GCU researchers have dramatically changed the manufacture of custom ankle-foot and foot orthoses through 3D printing combined with improved design personalisation.

The EU-funded A-FOOTPRINT project, led by GCU’s Professor Jim Woodburn, brought together 12 SME, large industry and academic partners from seven countries with the aim of developing novel ankle and foot orthoses for common disabling conditions which are cost-effective and personalised for form and function. Researchers have successfully developed and tested dynamic, multi-segmented biomechanical models of the foot and applied them through gait analyses to characterise changes in joint movement and forces, muscle action and plantar pressure distribution.

New 3D printed orthoses have been designed and trialled with patients with positive outcomes reported. Moreover, European SME companies in the orthotic design and manufacture sector have benefitted through the commercialisation of new orthotic products and computer-based design optimisation software. The research has also led to raised global awareness of the capabilities of 3D printing for the orthotic sector and beneficially influenced manufacturing research and development funding at the European policy level.

GCU’s musculoskeletal health research group has been conducting research to characterise and quantify changes in foot structure and function in important musculoskeletal conditions such as neuromuscular disorders and arthritis, to adopt manufacturing and enabling technologies to support this work, and to develop and test highly personalised foot orthoses as part of complex interventions.

The research team has since been awarded an EC Marie Curie International Outgoing Fellowship award to lead on the D-FOOTPRINT project to develop 3D printing for personalised orthotics in patients with diabetes and high-risk foot complications. This builds new collaborations
with The University of Washington in Seattle.
Knee Osteoarthritis (KOA) is the most common chronic musculoskeletal disorder, currently affecting over 8 million people within the EU, for which currently no cure is available. Adverse biomechanics, affected through some of the major health issues of our time (ageing, obesity, sedentary lifestyle) lie at the heart of the disease.

The new EU-funded KNEEMO Initial Training Network, led by GCU’s Professor Martijn Steultjens, with partners across Europe, will research targeted and tailored interventions for KOA, and focuses on identifying the right patients for the right treatment at the right time. Research areas include anatomy, musculoskeletal modelling, prevention and early identification of patients, epidemiology, biomechanical mechanisms, and intervention studies.

The KNEEMO training programme combines existing best practices from consortium members and is designed to equip researchers with skills and knowledge specific to the research field. Dissemination and outreach activities will also be undertaken to showcase project results and to communicate with both the scientific community and the general public to promote the importance of research and to raise public awareness of the Marie Curie Actions.

Further information:
Professor Martijn Steultjens
School of Health and Life Sciences
Glasgow Caledonian University

At Glasgow Caledonian University, we work with industry and public sector partners to ensure our expertise responds to the need for real world innovation. GCU’s strategic business development and knowledge transfer teams work with academic experts in our Schools and Research Institutes to support businesses with a problem-solving approach.

Contact us to find out more about building a brighter future with GCU at www.gcu.ac.uk/business.