

Ready-made intelligent solutions for the patient

21

An intelligent brace, adaptive insoles and 3D printing for bone structures. TNO has been working with seven partners over a two-year period and has come up with some appealing results. The Medical Field Lab is the centre in which these medical innovations have been born. Nick Guldemond, director of the Medical Field Lab: 'Without TNO these successes would not have been possible.'

'Collaboration with the doctors at the Maastricht University Medical Centre (UMC+) went really well,' says TNO project manager, Sytze Kalisvaart. 'Rather than spend two years developing all kinds of smart techniques and then waiting for a practical application, the doctors and researchers actively collaborated

from the very start. And that made a big difference.'

Guldemond and Kalisvaart pertinently point out that technical solutions alone will not solve the problems that occur in practice. Guldemond: 'You also have to have a good idea of how the hospital world works, what expertise the doctors possess and how healthcare chains function in practice. Other TNO experts have helped considerably in that respect.'

and remove it without assistance. Sensors and flexible materials allow support to be tightened or loosened at the required spot, depending on the load. Kalisvaart: 'It's like a trouser belt that will automatically move to the next hole if it gets too tight.'

Another development is printing three-dimensional bone structures. 'We have been able to make good use of our 3D-printing knowledge – and take it further. What is unique about this project compared to common methods is that we print cold rather than warm sintering out of auxiliary materials. This allows the required antibiotics and growth hormones to be added to stimulate the living environment without destroying these substances. And we succeeded,' Kalisvaart says with some pride.

INLAY SOLE

The Medical Field Lab is in the process of preparing a third innovation. Kalisvaart: 'Paediatricians are themselves now developing hand-made insoles specifically for their patients, a process that can vary quite considerably per specialist. However, that manufacturing can be automated to a large extent. TNO's sophisticated three-dimensional mechanical foot model enables a scan to be made that results in a few "optimal" alternatives of an inlay sole. The specialist can then pick out the most suitable one.'

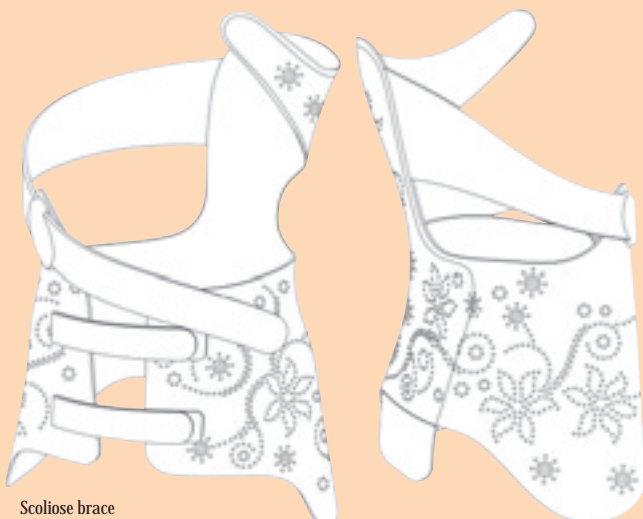
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CONSORTIUM

The consortium partners are azM, Dolphys, Katholieke Hogeschool Kempen (Belgium), MUMC+, IDEE, Orthopaedie 2000, RWTH Aachen (Germany), TNO and WeLL Design. The Medical Field Lab, originally established in 2007 through a subsidy from the *Peaks in the Delta* programme, has become a fully-fledged private limited company.

MORE USER-FRIENDLY

The intelligent brace, formally known as the 'scoliosis brace', helps teenagers (especially girls) with twisted spines to be treated with more comfort. Rather than the traditional concept, whereby the parents for instance have to lace the girls tightly into an inflexible harness from behind, the new design is quite a bit user-friendlier. The brace can be closed at the front allowing the patient to put the corset on



Scoliose brace



Foot model



3d bone structure