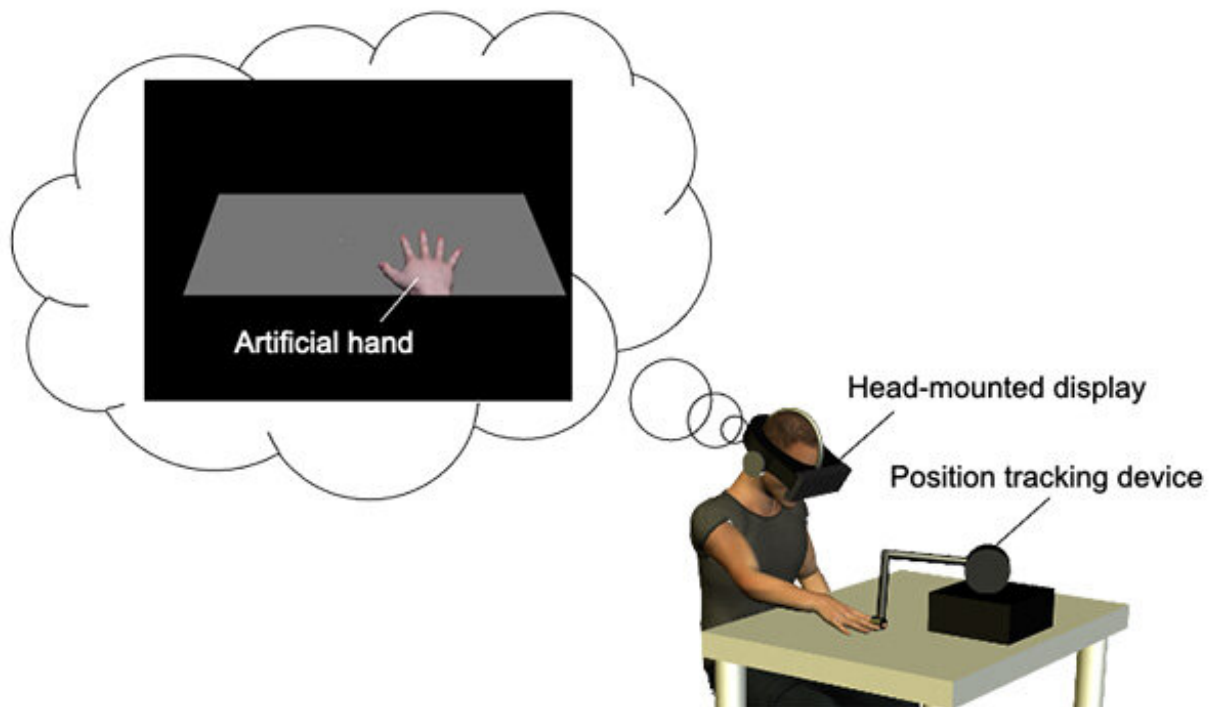


Using VR training to boost the sense of agency and improve motor control

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To investigate how aspects of body awareness affect motor control, the researcher used a virtual reality system. This system allowed for the manipulation of body ownership and agency over the artificial hand in the virtual environment as seen by the participant. Credit: Kazumichi Matsumiya

With Japan's society rapidly aging, there has been a sharp increase in patients who experience motor dysfunctions. Rehabilitation is key to overcoming such ailments. A researcher from Tohoku University has

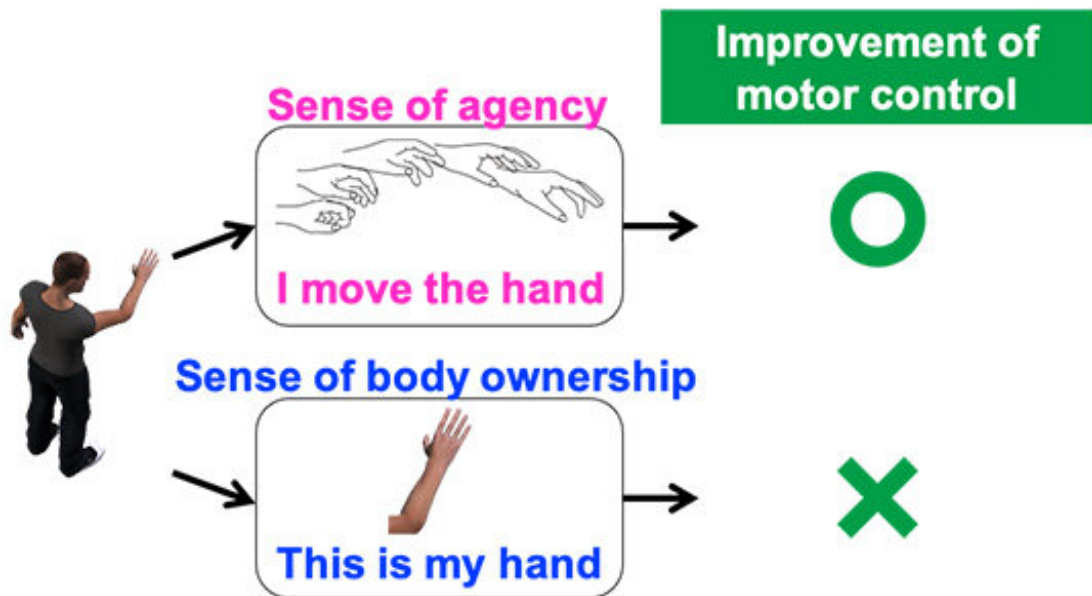
developed a new virtual reality (VR) based method that can benefit rehabilitation and sports training by increasing bodily awareness and improving motor control.

His research was published in the journal *Scientific Reports*.

Not only can we see and touch our body, but we can sense it too. Our body is constantly firing off information to our brains that tell us where our limbs are in real-time. This process makes us aware of our body and gives us ownership over it. Meanwhile, our ability to control the movement and actions of our body parts voluntarily affords us agency over our body.

Ownership and agency are highly integrated and are related to our [motor control](#). However, separating our sense of body ownership from our [sense of agency](#) has long evaded researchers, making it difficult to ascertain whether both ownership and agency truly affect motor control.

Professor Kazumichi Matsumiya from the Graduate School of Information Sciences at Tohoku University could isolate these two senses by using VR. Participants viewed a computer-generated hand, and Matsumiya independently measured their sense of ownership and agency over the hand.



The two aspects of body awareness: The experience of one's visible hands as one's own (ownership) and the experience of authorship over bodily movements (agency). The present study found the sense of agency, rather than body ownership, improves motor control. Credit: Kazumichi Matsumiya

"I found that motor control is improved when participants experienced a sense of agency over the artificial body, regardless of their sense of [body ownership](#)," said Matsumiya. "Our findings suggest that artificial manipulation of agency will enhance the effectiveness of rehabilitation and aid sports training techniques to improve overall [motor](#) control."

More information: Kazumichi Matsumiya. Awareness of voluntary action, rather than body ownership, improves motor control, *Scientific Reports* (2021). [DOI: 10.1038/s41598-020-79910-x](https://doi.org/10.1038/s41598-020-79910-x)

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