

Youth sports in the heat: recovery and scheduling considerations for tournament play

Bergeron, MF *Sports Medicine*; 39(7):513-22, 2009

Sport	Competition Load	Between-Contests Rest
Basketball	3-6 games/day	1 game duration (or less)
Soccer	2-3 games/day	1-2 h or 1-2 time slots
Softball	2-3 games/day	15-min (minimum)
Baseball	2-5 games/day	15 min – 1 h
Track and Field	3-5 running events/day	1 h (or less)
Tennis ^a	3 singles, 2 doubles matches/day	1 h (singles), 30 min (doubles)

^a No time limit for each match; a singles match can last, for example, less than 1 h or up to 4 h or more



Repeated-bout exercise in the heat in young athletes: physiological strain and perceptual responses



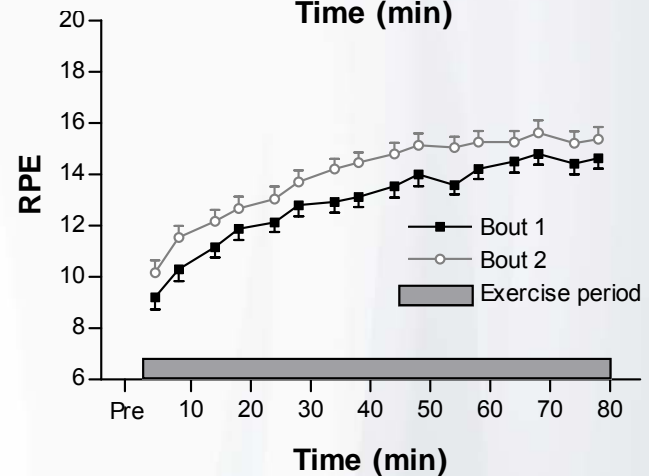
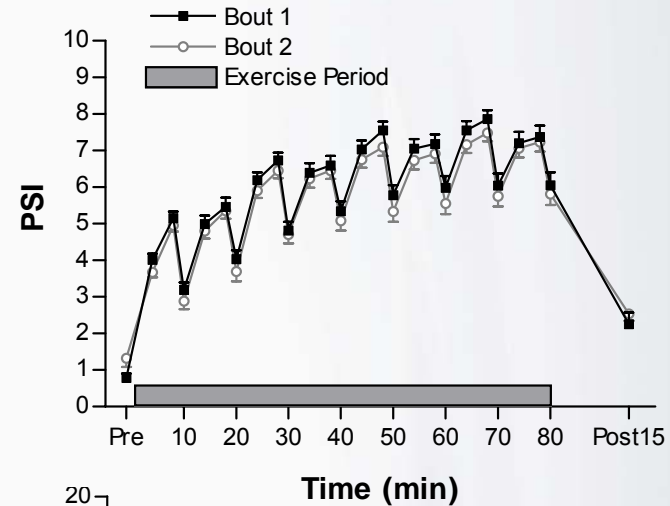
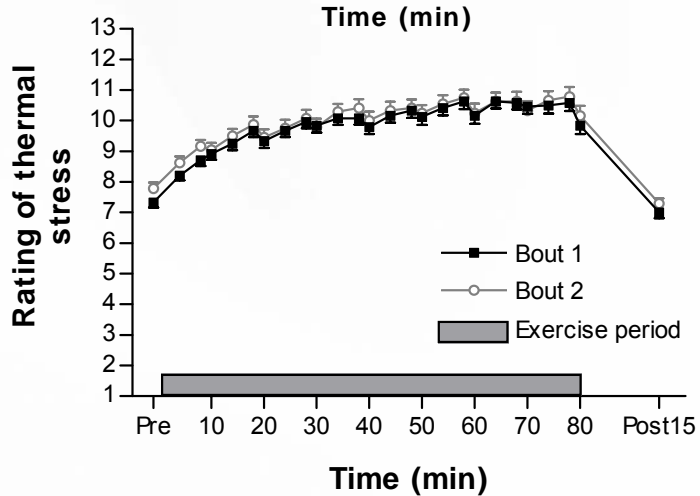
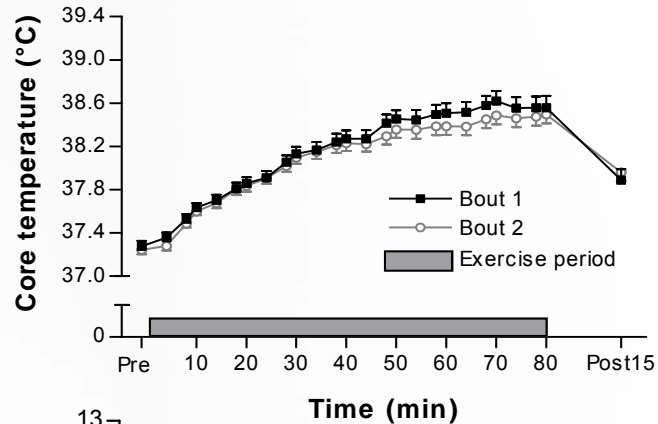
- 24 fit youth soccer athletes
- Two identical 80-min intermittent exercise bouts in 33°C
- 1 hour rest between bouts
 - Full rehydration
 - Thermoregulatory recovery

