

CARE OF THE WILDERNESS ATHLETE

Pre-Participation Medical Evaluation for Adventure and Wilderness Watersports

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A request for a preparticipation medical evaluation for wilderness watersports may be made by guiding agencies, instructional camps, or by patients presenting for an annual visit. Although guidelines have been published regarding preparticipation physical evaluation for traditional competitive high school and collegiate sports, little has been written about medical evaluations for those wishing to engage in wilderness and adventure watersports. In this article, we offer guidance based on literature review and expert opinion. Watersports are among the most common recreational activities in the United States and are generally safe. Drowning, however, is a significant risk, particularly in small, self-propelled craft, and among children. Medical counseling before participation in watersports should include screening for medical conditions which may impair swimming ability, including a history of seizures, heart disease, and lung disease. Physicians should also promote preventive health measures such as use of lifejackets and sun protection, as well as alcohol avoidance. Swim testing tailored to specific activities should be strongly considered for children and those with questionable swimming ability.

Key words: kayaking, canoeing, sailing, surfing, injury, injury prevention, drowning

Introduction/Overview

The last 150 years have witnessed a rapid increase in participation in wilderness watersports on rivers, lakes, and oceans. Engaging in these sports is not without risk and athletes and adventurers alike may present to physicians before participation for consultation on risk reduction. Although the spectrum of watersports is broad and continues to expand, these sports can be loosely categorized by means of propulsion (eg, paddle, sail, hand) or by the environment in which they take place (eg, river, ocean, lakes).

Although guidelines have been published regarding preparticipation physical evaluation (PPE) for athletes competing in traditional high school and collegiate sports,¹ little has been written about such evaluations

for those wishing to engage in outdoor watersports. In this article, we provide guidance for physicians and athletes based on literature review and expert opinion.

Injury rates for most watersports are relatively low in comparison with many land-based sports.² This is likely due to the fact that water provides significant cushioning from impact, and because in watersports there are few collisions between athletes or between the athletes and the ground. Mechanisms of injury vary widely by watersport, but examination of the literature reveals a number of recurrent themes. Injuries from collisions with one's own equipment such as a surfboard after a wipeout, or the boom of a sailboat are common.^{3,4} Impact with submerged objects such as rocks can occur in white-watersports and in the surf.⁵ Finally, environmental exposures such as cold water, solar exposure, and hazardous marine animals also pose risks.⁴

Although overall injury rates in wilderness watersports are low, the risk of death, predominantly from drowning, is higher than that of many traditional competitive sports.⁶ The aqueous environment leaves little margin for error among aquatic athletes because humans have

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little natural buoyancy, limited breathholding capacity, and inadequate insulation from cold water.

The unique risks associated with wilderness watersports mandate that a preparticipation evaluation should focus on assessing acute and chronic medical conditions that may impair swimming ability, placing athletes at increased risk of drowning. The PPE is also an opportune time for physicians to encourage risk-mitigating behavior such as the use of life-jackets, wetsuits, and sunscreen, as well as avoidance of drugs and alcohol in and around the water. In sports such as offshore sailing or river rafting, where participants may be days or weeks away from definitive medical care, the consulting physician may also be asked to provide prescriptions to treat medical problems that commonly arise during these journeys such as seasickness, skin infections, and regional infectious diseases.

The aquatic athlete also bears significant responsibility for his or her own wellbeing. They must insure that their physical fitness, skill level, and swimming ability are commensurate with the physical challenges they are likely to face. They should be aware of current forecasts for relevant information regarding wind speed and direction, tide, wave height, water temperature, and river flow. As with other wilderness endeavors, the athlete should mentally work through worst-case scenarios and develop contingency plans for self-rescue. Ultimately, after medical consultation, the decision to participate in watersports rests with the athlete, who needs to consider not only the risks to their own health, but also the risks they may impose on would-be rescuers should they encounter trouble on the water.

The scope of this article is limited to nonmotorized watersports and does not include scuba diving.

Methods

Authors searched the MEDLINE database from 1980 to present via PubMed and OVID with the terms sailing,

surfing, rafting, kayaking, kitesurfing, canoeing, immersion hypothermia, as well as swimming and injuries. Studies were limited to the English language. Although most studies were descriptive and retrospective in nature, where possible, authors selected large-scale, prospective studies.

Discussion

EPIDEMIOLOGY OF WATERSPORTS INJURIES AND FATALITIES INJURY RATES, COMMON INJURIES AND MECHANISMS OF INJURY

For a summary of injury rates from selected sports see [Table 1](#). Please note that cross comparison between sports remains difficult because of heterogeneous definitions of injury, methods of data collection, and study design.¹³

SAILING

Rates of injury and severe injury in a survey of sailors were estimated to be 4.6 and 0.57 per 1000 days of sailing, respectively.¹⁰ Falls and injuries while handling lines and winches were the most common mechanisms of injury. Among professional sailors competing in large keelboats in the America's Cup, the injury rate was 5.7 injuries per 1000 hours of sailing.⁹ Most of these injuries were overuse sprains and strains of the back and shoulder. A study of the 635 nautical mile Newport-to-Bermuda race found an injury rate of 12 per 1000 races per sailor.¹⁴ Hand injuries were most common, followed by lacerations to the head. Among novice dinghy sailors, abrasions, contusions, and lacerations to the lower extremity and head were most common. These were mostly due to blows from the boom or occurred while the boat was being rigged.³ Many studies have found a strong positive correlation between wind speed and injury rates.^{3,14,15}

Table 1. Injury rates for selected watersports

<i>Sport</i>	<i>Population</i>	<i>Injury Rate</i>
Surfing	Competitive	6.6 significant injuries per 10 000 h ⁵
	Recreational	3.5 significant injuries per 1000 d ²
Kitesurfing	Heterogeneous group	7 injuries per 1000 d ⁷
Windsurfing	Recreational windsurfers	1 injury requiring medical care per 1000 d ⁸
Sailing	America's Cup	5.7 injuries per 1000 h ⁹
	Novice Dinghy Sailors	0.29 injuries per 1000 d ³
Kayaking/canoeing	Heterogeneous group	4.6 injuries per 1000 d, 0.57 significant injuries per 1000 d ¹⁰
	Whitewater	3.6-5.9 injuries per 1000 d ¹¹
Rafting	Commercial whitewater	1.9 injuries requiring medical care per 1000 kayaking days ¹¹
		0.26-0.44 injuries per 1000 d ¹²

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