



CU SPORTS MEDICINE

Workout Tips for Exercise in the Heat

Should I change my workout on really hot days?

Yes. Physical performance in a hot environment can be compromised in three basic ways. Increases in your body's core temperature:

- Reduces the endurance capacity of the muscles.
- Increases the body's reliance on carbohydrate for fuel.
- Compromises many aspects of cardiovascular function.

As you get used to the heat, you'll be able to train harder and tolerate the heat better.

- During your first hot weather workouts, cut back on your exercise duration or intensity. Go easier. Train shorter.
- Exercise in the early morning or evening when air temperature is likely to be cooler.
- Monitor your heart rate. Slow down if your pulse is higher than your target zone or if you don't feel good.
- Drink plenty of fluids (see next page). This is critical.
- Pick a training route or exercise area that provides lots of shade: parks or tree-lined streets.
- Know the symptoms of heat stress. If you have these symptoms stop exercise, get cool, and rehydrate.
 - ❖ nausea
 - ❖ dizziness
 - ❖ headache
 - ❖ chilling
 - ❖ awkwardness
 - ❖ muscle cramps
 - ❖ extremely out of breath
 - ❖ a reduction in how much you are sweating
- Train with other people when it's extra hot. They'll notice if you or your performance are compromised, even if you don't.

What kind of clothing will keep me cool?

- Lightweight, loose, white, or light-colored "wicking" fabrics help reflect the sun's heat rays and allow good air circulation.
- Expose as much skin as possible to encourage evaporation of sweat.
- Remember to apply a waterproof sunscreen of at least SPF 15 to protect yourself from the sun's UVA and UVB rays.
- A sun visor or breathable, vented hat with a 4" brim can protect your face and eyes. Look for new lightweight fabrics like Solumbra™ or Solarweave™ that protect sensitive skin from ultraviolet radiation.

What factors affect my ability to tolerate heat?

You will generally be able to handle heat better when you are physically fit. Elderly individuals usually don't tolerate heat as well as younger people, but this difference disappears when *active and fit* senior citizens are evaluated. Other things that reduce your ability to tolerate heat include:

- sleep loss
- high humidity
- a sudden increase in training
- infectious disease
- depleted muscle glycogen
- excess body fat
- poor cardiovascular fitness

How can I teach myself to handle the heat better?

The best way to promote heat acclimatization is through **exercise training in a hot climate**, particularly for athletes who will be competing under hot conditions. Continuous or intermittent aerobic training causes your body to acclimatize after about 7 to 14 days. Just make sure you start slowly and watch for signs of heat stress. For the first few days, exercise aerobically at about 60 to 70% of your maximal heart rate. Then gradually increase both your training intensity and volume.

Adaptations that occur as you get used to the heat include:

- earlier onset of sweating
- lower body core temperature
- overall improved ability to tolerate heat.
- higher sweat rates
- increased blood volume
- lower heart rate response to submaximal workloads

I know that fluids are important to prevent dehydration, but how much and what should I drink?

In normal temperatures, the average sedentary person should drink at least 8 glasses of non-caffeinated, non-alcoholic beverages daily. Warm weather and exercise place even higher demands on the body for fluid. If you start an exercise session well hydrated, you'll go a long way towards maintaining performance and personal safety. Water is a great beverage choice, but fruit juices, smoothies, seltzer waters, lemonade, soft drinks, milk and herbal teas are also good. Remember that beer, coffee and caffeinated soda pop draw fluid *out* of the body since alcohol and caffeine are diuretics.

Don't rely on thirst as an indicator of your body's need for fluids. By the time you're thirsty, you're already dehydrated! If your urine is dark and there's not much of it, you're dehydrated. Increase your fluid intake. Some general guidelines:

- Drink fluids until your urine is pale yellow to clear and plentiful.
- In general, drink as much fluid as you can comfortably tolerate both before, during, and after exercise. Drinking small amounts frequently usually works better than drinking a large amount once or twice.
- General guidelines for fluid intake are:
 - 2-3 cups about 2 hours before exercise
 - 1 cup 5 to 10 minutes before exercise
 - 1 cup every 15 to 20 minutes during exercise, especially in warm weather
- *Cool* beverages are absorbed more quickly than warm beverages.
- The stomach can only empty about 1 quart of fluid per hour into the body during exercise. If you drink more than that you could feel bloated.

