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Shoe Sole Construction is Reflected in Foot Loading Patterns during Running

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INTRODUCTION

Different sole constructions affect loading characteristics at the foot^{1,2}.

The ground reaction force (GRF) is commonly interpreted to assess the effects of footwear on comfort, performance, or injury.

Extracting the most important features of loading (e.g., timing, location) would provide additional insight into its effects.

Objectives:

- (1) Determine the principal loading features at the foot during running.
- (2) Using these features, compare shoes that differ in construction.

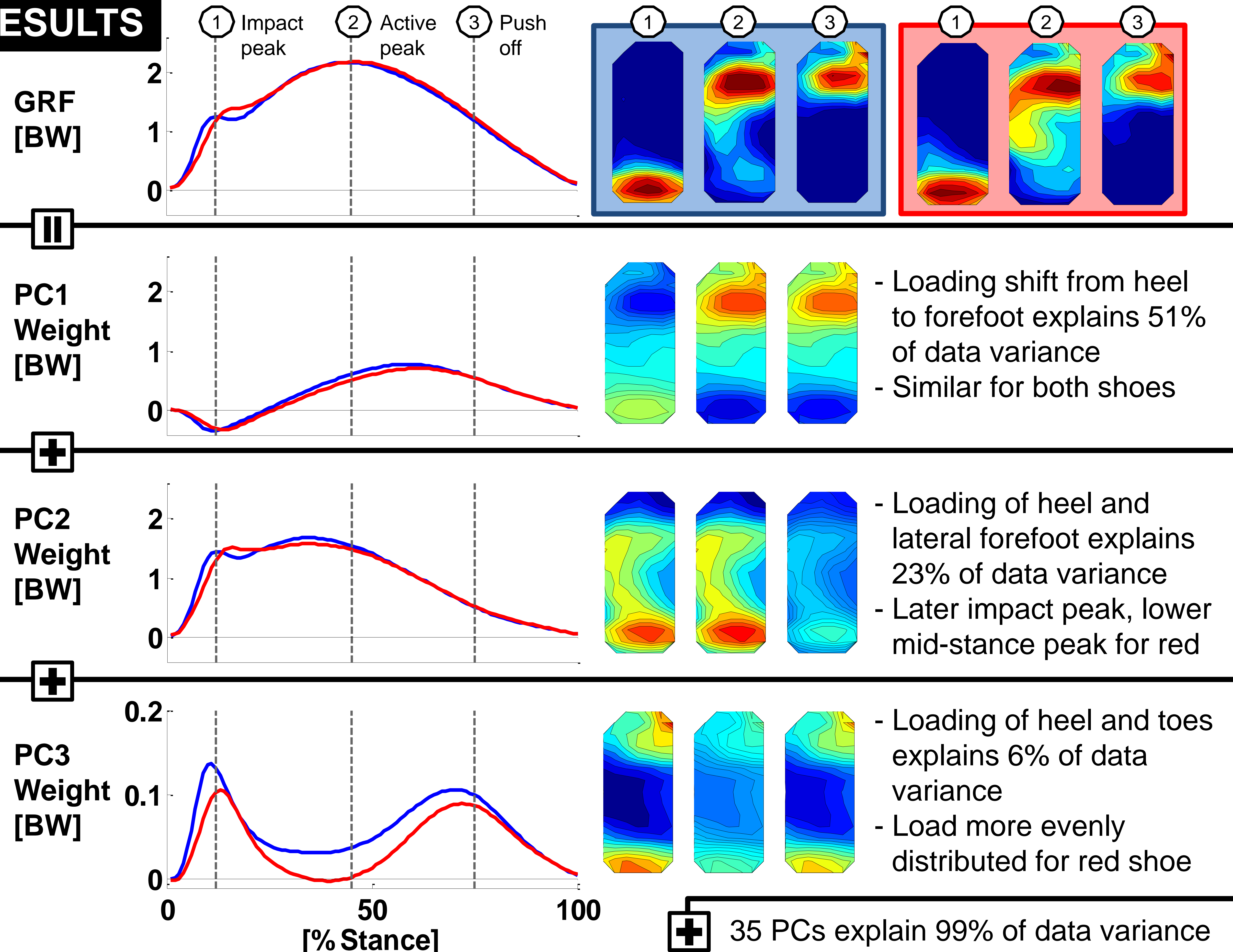
METHODS

- 43 heel strikers (22♂, 21♀, 18-55 yrs)
- 10 over ground running trials (3.33 m/s)
- 2 shoe conditions



- Plantar pressure measured from insole in left shoe (pedar®-X, novel, DE)
- Principal component analysis (PCA) to determine loading features (PCs)

RESULTS



DISCUSSION

Foot loading patterns and principal features reflect shoe sole construction differences such as cushioning and grooves.

Differences between shoes more substantial in higher order PCs. Successful classification of shoe conditions is possible from their loading features. A similar method can be used to classify clinical populations, or speculate about the effects of loading on injury.

REFERENCES

- ¹ Willy & Davis, *Med Sci Sports Exerc.* 2014.
- ² Boyer et al., *J Biomech.* 2012.

