

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,

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*