Table 1. Sample Characteristics

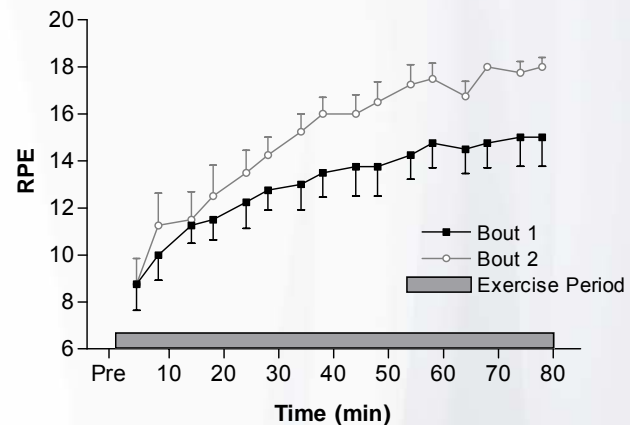
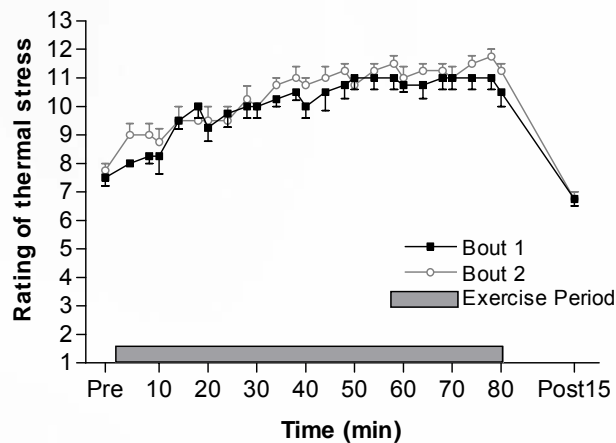
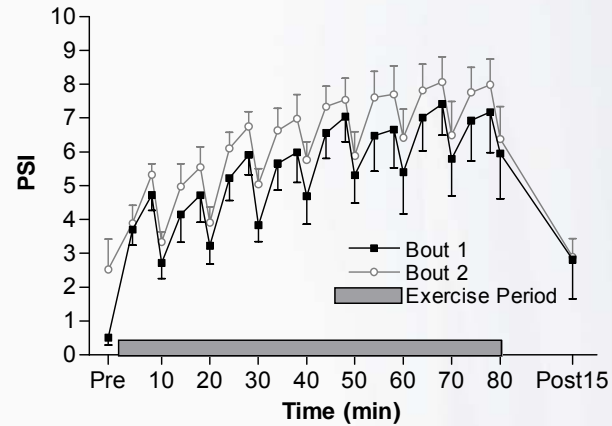
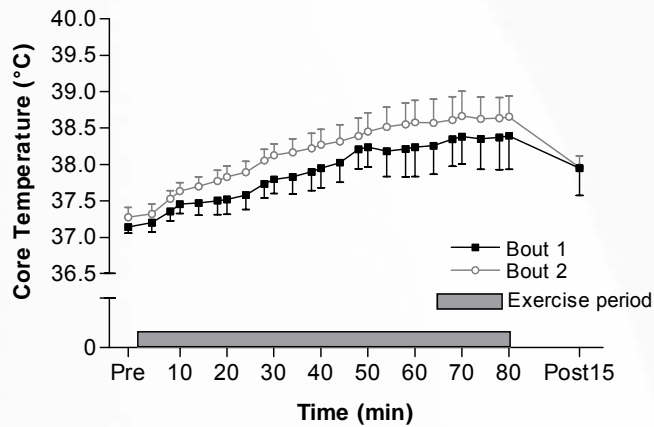
	12-13 y (6 boys; 6 girls)	16-17 y (6 boys; 6 girls)
Age (y)	12.6 ± 0.5	16.5 ± 0.5
Height (cm)	160.1 ± 9.4	166.0 ± 8.0
Mass (kg)	47.7 ± 8.3	61.0 ± 8.6
BMI	18.1 ± 1.8	21.9 ± 2.0
VO _{2max} (ml·kg ⁻¹ ·min ⁻¹)	55.5 ± 4.5	55.2 ± 8.3

Values are means ± SD

Repeated-bout exercise in the heat in young athletes: physiological strain and perceptual responses



Potential at-risk subjects?



