

INTERVENTION AT THE FOOT-SHOE-PEDAL
INTERFACE IN COMPETITIVE CYCLISTSSinead FitzGibbon¹Bill Vicenzino²Sue Ann Sisto³

ABSTRACT

Background: Competitive cyclists are susceptible to injury from the highly repetitive nature of pedaling during training and racing. Deviation from an optimal movement pattern is often cited as a factor contributing to tissue stress with specific concern for excessive frontal plane knee motion. Wedges and orthoses are increasingly used at the foot-shoe-pedal-interface (FSPI) in cycling shoes to alter the kinematics of the lower limb while cycling. Determination of the effect of FSPI alteration on cycling kinematics may offer a simple, inexpensive tool to reduce anterior knee pain in recreational and competitive cyclists. There have been a limited number of experimental studies examining the effect of this intervention in cyclists, and there is little agreement upon which FSPI interventions can prevent or treat knee injury. The purpose of this review is to provide a broader review of the literature than has been performed to date, and to critically examine the literature examining the evidence for FSPI intervention in competitive cyclists.

Methods: Current literature examining the kinematic response to intervention at the FSPI while cycling was reviewed. A multi-database search was performed in PubMed, EBSCO, Scopus, CINAHL and SPORTdiscus. Eleven articles were reviewed, and a risk of bias assessment performed according to guidelines developed by the Cochrane Bias Methods Group. Papers with a low risk of bias were selected for review, but two papers with higher risk of bias were included as there were few high quality studies available on this topic.

Results: Seven of the eleven papers had low bias in sequence generation i.e. random allocation to the test condition, only one paper had blinding to group allocation, all papers had detailed but non-standardized methodology, and incomplete data reporting, but were generally free of other bias sources.

Conclusions: Wedges and orthoses at the FSPI alter kinematics of the lower limb while cycling, although conclusions about their efficacy and response to long-term use are limited. Further high quality experimental studies are needed examining cyclists using standardized methodology and products currently used to alter SPFI function.

Level of Evidence: 3

Key words: Bicycling injury, orthoses, wedges

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