

Bike that measures bumps in the road reveals nerve condition risk to cyclists

Uneven road surfaces are causing a condition more common among workers using vibrating machinery.



HELEN MCARDLE
finds out more

THEY are the bane of cyclists' lives, putting riders at risk of accidents. But now another serious, if less obvious, risk of cycling over potholed roads is the focus of innovative technology.

A bike has been created which measures cyclists' exposure to potentially harmful vibrations from uneven road surfaces and it could be used to check the safety of cycle lanes and other routes.

As well as back problems caused by cycling over bumpy surfaces, work by Edinburgh Napier University's Transport Research Institute (TRI) has found that a large number of cyclists also show symptoms of hand-arm vibration syndrome (HAVS).

The condition is characterised by numbness and a pins-and-needles sensation in the fingers, muscle weakness leading to back pain, and aching in the arms caused by damage to bones and joints.

It can also lead to significant impairment of nerves and blood vessels.

Although more commonly thought of as an industrial problem affecting people such as construction workers who use vibrating machinery, there are concerns that poorly maintained roads are contributing to cases among cyclists and even bus users.

Edinburgh Napier University tested the theory using a specially-designed "data bike", which was fitted with a camera, sensors and computer to record vibration levels on Edinburgh streets.

They found cyclists were at risk of developing the condition after pedalling for as little as 16 minutes on the worst surfaces, such as cobbles.

The technology would be useful to public authorities such as councils, who maintain local roads, or the bodies such as Police Scotland who deploy officers on pedal bikes.

Professor Chris Oliver, a retired orthopaedic trauma surgeon who co-led the research, is to discuss the findings at a conference in Edinburgh next month.

He will speak at the 54th UK Conference on Human Responses to Vibration, which is being held in the capital between September 24 to 26.

Mr Oliver, a keen cyclist who is known as the Cycling Surgeon on Twitter, said: "You can be exposed to vibration from many sources – a lot of industrial equipment can expose it to you. There's vibration from sitting on a bus. You can get back pain and damage

to the discs in your spine, or if you get vibration through your hand it can damage your nerves in your hand – sometimes permanently. One of the things we did at Edinburgh Napier was to develop a bicycle that measures vibration transmitted from the road to your hands.

"We've shown that some road surfaces can cause toxic doses of vibration. The bicycle collects huge amounts of data."

Mr Oliver, who was also a professor of



physical activity at Edinburgh University until his retirement last year, said he understood that Glasgow City Council and Police Scotland had both expressed an interest in using the technology.

Spokesmen for Police Scotland and Glasgow City Council said they were not using the technology at present and were unsure whether there were any plans to in future.

Mr Oliver said Scotland and the rest of the UK could learn a lot from other European countries, where roads and cycle lanes are specifically designed to limit vibration.

He said: "The Dutch have whole books and guides on how to build a smooth road, but we don't have that kind of thing in the United Kingdom at all. If you phone up Edinburgh City Council and ask how smooth the roads are they'll say 'well, we fix the potholes'. That's not enough. We know that some road surfaces around Scotland cause hand-arm vibration syndrome and that's an industrial disease."

John Lauder, deputy CEO of cycling charity Sustrans Scotland, said: "A high quality surface is key to attracting the widest range of people to choose to walk, cycle and wheel, thus funding programmes at Sustrans consider the ride quality of any design to be fundamental to the award of funding."

A spokeswoman for Cycling Scotland added: "Potholes and uneven surfaces can have an impact on people cycling, in terms of both discomfort and safety, and it will be interesting to see the results from this research.

"We believe the benefits of cycling, particularly in terms of health and wellbeing, outweigh the risks of cycling on uneven road surfaces but the ideal is that our roads and cycle lanes are smooth and well maintained."

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■ Professor Chris Oliver says the new bike has produced huge amounts of data about the risks of cycling on uneven road surfaces.

Picture: Gordon Terris

