

A New Shoe Sole Technology that Transfers the Ground Composition to the Sole of the Foot: A User Experience Evaluation

B Sommer¹, D Baumgartner², RP. Kuster^{2,3}, M Wenger², CM. Bauer¹

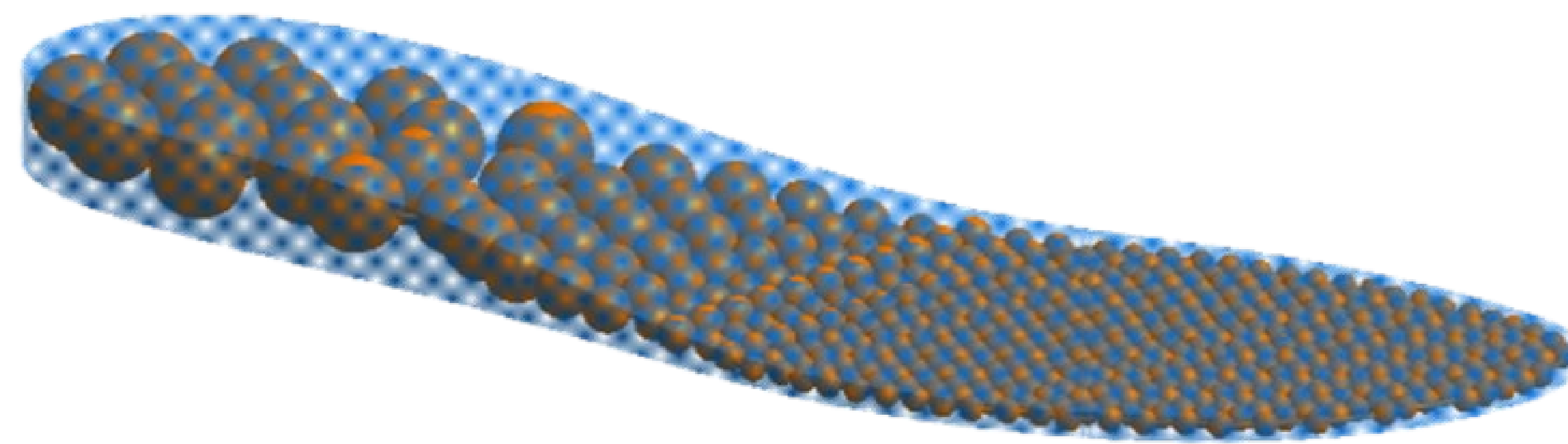


Figure 1: Shoe sole technology with balls in orange

Introduction

Neither comfortable, shock-absorbing shoes nor minimal shoes do stimulate the mechanoreceptors of the sole of the foot. This lack of stimulation leads to worse proprioception, poor posture and risk of injuries [1] A new sole technology is introduced, which transfers the ground composition to the sole of the foot and may provide enough stability through an integrated foot bed (Figure 1).

Methods

The stimuli transmitting shoe sole technology is performed mechanically. The shoe sole consists of hard plastic balls, which are pushed towards the sole of the foot due to uneven surfaces (Figure 2). This technologies' user experience was evaluated. The tests consisted of a two-week user study that evaluated three shoe sole in daily life as well as a one-hour monitored parcours evaluating the shoe sole on specific grounds.

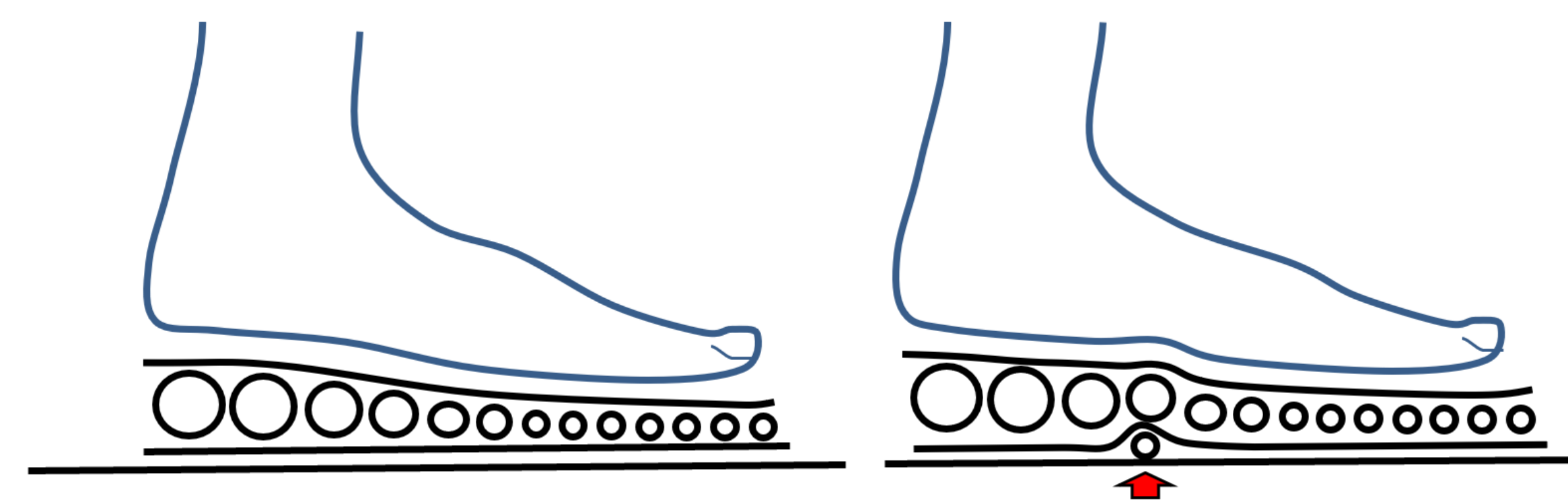


Figure 2: Technical concept which allows the transfer of uneven surfaces to stimulate the foot mechanically.

