

# Clinical Indications for loopwheels

This document is intended to provide a guide to therapists as to when you might consider Loopwheels as an option for a client.

Each client's individual circumstances and condition must be considered against the full range of equipment and interventions available.

Loopwheels are wheels with integral suspension which, by reducing vibration and shock, have been proven to help manage back and neck pain and fatigue, and to increase the amount of time people are able to manually propel each day.

Significant exposure to whole body vibration (WBV) has been linked to a variety of adverse health conditions and secondary injuries in workers exposed to WBV, especially in a seated position. This led to the International Standards Organisation (ISO) establishing guidelines for individuals regarding exposure to WBV. <sup>1</sup> "Whole Body Vibration" is a technical term covering both vibration and shock.

Studies have shown that wheelchair users are exposed to levels of vibration and shock that are higher than recommended safe limits according to the ISO standard, and that this can affect both health and quality of life<sup>2</sup>. This is a risk factor for all wheelchair users, although studies have particularly focused on people with Spinal Cord Injury.

Over-exposure to whole body vibration has been associated in particular for wheelchair users with muscle fatigue, discomfort, neck and back pain <sup>3,4</sup>, and excessive general fatigue. Effects can be both chronic and acute. WBV can have an adverse effect on comfort, ride quality and energy expenditure as well as on health.

Replacing traditional rear wheels with Loopwheels can have a significantly positive impact on reducing (a) shocks from small and larger obstacles on the road surface and (b) constant vibration from outdoor surfaces AND indoor surfaces (such as tile or carpet) <sup>5</sup>.

The reduction in whole body vibration delivered by Loopwheels has been independently proven by the University of Pittsburgh for manual propulsion, who also concluded the reduction is likely to be even more significant for people using a front power assist device.

**Choosing Loopwheels to replace spoked rear wheels reduces exposure to both vibration and shock compared to all spoked wheels and can bring daily exposure to within the safe limits recommended by the ISO standards.**

**Loopwheels have been independently shown to contribute to the management of pain, discomfort and fatigue for wheelchair users, and increase the amount of daily time manual wheelchair users in the community actively propel safely in their wheelchair.**

## Indications

You might consider Loopwheels as an option to help manage:

- fatigue
- neck or back pain (and in particular lower back pain)
- increasing time "out and about" in the community.

There is anecdotal evidence from individual case studies of Loopwheels helping with management of Ehlers Danlos Syndrome<sup>6</sup>, Cerebral Palsy, MS and protection for brittle bones, and with frequency of spasms and bladder control for SCI, but research studies involving in-wheel suspension have not been done for these.

1. ISO 2631-1:1997/Amd 1:2010 Mechanical vibration and shock – Evaluation of human exposure to whole-body vibration – Part 1: General requirements
2. Garcia-Mendez Y, Pearlman JL, Boninger ML, Cooper RA. Health risks of vibration exposure to wheelchair users in the community. *J Spinal Cord Med.* 2013
3. Pope MH, Wilder DG, Magnusson ML. A review of studies on seated whole body vibration and lower back pain. *Proc Inst Mech Eng H* 1999;213(6):435-46
4. Turner JA, Cardenas DD, Warms CA, McClellan CB. Chronic pain associated with spinal cord injuries: a community survey. *Arch Phys Med Rehabil.* 2001 Apr;82(4):501-9
5. Neti, A.; Brunswick, A.; Marsalko, L.; Shearer, C.; Koontz, A. Effects of In-Wheel Suspension on Whole-Body Vibration and Comfort in Manual Wheelchair Users. *Vibration* 2024, 7, 432-452.
6. Voermans NC, Knoop H. Both pain and fatigue are important possible determinants of disability in patients with the Ehlers-Danlos syndrome hypermobility type. 2010 Nov [cited 2022 Jun 8];33(8):706-7.

## Considerations

- Loopwheels are designed for people who weigh more than 50kg (110lbs), up to a maximum total loading of 120kg (265lbs) (user and chair). Some people over 40kg may feel benefits from Loopwheels LT model.



These case studies have been anonymised.

Indication	Pre-Loopwheels	Post-Loopwheels
Fatigue Bladder control Pain	Case study A is a male with a spinal cord injury, which occurred 22 years ago, and he has rotator cuff damage. Recently, he's started using a power bike attachment to reduce the amount of pushing he has to do. But, he's experiencing increased lower back pain and difficulties with bladder control, which are limiting his ability to use the power bike for anything but very short periods of time, so he's not using the power bike very often.	He loves getting out on his power bike. He uses it to access essential daily tasks such as shopping, and now joining his brother's family on weekend dog walks, finding he's able to travel the woodland tracks in comfort and with ease.
Inclusion in family life Travel over uneven surfaces	Case study B is a female who lives just outside town. The streets and squares of the medieval town centre and shops are cobbled. She has not visited her local town centre for 11 years since she started to feel too much pain and discomfort from jolting over the cobbles in her wheelchair.  She's feeling increasingly isolated, as she's unable to take part in normal social activities with her husband and friends. She's suffering from depression and has gained weight.	With Loopwheels, she can now go into town and travel the cobbled streets without extreme pain from jolting. Her husband also finds it much easier to push her than before. She has now re-connected with a group who meet weekly in a café on the cobbled market square, and she and her husband are going out to shops, cafés and restaurants that they had not visited for years.
Pain Travel Social inclusion Fatigue	Case study C is a female who has had MS for 16 years.  She no longer has function in her limbs, and her core trunk balance has been seriously reduced. Fatigue and pain are the biggest limitations in her daily life.	She used to come home with pain in her neck, shoulders and back, but with Loopwheels, she is now comfortable - even after being out for a whole day.  She says: "What a result! No more pain when I'm going to bed; no longer having to devise detours to avoid certain obstacles; no more spending three days in the house to recover after a day out. Loopwheels help me to participate in society in a fun, meaningful and purposeful way."

**See our website for further research evidence, full references and for stockists.**

Designed and made in the UK.

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