



Injuries among professional surfers

Luís Henrique Base¹, Marco Antonio Ferreira Alves², Erick Oliveira Martins² and Roberto Fernandes da Costa²

ABSTRACT

The aim of this study was to verify the occurrence of injuries in Brazilian professional surfers who took part in one of the stages of the Professional Brazilian Surf Championship for men. There were 32 professional surfers participating in the study and each one of them filled in a questionnaire about the injuries they had suffered during the surf practice. There were found 112 injuries among all the participants of the study. Lacerations/cuts was the most frequent injury, 38 (33.9%); followed by sprains, 29 (25.9%); contusions, 16 (14.2%); strains, 14 (12.5%); burns, 9 (8.0%); fractures, 6 (5.3%). We conclude that most of the injuries were originated by trauma, suggesting that the extrinsic factors inherent to this sport are potentially harmful to the athletes.

INTRODUCTION

Nowadays surfboard riding has an expressive number of practitioners in Brazil, with approximately 2.7 million surfboard riders. The *International Surf Association* estimates the impressive number of 17 million practitioners distributed in over 70 countries, and its industry moves around 2.5 million dollars per year. Brazil, along with the United States and Australia, are the three largest powers of world surfing. Although it is an expressive sport, the scientific literature about this modality is scarce, with just few authors and investigations in this field.

Surfboard riding has improved a lot over the last 30 years; the surfboards have become faster and with better hydrodynamics, which provides wider diversity of maneuvers, consequently increasing the risk of injuries. Currently we find people practicing the sport in all kinds of waves, sites and adverse weather conditions, which has also implied in differentiated risks for each region.

According to Bitencourt⁽¹⁾, in Brazil, concerning its competitive side, surfing also occupies a remarkable position, having circuits organized in many groups, from college, county, state and national circuits, to WCT – World Championship Tour, and WQS – World Qualifying Surfing circuits.

As any sport at competitive level, the relationship with health may be compromised. In surfboard riding this is due mainly to the unpredictability in maneuvers, contact with the surfboard or the seabed, involvement with the wave and excessive training⁽²⁻⁴⁾. In Brazil, there are few published studies on injuries in surfboard riding.

Therefore, the aim of the present study was to verify the occurrence of injuries among professional athletes who participate in a series of the Brazilian Professional Surfing Championship.

METHODS

The present transversal descriptive study was performed during one phase of the Brazilian Professional Surfing Championship

1. Curso de Especialização em Fisioterapia em Ortopedia e Traumatologia – Hospital das Clínicas – Faculdade de Medicina da USP, São Paulo, SP.
2. Grupo de Pesquisa em Disfunção do Movimento Humano da Faculdade de Fisioterapia da UNISANTA, Santos, SP.

Approved in 31/1/07.

Correspondence to: Roberto Fernandes da Costa, Av. Siqueira Campos, 518, apto. 14 – 11045-200 – Santos, SP. Tels.: (13) 3221-6576 / (13) 8129-7675. E-mail: roberto@robertocosta.com.br

Keywords: Injuries. Surf. Sport.

held in Maresias beach, São Sebastião – SP, on June 25 and 26, 2005.

Thirty-two athletes, age between 19 and 38 years (mean of 16 years), participated in this sportive modality practice. Each athlete previously signed a free and clarified consent form, and then answered an open questionnaire which asked about injuries occurred during their sportive lives in surfboard riding. The questionnaire was directly applied by the researcher, who limited to inquire and clarify doubts which occasionally occurred, with no interference in their opinions or production of guided answers.

The injuries were divided according to kind, namely: sprains, strains, cut-contusion wounds, fractures, and contusions. Concerning topography they were: head, chest, upper and lower limbs. Concerning etiologic agent we had: surfboard, maneuver and seabed.

RESULTS

The characteristics of the athletes of the present study are presented in table 1.

TABLE 1
Mean values, standard deviations, minimum and maximal for weight, height, age, time of surfing practice (ST) and time as professional (PST)

	Mean	SD	Min.	Max.
Weight (kg)	69.3	5.87	58.0	82.0
Height (cm)	172.0	6.00	162.0	186.0
Age (years)	26.5	5.11	19.0	38.0
ST (years)	16.0	5.01	9.0	28.0
PST (years)	7.5	4.47	2.0	20.0

The analysis of the obtained results in the questionnaire applied showed the occurrence of 112 injuries among all participants of the study, with all of them have reporting some kind of important injury during their careers, which has put them away from the practice for at least one day. The calculated proportion was of 0.76 injuries for each 1.000 days of the modality practice.

