

LECKEY



MyWay Pedal

Clinical Workbook

Supporting Children

What is MyWay Pedal?

The **MyWay Pedal** is an elliptical trainer which attaches to the size 2 and 3 MyWay+ frame.

It is suitable for children classified at GMFCS III-V and can be used as part of a child's therapy program, or just to enable them to be active and have fun with their friends!

Targets & Strengthens

MyWay Pedal targets and strengthens anti-gravity muscles to help reduce the risk of hip and knee contractures developing and improve function.

Pedalling in an upright, weight-bearing position targets and strengthens anti-gravity muscles [calf, quads and glutes] - unlike cycling, which encourages a flexed, seated position.

Encouraging movement with optimal alignment promotes symmetry and ensures active strengthening and stretching of the muscles in the lower limbs.

Replicates Stepping Pattern

MyWay Pedal provides a sensori-motor experience similar to gait. It facilitates a reciprocal, elliptical action which is more like stepping than the circular motion of cycling, to help support gait therapy goals.



HOW CAN THE MYWAY PEDAL BE USED?

Passively - at first for those who struggle to initiate any stepping

Actively - with the ankle straps in place

Free - with the ankle straps removed for the hardest workout

Suitability for MyWay Pedal

Poor lower limb alignment	✓
Scissoring gait	✓
Crouch gait	✓
Lack of reciprocal movement	✓
Lack of momentum	✓
Post intervention (botulinum treatment, lower limb surgery, serial casting, SDR surgery)	✓

Check the precautions and contraindications information in the MyWay User Manual for more details.



WHAT SPECIFIC CLINICAL ISSUES DOES MYWAY PEDAL ADDRESS?

Muscle weakness specifically anti-gravity muscles

- **MyWay Pedal** promotes hip and knee extension moving the child away from the crouch standing/walking position to an upright, extended posture.
- This results in the user working anti-gravity muscles (calf muscles, quads and hip extensors) through a full range of motion and provides targeted strengthening of these muscles.
- **MyWay Pedal** also facilitates active hamstring lengthening during the downward pedalling action.
- The opportunity to strengthen anti-gravity muscles and actively lengthen antagonist muscles may help reduce the risk of the user developing hip and knee joint deformities.
- Furthermore, the activity achieved using **MyWay Pedal** is directly transferable to functional activity such as standing transfers, stepping and ascending/descending stairs.

Lack of selective control

- Children with CP frequently experience a lack of selective control, having difficulty isolating the movement of one limb from the other. **MyWay Pedal** promotes reciprocal movement away from stereotyped simultaneous lower limb movement as it facilitates an elliptical pedalling motion.

Decreased quality of gait

- Unlike the circular motion of traditional cycling, the elliptical pedalling of **MyWay Pedal** gives an extended stretch of the lower limbs. This occurs as the pedal action involves more length than height and a sensori-motor experience similar to gait.

Asymmetry of posture and movement e.g. hemiplegia, asymmetric diplegia

- **MyWay Pedal** enables active movement of the lower limbs in good alignment, with the pelvis over knees, over ankles. This can reduce scissoring and promote symmetry.

HELPFUL TIP

Calf weakness is thought to contribute to crouch gait [Armand, Decoulon and Bonnefoy-Mazure, 2016]. Consider letting the child use **MyWay Pedal** without wearing AFOs. This enables activity and potential strengthening of calves.



HELPFUL TIP

For more advanced users, open sandal straps to prevent pull-up into flexion and encourage push-down into extension.



HELPFUL TIP

For hemiplegia, consider one strap off to target a weaker side [as per constraint therapy, Hoare 2019].





Scan the QR code with your camera to watch Tom use his MyWay+ and MyWay Pedal accessory to have fun outside with his family.



Lacking joint stability

- Muscle imbalance and insufficient co-contraction both compromise joint stability, causing problems with the control of movement, balance and coordination.
- **MyWay Pedal** offers the opportunity to promote co-contraction around unstable joints, thereby improving stability.

Lack of flexibility and break up in sedentary activity (GMFCS IV and V)

- When propelled by an attendant, **MyWay Pedal** can move the child's lower limbs through a range of flexion/extension, described as 'light activity' [Verschuren, 2016].



HELPFUL TIP

The child may benefit from adjusting the handle height to enable optimum elbow extension and accurate steering.

Lack of fitness

- **MyWay Pedal** allows a user to achieve aerobic activity which may result in improved cardio-respiratory fitness, circulation and stamina levels for the user.

HOW DO I USE MYWAY PEDAL?

- The first few uses may be tiring for the child. Build up tolerance as performance improves. You can start with gentle passive movement and progress to child-active pedalling.
- A typical program, as an adjunct to physical therapy, would include 3 sessions of 30 minutes per week over 6 weeks.
- Alternatively, use on a weekly/fortnightly basis as part of PE time or a general exercise program.

HELPFUL TIP

Pedalling backwards may be easier to begin with. This could be useful to give the child success in achieving active pedalling.



Did you know MyWay Pedal can stand up independent of the MyWay frame? This makes it really simple to bring it in from behind and attach it with the user already in the MyWay frame.





GOAL SETTING AND OUTCOME MEASURES

It is also possible to ascertain how effective **MyWay Pedal** is by setting goals with the child and their family and using appropriate outcome measures or records.

