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IIT Jodhpur designs robotic trainers for lower limb rehabilitation

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The usefulness of the designed stationary trainer was confirmed using computer-based simulations along with a motion control scheme



Researchers at the Indian Institute of Technology (IIT) Jodhpur have designed robotic trainers that can be used in physiotherapy to treat lower limb disabilities. Limb disability is a serious malady among Indians, and is caused by age-related ailments, physical deformations, accidents, strokes, polio, etc.

Recently, there has been interest in designing robotic devices for lower limb rehabilitation. In robotic rehabilitation, the therapist only needs to provide supervision and the setting up of the device.

Most existing robotic systems treat the patients by performing motions only in the sagittal plane – the imaginary plane that divides the body into the left and right parts. For complete limb movement, sagittal movement is not sufficient and movements in transverse (upper and lower body) and coronal (front and back) planes are also essential. The IIT Jodhpur research team has proposed a robot manipulator arrangement that is capable of providing motion to the ankle in all three planes i.e., sagittal, transverse and coronal plane.

“The robotic trainer we have designed will help provide physiotherapy to paralytic patients, and for those who have spinal cord injuries that have disrupted their lower limb functions”, said the research lead.

The trainer proposed by the IIT Jodhpur team is conceptually simple and has a modular mechanical configuration that is easy to fix and use. Furthermore, since only linear actuators are used for the hip and knee motions, the robot itself is stable, safe and robust during use.