Observation of injuries due to their topography showed that head was the part most hit by cut-contusion wounds; chest by muscular strains; upper limbs by burns; and lower limbs by knee and ankle sprains (table 2).

TABLE 2
Description of the absolute (n) and relative distribution (%) of the kind of injury per region of occurrence in the body

	Head	Chest	Upper limbs	Lower limbs	Total
Fracture	1 (4.3%)	1 (8.3%)	1 (7.7%)	3 (4.7%)	6 (5.4%)
Sprain	0 (0.0%)	0 (0.0%)	0 (0.0%)	29 (45.3%)	29 (25.9%)
Muscular strain	2 (8.7%)	4 (33.3%)	1 (7.7%)	7 (10.9%)	14 (12.5%)
Burn	0 (0.0%)	1 (8.3%)	5 (38.5%)	3 (4.7%)	9 (8.0%)
Cut-contusion	18 (78.3%)	1 (8.3%)	3 (23.1%)	16 (25.0%)	38 (33.9%)
Contusion	2 (8.7%)	5 (41.7%)	3 (23.1%)	6 (9.4%)	16 (14.3%)
Total	23 (20.7%)	12 (10.8%)	13 (11.7%)	64 (57.6%)	112 (100%)

Concerning causal agents, the surfboard was the greatest responsible for cut-contusion wounds 20 (50.6%) and contusions 12 (31.6%). Maneuvers performance was responsible for 18 (54.5%) of the sprains, and the seabed had equal participation in cut-contusion wound 3 (42.9%) and in contusions 3 (42.9%), according to what was described in table 3.

TABLE 3
Description of the absolute (n) and relative distribution (%) of the kind of injury by etiological agent

	Surfboard	Maneuver	Seabed	Total
Fracture	2 (3.8%)	4 (9.5%)	0 (0.0%)	6 (5.8%)
Sprain	4 (7.5%)	25 (59.5%)	0 (0.0%)	29 (28.2%)
Muscular strain	0 (0.0%)	13 (31.0%)	1 (12.5%)	14 (13.6%)
Cut-contusion	34 (64.2%)	0 (0.0%)	4 (50.0%)	38 (36.9%)
Contusion	13 (24.5%)	0 (0.0%)	3 (37.5%)	16 (15.5%)
Total	53 (51.4%)	42 (40.7%)	8 (7.7%)	103 (100%)

DISCUSSION

In the present study, the mean among all participants of the research was of 2.5 hours per surfing session; 5.5 days per week and 16 years of practice, revealing low occurrence of injuries, 0.76 for each 1.000 days of surfing. This result is much lower than what has been described by Lowdon⁽⁵⁾, who found 3.5 injuries for each 1.000 days of surfing, using the same criteria for injury from the present study: time away from the sport for at least one day. It is worth highlighting that this study was conducted in Australia, a country where the seabed, waves (especially the bigger ones), water temperature and marine animals characteristics are different from the ones presented in Brazil. There is also difference in competition level and schedule. These factors may explain the difference between findings in the studies.

A study by Taylor⁽⁶⁾, with 646 surfers of different training standards in Australia, have reported that 145 surfers presented 168 acute injuries during the previous 12 months, constituting 0.26 injuries per surfer in a period of one year.

Concerning the kind of injury, the ones found in the present study are those which most frequently appear in other studies described in the literature⁽⁵⁻⁷⁾. However, other injuries are also described in the literature, such as ocular injuries⁽⁸⁻¹⁰⁾; auditory injuries⁽¹¹⁻¹²⁾; injuries produced by contact with marine animals or organisms⁽¹³⁻¹⁴⁾, among others of less incidence.

From the total of injuries found, the one which had the highest prevalence was the cut-contusion wound, corresponding to 33.9% of the total of injuries. The mechanism for this kind of injury was collision with surfboard in 64.2% of the cases. The head, (face, skull and neck) was the most hit segment for this kind of injury, corresponding to 78.3%.

Previous studies have also mentioned cut-contusion wound as the most commonly found injury. The study conducted by Steinman *et al.*⁽¹⁵⁾ in the south of Brazil found 44.0% of injuries represented by this kind. In a study conducted in Hawaii⁽⁷⁾, a proportion of 40.0% was verified for cut-contusion wound among all injuries.

Sprains have appeared with 25.9% among the total of injuries, and maneuvers were the main responsible for this kind of injury (59.5%), reaching especially the lower limbs. This kind of injury was also very frequent in studies previously conducted. Bondioli⁽¹⁶⁾, showed sprains as responsible for 31.55% of the total of injuries, very close to the 28.6% found by Taylor⁽³⁾; both much higher than the ones found by Steinman⁽¹⁵⁾, in which sprains had participation in only 6% of the total of the found injuries.

