Sächsisches Textilforschungsinstitut e.V.

Affiliated institute of the University of Technology Chemnitz

Managing Director: Dr. Heike Illing-Günther
Annaberger Straße 240 | 09125 Chemnitz | Germany | Phone: +49 371 5274-0 | Email: stfi@stfi.de | www.stfi.de

AktiSup – Method for the application and integration of novel strain-stiffening structures in bandages

Objective

Ankle injuries caused by twisting are very common in sports. At the same time, athletes want to be able to use the full range of motion of the ankle joint without running the risk of twisting it and sustaining injuries as a result. However, the orthopaedic aids currently available on the market often significantly restrict the freedom of movement of the ankle joint or are unsuitable for wearing in shoes. This has resulted in a need for a new type of orthopaedic aid for the ankle joint that combines protection and mobility.

Approach and results

The concept pursued is based on combining the advantages of conventional bandages and orthoses. The aim is to maintain full mobility of the ankle joint while effectively preventing it from twisting. To achieve this, strain-stiffening elements have been integrated into bandages and stockings. These offer negligible resistance to straining up to a critical point, but stiffen when this point is reached and then block further movement in the same direction. Different geometries, sizes and application methods were tested for these elements. The most suitable patterns are shown in the images below. But these are not yet sufficiently functional in stabilising the ankle joint. In addition, the critical point at which further movement is to be blocked has not yet been sufficiently adapted to individual anatomical conditions.

Ankle bandage with 3D-printed strain-stiffening structure

Stocking with 3D-printed strain-stiffening structure

Acknowledgement

We would like to thank the Federal Ministry for Economic Affairs and Climate Action for funding the research project AktiSup (Reg. No. 16KN089723) within the funding programme "Zentrales Innovationsprogramm Mittelstand (ZIM)".

Gefördert durch:

Bundesministerium für Wirtschaft und Energie

aufgrund eines Beschlusses des Deutschen Bundestages

Contact: Manuela Fritzsch, Phone: +49 371 5274-215, Email: manuela.fritzsch@stfi.de
Theresa Meixner, M. Sc., Phone: +49 371 5274-225, Email: theresa.meixner@stfi.de