Scientific/Clinical Workshop

Workshop Title
Technologies to Optimize Ankle Foot Orthoses for Improving Patient Outcomes

Workshop Responsible
Niels Waterval (Amsterdam UMC)

Speakers
Niels Waterval, Rein Miedema, Jaap Harlaar

Attendee Engagement
Discussion, questions, hands-on time to explore the simulations

Abstract
In many neuromuscular disorders, the ankle plantar flexor muscles become weaker over time, leading to walking limitations like diminished walking speed, increased walking energy cost, fatigue and increased fall risk. To compensate for plantar flexor weakness, ankle-foot orthoses (AFOs) are often prescribed with the aim to augment walking. The effect of AFOs on improving gait depends largely on their mechanical properties, especially AFO stiffness, and how these properties are matched with the patientsâ€™ impairments. Consequently, to maximize treatment effects of AFOs, the stiffness needs to be optimized for each individual user. We have coined this as Precision Orthotics. In this workshop, we will demonstrate the beneficial effects of applying Precision Orthotics in the prescription of AFOs for plantar flexor weakness compared to usual care as shown in clinical trials. Secondly, we will demonstrate two innovative techniques that can be used to more quickly optimize the AFO stiffness. A demonstration about forward dynamic simulations and how this can be used to predict the optimal AFO stiffness will be given. Additionally, we show a new stiffness-adjustable AFO for which the stiffness can be changed instantaneous during walking. This allows for a rapid optimization procedure making it easier to implement optimization of AFO stiffness in daily practice.

Outline:

- Treatment with AFOs: the benefits of Precision Orthotics
- What can we learn from forward dynamic simulations with regard to AFO optimization
- Demonstration of a wearable, stiffness-adjustable AFO
- Discussion