Muscular strains have also had high prevalence 14.3%, of the total of injuries, with lower limbs representing the region of highest occurrence (9.4%). The main cause of this kind of injury was collision with surfboard (24.54%).

In the study by Steinman⁽¹⁵⁾, contusions were responsible for 16.9% of the total of injuries. In the research by Nathanson⁽⁷⁾, 12% was the proportion for muscular strains in the observed sample.

Muscular strains had a prevalence of 12.5% among all injuries; maneuvers were responsible for 31.0% of the cases of this kind of injury, constituting the main etiologic agent.

In the study by Steinman⁽¹⁵⁾, muscular strains were responsible for 9.6% of the total of injuries. Bondioli⁽¹⁶⁾, in his study, referred that muscular strains were responsible for only 1.19% of the total injuries. The comparison with some studies becomes impossible due to the adopted criteria, such as in those in which sprains and strains have been measured together, as muscle-ligament injuries^(5,17).

Fractures occurred in 5.4% of the total injuries, which is similar to the 6.0% result found by Nathanson⁽⁷⁾ and higher than the one found in research by Steinman⁽¹⁵⁾, 2.5%. On the other hand, Lowdon *et al.*⁽¹⁷⁾ have reported 9.0% of occurrence in their sample and Taylor *et al.*⁽³⁾, similarly, reported 8.9%. In all these studies fractures were most frequent in lower limbs and had as main etiologic agent the maneuvers.

In the present study, no complaints about dislocations as well as in other considered studies have been reported^(7,16). Only in the study by Steinman⁽¹⁵⁾, dislocations have been reported in 3.0% of the subjects. Low occurrence of fractures, as well as lack of dislocations, show that besides the protection factor the water plays (in the return), the energy of the traumatic injuries must be considered from 'low' to 'medium' in the majority of the cases. Moreover, the few dislocation cases which may occur, especially in the shoulder joint are related with drops from the waves in unfavorable conditions to these joints, a fact more frequent in less experienced surfers, with no conditions to better foresee these risky situations.

Concerning topography of injuries, the majority occurred in lower limbs 57.6% and in the head 20.7%, confirming what has been found in previous studies^(3,15-16).

Cut-contusion wounds have reached most frequently the head, with 78.3% of all injuries of this segment. Burns have been responsible for 38.5% of all injuries which reached upper limbs. Sprains have been responsible for 45.3% of the total of the injuries in lower limbs. From all the chest injuries, muscular strains have been responsible for 33.3% and contusions for 41.7%.

Within the etiological agents, the surfboard was the most responsible for injuries (51.4%), suggesting that they occur due to the high susceptibility of the athlete to be in direct contact with parts such as the nose, skegs, tail and rails. These values show that it is necessary to invest in studies for the development of improved protection gear. Nevertheless, some studies have shown that a low number of surfers wear those gears^(2,5,18). It is important to remark that professional athletes play an important role concerning the use of such gears⁽¹⁸⁾, which can aid in the prevention of injuries.

Maneuvers have been the second agent responsible for injuries with 40.7%. This fact probably happens due to the need to perform maneuvers with fast and sudden movements, with impact such as the floater, the tube and aerial maneuvers with combined spins. This last kind of maneuver can also explain the high prevalence of knee (48.2%) and ankle sprains (41.3%). Bondioli⁽¹⁶⁾ found in his research the floater and the pump as the most injury-prone maneuvers. Steinman⁽¹⁵⁾, found the tube followed by the pump, floater and aerial as the most injury-prone ones. These maneuvers require fast chest rotation movements and, as the lower limbs are in closed chain, there is a rotation component in the knee which may exceed the physiological threshold, leading to sprains in this joint.

Low occurrence of injuries due to collision on the seabed, in the present study (7.7%), is very probably due to the geological characteristics of the Brazilian beaches. Although these athletes spend

great part of the year surfing abroad, they also spend long periods surfing in Brazil, where the predominance is of sandy deep beds, which according to Conway⁽¹⁹⁾, are less dangerous. In studies conducted in Hawaii and Australia, for example, the contact with rocks and corals is responsible for great incidence of injuries^(2-3,6).

Compared with other sports, surfing is relatively safe and presents low level of injury⁽²⁾, corroborating the findings in the present study. However, there may be a number of other etiologic agents besides the ones mentioned here; such as increased risk of skin cancer due to high sun exposure, many times with no proper protection⁽²⁰⁾. Shark attacks, although rare, have occurred with 55 surfers in 2003 and were responsible for four deaths⁽²¹⁾. In Brazil, many attacks have been reported in the media, especially in the Pernambuco state.

