

The NF-Walker in the rehabilitation of children with a pronounced movement disorder

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“If you want to learn to walk, then you must walk.” This fundamental of locomotion therapy (walking training using a special treadmill, also known as a “lokomat” (1)) applies in general terms irrespective of which aid is being used and even in the case of walking training without an aid.

Nevertheless, there are a number of things to be taken into consideration. The decisive question in the treatment of a child with severe multiple disabilities is often at what point the child can or may be introduced to supported standing and walking. The individual therapy areas have widely differing views on this question. While placing a child on his or her own feet or verticalisation at a very early stage carries the risk of scoliosis, delaying this stage runs the risk of disturbance of hip maturation to the point of dislocation, as the hip requires corresponding stimuli to achieve correct maturation. In this respect each child must be tested individually to determine from when verticalisation, i.e. placing upright in the vertical position, may be started (2). One factor frequently given far from adequate consideration here is the opinion of the child. Only someone who has experienced how a child who either cannot walk at all, or only with great difficulty and supported by helpers, reacts on taking his or her first independent (more or less cautious or assertive) steps in a walking training aid, can understand why *to me* the opinion of the child in this matter is so important. Even children with such severe disabilities that they are unable to express themselves verbally with phrases such as “I can do that on my own” or “walk like the others” sense the independence they have achieved and react accordingly with delight.

However, standing upright and walking training require an appropriate aid. This should support the child in standing upright and support the child’s own movements when walking as much as possible but not more than necessary. Anyone who is more interested in the exact structure of the NF-Walker and how it works, which has been investigated in a study, is referred to the corresponding literature (5, 3).

Instead, I would like to describe in the present article the experience of my patients in using the NF-Walker in therapeutic and everyday family settings. In my practice I use the system of psychomotor holistic therapy (2) I have developed and, among other things, draw up therapy programmes for children with multiple disabilities that the family use at home for regular training with their child. As a very large number of my patients are severely restricted in their motor activity,

I use the NF-Walker relatively frequently with these children, and rate the opportunity it offers for flexible adjustment particularly highly.

I must stress here that the decision as to which walking training aid should be used for which child must always be a completely individual one, for example in the case of Nico. Nico is almost four years old and has been my patient since 2009. He was born 10 weeks premature, which led to a disturbance in psychomotor development with pronounced tetra spasticity. Other areas are affected to a significantly lesser degree, for example he has made enormous progress in language in recent months.

At home he undergoes a therapy programme within the framework of psychomotor holistic therapy that covers all areas. Particularly worth mentioning here are the exercises to help him crawl, as these work towards walking, on the one hand, and, on the other, represent important exercises to strengthen the back musculature and for hip maturation.

Not only were the overall programme and special aids such as a Mancini orthosis/hip abduction orthosis to counter adductor spasm (2) able to pick up the onset of partial dislocation, but hip maturation has improved to the extent that the hip is well covered and there is no longer any partial dislocation. As the hip requires standing exercises to achieve maturation, I suggested additional walking in a walking training aid.

The parents not only found out about the different walking training aids that were appropriate for Nico but we arranged for Nico to be able to try several of these devices for a couple of weeks at a time. Points to observe were Nico's posture, how upright his upper body was, the position of the legs and feet, and the ease with which he walked. It was clear that Nico was best able to hold himself upright in the NF-Walker.



figs. 1 to 3: Nico loves walking. Without an orthosis, adductor spasm means that he holds his legs crosswise and walks with the typical spastic foot drop and additional inward rotation of the legs, making guided walking impossible. There is a slight improvement using Nancy Hylton orthoses (2, 4) and the Mancini orthosis (2), but it is still extremely strenuous for the helper. The NF-Walker enables Nico to hold himself in a stable position and walk independently, going a little further every day. He clearly enjoys this. The guide bands support him in the alternating leg movements.

Thanks to the runner system and the attachment of these runners to the shoes, he is also best able in the NF-Walker to place his legs side by side and – without crossing them over – move them past each other. He still uses the Mancini orthosis when not in the NF-Walker; this would not be required in combination with the NF-Walker but he keeps it on to avoid having to constantly take it on and off. I have trained his parents in a special technique for getting Nico into the NF-Walker as easily as possible because, although Nico is only four years old, the standard method of first attaching the runners to the child while he or she lies on the floor and then placing him or her in the walking frame is extremely strenuous and not easy for the mother to manage on her own.

Nico is now placed in the ready-assembled device and the chest strap fastened, then the leg runners are placed in the catches on the shoes, the screws tightened and, finally, the knee strap fastened. This method is simpler and takes only a few minutes, so that there is still plenty of time left for walking, which incidentally Nico enjoys very much. He can already walk independently and is enthusiastic about extending how far he walks each day. And the NF-Walker had to go on holiday with the family to the Baltic – Nico insisted!

The NF-Walker can also be adjusted so that the child must largely stabilise the upper body him- or herself when walking. This is helpful if the child tends to want to lean, without needing to do so. This is the case with Christoph, for example.

Christoph has a global disturbance of psychomotor development, the origin of which is unclear.

