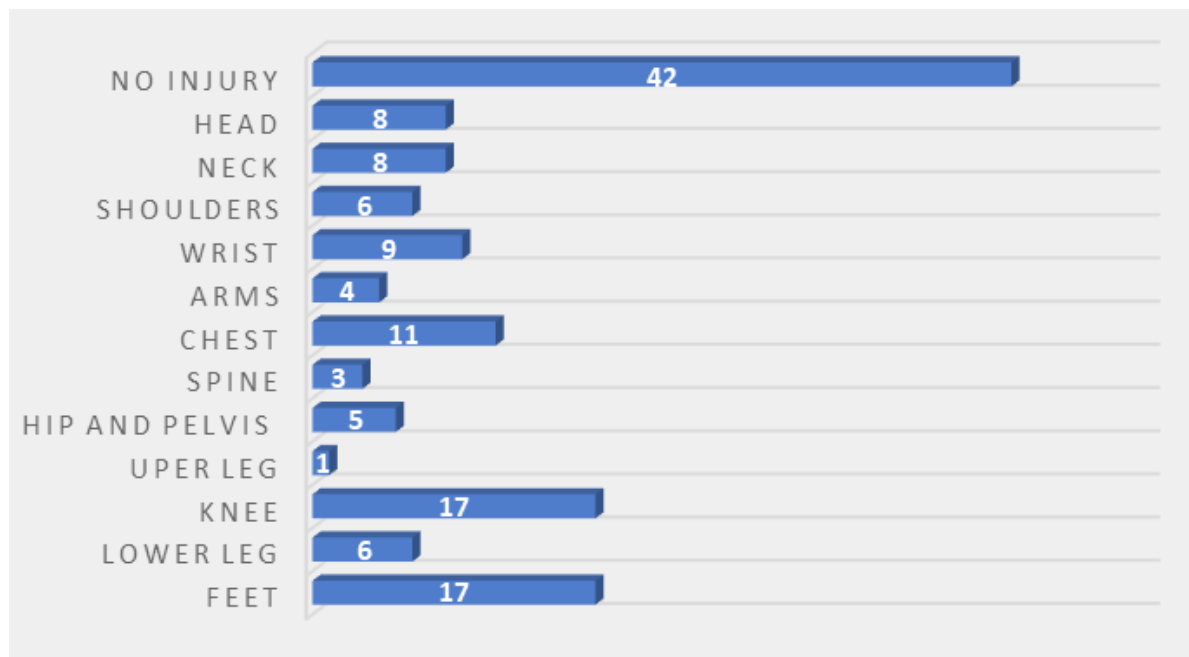


**Figure 1.** Injury percentage

Average number of injuries per examinee is 0.6129. Out of the whole sample two examinees are kiteboarding professionally (2.2%) – 100% of them suffered an injury, 77 examinees engage in kiteboarding recreationally (82.8%) – 49.35% of them had an injury, and 14 of them are kiteboarding teachers (15.1%) – 78.57% of them were injured during kiteboarding. Most of the examinees, 26 of them has 2-5 years of kiteboarding experience. The least number of examinees has more than 10 years of kiteboarding experience. Also, most examinees, 31 of them, spends 20-40 days a year kiteboarding, while the least number of them, 12 examinees spend 40-60 days a year kiteboarding. If the injury occurred after they started kiteboarding independently, most cases of injury occurred after 4-6 years of kiteboarding experience.

### ***Injury region***

Most injuries happen in the region of foot (17 injuries, 18.3%) and knee (17 injuries, 18.3%). Following them are 11 chest injuries (11.8%), 9 hand injuries (9.7%), 8 neck injuries (8.6%), 8 head injuries (8.6%), 6 shoulder injuries (6.5%), 5 hips and pelvis injuries (5.4%), 4 arm injuries (4.3%), 3 spine injuries (3.2%) and 1 upper leg injury (1.1%). Out of eight female examinees that suffered injury, 4 had injuries in the foot area. Most injuries in male examinees were located in the knee region (16) and foot region (13).