It is worth mentioning that the data collected in the present study are diagnostics which have not been joined with medical purpose, but they have been reported by the athletes themselves, which may imply in a limitation to the study. Nevertheless, other men-

tioned studies have applied the same technique with results considered valid^(3,5).

CONCLUSION

The analysis of the outcomes found in the present study let us conclude that the rate of injuries of the Brazilian professional athletes interviewed was low, and that the nature of the injuries was essentially traumatic, especially in lower limbs and head, with the surfboard appearing as the main etiological agent.

Such data are useful in order to better understand this sport, both from the practitioners' side and the professionals of the health field. Moreover, they can also aid in the elaboration of prevention and treatment proposals, with the aim to reduce the risk of injury or the time away from the modality.

All the authors declared there is not any potential conflict of interests regarding this article.

REFERENCES

1. Bitencourt V, Amorim S, Vigne JA, Navarro P. Surfe/Espportes radicais. In: Da Costa L. Atlas do Esporte no Brasil. Rio de Janeiro: Shape, 2005;411-6.
2. Sunshine S. Surfing injuries. *Curr Sports Med Rep.* 2003;2(3):136-41.
3. Taylor DM, Bennedett D, Carter M, Garewal D, Finch CF. Acute injury and chronic disability resulting from surfboard riding. *J Sci Med Sport.* 2004;7(4):429-37.
4. Zoltan TB, Taylor KS, Achar SA. Health issues for surfers. *Am Fam Physician.* 2005;71(12):2313-7.
5. Lowdon BJ, Pateman NA, Pitman AJ. Surfboard-riding injuries. *Med J Aust.* 1983;2(12):613-6.
6. Taylor DM, Bennedett D, Carter M, Garewal D, Finch CF. Perceptions of surfboard riders regarding the need for protective headgear. *Wilderness Environ Med.* 2005;16(2):75-80.
7. Nathanson A, Haynes P, Galanis D. Surfing injuries. *Am J Emerg Med.* 2002;20:155-60.
8. Lawless L, Porter W, Pountney R, Simpson M. Surfboard-related ocular injuries. *Aust N Z J Ophthalmol.* 1986;14:55-7.
9. Kin JW, McDonald HR, Rubsamen PE, Luttrull JK, Drouilhet JH, Frambach DA, et al. Surfing-related ocular injuries. *Retina.* 1998;18(5):424-9.
10. Hall G, Bengler RS. Missed diagnosis of an intraorbital foreign body of surfboard origin. *Ophthal Plast Reconstr Surg.* 2004;20 (3):250-2.
11. Kroon DF, Lawson ML, Derkay CS, Hoffmann K, McCook J. Surfer's ear: external auditory exostoses are more prevalent in cold water surfers. *Otolaryngol Head Neck Surg.* 2002;126:499-504.
12. Hurst W, Bailey M, Hurst B. Prevalence of external auditory canal exostoses in Australian surfboard riders. *J Laryngol Otol.* 2004;118(5):348-51.
13. Auerback PS. Hazardous marine animals. *Emerg Med Clin North Am.* 1984;2:531-44.
14. McGoldrick J, Marx JA. Marine envenomations. Part 2: Invertebrates. *J Emerg Med.* 1992;10(1):71-7.
15. Steinman J, Vasconcelos EH, Ramos RM, Botelho JL, Nahas MV. Epidemiologia dos acidentes no surfe no Brasil. *Rev Bras Med Esporte.* 2000;6(1):9-15.
16. Bondioli EB. Lesões no surf [Monografia]. São Paulo: Universidade Bandeirantes, 1999, 56p.
17. Lowdon BJ, Pateman NA, Pitman AJ, Kenneth R. Injuries to international surfboard riders. *J Sports Med.* 1987;27:57-63.
18. Loneon M. Prevention surfing injury. Disponível em: <<http://www.damoon.net/sma/SMAhealth.html>>. Acessado em: 15/06/1997.
19. Conway JN. Guia prático do surf. Lisboa: Editorial Presença, 1993.
20. Dozier S, Wagner RF, Black AS, Terracina J. Beachfront screening for skin cancer in Texas Gulf coast surfers. *South Med J.* 1997;31:707-10.
21. ISAF. 2003 Worldwide shark attack summary. Disponível em: <<http://www.flmnh.ufl.edu/fish/sharks/statistics/2003attackssummary.htm>>. Acessado em: 15 de julho de 2006.