


# Women sport injuries: a retrospective study of elite windsurfers

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## ABSTRACT

Penichet-Tomás A, Alonso-Fernández D, Gutierrez-Sanchez A, Andreu-Cabrera E, Suárez-Llorca C. Women sport injuries: a retrospective study of elite windsurfers. *J. Hum. Sport Exerc.* Vol. 7, No. 2, pp. 446-453, 2012. This study was designed to identify the injuries of professional women windsurfers, from their anatomical location, type of sport, context when they occurred, type of injury, the time of inactivity as a result of the same, the type of health care received and the relationship between the number of injuries and the position in the final classification of professional windsurfing competitions. We gave a retrospective questionnaire to 18 women elite windsurfers, who took part in the World Cup competition held in Fuerteventura (2008). Women are injured more frequently during training than competition (77.8%;  $p < 0.05$  vs. 20.5%). Women suffer leg injuries more than men (83.3%;  $p < 0.05$  vs. 14.3%) in freestyle. Serious injuries were more frequent for women (66.7%;  $p < 0.05$  vs. 28.2%) and the time of inactivity due to the injury was shorter for women (50%;  $p < 0.05$  vs. 20.5%). These results indicate that female windsurfers are more liable to suffer injuries, generally serious, during training sessions. Freestyle involves a greater risk of leg injuries for women. The knee is the area where most injuries occur, both for men and women, followed by the legs. **Key words:** WINDSURFING, INJURY, COMPETITION, PREVENTION, WOMEN

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## INTRODUCTION

The participation of women in sailing is much more limited than men from the beginning. The delay ended in the 1988 Seoul Olympics, where the participation of women was gradually growing. At the Olympics in Athens and Pekin, the women participating in sailing events accounted for 35% of all athletes competing in these Olympic Games.

Along with this, we must emphasize that the role of women in sports on the sea has been, sometimes decorative (Knijnik, 2010). Therefore, the strong emergence of the women's sports such as surfing was a step forward to building the identity of women in these sports.

Moreover, windsurfing is firmly established as motor activity of international competition and it is recognized as a powerful means of expanding the Anglo-Saxon culture and language (Sedlaczek, 2009). Besides, it is considered a sport very colourful and with many directly links with development and interaction with the environment (Pérez-Turpin, 2009).

Since the beginning, the development of windsurfing has always been linked with the evolution of the material. The technological development has made itself different ways of understanding windsurfing to be considered Olympic, as they have had to unify criteria in material navigation (sail dimensions and proportions of the table) to match the competition. There is another modality of windsurfing, not Olympic, which has a greater heterogeneity in the material characteristics and diversity in competition aspects that lead to new partnerships. Similarly, the sport has been widely accepted both recreational and competitive that involves millions of participants worldwide (Jablecki & Garner, 2000; Rosenbaum & Dietz, 2002; Dyson et al., 2006). We should add that in the 2012 London Olympics Games, there will be four types of sailing in the women, including women's match racing, which will debut on the Olympic Programme.

One of the most important organizations is the Association of windsurfing (PWA), which represents excellence in the sport. This Association (PWA) organizes different professional events where they compete the best windsurfers in the world with the aim of promoting the growth of this sport. The most important event of this association is the World Cup which takes place every year in a different city. The edition on 2008 was held on the beaches of Sotavento of Jandia (Fuerteventura) and gathered over 380 specialists from around the world, to challenge the competition in three categories:

- Speed: is the test where windsurfers travel a distance of 500 meters in the shortest possible time, the participation is individual and consecutive.
- Slalom: is a discipline of simultaneous involvement of windsurfers, where the competitors use a maximum of four sails and two boards, being emphasized the ability of the competitor and their tactics. Participants travel paths depending generally the wind crossing the race with buoys to form an eight.
- Freestyle: some judges rewarded by a scorecard the manoeuvres and jumps of the participants in this competition.

One aspect to consider when performing any type of sporting activity at sea is security. Sea sports, in its various manifestations and forms, have a damaging reality that may imply the extent to which their practice is safe and where they should be addressed in future prevention strategies. In the case of windsurfing, McCormick and Davis, in 1988 indicated that non-competitive surfing in the U.S. was a relatively safe sport because of the number of injuries and their ratio (0.22 injuries per 1000 hours). In this line, Nathanson and Reinert (1999) indicated that the prejudicial impact was 1 per 1000 days. Recently, Nathanson et al. (2007) found that in competitive surfing, there were 13 acute injuries per 1000 hours of navigation and the risk of injury was more than double when the game takes place in a context of large waves or a hard seafloor. However, it appears that both aerial maneuvers like jumps are the most common causes of injury (Dyson et al., 2006). Thus Pryma et al. (1999) indicated that there was an injury every 174 days at sea in a group of 44 elite surfers as a result of jumping maneuvers, and it is the most common type of accident. Later study (Gosheger et al., 2001) conducted with 49 elite competitors identified that there was a high risk of injury in the jumps. Similarly, Petersen et al. (2003), through an internet survey developed by German windsurfers, indicated that during the season for 2000, the injury rate was 1.92 per participant, and these resulted mainly from bruises and are presented as bruises and fractures. Kalegeromitros et al. (2002) found that 50% of serious accidents caused 22 fractures and 23% dislocations.

