

Tokyo Tech researchers develop the WalkMate System for improving the quality of life of Parkinson's disease patients

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Schematic illustration and components of the WalkMate system. Copyright: Tokyo Institute of Technology

Tokyo Tech's Yoshihiro Miyake and colleagues have developed an innovative, non-invasive therapeutic intervention that may improve the mobility, stability, and quality of life of Parkinson's disease patients.

The unintentional synchronizing of people's gait as they walk together is a familiar phenomenon. Understanding the mechanisms behind this synchronization could help people with a disturbed gait, such as patients suffering from Parkinson's disease. Research by Yoshihiro Miyake at the

Department of [Computational Intelligence](#) and Systems Science at Tokyo Institute of Technology has helped to demystify the process and led to a new walking support device—'Walk Mate'.

Yoshihiro Miyake investigated coupled walking processes between a [walking robot](#) and a walking person. The study included people with a healthy gait and people suffering from Parkinson's disease or hemiplegia due to brain infraction. He used the timing of the walking person as a [sensory input](#) for the robot and the sound of a walking rhythm as the robot's output. An algorithm based on travelling wave dynamics controlled the timing difference between the Walk Mate's input and output.

The study revealed how people adjust their pace in response to the robot's audible output. Patients' stride patterns were healthier using 'Walk Mate' and they reported a greater stability and "sense of togetherness" compared with more traditional [walking aids](#) that have a fixed rhythm. Further studies in collaboration with researchers at the Max Planck Institute for Human Cognitive and [Brain Sciences](#) and the Department of Neurology at Kanto Central Hospital have underlined the great potential of the device.

"Our approach offers a flexible, portable, low-cost, non-invasive [therapeutic intervention](#) that may improve the mobility, stability, and quality of life of Parkinson's disease patients," say the inventors.

The technology is also described in the August issue of *Tokyo Institute of Technology Bulletin*: www.titech.ac.jp/bulletin/index.html .

More information: Miyake Y (2009) Interpersonal Synchronization of Body Motion and the Walk-Mate Walking Support Robot IEEE Transactions on robotics 25(3): 638-644. [Doi: 10.1109/TRO.2009.2020350](#)

Hove MJ, Suzuki K, Uchitomi H, Orimo S, Miyake Y (2012) Interactive Rhythmic Auditory Stimulation Reinstates Natural 1/f Timing in Gait of Parkinson's Patients. PLoS ONE 7(3): e32600.

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