

## The immediate findings when standing, walking and running in FP7 HEELLESS concept footwear

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### Summary

57 people trialled a pair of novel concept running shoes to experience standing, walking and running in such footwear. Whilst at an exhibition they volunteered to try the shoes and stood, walked and ran on flat ground and on a treadmill. Afterwards they completed a questionnaire.

The results showed a high satisfaction with a rating of Good and OK in 82% (standing), 94% (walking) and 94% (running), with running in particularly rated as Good in 63% of the subjects. Immediately after testing 46% of testers felt Good, 40% felt OK, 12% felt Indifferent, and 2% felt very uncomfortable.

It can be concluded that the FP7 project HEELLESS footwear concept provides an attractive tool to help people to improve their posture and their fitness, which would be beneficial for their health.

## Introduction

A consortium of small and medium-size enterprises (SMEs) and research and development providers (RTDs) were sponsored by the EC to further develop and test a novel shoe concept. This heel-less footwear with Sole Force Distribution (SFD) and Sense Enhancement (SE) uses a natural and carbon fibre reinforced shock plate made of BioPreg™ in the sole, and aims to greatly reduce the impact on foot strike when running<sup>1</sup>. The plate allows the full natural movement of the foot during the full stance phase of the running movement and enables the midsole and outer sole to be lighter and more shock absorbing.

The Biomechanics Research team at Staffordshire University compared the energy return efficiency and the ground reaction force- sole deformation pattern when running in conventional running shoes against running in the SFD SE HEELLESS concept shoes<sup>2</sup>. The reduction in midfoot pressure with the latter shoes demonstrated the effectiveness of the Healus shock plate made with the material BioPreg (flax and carbon fibre reinforced polymer). This fibre-reinforced plate can result in a greater effectiveness of the sole to prevent over-strain in the plantar fascii and the Achilles tendons.

It has also been shown to improve posture during standing and walking<sup>2</sup>. Further information on the project and the concept is available on [www.heelless.org](http://www.heelless.org).

## Methodology

At the end of the project, concept prototypes and an introduction video with animations were shown at the Open Day at the European Commission Berlaymont Building in Brussels on 12<sup>th</sup> May 2012. The video explained how the footwear construction facilitated correct running and reduces the shock during every running step. Representatives of one of the SMEs, Healus Ltd, were at hand to explain how the shoes could improve posture and walking and running and assisted the attendees to try the shoes if they wished to do so.

They were asked to complete a questionnaire immediately after the trial. The questionnaire with information on the shoes was available in two languages: English and French. On the questionnaire they were asked to rate standing, walking and running in the shoes, and also how they felt afterwards with a choice of 5=good, 4=OK, 3=indifferent, 2=awkward and 1=very uncomfortable. They were also asked to comment in their own words.

## Results

57 attendees of the Open Day asked to try the shoes, and completed the questionnaires afterwards. 93.4 % of the multiple choice questions were completed and 56% of the completed forms included comments. Figure 1 graphically displays the results. The results showed a high satisfaction rate with a rating of Good and OK in 82% (standing), 94% (walking) and 94% (running), with running in particularly rated as Good in 63% of the subjects. Immediately after testing 46% of testers felt Good, 40% felt OK, 12% felt Indifferent, nobody felt Awkward and 2% felt very uncomfortable.

A representative range of comments which were written down on the questionnaires was: -'very comfortable and light on the feet', -'felt great running in them' -'Elastic' -'it's really different, like on high heels, but without' -'very stable, good balance' -'looking forward to see them on the market' -'when can I buy these shoes' -'very interesting' .

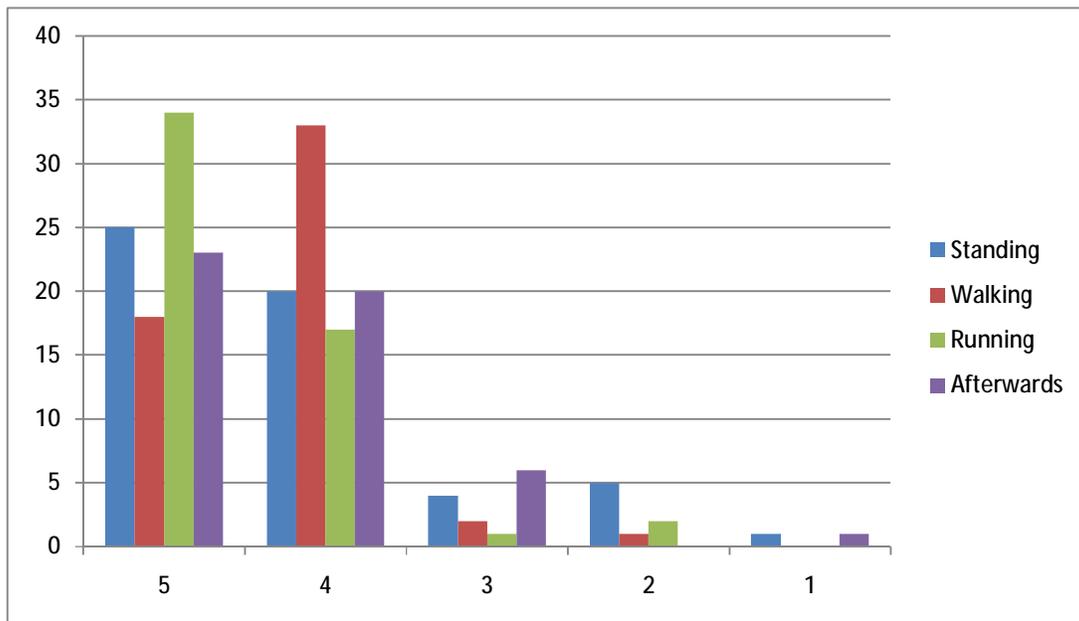


Figure 1. Ratings of immediate feelings standing, walking and running in FP7 project HEELESS concept footwear; 5=good, 4=OK, 3=indifferent, 2=awkward, 1=very uncomfortable.

## Conclusion

It can be concluded that the SFD SE HEELLESS footwear concept has immediate positive effects on people attracted to such footwear. This in itself could motivate people to walk and run more with subsequent health benefits.

Clearly no conclusions about specific posture and movement effects of standing, walking and running in this footwear can be drawn from this study. However appeal and the immediate feel of the footwear are important aspects for both commercial viability of the concept as well as for the health of European citizens.

The EC's Framework Programme 7 has been instrumental in the development and testing of this novel footwear. Commercialisation of the concept is now needed for the people in Europe to get health benefits from the shoes and for European business to increase exports. Whilst the shoes are not yet on the market, research and promotional activities by partners of the FP7 HEELLESS consortium have increase the awareness of the need to avoid heel impact during running. Since the start of the project in 2008, the awareness amongst runners in Europe and beyond about the need to run without a heel strike has greatly increased. At present many more people that run use specific exercises such as highlighted on Healus Ltd's website [www.heelless.co.uk](http://www.heelless.co.uk) to improve their movement co-ordination and avoid high heel impact forces, which could stop them running.

Further business development and promotion is needed to realise the potential of the developed footwear concepts.

## References

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