

Patient monitored for fast recovery

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Before and after an operation, sensible physical exercise is often essential to recovery. A new TNO motion detection system gives therapists greater insight into the motion patterns of their patients while the patients themselves find out more about their recovery process. With a couple of 'smart' insoles or knee braces each patient can get started straightaway.

Mrs Smith has had an operation on her leg. Her physiotherapist tells her that a daily workout will help her recover fast, but how can he be sure she doesn't put too much strain on her leg? TNO's electronic motion detection system can show whether she is doing it right. Mrs Smith wears a set of knee braces containing sensors that measure the angle at which the knee bends. Or she wears the insoles with their sensors to measure her foot pressure. Two minicomputers in her knee brace or shoes translate the readings into usable information and send this to her mobile phone where she can see whether she has to make any adjustments to her movements. The physiotherapist gets the data from her phone regularly on his or her own computer. The system is not yet available as a product but its principles have been demonstrated already.

DETAILS CRUCIAL

TNO developed the insoles system some years ago. During walking the pressure shifts around the soles. Knowing how the pressure is distributed over time says something about the frequency of the step and fatigue as well as indicates any deviations.

The knee brace has recently evolved into a very thin prototype. The sensors in the ribbon measure the angle at which the knee bends a hundred times per second to an accuracy of four degrees. This accuracy allows the motion expert to see every detail in the movements. 'Those details are crucial,' says project manager Sytze Kalisvaart of TNO. 'Slight deviations in the gait may reveal something about pain avoidance and rehabilitation progress.'

Physiotherapists and motion specialists are responding enthusiastically to the system. Kalisvaart: 'They are better able to coach their patients if they can see their motion pattern, even at home. By looking at the graphs they can see whether the patient is moving better or not since the last consultation, as well as more critically compare different recovery methods. And it can cut down the number of consultations, which reduces healthcare costs.'

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The knee brace, developed by TNO.

Photo: Victor Bochmo / TNO

PRE-TRAINING SAVES MILLIONS

People at high risk of complications following surgery benefit from preoperative therapeutic training, sensible eating as these remedies reduce the incidence of post-operative complications and enhances functional recovery. 'Proper training can save up to 16 million euros on healthcare costs for these fragile patients,' suggests Dr Nico van Meeteren, head of the Department of Health Promotion at TNO. 'Motion detection systems enable physiotherapists, for instance, to measure whether patients are indeed doing the right things during the therapeutic training. What's more, the high-risk patient gets a better idea of how his or her recovery is progressing. And that also seems to motivate them to exercise and consequently to accelerate their recovery.'

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