

## Return-to-Activity Following Exertional Heat Stroke

By: [William M. Adams](#), Luke N. Belval

Adams WM, Belval LN. Return-to-Activity Following Exertional Heat Stroke. *Athletic Training and Sports Health Care*. 2018;10(1):5-6.

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### Abstract:

Exertional heat stroke, defined as a body temperature greater than 40°C (104°F) to 40.5°C (105°F) with corresponding neuropsychiatric impairment and end-organ dysfunction, is a medical emergency that can lead to long-term complications or death without prompt recognition and treatment.<sup>1,2</sup> Implementing the standard of care for recognition and treatment of exertional heat stroke ensures 100% survival; however, clinicians must consider the clinical problems associated with long-term recovery from exertional heat stroke for a complete return to activity for the individual.

**Keywords:** exertional heat stroke | sports medicine | hyperthermia

### Article:

Exertional heat stroke, defined as a body temperature greater than 40°C (104°F) to 40.5°C (105°F) with corresponding neuropsychiatric impairment and end-organ dysfunction, is a medical emergency that can lead to long-term complications or death without prompt recognition and treatment.<sup>1,2</sup> Implementing the standard of care for recognition and treatment of exertional heat stroke ensures 100% survival; however, clinicians must consider the clinical problems associated with long-term recovery from exertional heat stroke for a complete return to activity for the individual.

When exertional heat stroke is suspected, evidence supports immediate recognition using an appropriate method of temperature assessment and aggressive, whole-body cooling to reduce the body temperature below the critical threshold of cell damage (40.83°C [105.5°F]) within 30 minutes of collapse.<sup>1-3</sup> Consideration of the time above the critical threshold for cell damage prior to the collapse from exertional heat stroke must be acknowledged by the treating clinicians because an increased duration of hyperthermia is associated with poor prognoses.<sup>4</sup>

Return to activity following exertional heat stroke is a complex process requiring an understanding of the underlying cause and the subsequent healing of the affected body systems.<sup>5</sup> Although most individuals who are appropriately treated fully recover from exertional heat

stroke, others may suffer from lingering issues and comorbidities if treatment is delayed. Therefore, return to activity should be guided by both the risk profile of the patient and the severity of the exertional heat stroke.

When returning an individual to full activity following exertional heat stroke, an individualized, clinician-guided approach must be taken. The continuity of care following the event is often lacking, especially in settings such as mass participation events (eg, running road races).<sup>6</sup> Current research and understanding of return to activity following exertional heat stroke is limited and largely based on anecdotal or cautionary evidence using patient symptomology and laboratory findings to guide clinician decision making.<sup>1,2,5,7,8</sup> The clinician responsible for the individual's care (an athletic trainer and/or physician) must consider the four items outlined in Table 1 when prescribing a rehabilitation program for the individual.<sup>5</sup>

Current recommendations regarding the return to activity following exertional heat stroke, as outlined by the American College of Sports Medicine<sup>2</sup> and the National Athletic Trainers' Association,<sup>1</sup> are presented in Table 2. By using these guidelines, the clinician is able to provide a guided approach to an individual's recovery and return to activity following exertional heat stroke by providing a gradual return to exercise and heat exposure to regain one's heat tolerance. Clinicians should also incorporate patient-based outcome measures to assess quality of life and disablement measures throughout the recovery process. Establishing patient-centered goals may also be beneficial in guiding the patient through the recovery process by providing an individualized, patient-focused plan of care. Integrating both clinician- and patient-based outcomes during a return to activity program following exertional heat stroke will optimize patient care for returning to full activity following injury.

**Table 1.** Clinician Considerations for Prescribing a Rehabilitation Program Following EHS

<b>Patient Parameter</b>	<b>Clinician Consideration</b>
Factors causing EHS episode	Identify and address any modifiable factors prior to the start of exercise. Modifiable factors may include heat acclimatization and/or fitness status, hydration, sleep deprivation, and genetic conditions, among others.
Healing of all affected tissues, organs, and body systems	Healing process can be verified via routine laboratory testing examining hematologic, renal, and hepatic function. Diagnostic imaging of affected tissues, organs, and body systems may also be considered.
Setting (athletics, military, labor) that the patient is returning to after EHS	Establish a gradual return to activity that includes considerations for both exercise and heat exposure. This should be individual and independent of patient's, teammate's, or coworker's activities.
Heat tolerance	Heat tolerance testing may be required to determine the presence of heat intolerance that limits physical activity and/or full return to activity in warm environments.

EHS = exertional heat stroke

**Table 2.** Current Guidelines for Return to Activity Following EHS<sup>1,2</sup>

<p>1. Refrain from physical activity for at least 7 days following the EHS incident to allow for healing of affected tissues, organs, and body systems.</p> <p>2. Approximately 1 week following the EHS incident, follow up with an appropriate physician for physical examination and laboratory testing involving measures of hematologic, renal, and hepatic function and other indicated diagnostic imaging.</p>
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3. Following physician clearance to begin physical activity, and under the supervision of medical personnel (ie, athletic trainer, physician, etc.), begin exercise in a cool environment and gradually increase the intensity, duration, and exposure to heat stress to assess heat tolerance and to establish heat acclimatization.
4. If return to vigorous activity is incomplete following 4 weeks of exercise, consideration of a heat tolerance test is warranted.
5. Following determination of heat tolerance, the athlete is cleared for full participation/competition following 2 to 4 weeks of training.

EHS = exertional heat stroke

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