Dear Dr Creswell,

I recently started a running website. I want to include some data I collected that relates resting heart rate to training miles completed while running. From what I read on your Athlete's Heart Blog, you might be willing to help me out.

First I would like to give you some background information. I have a PhD in Physics and taught and did research with students at Allegheny College for 34 years. I retired in 2006. I started running in 1959 and have been training and racing every year since then. I am now 73 years old. From 1959 until 1962 my running was intermittent. During the summer of 1962 I started training almost every day and continue to do so. To read more about my running history you can visit my website at jimruns.com.

Now I want to discuss the reason I have contacted you. From the Fall of 1962 until the Fall of 1964 I trained hard and won events in college and later in road races. During this period my resting heart rate (RHR) was near 40 bpm and sometimes a few beats lower. On Nov. 8, 1964 I ran a 25K race at 5:25/mi and came in third in a strong field. After that event I decided I would cut back on my running partly because I was tired from training so consistently for two years and partly because I had started graduate studies. Over the next 8 weeks I averaged 12 miles/week. Then over the following 5 weeks I did not run at all. My RHR rose to about 60 bpm. At the beginning of Feb 1965 I decided to start training for the Boston Marathon. I only had two and a half months to get in shape so I built up my mileage quickly. Fortunately when I decided to start running again I also decided to measure and record my RHR in my training log on a daily basis. I had not looked at that record until just recently when I was studying my old training log books.

I have overlaid two graphs in the figure I have attached. The data in these graphs starts at the time I began training again in the beginning of 1965 and ends in July of that year. The RHR data was collected through the middle of November 1965 but I have not analyzed all the data yet. One graph is a series of open squares with the position of each square representing the total miles run during a particular week. These squares are plotted as a function of the date at mid-week. The other graph is a series of filled circles with the position of each circle representing the average RHR for a particular week. In most cases I measured the RHR every morning of the week so the average RHR is the average of seven values. Each average RHR data point has been rounded off to the nearest integer value. The scale for the “miles graph” is on the left. The scale for the “RHR graph” is on the right.

Of course, if I had a good coach during the period of interest, I would have been advised to increase my mileage more slowly. On the other hand if I had increased my mileage in a reasonable way, the relationship between the two graphs probably would not be as interesting as it is. Because of the high mileage, I injured one of my knees in March. I kept running and within a few more weeks it became impossible to run because of pain in my knee. Needless to say I didn't run Boston. In the middle of April I started running again and increased my mileage more slowly with time. Thankfully my knee didn't bother me. On June 27 I ran the 12 mile St. Christopher's Road Race in Binghamton NY and came in second place with my fastest time in my five runs there. Interestingly on the morning of the St. Christopher's race in 1965 my RHR was 38, the lowest value recorded during the time period of interest. I was in good shape by June.

There are a few interesting things associated with the two graphs. They seem to be out of phase, when one is high the other is low. The main question I have is why is there no time delay for the RHR graph. It is my understanding that the RHR depends on the size of the heart and the thickness of the heart's muscles. It seems to me these characteristics of the heart do not change immediately but change over

time with training or lack of training. So why, as I increased or decreased my mileage, did my RHR show an immediate response? Does it have something to do with the heart's electrical system? A related question is why does the RHR of an athlete rise when he stops training for a few months? As illustrated by the graphs, my heart did not change appreciably during the three month period I was not training much.

I hope that you have an interest in my graphs and questions and I am very much looking forward to any response you may have.

Thank you,
Jim Lombardi
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