

## **The Long Distance Runner's Anemia: A paper from a coach to his athletes**

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### **Introduction**

Over the past decade I have seen a number of successful runners experience what most people call burn out, especially females. These athletes come in all forms and from all types of high school teams. I believe they are too often dismissed as athletes that lost their motivation or have experienced body structure changes through puberty. The first explanation is often too simple and the second one has never been bulletproof; I have witnessed many a runner that continues to improve throughout physical maturity. After much deliberation and research I have arrived at the conclusion that there is a different, and more likely, culprit: iron deficiency. The most common medical condition among athletes is anemia.<sup>1</sup> This condition is amplified for female endurance athletes, specifically long distance runners, which experience the majority of the reported cases. Evidence of this is no stronger than in high school cross country. There are symptoms that can turn a runner and her doctor onto a possible case of "runner's anemia". The treatment is usually very successful and quite easy to handle.

### **Anemia, Iron Deficiency and Iron Depletion**

Anemia is a medical condition in which an individual's blood shows an abnormally low level of erythrocytes, more commonly known as red blood cells. Or, the red blood cells that are present contain low levels of hemoglobin. Hemoglobin acts as the transporter of oxygen through the blood. When these levels are low, an endurance athlete's capacity to perform diminishes. Iron deficiency is the most common cause of low hemoglobin in athletes. Iron is required in the creation of hemoglobin, and low levels of iron lead to reduced hemoglobin production. A second condition may also be contributing to the development of runner's anemia. It's iron depletion and for distance runners, is even more common than iron deficiency. Iron depletion is a low rate of ferritin concentration. Ferritin is a compound that contains iron to be used by the hemoglobin and can often be low even when blood tests show a normal level of hemoglobin. This condition will then naturally fly under the radar if only hemoglobin levels are checked and serum ferritin levels are ignored.

It's common for runners to become iron deficient through a number of ways. The first is through blood loss. Blood loss obviously decreases the overall level of hemoglobin, ferritin and iron in the bloodstream. Gastrointestinal blood loss occurs during periods of intense exercise. Blood is secreted into the bowels and is evacuated from the body. Footstrike anemia, or hemolysis is also blamed for blood loss. In this case the impact of the run strike damages and destroys red blood cells circulating through the bottom of the foot. Female athletes also may become iron deficient through menstruation. This blood loss accounts for the largest loss of iron from the body. Outside of blood loss, athletes become iron deficient through inadequate dietary intake. This is leading factor in iron deficiency. In other words, the previous examples of blood

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<sup>1</sup> "Anemia and Iron Deficiency", Time-to-Run.com,  
<http://www.time-to-run/doctor/anemia.htm>

loss are quite common and are natural products of a serious female runner. However, young females commonly have poor eating habits and often shy away from foods rich in iron. Vegetarians are even more likely to miss the needed amounts of iron in their diets.

Effects of dietary iron deficiency can also impair the body's ability to produce ATP in skeletal muscle, reduce levels of VO<sub>2</sub>max and contribute to thyroid problems. It's estimated that 30% to 50% of young female athletes suffer from some level of anemia.<sup>2</sup> Another study showed that 80% of young female athletes were iron deficient, suggesting, while anemia may not be present, there is the possibility of it in the future.<sup>3</sup>

Even a slight drop in hemoglobin can reduce athletic performance. Also, runners with borderline levels of hemoglobin, which appear to be normal for non-athletes, are still often iron deficient. It makes sense for an endurance athlete to maintain a higher minimum hemoglobin level in order to attain peak performance. Iron is the delivery truck for proper oxygen transport and plays essential roles in a number of enzyme systems including mitochondrial electron transport and oxidative phosphorylation.<sup>4</sup>

### **Symptoms of Runner's Anemia**

True iron deficient anemia victims suffer from a general, but constant, lethargic state. Runners with iron depletion (low ferritin levels) can certainly experience a myriad of training symptoms that include abnormal exhaustion, increased blood lactate, slow recovery, declining performance, heavy legs, muscular tightness, loss of motivation and a substantial increase in injury risk.<sup>5</sup> Other research has pointed to the evidence that suggests low ferritin levels actually lead to overuse injuries. Those very things (stress fractures, shin splints, etc..) we thought were being caused by too many miles, poor running surfaces or old running shoes, may actually find their devil in the missing iron stores.

