WILDERNESS & ENVIRONMENTAL MEDICINE, **26,** S15–S19 (2015)

CARE OF THE WILDERNESS ATHLETE

General Consideration in the History, Physical Examination, and Safety Determination

Jonathan Buchanan, MBA, MD; William Dexter, MD; Amy Powell, MD; Justin Wright, MD

From the Legacy Medical Group, Sports Medicine, Beaverton, Oregon (Dr Buchanan); the Maine Medical Center, Portland, Maine (Dr Dexter); the University of Utah, Salt Lake City, Utah (Dr Powell); and Texas Tech University, Lubbock, Texas (Dr Wright).

A thorough medical history is perhaps the most important aspect when evaluating an athlete before wilderness adventure. A physical examination should follow focusing on conditions that may be affected by changes in atmospheric pressure, extremes of temperature, or altitude. This information can then be used to make safety recommendations ensuring that adventurers are able to safely enjoy participation in the wilderness pursuit of their choice.

Key words: wilderness medicine, history, physical examination, safety determination

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Methods

The following databases were searched: MEDLINE and Cochrane Database of Systematic Reviews. Articles were limited to those printed in English between 1980 and May 2014. Key terms included preparticipation, physical examination, and wilderness sports. These terms were crossmatched with the term "safety." The initial process yielded 14 published articles. The articles and references as well as several text books were reviewed for use in this article.

The authors report no conflicts of interest.

This article appears in a "Care of the Wilderness and Adventure Athlete" special issue, jointly published by *Clinical Journal of Sport Medicine* and *Wilderness & Environmental Medicine.*

Corresponding author: Jonathan Buchanan, MBA, MD, Legacy Medical Group, Beaverton, OR 97006 (e-mail: jon.buchanan@icloud.com).

HISTORY

Obtaining a good medical history is perhaps the most important aspect of determining an athlete's ability to perform any sport. studies evaluating the value a medical history demonstrate that 76% to 90% of the diagnoses are based on information obtained from the patient while taking a history.[1–4] Indeed, the physical examination and additional studies should be a means of confirming diagnoses considered in the differential developed by a carefully obtained medical history.

For wilderness athletes in particular, this opportunity for a physician to assess potential risk of participation provides a rare chance to see a population who otherwise not be seen by a medical professional. According to the National Parks Service, the 51 National Parks in the United States reported approximately 61.9 million visitors in 2013, a considerable increase from the numbers seen even 10 years ago,[5] suggesting a growing population interested in wilderness activities. Physiologic stresses inherent in wilderness activities such as activities at high altitude and low (diving) present unique challenges even for well trained athletes. A careful history is of great importance to identify findings that might put athletes at increased risk. Additionally, the ages traditionally seen visiting these national parks are mostly 18 to 44, those that are least likely, according to the CDC, to seek regular medical attention.[6] Therefore, having one of these athletes in your office provides an opportunity to

obtain pertinent historical information and provide advice and general risk assessment to this population.

Many tools have been investigated as means for obtaining historical information from athletes. The most accepted questionnaire is titled the Pre-participation Physical Evaluation and is published in the fourth Edition of the PPE.[7] The form may be valuable before wilderness and adventure events and is broken into History, Physical Examination, Clearance, and Athlete with Special Needs Supplemental forms. A supplemental evaluation form specific to wilderness and adventure activities is helpful when added to the traditional PPE form. Some schools have turned to an online format for obtaining information that is later reviewed with the athlete during the PPE. This option may be particularly appealing to the physician who has many PPEs to do in a limited amount of time as the electronic form can allow for greater efficiency in history-taking.

However, questions used to assess for high-risk activities, which are more commonly seen in this age group, should be asked in person in a private setting. These questions can assess the general health risks of this population independent of their activity in a wilderness setting. A teen screen (appendix B, page 160)[7] can be used at the time of the examination and is designed to guide the examiner when making inquiries into high-risk behavior.

PHYSICAL EXAMINATION

Although the history is the most important element of the PPE, the physical examination can be used to confirm suspicions raised by the history or uncover diagnoses missed on the history-taking portion of the visit.

Each physical examination should include assessment of vital signs with blood pressure and visual acuity screening. Athletes with a history of pulmonary disease should also get resting pulse oximetry reading. Visual acuity using a Snellen chart (or equivalent) is particularly important in athletes involved in wilderness medicine as eyesight is critical to assess for potential dangers in an unpredictable environment.

A careful system-based examination should include screening for cardiovascular conditions listed in the fourth Edition Monograph on PPE.[7] Conditions that may be affected by changes in atmospheric pressure and altitude will have to be carefully screened for. An example is undiagnosed heart failure. Preexisting heart failure can significantly increase the risk of high-altitude pulmonary edema. Findings of jugular venous distension, an S3 on cardiac auscultation, pedal edema, rales on pulmonary examination will warrant further workup before clearance is recommended. Additionally, right-sided heart murmurs from conditions such as pulmonic stenosis, pulmonic insufficiency, and tricuspid regurgitation are more sensitive to changes in atmospheric pressure. Therefore, careful auscultation of the heart is critical.

Pulmonary conditions may be particularly susceptible to changes in altitude. The risk of exercise-induced bronchospasm (EIB) increases with a drop in atmospheric pressure, particularly in a patient who reports a history of respiratory symptoms after exposure to exercise, cold, dry, or emotional extremes. By definition, EIB is benign at rest; and therefore, signs of bronchospasm will not be auscultated on examination. Therefore, careful consideration of the use of accessory muscles and work of breathing should be carefully assessed at rest before ascent as small findings at sea level or low elevations can become life-threatening at high altitude. Athletes with asthma should be assess for peak expiratory flow and should be taught to monitor changes with environmental and altitude exposures. Knowledge of common triggers, often identified in training, is helpful.

Examination of the abdomen is likely not going to be helpful except in patients who have preexisting conditions. When it is done, the abdominal examination should be performed with the patient in a supine position. Palpating for organomegaly or pulsatile masses is helpful in athletes with a known gastrointestinal diagnosis (Crohn's disease, ulcerative colitis, collagenous colitis, etc.). Palpation of the spleen is also indicated in athletes with symptoms suspicious for infectious mononucleosis.

The musculoskeletal examination should include sport-specific assessment of abilities. For example, the lead climber on a climbing should be evaluated for structural defects that may impair function, sufficient intrinsic hand strength, mobility, and fitness to allow for safe climbing.[8,9] Even minor deficits in strength in a controlled environment can be amplified to potential dangerous conditions in the wilderness.

DETERMINING CLEARANCE

While traditional PPE forms provide varying levels of "clearance" for an athlete to participate in sports, what a physician is evaluating in the wilderness and adventure is PPE, the level of potential risk the athlete is taking or exposing others by participating in the sport. In the era of shared decision-making with patients, determination of "clearance" or final recommendations often becomes a 2-way conversation about the amount of risk the patient is willing to assume in participating in the activity and sometimes about the amount of allowed risk based on the event and other participants. This is particularly important with the wilderness athlete as certain risks are