All participants were healthy with shoe size EU 38-43. The user study included 20 participants (Ø 64 years). Additionally, 10 persons (Ø 41 years) participated in the parcours. Questionnaires covered intensity of sensory transmission, general walking comfort and complaints and the effect of the ground composition on comfort. Answering options were on a Likert scale as well as open questions.

Results & Discussion

Intensity

Most of the participants rated the stimulus transmission as very or rather strong. Nobody rated it as very weak. In the parcours, the strongest sensation was on coarse stones and pavement transitions, followed by the forest floor (Figure 3).

Comfort & complaints

The majority perceived the shoe sole as very or rather comfortable. Participants perceived the stimuli strongest in the forefoot, where also most of the complaints occurred. The complaints were reported as tired feet, pain, pressure and burning feet, and occurred roughly every third day.

Ground composition

Nature trails seemed more comfortable than hard grounds, even though the opinions about hard grounds diverged. The most uncomfortable walking was on unpaved, downwards grounds.

How intense was the stimulus transmission of the shoe sole?

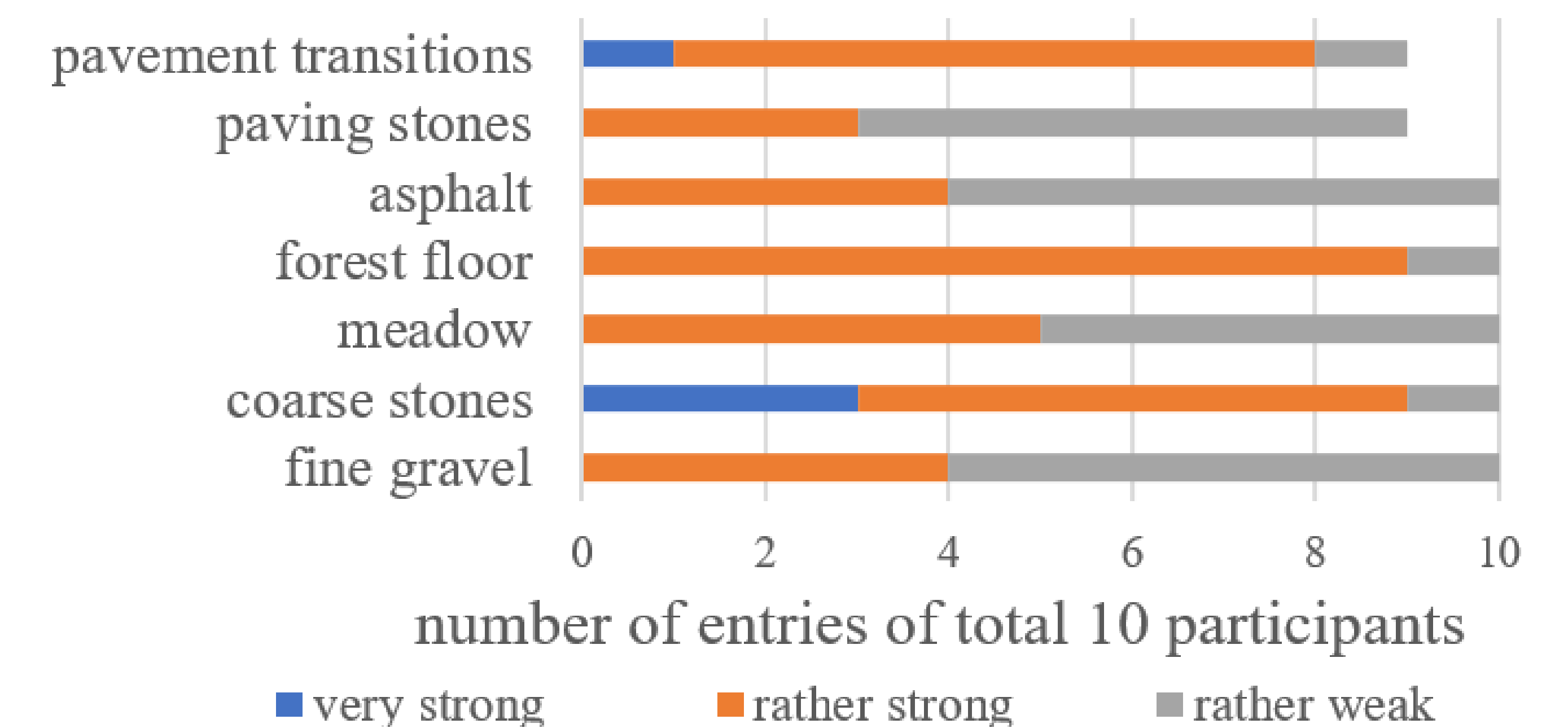


Figure 3: Intensity of stimulus transmission depending on ground

Conclusions

All participants perceived the stimuli transmission of the shoe sole. However, the product polarizes. While some considered the stimuli as comfortable, others found them too strong. The forefoot was the part with the strongest stimuli sensation, but also with the most complaints.

Acknowledgements

The project was funded by Innosuisse.

References

[1] Altman and Davis (2012). Current Sports Medicine Reports, 11: 244-250

Affiliations

¹ZHAW, School of Health Professions, Institute of Physiotherapy Switzerland

²ZHAW, School of Engineering, Institute of Mechanical Systems Switzerland

³Karolinska Institutet, Division of Physiotherapy, Sweden

Contact

Dr. Christoph Bauer
Zurich University of Applied Sciences
School of Health Professions, Institute of Physiotherapy
christoph.bauer@zhaw.ch