Below are some suggestions. Outcome measures and records can be reviewed monthly, termly or annually to monitor progress and provide information for reports at school or clinics.

Goals	Outcome measures
Maintenance of walking ability (speed) using independent walking or assistive walking device	Measure walking speed at set intervals; time taken over set distance or distance covered over set time. Validated test for independent walking: 1-minute walk test [McDowell <i>et al</i> , 2005], 6-minute walking test [Maher <i>et al</i> , 2008]
Prevent or reduce crouch gait	
Maintain /improve active knee extension during swing (active hamstring lengthening)	Use Gait analysis, either 3D gait analysis, 2D video analysis or observational analysis, e.g. Glasgow Index [Tennant <i>et al</i> , 2012]
Maintain/improve symmetry of gait	
Improve range of active/passive knee extension	Measure active range of movement
Improve/maintain functional mobility	Use GMFM [Russell <i>et al</i> 2002]. Timed up and Go test [Williams <i>et al</i> , 2005]
Improve ability to perform standing transfers	Use Goal Attainment Scaling [GAS] goals specific to the child, e.g. ability to rise to stand, assistance required, stepping to transfer and lowering to seating
Improve ability to ascend/descend stairs	Use GAS goals specific to the child, e.g. manual assistance required, rails to either side, leading foot/feet, same step/alternate step foot placement, depth of step and timing
Maintain/improve selective control	Test for selective control [Fowler, 2009]
Achieve aerobic activity and improve fitness level [Verschuren <i>et al</i> , 2016]	Record HR/BR at rest and after use of walker

WHAT'S THE EVIDENCE?

The **evidence for muscle strengthening and child-active exercise** has grown considerably in recent years. A systematic review by Novak *et al* in 2014 highlighted the risk of deterioration without rehabilitation and advocated **a child-active approach to rehabilitation**. Then in 2015 Rowland produced a report on the scope of physical therapy practice in health promotion and fitness for youth with disabilities. Recommendations included:

- **Muscle strengthening** programs to improve functional mobility and muscular endurance
- Maintain/improve cardio-respiratory health through **aerobic exercise**
- **Anaerobic activity** to build up speed and power



Gillett JG *et al* [2016] conducted a systematic review to determine the impact of strength training on skeletal muscle with a large effect found on muscle cross-sectional area following strength training. They concluded that there is preliminary evidence that **strength training leads to muscle hypertrophy.**

Park EY and Kim WH [2013] performed a meta-analysis of the effect of strengthening interventions in individuals with cerebral palsy. They reported that **'Strengthening interventions are useful for increasing muscle strength in individuals with cerebral palsy,** specifically in youth and children, and optimal exercise consisted of 40- to 50-min sessions performed 3 times per week.'

Verschuren [2016] produced CP specific physical activity and exercise recommendations based on: robust research evidence, expert opinion and extensive clinical evidence. With the health risks greatest for those spending large amounts of sedentary time, interventions to

promote **cardio-respiratory and resistance exercise were recommended.**

In 2017 Van Vulpen conducted a study which indicated that functional high velocity resistance training or **power training could improve muscle strength and walking capacity** of children with CP.

A further State of the Evidence review by Novak *et al* [2019] summarized the best available evidence. They stated that, 'Physical activity is essential for improving health' and listed **fitness training, goal-directed training and strength training as recommended interventions** to manage CP. Novak acknowledged that 'designing and implementing moderate to vigorous exercise programs for children with severe physical disabilities, who have limited movement and move slowly, is complex'.

With the need for a family-centred approach which can provide engaging and evidence-based methods to improve strength and fitness, the **MyWay Pedal** is the ideal addition to therapy programs.

Meet Eli

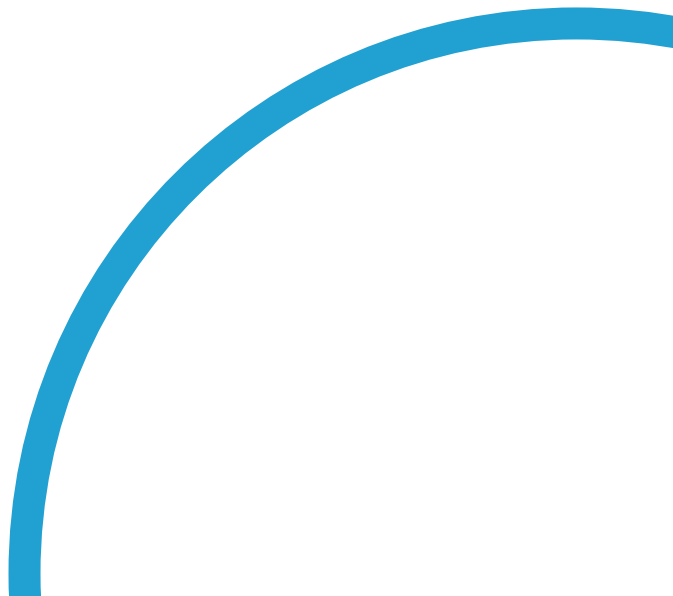
Eli is a happy 7-year-old boy who has cerebral palsy (GMFCS level III). Eli trialled **MyWay Pedal** for 6 weeks as part of our Case Story program. See how using the MyWay Pedal helped him improve his motor skills and muscle strength by scanning the QR code with your camera.



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