**Figure 2.** Examinees injuries

### ***Type of injury***

Most frequent types of injury are ligament sprain (25 injuries, 26.9%) and muscle sprain (13 injuries, 14%). Next are 9 bone fractures (9.7%), 8 distortions of joints (8.6%), 7 ligament ruptures (7.5%), 5 brain concussions (5.4%), 4 luxations of joints (4.3%), 3 muscle ruptures (3.2%), and one skull fracture (1.1%) and one brain contusion and laceration (1.1%).

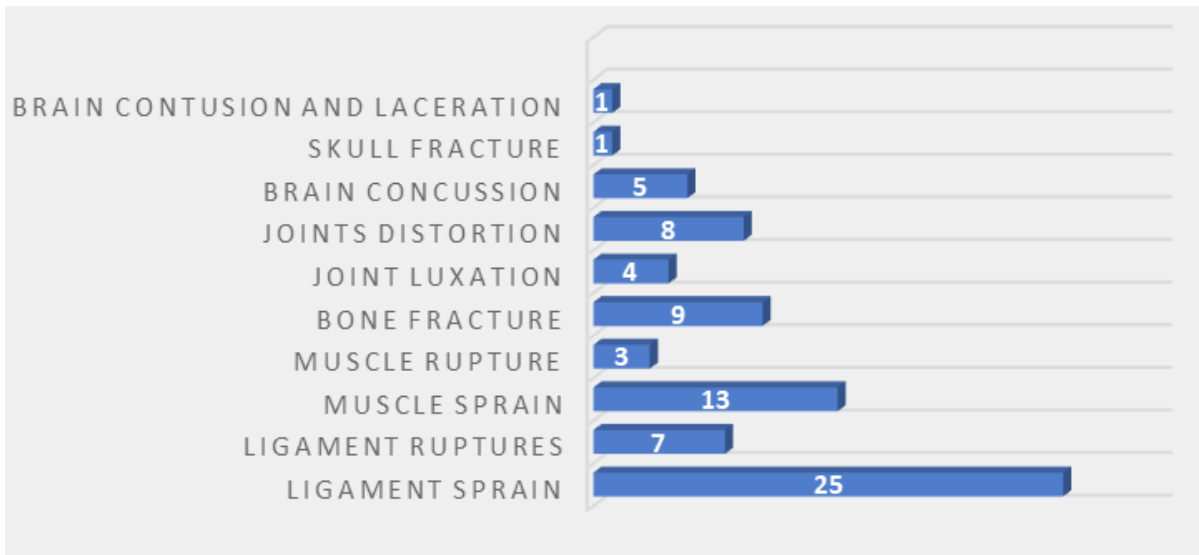


Figure 3. Type of injury

**Injury level**

Most examinees spent less than 7 days (18 cases, 19.4%) and up to a month recuperating from their injuries (18 cases, 19.4%). The least number of them spent more than 6 months recuperating, namely 7 (7.5%). Twelve of them spent 1-3 months recuperating (12.9%), and 3 of them (3.2%) spent 3-6 months recuperating. Out of examinees recuperating 3-6 months and more than 6 months, 5 had ligament rupture, and 3 suffered bone fracture. Out of 25 examinees that reported the most frequent type of injury (ligament sprain), 9 were recuperating less than 7 days, 13 up to one month, and 6 were recuperating 1-3 months. Also, 8 examinees (8.6%) pointed out that their injury required surgical procedure. Their injuries were ligament rupture (5), bone fracture (3), ligament sprain (1), muscle sprain (1), and muscle rupture (1). Seven examinees (7.5%) reported that the injury inhibited their further engagement in kiteboarding. Mostly their injuries were ligament rupture or bone fracture.

