

Cyber class

Chemical reactions made real for students in Technopolis' new virtual world

▶ 7

MAK attack

Yamila Idrissi leads the charge to put a museum of contemporary art on Brussels' canal

▶ 10



Child's play

The Henry Van de Velde labels have been awarded for excellence in contemporary design



▶ 11



Every step you take

Flemish rehabilitation centre improves quality of life for children with cerebral palsy

Senne Starckx

Every day, hundreds of children in Flanders spend hours on fitness machines and massage tables, at home or at the rehabilitation centre of the University Hospital Pellenberg. The centre is working hard to help children with cerebral palsy lead active lives.

Six months ago, 13-year-old Georges Vermast rode her bike for the first time in her life – from her home in the coastal city of Oostduinkerke straight to the beach. Even though she wasn't riding a real bike but a tricycle, it was a remarkable achievement and a demonstration of how endurance and devotion can eventually pay off.

A year before, Georges had been bound to her wheelchair, believing she would never be able to ride a bike or even walk independently.

The ride to the beach was the culmination of Georges' three-month rehabilitation programme at Leuven's University Hospital Pellenberg. There, she underwent radical surgery in which her legs were straightened and her leg muscles deviated. Thanks to that operation – and the intensive follow-up physiotherapy – Georges is now able to move her legs. To get around the rest of the time, she uses a walking frame.

Georges is just one of several thousand children and young adolescents in Flanders who suffer from cerebral palsy, a chronic brain disorder that arises at birth or at a very young age. Parts of the patient's brain are damaged or paralysed. The disorder is non-progressive, but the damage to the brain is permanent and (for the moment) irreparable.

Signal misfire

Typical symptoms include weakened or absent motor skills, problems with speaking or learning and behaviour that fits the diagnosis of severe autism. However, symptoms vary so greatly that it's impossible to describe an average cerebral palsy patient.

In Dutch, the disorder is described as a "paralysed brain", but that term is not only a stigma, it's also not accurate. On the contrary, the main problem with cerebral palsy – certainly where the motor skills are concerned – is that the brain continuously fires the body's muscles with signals, keeping the muscles in

Every step you take

Young patients face radical surgery and months of hard work

▶ continued from page 1



Orthopaedist and surgeon Guy Molenaers

a constant state of tension. In other words, patients' muscles are always contracting, never resting. This leads to the manifestation of involuntary movements, causing difficulties in walking or the use of arm and hand function.

What causes cerebral palsy is still a bit of a mystery. In the past, a lack of oxygen, known as hypoxia, during childbirth was thought to be the major cause, but recently this theory has been refuted. "We now consider cerebral palsy to be a result of complications during development of the foetus in the womb," says orthopaedist and surgeon Guy Molenaers, who leads the multidisciplinary rehabilitation centre at Pellenberg. "We also know there's an important genetic factor in the manifestation of the disease."

Naturally, all these children (and adults) need special assistance. These children all go to school and are part of youth groups or other activities. So what's the best way to treat them, without interfering too much in their daily lives?

One key feature that distinguishes children from adults is that they're growing and constantly changing their motor skills. But for children with cerebral palsy, the permanent high muscle tone and spasticity stand in the way of their development. The consequences are devastating:

“One advantage of a child's brain and nervous system is that they're elastic to some extent”

structural muscle reductions and bony deformities that cause deviant movement, constantly bent elbows and knees, and sometimes even a hip that spontaneously comes out of its socket.

"In contrast to classic orthopaedics, in which fractures and muscle strains can be repaired, we can't intervene at the root of the disorder, which lies deep inside the brain," says Molenaers. "Our treatment is aimed at minimising the effects of the high muscle tone and spasticity. This way, we can prevent the occurrence of muscle and bone problems, and



© Dieter Telemans



© Dieter Telemans

The rehabilitation department at the University Hospital Pellenberg teaches children with cerebral palsy how to better control their movements

we can limit the need for surgical treatment."

One way to reduce the muscle tone is to inject botulinetoxine, better known as botox, in the children's muscles. This enables the physiotherapist to stretch and intensively train the muscles. Molenaers: "One advantage of a child's brain and nervous system is that it's elastic to some extent. The damaged brain is able to make new connections, using other routes than the blocked ones in the body. We stimulate this 'rerouting' by

letting our children perform physical exercises specific to each child."

The common goal of the orthopaedists, child neurologists, rehabilitation doctors, physiotherapists and psychologists is the optimisation of the movement of the growing child. Before treatment of a new patient can start, Molenaers' team has to document their movement completely and meticulously.

To do this, the centre has a unique clinical setting: a high-tech laboratory for movement analysis – informally known as "the gait lab".