Most cases of iron deficiency and iron depletion are realized in runners that have been running for a season or two (1yr). However, new runners may also want to get tested. Remember, like any other ailment, early detection is the best cure and any positive changes are good.

### **Testing for Runner's Anemia**

The most important thing to keep in mind when testing for runner's anemia is getting comprehensive blood work done. Your physician will be familiar with anemia, low hemoglobin and iron deficiency. However, don't let them stop there. Make sure you get your serum ferritin levels checked. You may have to educate your doctor on the issue of iron depletion. (Remember, iron deficiency is different from iron depletion.)

The normal range for serum ferritin is somewhat debatable. Some scientists assert that it's between 50-150 nanograms per milliliter (n/ml) while others contend it's anywhere between 10-300n/ml. However, what ever the 'normal range' the lower the ferritin level the more iron depleted you are. And in general, the endurance athlete would

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<sup>2</sup> Volpe, Stella L., "Calcium, Iron, Zinc and Exercise in Women", Topics in Clinical Nutrition, June 1999, Vol. 14, Iss. 13, p.43(10)

<sup>3</sup> Browne, Raymond J., "Evaluating and Treating Active Patients for Anemia", The Physician and Sports Medicine, Sept 1996, Vol. 24, Iss.9, p.79(1)

<sup>4</sup> Browne, Ibid.

<sup>5</sup> Hess, Jeff, "Iron Depletion: What you and your doctor need to know", Track & Field News, 2005, <http://www.trackandfieldnews.com/hs/coachscorner/20051215.html>

prefer to have higher ferritin levels as they obviously rely more on their oxygen carrying capacity than any other type of athlete. No matter your level, if you are feeling the symptoms of iron depletion, any increase in your ferritin stores can be considered a step in the right direction. Get your tests done before the season starts or early enough so that any low findings can be corrected as soon as possible. It will usually take 4-8 weeks to begin to feel the results of supplement correction.

### **Supplementing your diet to correct for Runner's Anemia**

Runners borrow from their iron stores at a higher rate than the typical American teenage diet can replenish them. When a blood test reveals a problem, increasing the amount of iron rich foods and foods high in vitamin C in your diet, cooking with cast iron cookware and taking daily iron supplements are recommended. Ferrous sulfate or ferrous gluconate elixir are the most effective at rejuvenating iron stores. They come in liquid form and are more easily absorbed by the digestive system. These, however, are not the most common forms prescribed by your doctor. Typically, tablet forms of similar iron supplements cannot be absorbed at the appropriate rate. Also, there are important things someone suffering from anemia or iron depletion needs to know about proper iron supplementation. Calcium, caffeine (soda, coffee, tea), and non-steroidal anti-inflammatories (ibuprofen) all can curtail your efforts as they prohibit proper iron absorption. These should be avoided during the time of day you are ingesting your iron. However, in respect to calcium, this is just as important as iron in maintaining a proper diet, especially for females. Iron and calcium should simply be taken at two different times of the day. On the other hand, vitamin C actually encourages the absorption of iron. So wash down your ferrous sulfate with some orange juice to get the most intended effects. It is believed that only 15% of the iron in our diet is actually absorbed by our bodies.<sup>6</sup> This makes it all the more important to take any absorption advantage you can get.

### **Conclusion**

I refuse to follow the masses and believe that the natural condition of body growth, which is making us stronger, is the culprit for negative changes in running performance. The more knowledgeable I become about runner's anemia and iron depletion, the more I am recognizing the symptoms in the athletes on our team. If you feel like you're experiencing the effects of anemia or iron depletion now is the time to get tested.

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<sup>6</sup> Hess, Jeff, Ibid.

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