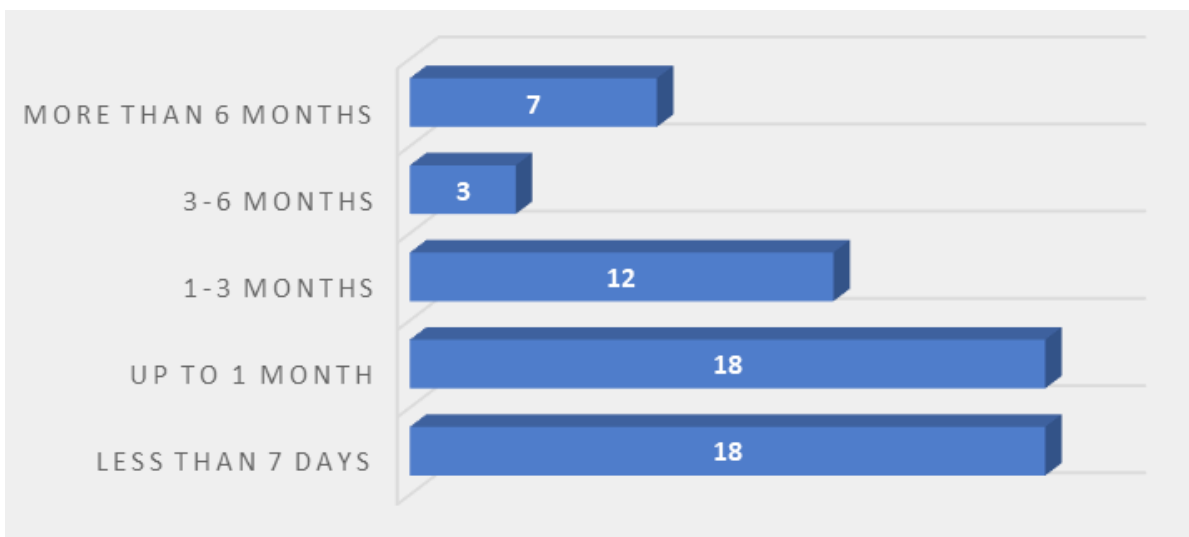


Figure 4. Recovery time

### ***Location and cause of injury***

The most common location of accident, i.e., of occurrence of injury was on the water (sea, lake), total of 47 injuries. On the land 9 injuries occurred. The occurrence of injury is in 47 cases caused by the athlete's own error (50.5%), and in 4 cases it was caused by their own error and the error of other kiteboarders (4.3%). There were no injuries caused solely by error of other kiteboarders. Injuries occurred most frequently during performing of jumps (31 injury, 33.3%) and due to the insufficient control of the kite in the water or on the land (22 injuries, 23.7%).

## **DISCUSSION**

The results are showing 51 cases (54.8%) of those suffering injuries while kiteboarding, i.e., 43 male and 8 female examinees, which is more than half of total number of examinees. Showed results are in accordance with the previous research in kiteboarding. According to Nickel et al. (2004) the most frequent anatomical location of the injuries are lower extremities. Pérez-Turpin et al. (2011) state that of the total number of injuries, 45–70% includes injuries in the area of lower extremities. Ankle (64%) is the area mostly affected by injuries, then foot (14%), knee (11%) and lower leg area (11%). Acquired data can be connected to the fact that during the ride majority of the force is on the lower extremities, and during the jumps in the moment of take-off, and especially during the landing that force is even more pronounced, which causes more frequent injuries of lower extremities. As Peeri et al. (2011) states, the muscles of the lower extremities and the lower back are under heavy load, which can lead to uncontrolled performance and incorrect technique. This incorrect technique can also be related to overtraining. Also, when we consider using of twintip board with footstraps, in cases of falling or not controlling the board in higher velocities, the foot or both feet usually stay in the footstraps which causes injuries of mentioned feet.

The most frequent types of injury are ligament sprain (25) and muscle sprain (13) which make 57.91% of total number of all mentioned types of injuries. Also, according to the Pérez-Turpin and assoc. (2011) the highest percentage was for the ankle sprain (up to 40%), then contusion (up to 34%) and abrasion (up to 28%). Muscle and tendon damage made up 18% of total number of mentioned types of injuries. Out of total 25 cases of examinees with ligament sprain, 9 were recovering less than 7 days, 13 up to a month, and in 5 cases recovery lasted 1-3 months. So, in most cases injuries were of minor or medium severity, not requiring long recuperation period. Considering the sample of examinees majority of which is engaged in kiteboarding recreationally, the quality of warm-up before kiteboarding performance should be questioned, which is backed up by research by Peeri et al. (2011) pointing out that lack of quality warm up is the second most frequent cause of injuries (22.4%).

