

SICKLE CELL TRAIT



WHAT IS SICKLE CELL TRAIT?

Sickle cell trait is not a disease. Sickle cell trait is the inheritance of one gene for sickle hemoglobin and one for normal hemoglobin. Sickle cell trait will not turn into the disease. Sickle cell trait is a life-long condition that will not change over time.

- ▶ During intense exercise, red blood cells containing the sickle hemoglobin can change shape from round to quarter-moon, or “sickle.”
- ▶ Sickled red cells may accumulate in the bloodstream during intense exercise, blocking normal blood flow to the tissues and muscles.
- ▶ During intense exercise, athletes with sickle cell trait have experienced significant physical distress, collapsed and even died.
- ▶ Heat, dehydration, altitude and asthma can increase the risk for and worsen complications associated with sickle cell trait, even when exercise is not intense.
- ▶ Athletes with sickle cell trait should not be excluded from participation as precautions can be put into place.

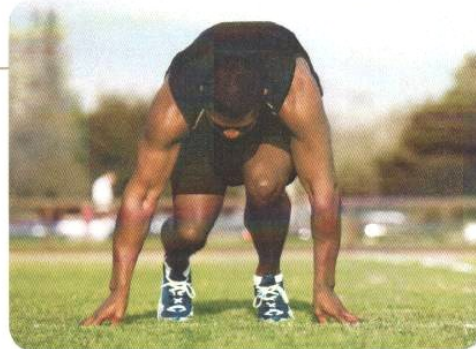
DO YOU KNOW IF YOU HAVE SICKLE CELL TRAIT?

People at high risk for having sickle cell trait are those whose ancestors come from Africa, South or Central America, India, Saudi Arabia and Caribbean and Mediterranean countries.

- ▶ Sickle cell trait occurs in about 8 percent of the U.S. African-American population, and between one in 2,000 to one in 10,000 in the Caucasian population.
- ▶ Most U.S. states test at birth, but most athletes with sickle cell trait don't know they have it.
- ▶ The NCAA recommends that athletics departments confirm the sickle cell trait status in all student-athletes.
- ▶ Knowledge of sickle cell trait status can be a gateway to education and simple precautions that may prevent collapse among athletes with sickle cell trait, allowing you to thrive in your sport.

HOW CAN I PREVENT A COLLAPSE?

- ▶ Know your sickle cell trait status.
- ▶ Engage in a slow and gradual preseason conditioning regimen.
- ▶ Build up your intensity slowly while training.
- ▶ Set your own pace. Use adequate rest and recovery between repetitions, especially during “gassers” and intense station or “mat” drills.
- ▶ Avoid pushing with all-out exertion longer than two to three minutes without a rest interval or a breather.
- ▶ If you experience symptoms such as muscle pain, abnormal weakness, undue fatigue or breathlessness, stop the activity immediately and notify your athletic trainer and/or coach.
- ▶ Stay well hydrated at all times, especially in hot and humid conditions.
- ▶ Avoid using high-caffeine energy drinks or supplements, or other stimulants, as they may contribute to dehydration.



- ▶ Maintain proper asthma management.
- ▶ Refrain from extreme exercise during acute illness, if feeling ill, or while experiencing a fever.
- ▶ Beware when adjusting to a change in altitude, e.g., a rise in altitude of as little as 2,000 feet. Modify your training and request that supplemental oxygen be available to you.
- ▶ Seek prompt medical care when experiencing unusual physical distress.

For more information and resources, visit www.NCAA.org/health-safety

Sickle Cell Trait

Sickle cell trait is not in itself a disease. It is a descriptive term for a hereditary condition in which an individual has one normal gene for hemoglobin (A) and one abnormal gene for hemoglobin (S), giving the genetic type (AS). Sickle cell trait condition (AS) is different from sickle cell anemia disease (SS), in which two abnormal genes are present. Approximately eight to ten percent of the U.S. black population has sickle cell trait, while less than one percent exhibit sickle cell anemia. Sickle cell trait is found in non-black athletes as well as black athletes, although, in a much lower frequency. It is present in athletes at all levels of competition, including professional and Olympic. Sickle cell trait is not a barrier to exercise or participation in sport.

In general, sickle cell trait is a benign condition that does not affect the longevity of the individual. Persons who carry the sickle cell trait alone do not have the associated anemia. However, sickle cell trait has been definitively linked to splenic infarction with cases apparently occurring more frequently in non-blacks. This situation typically occurs at high altitudes (usually greater than 5,000 feet), although a case has been described near sea-level. Symptoms of a splenic infarction include sudden acute pain in the lower ribs, weakness and nausea. It appears that strenuous physical exertion after a recent arrival at altitude is a common theme. Although there are more than two million people in the U.S. with sickle cell-trait, only a few cases of splenic infarction are reported each year.

It has been suggested that sickle cell trait is linked to two other medical problems that may elicit health and performance concerns. These include: 1) Exercise-related rhabdomyolysis (skeletal muscle breakdown), and 2) Exercise-associated sudden death. Several anecdotal cases of exercise-related rhabdomyolysis (fatal and non-fatal) have been reported in athletes. However, exercise-related rhabdomyolysis also has been reported in non-sickle cell trait athletes. At this time, no direct causal evidence has been shown and the relationship between sickle cell trait and exercise-related rhabdomyolysis is unclear. There is a controversy in the medical literature concerning the possibility that sickle cell trait increases the risk of exercise associated sudden death. One study from a large population of recruits undergoing military basic training indicated a possible association of increased sudden unexplained deaths (heat injuries, rhabdomyolysis and sudden cardiac arrhythmia) in black recruits with sickle cell trait. There have been no studies concerning athletes.

Acknowledging that no sports medicine body currently suggests any restrictions for the athlete with sickle cell trait, the American College of Sports Medicine (ACSM) and the National Collegiate Athletic Association (NCAA) recommend that the following points be considered by healthcare providers:

1. Team physicians and athletic trainers should familiarize themselves with the medical literature concerning sickle cell trait;
2. Serious medical problems associated with sickle cell trait are rare even during athletic competition. Unwarranted restrictions or limitations on activity should not be placed on individuals with sickle cell trait;
3. If screening for sickle cell trait is conducted, it should be done on a voluntary basis with the informed consent of the individual and should be offered to all individuals, since sickle cell trait is found in both black and non-black individuals. If a test is positive, the individual should be offered genetic counseling for concerns such as family planning, and an explanation of a possibly remote and unclear risk involved with physical exercise and altitude. This consultation should be documented in the athletes' medical records; and,



ACSM CURRENT COMMENT

4. All exercising individuals, including those with known sickle cell trait, should be counseled to:

- a. Avoid dehydration;
- b. Acclimatize gradually to heat and humidity;
- c. Condition carefully and gradually for several weeks before engaging in exhaustive exercise regimens;
- d. Acclimate to altitude over an appropriate amount of time; and,
- e. Refrain from extreme exercise during acute illness, especially one involving fever.

Current Comments are official statements by the American College of Sports Medicine concerning topics of interest to the public at large.

Street Address: 401 W. Michigan St. • Indianapolis, IN 46202-3233 USA
Mailing Address: P.O. Box 1440 • Indianapolis, IN 46206-1440 USA
Telephone: (317) 637-9200 • FAX: (317) 634-7817



AMERICAN COLLEGE
of SPORTS MEDICINE
www.acsm.org