

# Laser shoes prevent 'freezing' in Parkinson patients

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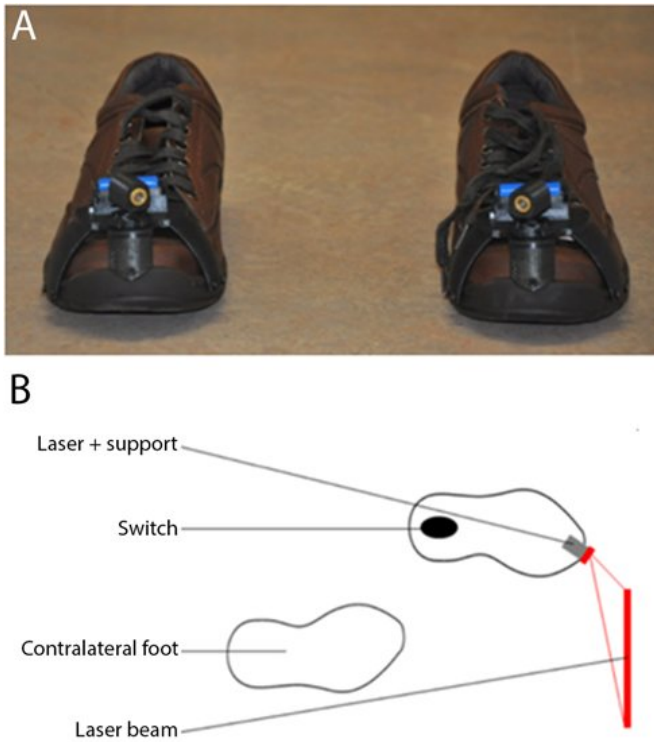


Figure 1: laser shoes. Credit: Radboud University

Freezing of gait, an absence of forward progression of the feet despite the intention to walk, is a debilitating symptom of Parkinson's disease. Laser shoes that project a line on the floor to the rhythm of the footsteps help trigger the person to walk. The shoes benefit the wearer significantly, according to research by the University of Twente and Radboud university medical center, which will be published on December 20 in *Neurology*, the scientific journal of the American Academy of Neurology.

Walking problems are common and very disabling in Parkinson's disease. In particular, freezing of gait is a severe symptom which generally develops in more advanced stages. It can last seconds to

minutes and is generally triggered by the stress of an unfamiliar environment or when medication wears off. Because the foot remains glued to the floor but the upper body continues moving forward, it can cause the person to lose her balance and fall.

## Lines on the floor

Parkinson patient experience a unique phenomenon. By consciously looking at objects on the floor, such as the lines from a zebra crossing ('visual cues'), and stepping over them, they are able to overcome their blockages during walking. This activates other circuits in the brain, hereby releasing the blockages and allowing the person to continue walking. This is why patients often make use of floor tiles at home. With the laser shoes, these useful cues can be continuously applied in everyday life, to walk better and safer. The principle behind the laser shoes is simple: upon foot contact, the left shoe projects a line on the floor in front of the right foot. The patient steps over or towards the line, which activates the laser on the right shoe, and so on (see videos below the text).

## Beneficial effect

The present research study shows a beneficial effect in a large group of patients. The number of 'freezing' episodes was reduced by 46% with the use of the shoes. The duration of these episodes was also divided by two. Both effects were strongest in patients while they had not taken their medication yet. This is typically when patients experience the most problems with walking. But an improvement was also seen after the patients had been taking their medication.

"Our tests were administered in a controlled lab setting with and without medication," says researcher Murielle Ferraye. "Further research in their everyday environment is necessary. We plan on testing this using laser shoes that in the meantime came on the market."

## Activating the laser

Of the nineteen patients who tested the shoes, the majority would be happy to use them. The [patients](#) did not seem to mind that the laser was activated for each single step. "Ideally, the laser should only be activated once the blockage is detected, but we're not quite there yet," says Ferraye. "Freezing is a very complex phenomenon."

Murielle Ferraye, who developed the laser shoes, conducted her study at the Donders Institute at Radboud university medical center and the MIRA Institute for Biomedical Technology and Technological Medicine at the University of Twente.

Provided by Radboud University

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