In a recent study, Dyson et al. (2006), found that the prejudicial effect was 1.5/person/year with a high incidence of new and recurring injuries. Back muscle injuries were common, indicating the need for preventive measures. The Wave and Slalom modes associated with new and recurrent injuries and the need for head protection.

Although mentioned investigations has been a step in clarifying the reality adverse effect on windsurfing, it would be interesting to reveal the time at which these injuries occur in high competition, what kind of injuries are most common, who come for treatment, how long it takes to return to training and / or competition after the injury, if they are affected equally all the classified and what differences exist by type.

The aim of this study was to determine percentage of injuries from their anatomical location, type of sport, the context in which it occurs, the type of injury, downtime derivative thereof, type of health care received and the relationship between the number of injuries and result in the final standings of the competition in women pro riders.

## MATERIALS AND METHODS

### *Subjects*

A total of 18 women windsurfers took part, elite competitors (from 20 to 35 years of age) in the windsurfing World Cup (2008) held in Fuerteventura (Spain). All subjects gave their written consent before the study began. The University of Alicante ethics committee approved the study.

### *Questionnaire*

In order to carry out this descriptive epidemiological study, a previously validated retrospective questionnaire (24 months) was used (Eloranta & Tittonen, 2006). Said questionnaire gathered information about the instant the injuries occurred, whether during training or in competition (Dyson et al., 2006). It also asked about the anatomical location of the injury (foot, leg, knee, back, clavicle, ankle and head). They were classified in the following styles: speed, slalom and freestyle and by the type of injury (overuse, acute and others). It also asked about the type of professional consulted to treat the injury: doctor, masseur or other, and the time taken to return to practice or competition after the injury: 1-3, 4-7, and 8-21 days. To

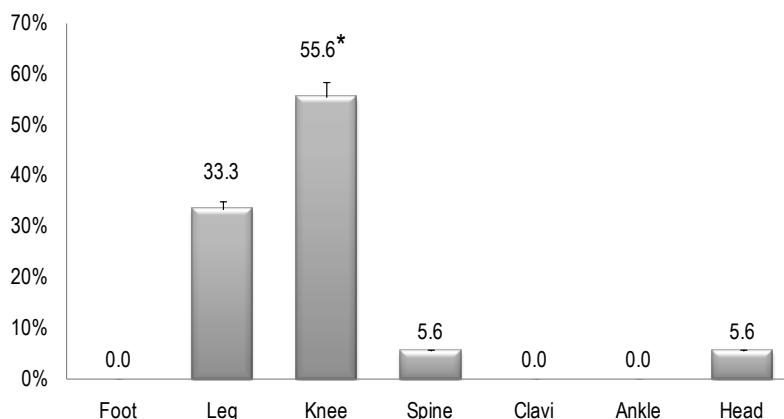
classify the level of competition, the following scale was used: in the first group, those classified in the first 10 places of the previous World Cup 2007; in the second group, those classified from 11 to 20, while the third group consisted of those classified from 21 to 30. All the data was gathered by hand, anonymously, during the Word Cup Fuerteventura 2008 (Spain), organised by the Professional Windsurfers Association (PWA). The competition consisted of three styles: speed, slalom and freestyle.

**Statistical analysis**

The data was analysed using SPSS v. 15 to calculate descriptive statistics, frequencies and distributions. Chi-square ( $\chi^2$ ) tests were used to determine significance of data. The level of significance was set to  $p < 0.05$ .

**RESULTS**

The results show that women windsurfers are injured more often during training than competition (77.8%;  $p \leq 0.05$  vs. 20.5%). Figure 1 shows the frequency with which injuries occur in different anatomical locations. Knees and legs suffer the most injuries.



**Figure 1.** Location and proportions (%) of injuries. \* $p \leq 0.05$ .

Table 1 shows the anatomical location of injuries by sporting style (speed, slalom and freestyle).

**Table 1.** Location and proportions (%) of injuries by sport style.

	Speed	Slalom	Free Style
Foot	0	0	0
Leg	0	11.1	83.3*
Knee	33.3	88.9*	16.7
Back	33.3	0	0
Clavicle	0	0	0
Ankle	0	0	0
Head	33.3	0	0

\* $p \leq 0.05$

Table 2 shows the percentage of injuries according to the side of the body, type of injury, sporting style and sporting level. It also shows the type of specialist chosen to treat the injury and the time taken to return to training or competition.

