

CALL FOR RESEARCH VOLUNTEERS

Advancing heart health for endurance runners

Take part in a novel Boston Marathon Medical Study

Does stepping between heartbeats enhance health and performance?



Presented by sports scientists from Stanford & Brigham Young University. We thank the Boston Athletic Association for its financial support of this research.¹

Heart pump

Sends blood to working muscles most effectively between steps



Muscle pump

With each step, your body most effectively pumps blood to the relaxing heart between beats

When you run, your largest muscles pump blood towards the heart with every step you take. Blood is pumped into muscle most effectively as it relaxes between contractions. Leveraging this concept, this study addresses three hypotheses:

- 1) Performance, endurance, aerobic fat burn, heart health and recovery are enhanced when step rate and heart rate are equal, and steps are timed between heartbeats.
- 2) When heart and muscle pump timing are poorly coordinated, blood and oxygen delivery to both working skeletal and heart muscle is diminished, and performance is impaired.
- 3) This explains why *many elite runners unconsciously lock into stepping between heartbeats.*²

Study Method and Goals: Runners enrolled in the study will wear a chest-strap mounted, precision heart and movement sensor throughout the run. The gold-standard blood test used in emergency rooms to diagnose heart injury will be drawn before and immediately after the event (this post-race biomarker, *troponin*, has frequently been high in prior studies of marathon runners.^{3,4}) We'll analyze each subject's step timing vs. heart cycle timing throughout the race for correlations with (1) biomarker evidence of possible heart injury, and (2) evidence of performance enhancement.

Enrollment criteria: Recruitment will be limited to 120 healthy Boston Marathon runners between the ages of 18 and 34, balanced across qualifying times and gender.

Additional Benefits of Participating:

- Find out when you naturally stepped in sync with your heart cycle throughout the race.
- Study results will be available to participants.
- Study finishers can keep the Counterpace sensor (step timing guidance system) as a "thank you" for participating (normally \$199) or return the sensor and receive \$50 cash.



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1. The conduct of the research study, and any research, results and other information obtained or produced in connection therewith, is independent from, and is not endorsed by, the B.A.A.
2. C. Emhoff et. al. MSSE 2020 52(7S):711-711
3. S. Janssen et. al., Current Opinion in Physiology 2023, 31:100629
4. T. Eijsvogels, Journal of Science and Medicine in Sport, 2015, 88-92