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Impact of mountain bike events on heart function among athletes

Mr.SudheerBabu.N, Research Scholar Malwanchal University, Indore

Prof.Dr.Manila Jain, Research Supervisor ,Malwanchal University, Indore

Introduction

Exercising regularly is excellent for you; this is a widely held idea supported by studies. The effect of an ultra-endurance mountain biking race on the heart of an endurance athlete is unclear.

The majority of endurance athletes may gain from training because of the evidence that it causes beneficial physiological changes. An endurance athlete's heart, since it is in good shape, may react well to short bursts of exertion and defer tiredness over longer periods of effort. Initial bouts of ultra-endurance exercise may produce an acute loss in cardiac function, triggering a physiological cascade that releases cardiac biomarkers, as indicated by Ganet et (2018), who evaluated the acute and chronic adaptation on the hearts of endurance athletes. These findings suggest a pathophysiological cascade may occur in certain endurance athletes. Both athletes and medical professionals need to be aware of this pathophysiological occurrence and respond appropriately.

Monitoring HRV may help determine whether an athlete is overtraining and help develop tactics to avoid it. Over-reaching was defined by Mak et al. (2013) as a "accumulation of training and/or non-training stress resulting in a short-term decrement in performance capacity with or without related physical and psychological signs and symptoms of maladaptation in which restoration of performance capacity may take from several days to weeks."

Dysfunction and abnormalities in the autonomic nervous system (ANS) are among the many warning indicators associated with over-reaching. It is consequently well-established that prolonged or more strenuous exercise may place a greater strain on the body's physiological systems. This research set intended to use heart rate variability (HRV) as a surrogate for autonomic function in order to ascertain the impact of a two-day ultra-endurance mountain biking race on the hearts of its participants. In this study, we tested the hypothesis that participants' heart rate variability (HRV) would be significantly different before, during, and after a two-day ultra-endurance mountain bike competition.

Methodology

A prospective quantitative research strategy was employed to gather and analyse numerical data for this investigation. If the associated author makes a legitimate request, all relevant data will be made available to them. There is no conflict of interest amongst the authors and no outside funding was accepted.

In accordance with Indian government regulations, we will save each participant's medical history and measurements for the length of the study. All paper files are locked away, while their digital counterparts are housed in a secure cloud repository. Only the principal investigator gets access to the data and it is kept for at least six years. All direct IDs of participants were replaced with indirect identifiers in the primary data set to protect anonymity. Indirect identifiers are stored in a different data set called the "Key" alongside the direct ones.Twenty individuals (both male and female) who participated in an ultra-endurance mountain bike race over the course of two days were randomly chosen to take part in the research. The Mountain Bike Challenge race directors gave their formal consent for the research to be done at their event.

After the third day, one individual dropped out and was no longer included for analysis. 16 people who participated in the whole two-day stage event were

tracked as a result. The results of this research are consistent with the Declaration's tenets.

After receiving an email invitation to participate in the research from race organisers, participants were given the option to do so if they so desired. The study's participants were then contacted and invited to a meeting during which the researcher provided an overview of the project. Participants were given the chance to review the informed consent form, ask questions, and sign it before being recruited in the research. This study was conducted in accordance with ethical standards and was approved by the Ethics Committee.

The use of tobacco products and consumption of alcoholic drinks were both strongly discouraged before to and during the duration of the trial. No one mentioned using any cardiovascular-altering medications or sympathomimetic medicines. All riders were amateurs who had been riding mountain bikes for at least two years and were in good physical shape.

Results

Two and three days after the incident, the average heart rate was much higher and the R-R variability was significantly lower compared to pre-event testing,

but did not revert to pre-event values until 48 hours later. In the first 48 hours after the incident, there was a significant rise in mean HR and a reduction in R-R variability compared to baseline values. Differences between the first and third quartiles of HR and R-R variability before and after an incident are statistically significant.

Values for both the SDNN and the NN50 interval dropped significantly on day one compared to baseline and stayed low throughout days two and beyond. The third day saw a rise over the previous two, but a significant decrease from the first. There was no noticeable improvement in recovery from baseline to post-event after 48 hours. Significant reductions in RMSSD were seen beginning on day two compared to day one, and these reductions persisted through day three and beyond. The third day saw an increase in power compared to the previous two, although this was still much lower than the first two days. Twenty-four hours after the occurrence, there was no statistically significant difference between the RMSSD before and after the incident. Variations in the TP, HF, VLF, and LF/HF of HRV were very significant on day one compared to baseline and were indicative of cardiovascular modulation. There were no statistically significant differences between the two 48-hour periods before and after the occurrence. The LF decreased significantly on day 1 following the incident, but on days 2 and 48, there were no further changes compared to pre-event levels.

Conclusion

Study concluded that HRV be used as a measuring instrument to monitor cardiac autonomic activity. This will allow sports physicians, players, and coaches to determine the impact that ultra-endurance competition has on the autonomic nervous system and come up with effective post-competition recovery plans. In addition to its use in evaluating an individual's level of recovery after an ultra-endurance competition, we also recommend that sports physicians employ HRV as a screening tool in order to determine the state of an individual's autonomic nervous system prior to participating in an ultra-endurance competition. According to this line of reasoning, susceptible athletes are more likely to have a cardiovascular event if their is autonomic nervous system faulty. It is necessary to do further research in order to determine whether or not measurements of HRV may assist reduce the chance of cardiac events in high-risk groups.

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