
Citation:

Eken, M and Tam, N and Jones, B and Hanley, B and Vanwanseele, B and Brown, J (2025) Description of changes in self-reported comfort and injuries in runners transitioning to new shoes. *Footwear Science*, 17. pp. 36-37. ISSN 1942-4280 DOI: <https://doi.org/10.1080/19424280.2025.2489694>

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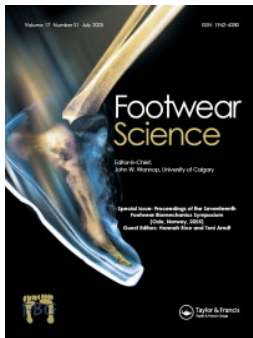
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To cite this article: Maaïke Eken, Nicholas Tam, Ben Jones, Brian Hanley, Benedicte Vanwanseele & James Brown (2025) Description of changes in self-reported comfort and injuries in runners transitioning to new shoes, Footwear Science, 17:sup1, S36-S37, DOI: [10.1080/19424280.2025.2489694](https://doi.org/10.1080/19424280.2025.2489694)

To link to this article: <https://doi.org/10.1080/19424280.2025.2489694>



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Published online: 20 Jun 2025.



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ABSTRACT



Description of changes in self-reported comfort and injuries in runners transitioning to new shoes

Maaïke Eken^{a,b,c}, Nicholas Tam^d, Ben Jones^{a,e,f,g,h}, Brian Hanleyⁱ, Benedicte Vanwanseele^j and James Brown^{a,b,h}

^aCarnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK; ^bInstitute of Sport and Exercise Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa; ^cInstitute of Orthopaedics and Rheumatology, Mediclinic Winelands Orthopaedic Hospital, Stellenbosch, South Africa; ^dSport Science Laboratory, On AG, Zurich, Switzerland; ^ePremiership Rugby, London, UK; ^fEngland Performance Unit, Rugby Football League, Manchester, UK; ^gSchool of Behavioural and Health Sciences, Faculty of Health Sciences, Australian Catholic University, Brisbane, QLD, Australia; ^hDivision of Physiological Sciences and Health Through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; ⁱCarnegie School of Sport, Leeds Beckett University, Leeds, UK; ^jHuman Movement Biomechanics Research Group, Department of Movement Science, KULeuven, Leuven, Belgium

ARTICLE HISTORY Received 17 February 2025; Accepted 1 April 2025

KEYWORDS Footwear; biomechanics; impact; running; injuries

Introduction

Over the past five decades, running has become increasingly popular across the world. Although running is accessible to many people and is associated with numerous health benefits, it also carries a risk of sustaining a running related injury (RRI) (Malisoux et al., 2020).

Of these RRIs, understanding the biomechanical changes and issues runners' face when transitioning to a new pair of shoes is of special interest and not well understood.

Purpose of the study

The aim was to understand changes in self-reported comfort, niggles/injuries and Spatiotemporal characteristics when recreational runner's transitioned from their own shoes into the cushioned *On CloudSurfer*.

Methods

In a 16-week cross-over design, 77 runners were recruited to run in their own current training shoes for the initial 8 weeks (control period), after which they ran in the *On CloudSurfer* shoe for 8 weeks (On period).

During each run, participants wore an inertial measurement unit (IMU) (RunEasi, Leuven, BE) mounted on a waistband centred on the sacrum to record spatiotemporal variables. At the end of each of the 16 weeks, participants received the 4-item Oslo Sports Trauma Research Centre (OSTRC) self-report questionnaire to assess whether they experienced any niggle or injury in the preceding 7 days and the severity thereof. The severity of the injury was

presented in a score from 0 – 100, based on the answers of the 4-item OSTRC questionnaire. At the end of the 16-week period, participants were asked to rate the comfort of the *On CloudSurfer*.

The incidence of niggle/injury was calculated by dividing the total number by the sum of running exposure in hours (per 1000 running hours). A mixed model's analysis was used to investigate differences in running distance, duration and spatiotemporal data between the two periods.

Results

In total, data from 71 runners were included in the study (male: $n=38$; female: $n=33$; age: mean (SD) = 37 (10) years).

Almost all participants rated the *On CloudSurfer* overall as 'good' to 'very good' (92%). Participants reported a slightly higher rate of niggles/injuries during the On period (35.7 per 1000 running hours) when compared to the control period (22.8 per 1000 running hours; relative risk = 1.56 (95%CI 1.04–2.36); $p=0.03$) (Figure 1). However, there was no difference in the reported severity (control period: mean (SD) = 4.4 (12.4); On period: mean (SD) = 5.5 (14.7); $p=0.20$). While participants did run more in the control period ($p=0.05$), the average impact was lower and cadence higher during the On period ($p<0.01$; Table 1).

