

# EXTREME ENDURANCE EXERCISE AND A FUTURE RUNAWAY HEART

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If you haven't yet seen Dr. James O'Keefe's video presentation and PDF article on "**Cardiovascular damage from Extreme Endurance Exercise**"<sup>1 2</sup>, both can be found in the references.

Dr. O'Keefe explains that at rest, the amount of blood pumped each minute from the ventricles (cardiac output) increases five-fold during extreme endurance exercise. Such extreme overload significantly stretches the walls of the two atria and their ventricles, especially the walls of the right atrium and the right ventricle, which is much thinner walled than the left ventricle. Although once recovered from overload and returned to normal chamber dimensions, chronic overload may result in remodeling and patchy scarring. In time, such pathology has the potential to provide origins and pathways for abnormal rhythms, especially atrial fibrillation and possibly abnormal tachycardias or heart block.

Serological markers of cardiac damage, including cardiac troponin, creatine kinase MB, and B-type natriuretic peptide, have been documented to increase in up to 50% of participants during and after marathon running.<sup>3-10</sup> Dr. O'Keefe also warns that long-term excessive sustained exercise may cause calcification of the walls of the coronary arteries and the aorta.

## 52,755 Fit Male Cross-Country Skiers

A report from Sweden published in the European Heart Journal in 2013<sup>11</sup> studied 52,755 men who competed during 1989 to 1998 in a 90 km (55.9 miles) Vasaloppet cross-country skiing event that tests the endurance of the most experienced skiers. Participants are expected to complete the race in 12 hours or less. The purpose of the study was to identify the risk of abnormal heart rhythms relative to dosage (races completed) and intensity (finishing times). A high number of completed races and a faster finishing time were associated with a higher risk of arrhythmias, particularly atrial fibrillation, the mechanism of which is compatible with the fibrosis mentioned by Dr. O'Keefe. Those with the fastest relative finishing time had higher risk of atrial fibrillation as well as other arrhythmias.

During follow-up, 919 of the athletes experienced their first arrhythmias at an average age of 57 years. In 681 participants that arrhythmia was atrial fibrillation. John Mandrola M.D. in his article on "**Endurance Exercise and Arrhythmia—It's Time to Believe**" tells us the overall incidence of arrhythmias experienced by these athletes is more than double the rate in an age-matched group.<sup>12</sup>

## Brutal Badwater Marathon

In July 2009, Perry Edinger, an experienced long distance runner, responded to the lure of "The World's Toughest Footrace", 135-miles from *Badwater* in Death Valley (elev. 282 feet below sea level) to Whitney Portals on Mt. Whitney (elev. 8360 feet). He covered 135 miles in 29 hours, 19 minutes, 4 seconds to finish ninth among the 86 runners. These stats speak for themselves. He knows he overstepped his bounds and he did so willingly. At 23 miles his gut was so oxygen-deprived that he was vomiting and unable to retain liquids to replace his electrolytes. As for his brain, to this day he remembers nothing of the run after reaching Lone Pine. I'll not comment more on this. Read Perry's story on **azcentral.com** and come to your own conclusions. Thanks to Kathryn Lewis Ph.D for sending the article.

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