Cumulative heat stress appears to affect match outcome in a junior tennis championship

Coyle J. *Med Sci Sports Exerc*, 38:S110 [abstract], 2006

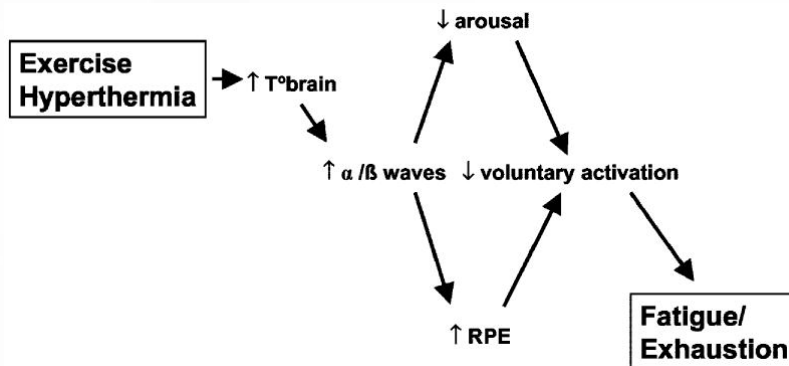


- National boys' 14s junior tennis championships
 - 7 years evaluation
- Cumulative heat stress
 - Effect on second same-day match outcome
 - Effect of seeding removed
- Prediction of winner of afternoon singles match
 - Same-day degree-minutes acquired in the morning



Fatigue

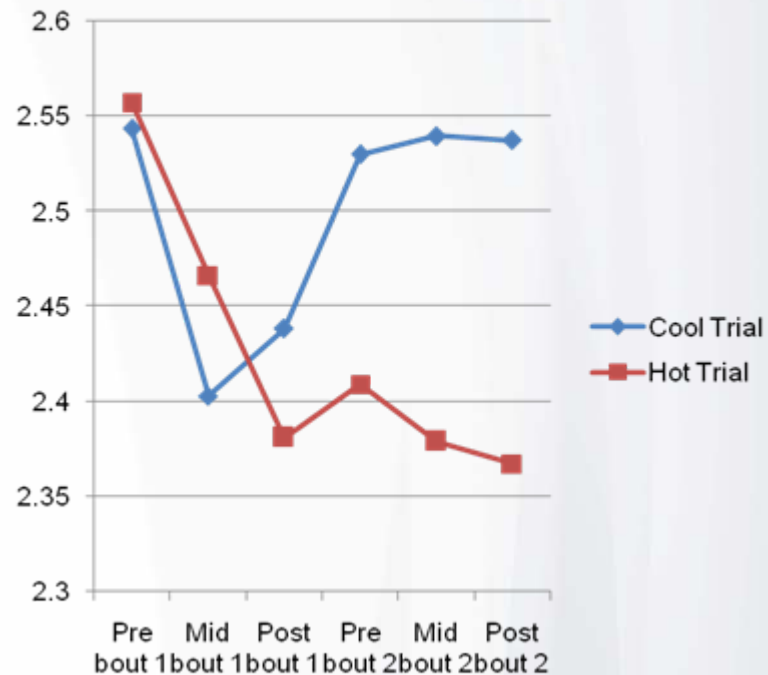
- Fatigue
- Proprioceptive Deficit
- ↓ Neuromuscular Control
- Functional Instability
- Repetitive Injury or Acute Trauma



Repeated Exercise Bouts in the Heat: Effects on Dynamic Stability



Dynamic Postural Stability Index



Key Points: Young Athletes



- Similar cardiovascular & thermoregulatory capacities as adults
 - Adequate hydration
- Progressive acclimatization is critical
- Often begin practice measurably dehydrated
 - ↑ CV & thermal strain
- Multiple sessions
 - Insufficient recovery



Conclusions

- Health endpoints
 - 40°C (104°F); lower than required for cellular damage, CNS dysfunction, measurable ↓ performance
 - Time periods for acute and chronic exposure
 - Depends on intensity, clothing, hydration, etc.
 - Time-temperature thresholds (negative functional & metabolic effects and ultimately thermal damage)
 - 39.5°C (103.1°F) – conservative
 - Time – variable, based on modulating factors
- Support / contrast with the REPORT
 - ↓ Neuro-motor function / intensity-dependent strain
- Targeted and cost effective research to better define time-temperature thresholds
 - Activity-duration heat safety grids
 - Thermal responses, heat illness risk, contributing factors

Thank you!