During the control period, most injuries were reported at the knee (21%), calf (19%) and Achilles tendon (14%). In contrast to the On period, most injuries were also reported in the knee (36%) and calf (15%), while only limited injuries were reported in the Achilles tendon (2%) and more injuries reported in the shin (11%).

CONTACT Maaïke Eken  meken@sun.ac.za

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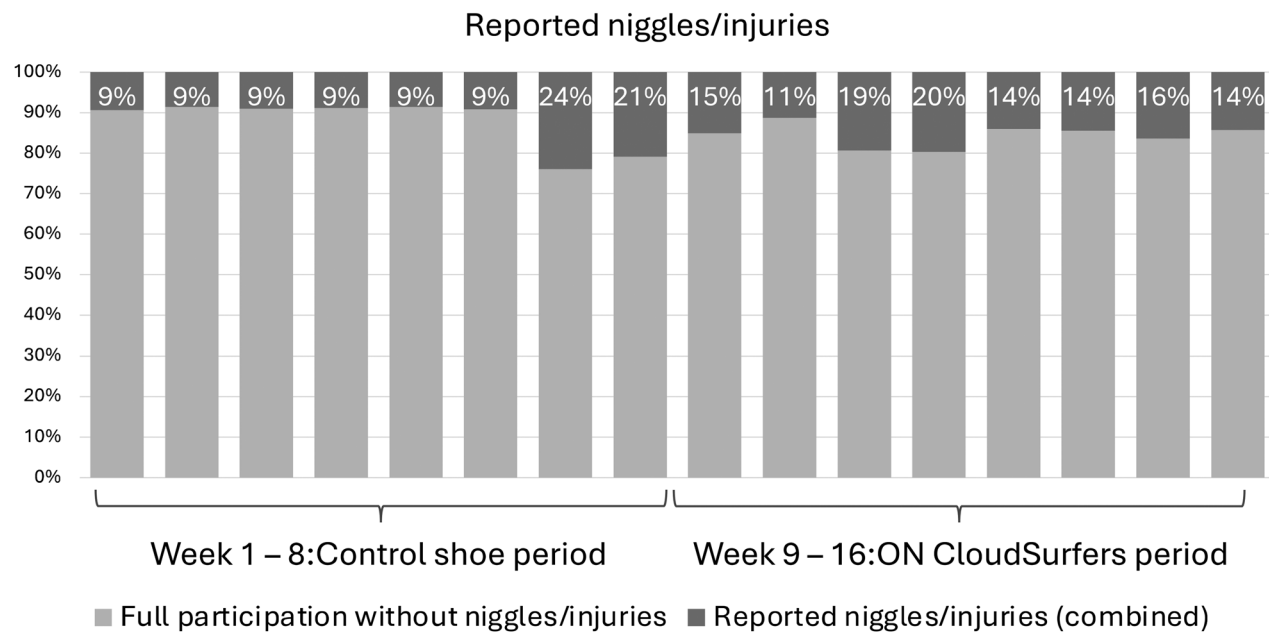


Figure 1. Prevalence of reported niggles/injuries per week.

Table 1. Spatiotemporal and running load related data

| | Control period Mean (SD) | ON period Mean (SD) |
|----------------------|-----------------------------|------------------------|
| Distance (km/wk) | 23.8 (21.0) | 21.9 (20.6)* |
| Impact (G units/min) | 686 (258) | 638 (245)* |
| Cadence (steps/min) | 168 (9) | 170 (7)* |

* $p < 0.05$.

Discussion and conclusion

The primary finding of this study was that most participants were positive about the 8-week transition from their own shoes to new, cushioned shoes (*On CloudSurfer*). The new footwear was also associated with reduced impact and increased cadence, which could be explained by different footwear characteristics (foam, stiffness or weight).

Overall, the incidence (but not severity) of self-reported discomfort or injury was higher during the On period than when participants ran in their own (control) shoes. Moreover, running load (frequency and distance) was

higher in the control period, which could have predisposed runners to injuries when transitioning into the cushioned shoe period. This is a limitation of the current study design. Future research, using a randomised cross-over design with longer periods in control and cushioned shoes, are recommended to better understand the effects of transitioning to cushioned shoes on self-reported niggles.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Reference

- Malisoux, L., Delattre, N., Urhausen, A., & Theisen, D. (2020). Shoe cushioning influences the running injury risk according to body mass: A randomized controlled trial involving 848 recreational runners. *The American journal of sports medicine*, 48(2), 473–480. <https://doi.org/10.1177/0363546519892578>