The impact of individually fitted carbon insoles on sprint performance in competitive cycling

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Introduction

In modern cycling, the spotlight is increasingly being put on the interfaces between man and machine. In this study, the transmission of power from the foot to the pedal by dint of Solestar carbon cycling insoles was optimized. A special active principle, which supports and guides the foot during the entire pedaling cycle. An optimized ergonomics reduces the symptoms of physically overstressing specific to this particular movement and raises the performance brought to the pedal. It was examined whether an improvement of the average performance in a sprint for a period covering eight seconds can be achieved by dint of individually fitted carbon insoles.

Methods

Each test person (n=25) completed three sprint tests of eight seconds each with the standard soles of his own racing bike shoes. After a standardized warm-up phase of ten minutes, a total of three sprints lasting eight seconds each were performed in intervals of five minutes (recovery phase). The performance measurement was done on the test person's own bicycle using a standardized Cyclus 2 gauge from the manufacturer RBM elektronik-automation GmbH. The maximum values and the average sprint performance covering eight seconds were measured in watt during all the sprints. Subsequently, each test person was equipped with suitable Solestar carbon insoles fitted individually to his foot and racing bike shoe. After a phase of getting accustomed to the insoles lasting two weeks, the sprint test (see above) was repeated. Within these two weeks, the test persons completed merely training units in basic endurance without sprint intervals so as to avoid performance-enhancing adjustment effects.

Results

We examined a total of 25 test persons (5 women, 20 men; average age: 30.4 ± 10.87 years old; a range from 17 to 45 years old, average weight: 70,05 kg ± 10,82 kg). The average

sprint performance covering 8 seconds rose from 896.9 ± 167.3 W to 958.7 ± 183.0 W ($p < 0.001$; paired t-test; 95% confidence interval of the change 48.8 W – 75.0 W) by 61.9 W (around 6.9%).

Discussion

A jump of the sprint performance in cycling in terms of the complete duration of a sprint covering eight seconds can be effected by dint of individually fitted carbon insoles. The optimization of transmission of power by an even distribution of power over the entire midfoot axis and the support of the arch using individually fitted carbon insoles for racing bike shoes is apparently the decisive factor for these results.

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