

# Iron for Female Athletes

## Eat Nails

By Dr. T. P. Turner

Well, I hope all of you two wheeled riders of the velvet couch read last months opening installment about maintaining health while trying to achieve fitness. It is time to start discussing specific factors that can adversely effect and interfere with training. This month I get to write about one of my favorite topics: iron. A significant number of athletes, especially women, are deficient in iron to affect performance, general well-being, concentration, and to induce general fatigue. The discussion of iron is, after all, a discussion about energy.

Most of the body's energy is produced aerobically. This process is an oxidative reaction much like fire. To keep a fire burning requires fuel and oxygen. In the aerobic process the fuel is hydrogen ions gathered from carbohydrates, proteins, and especially fats. The oxygen is supplied for hemoglobin function.

There is some disagreement in literature as to whether athletes are more prone to iron deficiency than the general population. One camp suggests that training increases plasma volume (the fluid component of blood) and that this is responsible for any differences seen on blood tests of athletes.

However, there is another camp, which recognizes that there are three stages of iron deficiency. Stage 1: depletion of iron stores in the liver, spleen and bone marrow measured as low ferritin. Stage 2: low serum iron. Stage 3: low hemoglobin. They also recognize that there are two easily measured factors that are significantly different in athletes as compared to non-

athletes; ferritin which is stored iron (see stage 1 above) and mean cell volume (MCV), which is the size of each red blood cell.

In a recent study, for example, the average ferritin level of female aerobics instructors was 16.7 as compared to 36.4 for non-exercising controls. The average MCV for the same groups was 94 and 87 respectively.

Lower ferritin and increased cell volume cause a loss of efficiency in the aerobic system, which is associated with symptoms such as fatigue and loss of concentration. This loss of efficiency is a problem for the general population but it is especially problematic for cyclists due to the intense demands we put on our aerobic systems. 80 - 95% of our muscle fibers are aerobic fibers and cycling tends to demand more of them than any other sport.

I find in actual practice that athletes with low ferritin levels and elevated MCV tend to suffer loss of motivation, fatigue, poor recovery and they even appear to have a greater tendency to injury.

The ranges considered "normal" for ferritin and MCV are quite large and tend to be related to pathology. Experience and recent research have led me to set narrower physiological or "ideal" limits.

My target range for ferritin is 60 - 100 pg/L. This is based on the observation that subjects with levels below 12 -15 most often have all the symptoms listed above plus poor workouts and poor performances. A significant number of them tend to have stage 2 or stage 3 deficiencies as well. Subjects with levels below 30, but above 15, tend to have one or more of the symptoms but rarely have the more advanced stages.

Subjects with levels above 30 tend to be symptom free but the stress of a long season of training and racing puts a strain on this system and lower levels in many athletes. I like to see levels above 60 at the start of the season.

Very high levels of ferritin can be associated with increased risk of heart disease. It is wise to actually have your blood ferritin tested before considering supplementation.

To give some perspective on all of this, let's look at our aerobics instructors again. In this study 1/3 of the subjects had ferritin levels below 12 while none of the controls were that low. In the women's athletic department at our local mega university, 20% of 332 athletes we tested had levels below 15, 36% had levels between 15 - 30 while another 36% had levels between 30 - 60. Only 9% had levels above 60 without supplementation and 56% had levels below 30 without supplementation.

The numbers for women are probably worse than for men due to menses and the high incidence of eating disorders among female athletes. However, remember in our aerobics instructor study the average ferritin was 16.7 as compared to 36.4 in control who were also women. The difference was clearly training. Although I do not have the same access to numbers for men, we are not immune to this problem.

Pathological standards for MCV dictate that levels above 97 - 100 cu indicate a type of anemia called macrocytosis (cells too big). Functional or "ideal" levels are probably somewhat lower. I prefer to see levels below 90. The cause of the increased cell size is that supplementation with vitamin B12 and folic acid generally has a lowering effect.

This off-season, along with a lot of rest and reflection, take a good look at your body. If you have had some of the symptoms mentioned here, consider a trip to your favorite sports of family doctor. Have a good exam including a CBC and a ferritin check. (You will probably have to ask for a ferritin check to get one). If your ferritin is low and your MCV is high consider making a few changes.

In spite of all the talk about complex carbohydrates, save room for meat at least three times per week. A good rare or medium rare steak seared in a cast iron skillet is not only tasty but a great source of the nutrients you need. If levels are very low, supplementation is probably the most efficient thing to do.

When choosing an iron supplement, avoid ferrous sulfate. It binds up the gut and is poorly absorbed. Your doctor may not agree but then I once had a doctor tell one of my patients that eating a nail would work as well as any supplement. Instead of eating nails, try ferrous gluconate or ferrous fumarate in doses of 30 - 60mg/day. Take it before meals and away from calcium and vitamin E supplements for best absorption.

When choosing B12 look for a resin bound form (read the label) if possible and always suck or chew them. Folic acid is easily absorbed and most products are ok. Take both of these in 1 - 5 mg/day. A very high MCV may need B12 in shot form. Talk to your doctor about that.