

Physical Stress from Cycling ~Where to place feet on pedals~

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Abstract

An experiment was conducted to determine the best cycling posture for reducing load. Tests on foot positioning showed that the most efficient method is pedaling with the toes while maintaining the usual posture. Also, only heart rate proved useful for visualizing the load.

1 Introduction

Some students cycle more than 8km every day, we decided to find an easy way to get students who cycle to reduce their effort spent cycling stress, focusing on how to place feet on the pedals. We hypothesized a smaller change in values means a smaller amount of stress on the body. We tested three different foot positions on the pedals (toes · arch of the foot · heel).

2 Theory and Experiment

We performed the experiment by measuring the heart rate, body temperature, surface temperature and CO₂ concentration exhaled when subjects used a bicycle with different positions of the feet placed on the pedals.

3 Results

There was no major difference in Subject A's total heart rate in 10 minutes. Subject B's heart rate increased in order of toes < arch of the foot < heel. Nevertheless, Subject B's order of magnitude of results shown in Graph 1 and heart rate in Graph 2 were reversed.

4 Discussion

In other words, there is a possibility it is most comfortable and efficient to ride a bicycle when pedaling it with one's toes. It is because when a person pedals a bicycle on their toes, they can move the three joints of their heels, knees, and hips, and thus the moment force acts in three places, which is thought to cause a smaller increase in heart rate and makes it easier to pedal.

5 Conclusion

The most comfortable way to ride is to pedal the bike with your toes and maintain a normal posture. In future studies, we will analyze the experimental results in detail and increase the number of experiments.

6 References

The impact of riding posture on the physical burden of cycling (7/29 15:00)
(Human Life Engineering Research Institute, Ryo Hirota)