

Lactate and the Long Walk

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Most athletes cower when they hear the terms "lactate" or "lactic acid." I, myself wake up in a cold sweat from nightmares involving my high school cross country coach, Bill "Sluggo" Markiewicz, stop-watch in hand, grinning fiendishly while we suffered through endless 400-meter repeats that he promised would make lactic acid our best friend. Of course with friends like Lactic Acid, we thought, who needs enemies?

But is lactic acid really the enemy? Well, yes and no. Lactic acid, or lactate, is essentially nothing more than incompletely combusted carbohydrate; carbohydrate burned without sufficient oxygen for complete break down to occur. This lactate, created in the working muscles, is subsequently circulated through the body for "processing." Lactate is actually a "friend" to your heart, which preferentially uses it as a fuel, but your skeletal muscles don't see it that way: Lactate slows down enzymatic activity in the working muscles by lowering the pH (raising the acidity) within them. The result? As acid levels rise, you have to slow down. Slowing down (obviously) requires less energy, so less carbohydrates are burned, and less lactate is spun off. After several minutes of slower walking, excess lactate is consumed and you generally get a "second wind" which will allow you to pick up the pace again.

The lesson: Don't go out too hard in a race in the first place and you won't build up high lactate levels. But what about those nasty 400-meter repeats? Yes, speed work is a key component of training for any endurance event. But in a discipline that takes place over the course of 5 to 50 kilometers, top-end speed isn't the problem. The problem is maintaining a relatively comfortable pace for long periods of time--and you can't do that if you're swimming in lactic acid. "Sluggo" realized that you can "teach" the body to process lactate more efficiently by doing hard intervals. But wouldn't it be nice if your muscles weren't generating buckets of lactate in the first place? Real nice... but how? The solution is to improve your "plumbing" so that the muscles get bathed in loads of oxygen-rich blood. And the only way to do that is by getting out for those long EASY walks.

Easy distance work--walks over one hour in duration at 65-75% of maximum heart rate--will increase capillarization into the working muscles. The average guy on the street has 1 - 2 capillaries supplying each muscle cell with oxygen. A well-trained athlete has 4 - 6, which means he has 2 to 6 times more oxygen going into the muscles. More oxygen means you can walk much faster without building up lactic acid. The easy aerobic distance work also increases the size and number of mitochondria in the working muscles. Remember high school biology? Mitochondria are the "power houses" where fuel (carbs) are turned into ATP, which leads to muscle contractions. More mitochondria per muscle cell means higher total energy output (i.e., faster racewalking!)

Your body doesn't know whether your next race is a mile or a marathon, so you can't really "shortcut" the long days just because you're "only" racing 5kms. That doesn't mean, however, that you have to do 3-hour walks to prepare for 5 km. But you should be getting out for several 1-hour or so walks per week, and a long day of 10-15 km. 10 km racers should be out there for 15-20 km on the long day, and 20 km racers need to do 25-30 kms on the long one.

The good news is that you don't have to--and shouldn't--go very fast. Walking the long one too fast not only doesn't give you additional aerobic benefit, it actually does damage that's counter-productive to it's intended purpose: building muscle and capillary beds. Going too fast will raise intra-muscular acidity and keep these acid levels high for an extended period of time. I tell walkers at my clinics that this is like taking a hunk of steak (your muscles) and leaving it in a vat of acid for a few hours. After a while, no more steak... It's not

quite that dramatic, but if done too often, the result is the same. Sustained, high intra-muscular lactate levels destroy muscle tissue and the capillary beds that you are so desperately trying to develop.

Long walks should be walked in the 65 - 75% of maximum heart rate range. Since heart rate will rise as heat builds up in the muscles and dehydration sets in, you should always try to stay below 70% of maximum heart rate for the first 2/3 of the workout, allowing your heart rate creep up to--but not over--75% over the final 2/3. It's difficult to make hard-and-fast pace-per-mile rules, but you should walk about 2 minutes per mile slower than race pace (for that distance) on your long day: If you're training for a 10 km and your long day is 20 km, walk 2 minutes per mile slower than your 20 km race pace.

Although Mr. Lactic Acid may never become your best friend, by consistently getting out there for that long day you'll be able to "walk away" from him--and that refrigerator he wants to strap to your back--without "Sluggo" beating you up on the track.

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