**Table 2.** Different proportions (%) of injuries.

<b>Injuries by side of body</b>	Right	72.2*
	Left	16.7
	NA	11.1
<b>Type of injury</b>	Overuse	11.1
	Acute	66.7*
	Other	22.2
<b>Style</b>	Speed	16.7
	Slalom	50*
	Free Style	33.3
<b>Type of attention received</b>	Physician	72.2*
	Massage	27.8
	Other	0
<b>Time taken to return to practice</b>	1-3 days	50*
	4-7 days	33.3
	8-21 days	16.7
<b>Sporting level</b>	1	22.2
	2	33.3
	3	44.4

\* $p \leq 0.05$

Table 3 shows the time spent inactive depending on when the injury occurred (during competition or training).

**Table 3.** Time spent inactive depending on when the injury occurred.

	<b>Day</b>	<b>%</b>
<b>Training</b>	1-3	42.9
	4-7	42.9
	8-21	14.3
<b>Competition</b>	1-3	75*
	4-7	0
	8-21	25

\* $p \leq 0.05$

## DISCUSSION

The highest percentage of injuries is concentrated during the competition. It is likely that this is due to increased demands for this type of situation in which every athlete tries to overcome as far as possible. In any case these results are consistent with those reported by Nathanson et al. (2007).

The knees are the most damaging impact area in the body, mainly in the form of slalom. These results are consistent with those obtained by Dyson et al. (2006) and by Pryma et al. (1999), who stressed that the tendon injury was the commonest (mostly knees). However, it should be noted that Pérez-Navarro (2004) showed that only 16.4% of injuries occurred in the knees. This difference may be because the study of Pérez-Navarro was performed with windsurfers and intermediate-level, without a mastery of technique. It seems remarkable that the great demand for this anatomical region has this mode mainly due to its own operational idiosyncrasies. In this sense, becomes crucial to develop specific equipment that would quickly release the feet if necessary as well as the ability to download additional tensions characteristic of this discipline (Witt et al., 1995; Salvi et al., 1997; Kalegeromitros et al., 2002; Dyson et al., 2006).

As for the type of injury, manifested a high prevalence of acute injuries in the categories of speed and freestyle. This may be due to the aerial and acrobatic manoeuvres and the impacts that these stem where the crash can be relevant if the impact is against the very instruments of navigation and / or also for the high speeds achieved in speed mode (Rosenbaum & Dietz, 2002; Petersen et al., 2003). Perhaps this is the reason that in the freestyle, the prejudicial impact is spread over a greater extent than in other methods of standing out the back and knees and followed by the leg, ankle and head. In this regard it should be especially careful to use a material that protects the integrity of these body areas, especially recommended helmet so earnestly not only for this mode but also for speed as well as being the the highest percentage of injuries occur in the impact area also tends to be larger by the shock resulting from the jumps and stunts like speed (Gosheger et al., 2001; Rosenbaum & Dietz, 2002; Petersen et al., 2003).

10.3% of injuries are in the back and they occur in 10% in speed mode and 14.3% in the freestyle. It would be desirable, and in light of the foregoing, protect the back face of possible impacts as well as use a hip belt that acts as backup (Dyson et al., 2006). In addition and as a complement to the training sessions would also be interesting to include exercises that improve the stabilization of the middle zone (Rosenbaum & Dietz, 2002).

In our case, we agree with Dyson et al. (2006) in the slalom mode causes a higher injury rate than other modalities (56.4% compared to 25.6% in speed and freestyle 17.9%) being from acute injuries, which occur more frequently in this discipline.

Regarding downtime as a result of injury, 74.3% of injured athletes retake the training or competition over the next week having suffered the injury and 25.7% take between 8 and 21 days. This could indicate that a high percentage of injuries that occur may be mild to moderate. In this line should be added that in addition to more injuries occur during competition, they may be somewhat more complex because the 29% take between 8 and 21 days while injuries resulting from training reaches only 12.5% this time.

Unlike other works such as Dyson et al. (2006) who proved that the defendant Specialist to treat the injury was a physiotherapist, in our case, most windsurfers chose to be treated by a physician (61.5%). However, if related to the type of injury may be added that 100% of overuse injuries; medical personnel treated 81.8% of the acute and 7.1% of other injuries. 18.2% of acute injuries were treated by massage and the other 92.9% of injuries not covered by overuse or acute. Did not consult other specialists.

Although not significantly, it seems that athletes who are showing better results in major competitions before, have a lower incidence harmful. It should be pointed than those classified in category 1 have a higher percentage of overuse injuries as opposed to those attached to the 2 category whose injuries occur at a higher rate and acute.

## CONCLUSIONS

The highest percentage of injuries is presented in the lower body especially the knees. This suggests that more work is necessary on prevention mainly in slalom. A high percentage of injuries result from overuse of what would be reviewing the progressions and training with the intention of optimizing the recovery periods. The back is still very affected by this also requires new approaches, including those applying from training to improve their competitive stress tolerance. Likewise also required to protect the head.

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