



Wearable Soft Robotics for Independent Living

Newsletter September 2021

And we're off!

The Freehab team are excited to have started data collection and to be one step closer to creating a soft-robotic, assistive device for people with impaired mobility.

One of our Clinical Partner physiotherapists video-recorded their assessment of a patient whilst talking out aloud his clinical reasoning. This patient had a stroke earlier in the year, had very limited mobility and was working with the physiotherapist to improve her sit to stand. Our Research Fellow, Leah, then watched the video with the therapist and asked questions to get a more in-depth understanding of *what* the therapist does during and assessment and *why*. For instance, understanding why the therapist provided facilitation at certain points of the patient's movement, and what type of facilitation they provided.

The preliminary analysis has been fascinating for not just the researchers, but also the therapist, who has never had the opportunity to observe his own practice. Our understanding of what a future assistive device needs to be able to has progressed, and new considerations have come to light. For example, a key challenge in the patient's assessment had been a particularly low chair that put the patient at a biomechanical disadvantage and, therefore, made getting out of a chair more challenging. As a team, we are now exploring how a device may be able to reduce the effects of a low chair, hopefully making the physiotherapist's job that little bit easier and increasing the amount of effective rehabilitation in a session.

It's all in the context...

The above section regards just one patient, and we hope to have collected data from many individuals by May 2022. However, what is already clear from the preliminary analysis is that the physiotherapist assessed a wide range of factors that affected the patient's recovery, many of which are individual-specific. From assessing things such as the patient's physical and social environment (carers, family support etc.), and her own belief in her ability, the physiotherapist was able to tailor the assistance he provided during the rehabilitation session. For the Freehab team, this highlights the essential nature of creating an assistive device that can be fine-tuned to an individual's needs.

We are adopting a complex method to analyse our data, called critical realist grounded theory. In a nutshell, this analysis aims to work out *why* something happened/*what* caused it. For us in the Freehab team, this means working out *why* the physiotherapist chose the treatment they did/facilitated the patient as they did etc., and the *why* might be the context

of the patient, or wider contexts. The more patients we observe, the more range of contexts we will begin to understand, resulting in richer data, and, subsequently, a more finessed assistive device. We cannot wait for more patients to be recruited!

Introducing...

Every newsletter we would like to introduce you to a different member of the team. Up today: Dr Richard Suphapol Diteesawat, a full-time Freehab Research Associate at the University of Bristol:

"I completed my PhD in Robotics and Autonomous Systems, in the Soft Robotic field, at the University of Bristol in 2020. My expertise are new materials, approaches, and applications in interdisciplinary research to innovate novel artificial muscles and robots. This led me to join the FREEHAB project – a great opportunity to work with an engineering and clinical team. My research focus is based on pneumatic and electrically driven technologies including general soft robotic technology. The clinical findings increase my understanding in user requirements



and difficulties, and therefore my ability to address these user needs. I perceive that the future generation of wearable assistive devices will become more compatible, comfortable and will closer resemble normal clothing. They must be aesthetic, practical, and affordable for everyone. Although we are in the early stage in improving low-level technology and device prototypes to be more effective and overcome research challenges, I truly believe that our success is foreseeable." - Richard

If you would like to be removed from the newsletter database, please let Leah Morris know. *The Right Trousers Team*

Contact for newsletter

Dr Leah Morris

Glenside Campus, Blackberry Hill, BS16 1DD

Email: leah.morris@uwe.ac.uk

Find lots more info, including videos, articles and our friendly team of engineers, clinicians, and researchers on: <https://therighttrousers.com/>

