SPORTS MEDICINE: Sickle Cell Trait Policy and Protocol

Introduction:
Sickle Cell Trait is the inheritance of one gene for sickle hemoglobin and one for normal hemoglobin. During periods of intense exercise, the sickle cell trait can change the shape of the red blood cells from round to quarter-moon. When this occurs, these sickled red blood cells can accumulate in the bloodstream. The accumulation of sickled red blood cells can block vessels and can cause ischemic (cell death) rhabdomyolysis, the rapid breakdown of muscle cells. Sickling can occur in 2-3 minutes of intense exercise. Heat, dehydration, altitude, asthma and other medical conditions may increase the risk. In some cases, particularly with exertional rhabdomyolysis, sickle cell disease can be fatal.

Facts:

- Those at highest risk are ancestry from Africa, South or Central America, Caribbean, Mediterranean countries, India, and Saudi Arabia.
- Sickle Cell Trait occurs in 8% of U.S. African-Americans and 1 in 2,000 to 10,000 Caucasians
- Most dangerous risk is exertional rhabdomyolysis.
- Dehydration worsens exertional sickling.
- Sickled cells log jam blood vessels.
- The harder and faster the athlete goes, the faster the onset.
- Training and rest should be modified.
- A sickling collapse is a medical emergency.

Telltale features of Sickling Collapse:
Sickling collapse has often been mistaken for cardiac collapse or heat collapse. Unlike sickling collapse, cardiac collapse tends to be "instantaneous" has no "cramping" with it, and the athlete (with Ventricular fibrillation) falls to the ground and unable to speak. Unlike heat collapse, sickling collapse often occurs with-in the first half hour on field, as during wind sprints. (Source: NATA Consensus Statement)

- Sickling does not present with muscle twinges as compared to cramps;
- Heat cramping pain is more severe than sickling;
- Heat cramps cause normal athlete's muscles to tighten up; sickling athletes slump to the ground in muscle weakness
- Heat cramping athletes will complain of pain due to severe muscle contractions; sickling athletes do not generally exhibit pain and will present with normal muscle tension
- Sickling athletes caught early and treated can recover and do recover faster than athletes with dehydration and cramping.

Precautions and Treatment:

- Build up in training slowly with paced progressions, allow for longer rest and recovery periods. Student-athletes should be involved in year round and preseason strength and conditioning to enhance preparedness of student-athletes.
- Student-athletes with Sickle Cell Trait should be excluded from participation in performance test such as mile runs, serial sprints, etc.
- Stop activity with onset of signs and symptoms (muscle cramping, pain, swelling, weakness, tenderness, inability to catch breath, fatigue).
- The Athletic Trainer will have the ability to pull a Sickle Cell Trait student-athlete out of activity, if needed.
- A **soccer player** suffering from sickling may be subbed at any time and not subject to the substitution rules (Source: NCAA).
- Allow Sickle Cell Trait student-athletes to set their pace.
- Athletes with Sickle Cell Trait that perform repetitive high speed sprints and/or interval training that induces high levels of lactic acid should be allowed extended recovery between repetitions.
- Allow student-athletes to seek evaluation once signs and symptoms arise. These student-athletes also should not be harassed for sitting out.
- Encourage proper hydration.
- Asthma, heat illness, and altitude can increase the likelihood of sickling.
- Sickle Cell Trait student-athletes should not participate when they are ill.
- Coach should contact ATC or EMS if sickling is suspected.

In the event of a sickling collapse, treat it as a medical emergency by doing the following:

- Check vital signs, along with checking oxygen saturation.
- Provide oxygen to student-athlete as soon as possible.
- Cool student-athlete, if necessary.
- If the student-athlete is not alert or vital signs begin to decline, activate Emergency Action Plan (EAP) and call 911 to transport student-athlete to hospital as fast as possible.
- Inform EMS/treating physicians of student-athlete's positive Sickle Cell Trait and to expect explosive rhabdomyolysis.

Embry-Riddle University Sickle Cell Testing Policy:

In order to help ensure the health, safety and well-being of our student-athletes, it is appropriate to screen for Sickle Cell Trait. The testing procedure is as follows:

- **All ERAU student-athletes will be required to have a blood test to determine if they have Sickle Cell Trait. There is no option for waive out.**
- **Tryouts and Recruits must show proof of testing/results prior to their tryout.**

Once ERAU Sports Medicine is informed that a student-athlete has tested positive for Sickle Cell Trait, the following actions will be taken in order to prevent complications and a sickle collapse with participation in ERAU athletics:

- The student-athlete, coach, and sports medicine staff will be informed of the positive test by the Director of Sports Medicine.
- At meeting, student-athlete will be educated on what is Sickle Cell Trait. Student-athlete will be made aware of common signs and symptoms if sickling, possible need of adjustments of workouts, rest and recovery periods, and proper treatment when sickling is suspected.
- The student-athlete will be informed that they may meet with the team physician if they have further questions regarding their positive Sickle Cell Trait test.
- The student-athlete will be asked to sign a Notification Form stating that they were informed, that they understand the information and that they are fully aware of the risks involved in athletic participation.
- The coach of that student-athlete will be informed of the positive test by the Director of Sports Medicine.
- The coach will be educated on what Sickle Cell Trait is, signs and symptoms to be aware of, the adjustments of workouts, rest and recovery periods and proper treatment when sickling is suspected.
- The coach will also be asked to sign a Notification Form stating that they were informed, that they understand the information and that they will follow the guidelines from sports medicine.

The ERAU Sickle Cell Testing Policy and related procedures are designed to help screen and prevent otherwise avoidable medical incidents related to Sickle Cell disease. This policy and related procedures are not a guarantee that medical incidents will not occur because even with strict adherence, medical emergencies may arise. Likewise, this policy and related procedures are not intended to be relied upon as a substitute for individualized medical care, advice, or treatment.

Given the potential for severe consequences, including death, ERAU reserves the right to bench, sideline, or otherwise disallow participation on, for, or on behalf of any ERAU athletics team or at any University sponsored or sanction event by any ERAU student-athlete if, in the opinion of the Team Physician or Director of Sports Medicine, allowing such participation presents an undue threat of harm to a student-athlete.

Definitions:

Acute Ischemic rhabdomyolysis: the rapid breakdown of muscle tissue starved of blood.
Exertional rhabdomyolysis: muscle breakdown triggered by physical activity.
Exertional sickling: hemoglobin (red blood cells) sickling due to intense or sustained physical exertion.
Hypoxemia: decreased oxygen content of arterial blood.
Ischemia: a deficiency of blood flow to tissue.
Obtunded: having diminished arousal and awareness; mentally dull.
Sickling collapse: the collapse of an athlete who shows features consistent with exertional sickling.
Ventricular Fibrillation / Heart Arrest: a condition in which there is uncoordinated contraction of the cardiac muscle of the ventricles in the heart.

Resources for more information:

National Athletic Trainers Association
National Athletic Trainers Association Consensus Statement: Sickle Cell Trait and the Athlete.
Retrieved from: http://www.nata.org/statements/consensus/sicklecell.pdf.