- You'll often see athletes pouring cold water over their head during a race or competition. While this may provide some temporary relief, pouring enough cold fluid *into* the body is more effective in dealing with hot temperatures.

What about sports drinks?

If a vigorous exercise session lasts longer than 60 minutes, it's a good idea to drink a sports beverage during the activity. You should choose something with 4 to 8% carbohydrate along with electrolytes (sodium, potassium, etc.) depending on the length of time you are exercising. This is about half the carbohydrate concentration of soft drinks. It promotes fluid absorption while providing energy. Many people consider sports drinks unpleasant during rest, but appreciate these lightly sweetened or flavored beverages while participating in sports. Athletes tolerate various beverages or sports drinks differently. Therefore you should never experiment with a new drink during a competition. Your training workouts are the time to try new and different options.

Do the fluid recommendations change after I'm through exercising?

- Some athletes find it helpful to weigh themselves both before and after a workout. For every pound of weight you lose during a workout, drink 2.5 to 3 cups of fluid. Rehydration occurs faster in the presence of sodium (salt), regardless of whether this sodium is in a sports drink or food.
- To replace muscle glycogen stores and speed recovery from the workout, you should start replenishing carbohydrates within 15 minutes after exercise. You may not feel like eating so soon after a workout, but a sweetened beverage will often hit the spot. You'll get more carbohydrate per ounce of fluid if you choose fruit juice, a juice drink, or other "typical beverage" instead of a sports drink.

What about heat cramps?

Heat cramps are brief, often excruciating muscle contractions that can occur in athletes who sweat a lot, especially when exercising in a hot environment. Usually this happens because the person has lost a large amount of sodium chloride through sweating and hasn't taken in enough sodium when replacing fluid losses. Mild heat cramps can be treated by drinking 1 liter (about 1 quart) of water with about 1/4 to 1/2 teaspoon salt dissolved in it. Athletes with normal or low blood pressure shouldn't restrict their sodium intake. Salt tablets should definitely be avoided because they are a gastric irritant.

Heat acclimatization appears to reduce the incidence of heat cramps. Heat cramps can be prevented by following the above suggestions for fluid intake, having adequate sodium in your diet, and gradually progressing your training.

How do I know if it's too hot to exercise safely?

Eighty to ninety percent of heat loss in a hot, dry environment is from the evaporation of sweat. However, in a humid environment, moisture in the air doesn't allow the sweat on your body to evaporate. And contrary to popular opinion, it's the *evaporation of sweat*, not the sweat itself that cools us down. So exercise in humid heat is a lot riskier than exercise in dry, hot conditions. Check the weather chart on the next page and if the "apparent temperature" is in the danger area, it's a good day to take a break or exercise indoors with air conditioning.

Apparent Temperature is how hot the heat-humidity combination makes it feel.

Air Temp (in F)		Relative Humidity (in percent)																				
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
140	125																					
135	120	128																				
130	117	122	131																			
125	111	116	123	131	141																	
120	107	111	116	123	130	139	148															
115	103	107	111	115	120	127	135	143	151													
110	99	102	105	108	112	117	123	130	137	143	150											
105	95	97	100	102	105	109	113	118	123	129	135	142	149									
100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144							
95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136					
90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122			
85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108	
80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91	
75	69	69	70	71	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80	
70	64	64	65	65	66	66	67	67	68	68	69	69	70	70	70	70	71	71	71	71	72	

Heat Index	Category	General Effect of Heat Index
80 to 89° - Very Warm	Caution	Exercise more fatiguing than usual
90 to 104° - Hot	.Extreme Caution	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
105 to 129° - Very Hot	Danger	Sunstroke, heat cramps or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity.
130° or higher - Extremely Hot	.Extreme Danger	Heat/sunstroke highly likely with continued exposure

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