He was already able to walk on his own, but lost this skill as a result of an enormous increase in the frequency of epileptic seizures and the anti-epileptic medication administered as a result. In the meantime his condition has improved again, and the dosage of anti-epileptics was able to be reduced. Christoph has become more cheerful and lively again. He would very much like to walk, but also has a tendency to make it easy for himself by “hanging” in the strap. Without the top strap, he holds himself upright, places his legs independently and does better every day.

Exactly the same applies to Frank-Udo. Frank has Angelman syndrome, which involves severe impairment in all areas. He is now 22 years old and 1.80 m tall, which certainly doesn't make handling any easier. For Frank, too, the top strap is left unfastened if he “hangs” in the strap system, and an extra strap is used at the waist for safety. Of all the children and young people described here, Frank-Udo is naturally the one I know the best: he is my son.

For many years our regular daily training (2) has included – alongside several other exercises – intensive walking training, either guided or on the treadmill. Frank became increasingly less willing to take part and often sat down after 20 m, although no one could explain why.



Fig 4 Christoph after approx. 3 weeks with the NF-Walker. The intensive training helps him to walk better and a bit further in it each day, if the top strap is left unfastened.

When village life on the island proves particularly interesting during the holidays, Frank even manages to stand up straight with the upper strap fastened Figs 5 and 6. The kilometre he has already covered doesn't show on him. Previously, we walked this stretch into the village centre without NF-Walker, but both of us were completely exhausted on arrival (I scarcely less than him). The adjacent photo of everyday training at home clearly shows that the upper strap is left unfastened, necessitating an extra strap at waist height for safety reasons, as is planned for Christoph.

What I was looking for was a way to prevent this sitting down. Luckily, it was right at this time that the NF-Walker was developed in a larger size. Everyone involved was highly sceptical as to whether it would be possible to get this extremely tall young man into an NF-Walker.

The method using a hoist didn't appeal to me personally, as I wanted to remain able to move freely. So I was left with no choice but to develop a method other than the standard one – and I was successful in this to the extent that it now takes only three minutes and I no longer require a helper.

I have already described this method in relation to Nico. Frank enjoys his walking training in the NF-Walker so much that he perceives it as an outing rather than exercise and it is now no problem to motivate him to cover 2 to 4 km a day. Our radius is steadily increasing, becoming more interesting for Frank as a result. Looking back, I think he simply could no longer bear being guided by me. In the NF-Walker he clearly does not feel he is being guided, because I am not holding either the device or him.

The NF-Walker can also be used when head control is impaired, for example by using an extra neck or shoulder support. One must in any case not expect every child to be able to walk in the NF-Walker straight away. With some children, particularly those with very pronounced spasticity, the device will initially only be used to train them to stand, and only little by little for walking training.

Teresa, who has been my patient since 1998 and is now 16 years old, shows what a child with pronounced tetra spasticity can achieve. Despite her severe tetra spasticity, she enjoys movement and does regular and intensive training within the context of psychomotor holistic therapy. Walking training in the NF-Walker is a fixed part of her everyday routine (2, 5).

As well as tetra spasticity, she also has significant speech disorders, such that it is often difficult for people other than her family to understand her. Since being provided with an appropriate electronic communication aid, she has been much more able to communicate to those around her all she can do, all she knows (e.g. reading, writing and arithmetical skills and knowledge of special subjects) – and what she would like. Her mother has now programmed the communication aid to enable Teresa to ask in the mornings at school when she can walk in her NF-Walker.

At home this isn't an issue, because her parents know how much Teresa likes going for walks in the countryside. Teresa has a short rest after school and then enjoys a regular daily walk of 1.5 to 2 km across the fields with her mother.



Fig. 7: Teresa is already able to raise her head with good control when standing but finds this more difficult when walking. Her NF-Walker has a neck support, which she prefers to lean her shoulders against rather than her head: the support can however also prevent Teresa's head inadvertently falling backwards. Teresa also benefits from the special guide bands on the NF-Walker, as without these bands her steps become too long. Now, in summer 2011, Teresa can place her heels on the ground and move the knee much more easily.

As Teresa's leg muscles were increasingly contracting as a result of the spasticity, and this was also preventing her from walking in the NF-Walker, a fasciotomy was performed in 2010 (2). Post-operative healing was good, such that Teresa was relatively quickly able to use her NF-Walker again, and much better and more purposefully than before. This is because both adductor spasm and contraction

of the patellar ligaments have been reduced, enabling her to stand and support her weight more purposefully and with better stamina, which benefits Teresa in all areas.

Summary:

The NF-Walker also helps children with multiple disabilities who, without this device, would need strong guidance and/or support from a helper to walk. This guided walking without a walking aid can be extremely strenuous for parent and child, depending not only on the motor stability but also the size of the child. The NF-Walker, on the other hand, enables the child to cover longer distances, as a result of which walking is increased and the walking sequence can more easily be automated. This intensive walking increases muscle strength in both the legs and upper body.

There is also a positive impact on hip maturation, as this requires standing and walking stimuli. The flexible system of the NF-Walker means the support can be precisely tailored to the needs of the child. Other people more readily perceive children using the NF-Walker as individual personalities, as they are walking and are at "eye level". And the children themselves enjoy the feeling, and are proud to be standing and walking on their own feet in the NF-Walker.

References:

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