

## Summary produced for *Cycling Weekly* published Jan 2011

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### Title:

### **FOREFOOT VARUS WEDGES ENHANCE CYCLING PERFORMANCE IN RIDERS WITH FOREFOOT VARUS**

#### **Outline of study**

Although not linked, this study represents an extension to the work carried out by Dr. Andy Pruitt of the Boulder Center for Sports Medicine in the development of the Specialized Body Geometry (BG) shoes, footbeds, and shims. Dinsdale and Williams examined the effect of forefoot varus wedges on cycling performance in riders with varying levels of forefoot varus. Each cyclist performed 2 x 30 second maximum efforts on a cycle ergometer, one *with* and one *without* varus wedges. Unlike previous studies, this study reported forefoot varus measurements for each rider, and the corresponding number of wedges used in testing. Unique to this study, the results demonstrated a strong correlation between power output and cyclists with varying amounts of forefoot varus. Consequently, those with the highest levels of forefoot varus demonstrated increased anaerobic mean power outputs of approximately 10%. Summarising, cyclists presenting with higher levels of forefoot varus potentially have the most to gain.

#### **Explanation of results**

Previous research has demonstrated that as power outputs increase so does the amount of foot pronation. Pronation is where the forefoot tends to collapse allowing the forefoot to become parallel with the pedal. Moreover, the condition known as *forefoot varus* (described as a forefoot-rearfoot alignment problem) exaggerates the amount of foot pronation, which can lead to greater knee misalignment (knee injuries), pelvic muscle imbalance (often accompanied by pelvic alignment problems), and most crucially, potentially greater power losses. Considering the high prevalence of forefoot varus (87%) found amongst cyclists, these findings may have implications across the cycling population.

#### **Layman Lowdown**

Many riders have forefoot varus to some degree, in one foot or both, and therefore, may be experiencing minor losses in performance - additional to an increased risk of knee and pelvic dysfunction. The results of this study suggest that riders with higher levels of forefoot varus, performing at high intensity levels, have the most to benefit when using the appropriate number of forefoot varus inserts. Ideally, to prevent the above problems, riders should undergo appropriate biomechanical screening prior to cycle position set-up.

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