Walking patterns could predict type of cognitive decline

February 16, 2021

Researchers' assessments of gait variability identified Alzheimer's disease with 70-per-cent accuracy.

By Laura Goncalves, Special to Western News

February 16, 2021

Canadian researchers are the first to study how different patterns in the way older adults walk could more accurately diagnose different types of dementia and identify Alzheimer's disease.

A new study by a Canadian research team, led by London researchers from Western University and Lawson Health Research Institute evaluated the walking patterns and brain function of 500 participants currently enrolled in clinical trials. Their findings are published in *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*.

"We have longstanding evidence showing that cognitive problems, such as poor memory and executive dysfunction, can be predictors of dementia. Now, we're seeing that motor performance, specifically the way you walk, can help diagnose different types of neurodegenerative conditions," said Dr. Manuel Montero-Odasso, professor at Western's Schulich School of Medicine & Dentistry and scientist at Lawson.

Dr. Montero-Odasso is world-renowned for his research on the relationship between mobility and cognitive decline in aging. Leading the Mobility, Exercise and Cognition (MEC) team in London, he is pioneering new diagnostic approaches and treatments to prevent and combat early dementia. Montero-Odasso also co-leads the Mobility, Exercise and Cognition Team at the Canadian Consortium on Neurodegeneration of Aging (CCNA), a team composed of 22 researchers and six trainees.

This study compared gait impairments across the cognitive spectrum, including people with subjective cognitive impairment, Parkinson's disease, mild cognitive impairment, Alzheimer's disease, Lewy body dementia and frontotemporal dementia, as well as patients who were cognitively healthy.

Four independent gait patterns were identified: rhythm, pace, variability and postural control. High gait variability – the stride-to-stride fluctuation in distance and timing that happen when we walk – was associated with lower cognitive performance and it identified Alzheimer's disease with 70-per-cent accuracy.

"This is the first strong evidence showing that gait variability is an important marker for processes happening in areas of the brain that are linked to both cognitive impairment and motor control," said the paper's first author, Frederico Perruccini-Faria, research assistant at Lawson and postdoctoral associate at Schulich Medicine. "We've shown that high gait variability as a marker of this cognitive-cortical dysfunction can reliably identify Alzheimer's disease compared to other neurodegenerative disorders."

Montero-Odasso adds that this gait variability could be perceived as similar to an arrhythmia. Health care providers could potentially measure it in clinical settings, like how heart rhythm is assessed with electrocardiograms.

"Having gait variability as a motor marker for cognitive decline and different types of conditions could allow for gait assessment to be used as a clinical test, for example having

Dr. Manuel Montero-Odasso

patients use wearable technology," said Dr. Richard Camicioli, Professor at the University of Alberta and co-senior author on the paper.

The London team collaborated with researchers at the University of Toronto, University of Calgary and University of Alberta. They are part of the CCNA, a collaborative research program tackling the challenge of dementia and other neurodegenerative illnesses.