

## NF- Walker: dynamic and mobile standing orthosis

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The NF-Walker offers children the possibility to experience standing independently, both still and moving. This device guarantees a correct body alignment, allowing the lower limb flexor muscles to stretch and improving head control and trunk stability. It consists of a system of braces and supports which allows children to load around 80- 90% of the corporal weight on their feet whilst the remaining 10-20% is taken by the thoracic, pelvic and tibial supports. The child is slightly de-gravitated making it easier for him or her to be able to take a step.

NF-Walkers adapt individually to each user, so that two different children cannot share a device. It is also necessary to have regular follow-ups (every 3 months) to modify the positioning and movement components, as the child grows, so that they always have a physiological upright posture. This is a prerequisite for the child to learn a correct movement pattern.

### Therapeutical effects

The NF-Walker is a combination of a dynamic standing brace and a walker. This device needs to be adapted individually to each user, according to height, weight, muscle strength and movement patterns. The main feature of this product is that it keeps the child completely straight and loads the body-weight on the feet in an equal manner.

The therapeutic effects that the NF-Walker offers vary a lot from one person to another. After 10 year of experience in Europe, it has been proved that this device only offers the possibility to experience what standing for short periods of time for some patients, whilst for others it helps learn to walk independently.

The main benefit of this device is for children who cannot walk unaided, offering them the possibility to walk independently in their environment. It does not generate a perfect walking pattern, but once the child adapts to the device, they are able to maintain a correct upright posture whilst having their hands free to play. This allows the child to progressively regulate tone, and, in some cases, they can manage to move considerable distances

- Advantages of the NF-Walker with respect to other standing devices

The therapeutic effects of standing – preventing joint retractions and muscle shortening, osteoporosis and pathological fractures, helping regulate postural tone, improving cardiopulmonary function, renal function and gut regulation, as well as improving coordination and balance in general – are common to all standing devices currently in the market.

Below we describe the features that set the NF- Walker apart from other standing devices:

- Ensuring a correct posture with all of the articulations well aligned

The NF-Walker has a unique brace system that avoids the child adopting incorrect postures. It is made up of orthopaedic footwear to correct postural deformities of the feet (such as postural equinovalgus) which is attached to a set of braces to a pelvic support, and another two vertical bars join the pelvic support to a thoracic support. There are also two further supports which are adjusted below the knee to avoid genu valgus and genu varus. It also has other accessories for the head when needed, so as to control an extensor pattern.

- It allows the child to experience slight movements.

Other standing devices keep the child bound to a flat wooden structure or a plaster mould, whereas with the NF-Walker the child has practically the whole body free to move and is able to move both upper and lower limbs freely. This allows them to learn different movements after experiencing them several times.

It helps increase trunk stability.

The thoracic support can be height-regulated depending on the trunk support that the child has. As trunk stability improves the support can be moved down (closer to the pelvic support) allowing the user to actively improve trunk stability, moving away from the midline and moving back to recover the correct posture.

- Greater stability

The NF-Walker has a wide base with four wheels. The back wheels are fixed in place whilst the front

wheels are free to turn, in such a way that it is not possible to tip over the device, so long as the brakes are not activated. Both if the user pushes himself against a surface or even if he were pushed by one of his friends from one place to another, the device would turn around itself or it will move in some direction but it would not tip over.

- It helps the child to integrate with his peers.

When the child is in the NF-Walker, the child has his feet placed on the ground and is at the same height as his peers (as opposed to other devices which place the child at an adult's height by placing a platform underneath). Even though it has four wheels the parent can come close to the patient and touch him, hug him, or hit him as they would with any other child. It also allows the child to participate actively in games like kicking a ball.

- **Physical and emotional wellbeing**

As discussed earlier, standing has many therapeutic effects. The fact that the NF-Walker allows children to stand without having to stand in a corner - either because the device is not stable enough to allow others to come close by or because they are too large and cannot be placed in the middle of the classroom - means it makes practising standing fun because they feel equal to their friends, helping their self-esteem.

- **Advantages of the NF-Walker over other walkers**

The main differences between the NF-Walker and the other walking devices that are in the market today are:

- **Aligned posture**

The child is well-aligned and held by a pelvic support and another support across the chest, two bars that work like long braces, connecting the pelvic support to the footwear. This system does not allow the patient to sit. Other walking devices allow the child to “hang” on a pelvic harness, adopting a poor posture once he tires.

- **Reciprocal gait**

This device has elastic straps which help reciprocal gait, making it impossible to step forward with both legs at once (when one knee flexes the other one gets pulled into extension).

- **Size**

The NF-Walker has a wider base than other walking aids, offering a greater stability. The base is distributed in four points forming a square as opposed to a triangle, which helps going through doors and other narrow spaces.

- **Going around corners**

The greatest inconvenience about the NF-Walker is that it is very difficult for the user to turn left or right. It has an accessory that works like a steering wheel, allowing the user to turn, otherwise, it takes a great deal of dexterity to be able to turn using only the lower limbs.

## Contraindications

The NF-Walker is contraindicated in the following cases:

- Structured joint deformities, such as hip/knee/ankle flexion contractures of more than 20°
- Children without enough cognitive capacity to identify dangers (such as stairs, busy roads, etc.) unless they are under continuous surveillance.

When addressing children with very poor head control that necessarily leads to them being completely supported, not allowing them to feel any free movement, the use of an NF-Walker is not contraindicated, but it does not have any additional benefits to conventional standing devices. Therefore, when children are in this phase it is preferable to use a standing frame that offers the same therapeutic effects for a more economic price when funding is an issue.

In the same way, children that are able to walk with a posterior walking frame or holding hands with an adult, as well as the children who have enough balance to stand unassisted are not candidates to use this device, because it would make walking harder for them, especially turning.

## Bibliography

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