

What is Overtraining in Distance Runners?

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Please Note: This article is not intended as a medical recommendation of any sort. It is merely an attempt to understand an area of training that very little is known about.

Summer 2006. Our top returning runner was hitting all the mileage and intensity targets in the 50+ mile weeks, going as high as 80 miles (30 above goal) once. Being a young, growing program, this was uncharted territory for the group. I was mildly concerned that his “excessive” mileage would come back to haunt us, but I felt pretty confident he could handle the workload as well as anyone. Still, the danger of overtraining lingered in the back of my mind.

It wasn't until well into the season that I learned that the athlete had skipped many of his off days in the summer, in addition to doubling up some days to run with multiple groups, which added to the concern. There was little that could be done about it at that time and no point expressing my fears. I figured we would ride it out and see how well he could hold on. However, his performances stagnated midseason, and he complained of frequent calf soreness and an inability to pick up the pace in workouts and races.

Two to three weeks before the end of the season, we began connecting the dots and put him on liquid iron. The symptoms were a bit misleading, as general fatigue and a drop-off in training are usually expected of iron depletion, whereas he could handle everything fine but just couldn't go faster. He ate a healthy, balanced diet and did not display the physical signs typical of low iron. It was easy to miss.

Even with such a short period of time to boost his iron levels – 6 weeks is considered necessary for results to show – he regained his position as #1 on the team (had been #3 for several races) for Districts and State and said he felt much better physically.

So, after the State Championship meet, I started thinking... Is iron depletion really all that “overtraining” amounts to? Aside from actual overuse and impact injuries, is there anything else going on physiologically? It shouldn't be possible to work the muscles aerobically to the point of lasting damage. The joints will fall apart first! What else is there? Possible explanations include:

- Ventilatory Drift.¹ This is just a temporary breathing condition with no negative effects once the run is concluded and the lungs have caught back up.
- As slow twitch muscle fibers become fatigued, fast twitch fibers are recruited, but this only serves to bolster the aerobic system by making it more efficient.
- More training requires more carbohydrate intake to replace fuel burnt, plus more protein to rebuild muscle cells which are presumably broken down at an advanced rate as exercise duration increases. This is the normal process of building stronger muscle. As long as a well balanced diet is maintained, overtraining should not result in a nutritional deficit.
- Blood chemistry changes, electrocardiographic (ECG) changes, etc. This is a far broader topic than I could hope to cover. From what I can tell, these areas of research do not seem to differentiate between heavy training and overtraining – perhaps because

the latter does not have an agreed upon definition – instead focusing on the gradual buildup of symptoms.

There *is* one possible catch. To be honest, I do not have a full enough grasp of the material to form a conclusion, but here is a brief overview: Jan Olbrecht² has a theory on lactate threshold training that could be relevant, although, in my opinion, it raises more questions than answers. The basis of his studies is the lactate curve's shift, its effect on anaerobic threshold and aerobic capacity, and how that shift can lead to overtraining. But from the synopses I've read of his work (which may not be 100% accurate, as it's very detailed stuff), it's still plausible that something like iron depletion is the underlying cause of the effects he studied. Too little is known about iron's effect on the body to rule out the possibility, in my opinion.

I am also skeptical of some of Olbrecht's claims regarding aerobic development and how they tie in to ideal training loads. In short, too much aerobic work reduces anaerobic capacity while not increasing aerobic capacity (see a logic problem?), causing the aerobic system to be over-worked at all effort levels, thus overtraining sets in.

It is interesting to note that Olbrecht's studies and coaching have been primarily with swimmers, which, as the very successful high school coach Jack Farrell³ has noted, appears to be the group from which the notion of tapering for runners came from. As Farrell says, the non-impact qualities of swimming allow a much greater volume of work to be done, creating more lasting fatigue than distance running can produce. I would imagine this ties in fairly close to Olbrecht's observations of the potential for overtraining.

That possibility aside, if all that overtraining boils down to is low iron levels, what an easy issue to correct! Despite the commonly held fear that once the overtraining line is crossed, that season is surely lost, could it be that an inexpensive, over-the-counter bottle of liquid iron is the answer?

Several weeks after the 2006 season concluded, I ran across a US Olympic Committee⁴ article while researching something entirely different. On page 9, they list the various symptoms of overtraining:

- apathy (*)
- lethargy (*)
- depression
- decreased self-esteem
- emotional instability
- impaired performance (*)
- restlessness
- irritability
- disturbed sleep
- weight loss
- loss of appetite
- increased resting heart rate (*)
- increased vulnerability to injuries (*)
- muscle pain/soreness (*)

Several of the key symptoms (*) are exact matches for those of iron depletion, while the rest are all pretty common signs of any ol' thing not going well. The symptoms can be [roughly] divided up into physical and emotional issues, with the physical ones applying equally well to overtraining and iron depletion. While not exactly proof, this strikes me as well beyond coincidental. It bears repeating that little of substance is actually known about overtraining, so this observation is as close to conclusive as anything you will find.

Of course, there are still separate issues such as too much sharpening too soon, or more pounding than the body is prepared to handle. But, as far as I can tell, overtraining is not something to be afraid of as long as the athlete is willing and able to monitor ferritin (iron) levels. This is not a green light to go out and run oneself into the ground. Stay healthy, train smart, and train hard!

Perhaps these questions will compel someone to perform a specific overtraining study, testing to see if simple iron supplementation can alleviate the symptoms without backing off the training load. It may have already been carried out, but if so, it sure isn't easy to find in the literature. It may turn out there are gradients of overtraining, with the less severe varieties being correctable by iron supplementation. That would still be a perfectly good answer, in my opinion. Taking liquid iron as soon as the typical symptoms appear should ward off any problems.

I *have* managed to find a loose connection between iron levels and overtraining in some of the research, but the body of work seems to view iron deficiency as a side effect and stops short of investigating it as a cause and effect relationship. For example:

“Overtrained athletes have been shown to be anemic and iron deficient, and various authors have documented low serum ferritin levels in association with overtraining.”⁵

The area of blood chemistry research has the greatest likelihood of disproving the above theory, but more reading is needed at this time.

¹ John Kellogg, Paragon Running; no longer available online

² <http://www.lactate.com/bkolbr.html>

³ http://www.coacheseducation.com/xc/jack_farrell_nov_01.htm

⁴ http://www.usoc.org/education/coach_summer2003.pdf

⁵ Electrocardiographic abnormalities and cardiovascular physiology in athletic overtraining, by A King Jr, YSA Lo, MK Chin, JX Li, RCH So.