

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 will be just one of many considerations. Individual needs and preferences will vary in every case.

# Clinical indications for loopwheels

See our website for stockists

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# Loopwheels are wheels with integral suspension, which reduce vibration and jolting

Studies have shown that wheelchair users are exposed to levels of vibration that are considered unsafe and that this can affect health and life quality<sup>1</sup>. This is a risk factor for all wheelchair users, increasing the amount of muscle fatigue and potentially damaging connecting nerves<sup>2</sup>. It can be particularly acute for those with spinal injuries. Exposure to whole body vibration has been associated in particular with lower back pain<sup>3</sup>. The frequency range most problematic for human health is 1-20Hz<sup>4</sup>.

Vibration can be damaging, painful and tiring. Loopwheels reduce vibration by up to 70% compared to a spoked wheel.

For most people with spinal injury the stabilising lower body or core muscles are very weak or absent, meaning that vibrations and jolting from bumps in the road are transmitted directly, and significantly disturb internal organs and impact your spinal column. Since Loopwheels can reduce up to 70% of the vibrations generated through your rear wheels, they can help provide extreme relief from these debilitating effects.

Most individuals with spinal cord injury experience chronic pain. Most commonly, chronic pain is felt in the back, hips and buttocks, and in the legs and feet<sup>5</sup>.

**Loopwheels make it easier to get over lips, bumps and kerbs, and can contribute to the management of pain, discomfort and fatigue for someone using a wheelchair.**

## Indications:

You might consider Loopwheels as an option to help manage:

- fatigue, as vibration can be a strong contributing factor, particularly when travelling longer distances
- travel over uneven surfaces (e.g. cobbled or paved streets, forest tracks, gravel paths)
- back pain (and in particular lower back pain)
- pressure sores
- bladder control
- frequency of spasms

## Considerations:

- Vibration is much worse when travelling at speed, so may be of particular benefit for those using a hand bike or power attachment
- Reducing pain, discomfort and fatigue can be important in helping someone to return to work and to participate in more social and family occasions
- Loopwheels are designed for people who weigh more than 50kg, up to a maximum total loading of 120kg (user and chair). The benefit is reduced at lower weights
- Loopwheels may also be used as part of a range of equipment choices for manual wheelchair users. A correctly adjusted chair and seating cushion must always be the first consideration. Vibration is transmitted through the castors as well as the rear wheels so optimising the front wheels, or lifting the castors off the ground with a power attachment, may be considered

## Case studies

Indication	Case study or example: pre-Loopwheels	Case study or example: post-Loopwheels
Fatigue Bladder control Pain	Mr A has a spinal cord injury, which occurred 22 years ago. He has rotor cuff damage. He has recently started using a power bike attachment to reduce the amount of pushing he has to do. But he is 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. He is not using the power bike very often.	Mr A is loving getting out on his power bike. Not only is he using it to access essential daily tasks such as shopping, but also he has started joining his brother's family on weekend dog walks in the local forest, where he finds he is able to travel over the woodland tracks in comfort and with ease.
Inclusion in family life Travel over uneven surfaces	Mrs B lives just outside town. The streets and squares of the medieval town centre and shops are cobbled. Mrs B 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 is feeling increasingly isolated as she is unable to take part in normal social activities with her husband and friends. She is suffering from depression. She has gained weight.	With Loopwheels, Mrs B is now happy to go into town as she can travel over the cobbled streets without extreme pain from jolting. Her husband finds it much easier to push her than he did without Loopwheels. She has now re-connected with a group who meet weekly in a café on the cobbled market square. She and her husband are going out to shops, cafés and restaurants that they had not visited for years.
Pain Travel for a prolonged period Social inclusion Fatigue	Myrna is from Amsterdam and has had MS for 16 years.  She no longer has any function in her limbs, and Myrna's core trunk balance has been seriously reduced. Fatigue and pain are the biggest limitations in her daily life.	Myrna tried out Loopwheels on many surfaces, including pebbles, gravel and cobblestones, and other physically demanding surfaces. Whereas she used to come home with pain in her neck, shoulders and back, Myrna is now comfortable even after being out for a whole day.  Myrna's conclusion: "What a result! No more pain when I'm going to bed; no longer having to devise detours to avoid certain obstacles; not having to cancel birthdays due to fatigue and pain; no more spending three days in the house to recover after a day out.  The Loopwheels make such a positive contribution to my life! These wheels help me to participate in society in a fun, meaningful and purposeful way."

1. Vorrink SNW, Van Der Woude LH V, Messenberg A, Crompton PA, Hughes B, Sawatzky BJ. Comparison of wheelchair wheels in terms of vibration and spasticity in people with spinal cord injury. Assist Technol Res Ser. 2010

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. Katu US, Desavale RG, Kanai RA. Effect Of Vehicle Vibration On Human Body - RIT Experience

5. 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