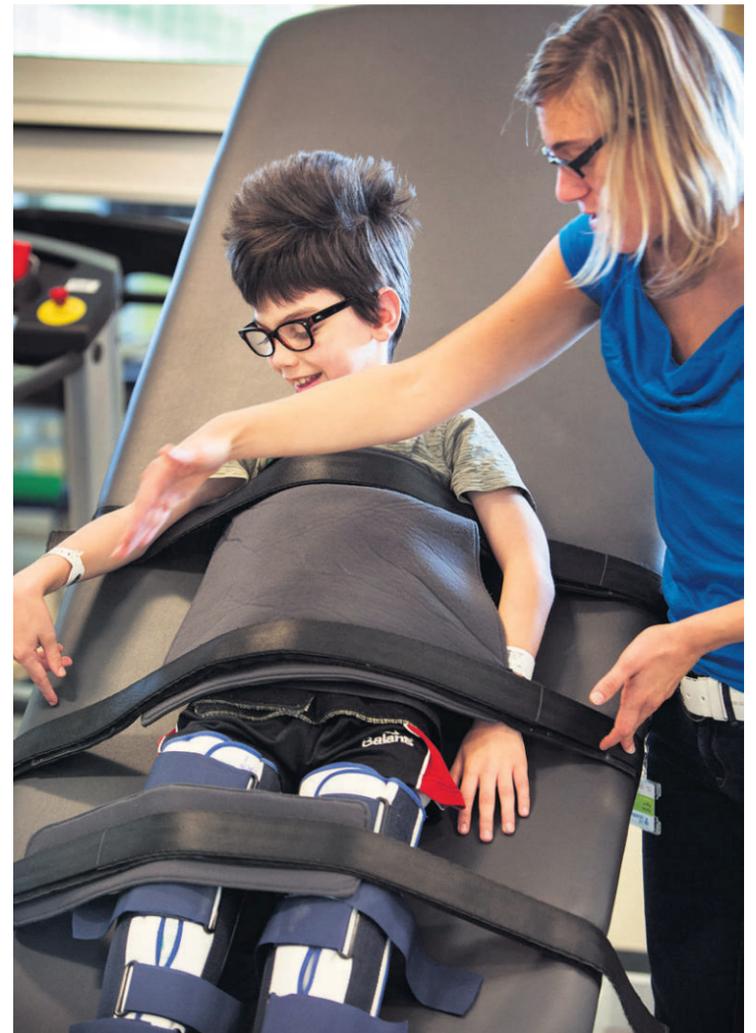
Here, a 3D gait analysis is made of the movements of the child's torso, legs, arms and even the hands while doing specific locomotive tasks.

It looks a bit like a catwalk – but one with a soft floor and toys on it (most children don't understand why they have to walk back and forth for more than two hours). While they're walking – or shuffling, assisted by a walking frame – the children's limbs are covered with dozens of tiny sensors and electrodes.

"The electrodes measure the muscle tone while moving," explains Katrien Fagard, a physiotherapist at Pellenberg. "And the sensors emit light that the cameras around the catwalk can register." A computer combines all these signals and churns out a detailed movement analysis in 3D. "Based on this analysis, we can see when – and at what speed – the muscular tone of our children differs from that of healthy children," says Fagard.

Based on the analysis, a treatment is determined and a patient is ready to start with a strict physiotherapy regime, often on a daily basis. In the rehabilitation room, fitness-like machines help the children bend their elbows or knees again, ride a tricycle or start to walk. The daily visits demand a lot of the children – and of their parents and family. In most cases, parents have to bring their children to Pellenberg five days a week.

Freya (not her real name) is the mother of Bruno, an 18-year-old



© Dieter Telemans

Physiotherapist Katrien Fagard works with a child at Pellenberg

who's become severely autistic due to cerebral palsy. He has been at Pellenberg every day for six months. A couple of weeks ago, Bruno had surgery, through which – in the long term – he might be able to start using his legs again, having spent his entire life in a wheelchair.

"First I had doubts about the surgery," says Freya. "I thought: Why should I disrupt his life? He's happy the way he is. But Dr Molenaers' team are convinced there is indeed a chance that my son could walk again in the future." To maximise that chance, Bruno undergoes physiotherapy

every day.

Of course, there's the expense – for the parents and for society – of treating children with cerebral palsy. "For patients who are under 18, the treatment is refunded by health care insurance," says Molenaers. "But the parents have to pay a lot of non-refundable medical expenses. Besides that, housing and moving a disabled child asks a lot of them. They often need an elevator at home; their car needs to be adapted to transport a wheelchair... By the way, none of these children will ever get insurance for hospitalisation."

MOVE TO IMPROVE

To offer children with cerebral palsy a treatment that really makes a difference – without ruining their parents financially – Dr Guy Molenaers started a relief fund in 2008 called Move to Improve. One of its initiatives was a sponsored bicycle ride from Geneva to Nice, organised by Stefaan Vermast, who saw firsthand the costs of providing fitness equipment during his daughter Georges' struggle to learn to ride a bike.

"For a good rehabilitation, you need specialised equipment, and the children should be able to practise at home," he says. The ride allowed Move to Improve to buy six continuous passive motion

(CPM) machines, which help to bend the children's knees after surgery. Vermast: "For Georges, we had to pay €550 per month to have a CPM machine at home – without any refund. Now six machines are hired out to patients for free."

Move to Improve organised another cycling event last August, when 80 cyclists, including Flanders' minister-president Kris Peeters, rode across the provinces of Antwerp and Limburg. One of the stops was Mol, where former world champion cyclist and Move to Improve patron Tom Boonen lives. With the proceeds, the fund wants to buy a tricycle that's specially adapted for rehabilitation.

▶ www.movetoimprove.be