Back pain and fatigue in wheelchair users

Back pain and fatigue are big issues facing many wheelchair users. These two activity-limiting symptoms are extremely complex and, in many ways, interlinked. Our customers often mention these issues to us. As a result, we have drawn together published research alongside our own testing and customer survey results to understand more about the cause and effect of these symptoms and how our product may help.

Do wheelchair users get more back pain?

And if so, what can we do about it?

Back pain is an extremely common problem across the world. It is estimated that at any point in time around 1 in 10 people are suffering from back pain (1). If you are a wheelchair user your risk of back pain is about 5 times higher than the overall population; around half of wheelchair users are affected (2,3).

Back pain tends to occur in the lower part of the back and may be referred to as “lower/low back pain" or sometimes “lumbar back pain” (4,5). Some people’s back pain may be short-lived, whilst for others it can last for months or even years. If you have pain that has persisted or kept coming and going for over three months, it is known as “chronic pain” (6).

Back pain can be extremely limiting to day-to-day activities and can seriously affect your overall quality of life. Unfortunately, the longer you have suffered from back pain without successful resolution, the more likely it is that it will continue to persist (7). The reasons behind a person’s back pain can be complex. However, an important factor to consider as a wheelchair user is “whole body vibration”, sometimes abbreviated as “WBV”.

Vibration

Research has been done to look at what effect exposure to high levels of whole-body vibration has on the human body. Researchers often study people whose jobs mean that they have high levels of exposure. Workers exposed to high levels of vibration are at a significantly higher risk of suffering from back pain (8).

Due to the effect vibration can have on the body, in the United Kingdom, employers are required by law to ensure that workers are not exposed to excessive levels of vibration at work (9). This can be achieved by adopting measures to reduce vibration intensity or limiting the time that workers use vibrating equipment.

However, another group of people at risk of being exposed to high levels of vibration are wheelchair users. When travelling over uneven ground, vibration can be transmitted from the wheelchair up to the user. Unfortunately, the laws protecting workers against exposure to excessive vibration don’t offer the same protection to people in their everyday lives. Wheelchair users have been shown to be exposed to vibration levels that exceed the threshold at which it is damaging for health (3).

Loopwheels are wheelchair wheels with built-in shock absorption. They are designed to improve the overall suspension capabilities of a chair, reducing the user’s exposure to harmful vibration and jolting. On testing in line with ISO-2631 (the international standard for vibration testing), Loopwheels were shown to reduce harmful vibration by up to 76% (10). In our April 2022 Customer Survey, we asked users why they purchased Loopwheels and how they had benefited from them. 65% of respondents who purchased Loopwheels to manage back pain reported a noticeable improvement.

Fatigue in wheelchair users

Making some sense of a complex problem

Fatigue is extremely common. One in five visits to the GP feature fatigue (11). In its worst forms, fatigue can have a devastating impact on a person's life, limiting work, day-to-day activities and enjoying time with friends and family.

Despite this, it can be hard to define exactly what "fatigue" is. It can be categorised in various ways, including splitting it into physical and mental fatigue(12). Physical fatigue can include feeling sleepy, lacking energy or experiencing muscle weakness, whilst mental fatigue can include feeling emotionally drained or having difficulty concentrating (13).

Fatigue is extremely complex and can be caused or contributed to by a wide range of physical and mental health problems. Amongst wheelchair users, MS is perhaps the most common, well-recognised cause of fatigue. However, research also indicates an increased risk of fatigue in those with spinal cord injury (14), hypermobile Ehlers-Danlos syndrome (15) and cerebral palsy (16), amongst others.

Pain and fatigue are symptoms that frequently go hand in hand (17)(18). This is of particular relevance to wheelchair users where back pain and shoulder pain are common place (2)(3)(19).

Vibration

Vibration is another important consideration. Wheelchair users have been shown to be exposed to vibration levels that exceed the threshold at which it is damaging for health (3). So far, most research concerning vibration and fatigue has been done on workers. This research has showed that workers exposed to vibration are overall roughly twice as likely to experience work-related fatigue, with those exposed to higher levels of vibration at higher risk (20). In testing of hand grip strength, vibration has also been shown to induce muscle fatigue (21).

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This work was conducted by Harrison Smalley, a postgraduate[1] from the University of Nottingham, as part of a research placement[2] at Loopwheels.

For further information about our project, contact info@loopwheels.com.

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