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OPTIMUM MATERIALS FOR THE CLINICAL MANAGEMENT OF THE FOOT-AT-RISK

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Current selection of cushioning materials in therapeutic footwear and orthoses is based on empirical/ anecdotal evidence. This project combined computer modelling and in-vivo testing techniques and enabled for the first time the quantitative assessment of the importance of correct material selection. International partners are invited to collaborate on the development of methods to inform optimum material selection in the clinic.

Towards evidence–based material selection in the clinic

Finite element analysis and *in vivo* testing showed that correct selection of cushioning material stiffness for therapeutic footwear/ orthoses can significantly improve their ability to protect against overloading/ trauma. Moreover, people, who weigh more or have a higher BMI, need stiffer cushioning materials in their footwear/ orthoses for better protection. Similarly regions of the foot that are more heavily loaded (e.g. heel) also need stiffer materials compared to other regions that are not as heavily loaded.

What is the impact for AT users and other stakeholders?

This work sets the basis for personalised optimisation of footwear/ orthoses' material stiffness in the clinic.

- *Enhanced protection against trauma for the foot-at-risk.*
- *Reduced cost for healthcare systems.*

Implications for products, provision and personnel?

Products

Guidelines to help companies producing cushioning materials for the foot-at-risk identify the people most likely to benefit from their products.

Provision

Provision of therapeutic footwear/ orthoses that is not based on trial and error.

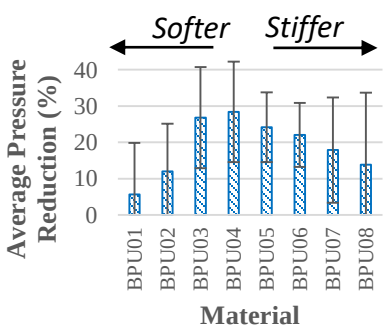

Figure: Testing set-up for investigating optimum cushioning (top) and the effect of material stiffness on efficiency pressure reduction (bottom)

Personnel

Ability to identify the materials that are most suited for the needs of individual patients.

Implications for other aspects of global agenda

Therapeutic footwear/ orthoses play a key role in the management of diabetic foot, which is a global epidemic.

The proposed method for footwear personalisation can improve therapeutic outcome without the need for substantial investment from global healthcare systems.

Strategies to share and build global capacity based on this work

We welcome interest from international partners to develop clinical protocols for optimum material selection. We are able to share:

- ✓ Testing protocols.
- ✓ Initial results.
- ✓ Material samples.

Contact for global liaison

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