Previous research also shows that small percentage of kiteboarders suffered severe or very severe injuries which obstructed their further engagement in kiteboarding. For example, Nickel and assoc. (2004) have noted in their research 124 injuries in 235 kiteboarders during the 6month period. They reported one fatal accident during their research (polytrauma: 0.8%; 0.05/1000 hours of kiteboarding) and 11 injuries classified as severe (3%; 0.2/1000 h). Most of the injuries were classified as minor injuries (77%; 5.4/1000 h) or medium injuries (19%; 1.4/1000 h). Wegner and

Wegener (2012) in their research pertaining to a 12-month period acquired results on 653 injuries in the heterogenous group (beginners, advanced, experts) of 335 kiteboarders. Only 78 kiteboarders (23.3%) suffered no injury, which points to multiple injuries of the rest of 257 kiteboarders. Out of 653 injuries, 533 were classified as minor injuries (82%; 10.0/1000 hours of kiteboarding), 99 injuries as medium (15%; 1.9/1000 h), 20 as severe injuries (3%; 0.4/ 1000 h), and one injury was classified as very severe (0.2%; 0.02/1000 h).

The number of injuries occurring on the water (sea, lake) is much greater (47) compared to the injuries occurring on the land. After perfecting basic skills of board riding and kite controlling, the participants start with training and performing of more complex and more extreme and demanding elements, which is the reason why greater number of injuries occurs on the water. Petersen and assoc. (2002) have proved in their study that most of the injuries happened near the coast due to the technical issues, wrong choice of kite size or difficult weather conditions. Results of the questionnaire state as the most common cause of injuries performing of jumps (31) and insufficient control of kite on the water or on the land (22). Furthermore, the injuries most frequently happened in kiteboarders with 4 – 6 years of experience. After initial acquisition of basic knowledge in the first two years, kiteboarders start learning advanced techniques, performing jumps and different tricks which causes increase of possible situations in which an injury can occur. Precisely because of the fact that injuries most often occurred in subjects with 4-6 years of experience performing more advanced techniques of elements, it is necessary to emphasize the importance of proper training of basic elements.

The lowest percentage of injured (43.18% of total number of examinees who acquired their basic knowledge this way) pertains to the mentioned way of knowledge acquisition, if compared to the other ways of acquiring basic knowledge. The biggest percentage of injured (70 %) is in examinees who were acquiring basic knowledge on their own, without help. Further, 68.18% of those acquiring basics with the help of a friend with kiteboarding experience, and 58.82% of those acquiring basic through kiteboarding course, but with uncertified teacher suffered injuries. There is a significant difference in the percentage of injured depending on the way they acquired their basic skills in kiteboarding. The examinees that acquired their skills through kiteboarding course with certified teacher suffered less injuries. Therefore, based on the results it is recommended to acquire skills in kiteboarding exclusively with the help of educated and expert teacher. Well mastered basics of kiteboarding and through understanding of kite functioning from the beginning will for sure decrease the number of injuries in the later phases during performing more demanding elements.

## CONCLUSION

Kiteboarding is relatively young sport, which experienced fast development in the last ten years of the 21st century. Great development and investment in the equipment has ensured safe usage and engagement in kiteboarding for expanding population, and with it the number of injuries was also decreased. This research was conducted to define the type and frequency of injuries in kiteboarders, and it confirmed previous findings on most frequent injuries (foot, knee). Considering that kiteboarding is a sport with a short history, it still cannot be stated that the system of organization

is in level with other sports. We can acknowledge that most of the people engaged in kiteboarding are recreationists, so it is important to stress that the right way of acquiring of basic knowledge with the certified teacher greatly reduces the number of injuries. Quality and professional training as well as not overestimating one's own abilities are necessary in order to reduce the number and severity of injuries to a minimum. . With proper training of basic knowledge, the number of injuries during the performance of more advanced techniques can potentially be reduced. After research some new questions appeared, concerning the quality of warm-up and body exercise so the specific demand of this sport could be met, and the issue of connection of quality warm-up and number of injuries. The data acquired through the research could be used as a guideline for preventive actions.

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