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## Experiences with a New Orthosis "Made in Germany"

By Bert Bröcking

**For twenty years now, I have been using an orthosis to help me move. My right leg is paralysed due to polio and the muscles of my right knee do not function.**

To make up for this shortcoming, I have been using a carbon KAFO (Knee Ankle Foot orthosis) with an intelligent knee joint for about 15 years now. To put it simply, the intelligent joint does what my knee muscles fail to do: at the right moment it ensures that my right leg is locked. As such, I avoid moving forward uncontrollably and falling. For about ten years now, I have been using a mechanical knee joint from the company FIOR & GENTZ (F&G) in Germany. Ten years ago, I was part of a small group of test subjects that participated in a test organised by the rehabilitation department of AMC (Academisch Medisch Centrum) to test this type of joint. The tests were a positive experience for me. Since then, I have been walking with the aid of a mechanical F&G joint.

### "Falling at that Congress was a Blessing in Disguise"

#### A Fall with Surprising Consequences

Last year, I attended the Polio Congress in Amsterdam. There I had my fall. Falling at that congress was a blessing in disguise. Many doctors with knowledge in the field of (post)polio and the consequences of such a fall were present! I had no complaints concerning the diagnosis. My physical damage was not too bad, although I had to spend the rest of the congress in a wheelchair. In this position, I met the director of F&G, Ralf Gentz. I have known him since the time I participated in testing the mechanical joint. He asked me why I was sitting in a wheelchair and I told him my story. He then wanted to know exactly how I fell. His conclusion was that my mechanical knee joint did not lock when I came to a standstill in the upright position. According to him, this is the problem with this type of mechanical joint. The new type of electronic joint by the company F&G solves this problem. It always locks when you stand upright.

We started talking and he asked me how I was coping with my polio. I told him that I suffer from neck and shoulder pain caused by the overloading of my arm when I walk. He then told me that he was testing a concept on the walk pattern of people with an orthosis. People with a healthy set of legs and feet– I exaggerate a little – always place the feet a bit closer and in front of each other (see below).



People with an orthosis usually place the feet a bit further apart when walking and then move them parallel to each other. This is caused by the way the orthosis is set up. His idea was to design an orthosis, which copies the normal human walk pattern of the above figure more closely. The orthosis would be equipped with an electronic knee joint, which would lock the

knee automatically when standing upright and walking.

He needed a test subject and asked me whether I would like to participate. I would then get the orthosis for free if the test were a success. However, the terms and conditions were:

- My rehabilitation doctor had to agree with this testing procedure;
- Paid accommodation in Lüneburg (Germany), where he would fabricate the orthosis in his factory;
- The participation of Noppe Orthopedie (my regular supplier of orthoses) in the fabrication of the orthosis in Germany.

My rehabilitation doctor had no complaints and Noppe Orthopedie thought it to be an interesting experiment.

### **On the Way to Lüneburg**

In August 2015, my wife and I travelled to Lüneburg. On Monday, we enjoyed a friendly reception in the factory of F&G. After we'd had coffee, we started immediately with a gait image analysis of the way I walked. They captured a distance of 10 metres on camera. They designed the orthosis based on the film material. Afterwards, they began the casting process of my leg with the assistance of the employees of Noppe Orthopedie.

### **| A Special Way of Measuring**

The plaster cast was made with the aid of the "e-cast method" developed by F&G. For this purpose, my right leg was wrapped in plastic tape.



On the tape, sensors (see above) were stuck on my foot, lower leg and upper leg. Then, the position of the knee and ankle joints were marked carefully with a kind of button cell. This all happened while I was seated. After that, still in a seated position, my leg was held in a horizontal position.

### **Then the Trick with the "E-Cast" Began**

With the aid of a little meter (see photo), the exact position of the three sensors on my outstretched leg was determined.

Then I had to stand up straight, with my legs and feet close together. This standing position was measured carefully on the front and on the side. I was asked whether this standing

position was comfortable. At that point, it was not comfortable yet, so they continued searching for the most comfortable position. After they had found it, they again determined the position of the sensors on my leg using the meter.



After that, I could sit down and my right leg was put into a plaster cast whilst in this sitting position. It was then straightened out before the plaster cast hardened. The little meter was called into action again. Straightening out my leg was done with the aid of the beep sounds from the meter. An ongoing beep signalled my ideal position for the plaster cast model and, consequently, my future orthosis. Then the plaster cast was removed and they could start making the positive cast of my leg.

I returned the next day to have a test model fitted. Once it fitted well, the work on the orthosis could begin.

Two days later and the orthosis was ready (see the photo on the next page).

### | It was an experience that felt good right away

When I stood on the orthosis for the first time, I had the feeling that I was standing completely upright with my weight evenly distributed between both legs. It was an experience that felt good right away. This was a feeling that I had not experienced before.

Initially, walking with the electronic joint did not meet my expectations. The joint locked at nearly 50 % of all the steps I took. According to the F&G experts, this is often the case. It would just be a matter of getting used to.



Once they had finished making the orthosis in Lüneburg, the employees of Noppe Orthopedie received a certificate stating that they were now qualified to use the "e-cast" method.

### | I Discovered that Walking Actually Required Less Energy

During the trip back to the Netherlands, I wore my old orthosis to avoid problems.

The next day I put on the new orthosis at home. After half an hour, I was already walking with full confidence, as predicted by Ralf Gentz.

What I noticed after one day was that, due to the different alignment of the orthosis, I was walking more upright than previously and that my weight was better distributed between my legs. After another couple of days, I discovered that I needed less energy to walk. I could therefore clearly walk longer distances than before.

It became apparent that my walking pattern really had improved when I went to my physiotherapist for the first time with my new orthosis. She immediately noticed that I was walking much better: more upright and with less swaying of the upper body.

Nevertheless, I still had some problems with the electronic joint. The electronic joint needs two AA batteries to function. Time and again these batteries were flat after about six hours; they should last for around 36-48 hours according to the manual. After having contacted F&G in Lüneburg, we suspected that the battery charger supplied might be faulty. Since I also had a HEMA battery charger and batteries at home, I put these into the orthosis. And behold, as expected of HEMA, these batteries lasted around 36 hours.

To summarise, the different alignment of the orthosis provides me with a better walking pattern, which costs me less energy. Also the electronic joint gives me a feeling of more safety when I walk and stand. In this regard the test has been a success. Sitting or standing up is trickier, because the joint must be switched off and on respectively.

Thanks to the test, Noppe in Noordwijkerhout (the Netherlands) are even more certain that the success of a good alignment of the orthoses depends on the measuring phase. Since then, they have also used the "e-cast" method of applying plaster cast when taking one's measurements for an orthosis.

I hope that future orthosis users will benefit as much as I did from this new measurement taking technique.

I am curious to find out the experiences of fellow sufferers with leg orthoses from other rehabilitation centres and manufacturers in the Netherlands. Please send your experiences to the editorial team of the newsletter. [postpolio@spierziekten.nl](mailto:postpolio@spierziekten.nl)

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