

Assessment of the Safety and Efficacy of Robotic Rehabilitation Using the Lumbar type HAL for Disuse Syndrome: A Multicenter Prospective Intervention Study

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In a super-aging society, disuse syndrome urgently requires innovative treatments. We assessed the safety of robotic rehabilitation using the Hybrid Assistive Limb (HAL) lumbar type for disuse syndrome. The subjects consisted of 17 elderly patients with disuse syndrome, excluding those with cardiac pacemakers or serious comorbidities. The robotic rehabilitation protocol involved four types of exercises: forward trunk bending, pelvic tilting, standing up, and squatting, conducted in 15-minute sessions five days a week for two weeks. The primary outcome was the completion rate of the rehabilitation protocol as a measure of safety. The majority of subjects safely performed the protocol, as indicated by the completion rate of 93.3% in the results. The secondary outcomes showed a trend of improvement in the five-time sit-to-stand test but did not detect any statistically significant differences in mobility functions or Activities of Daily Living (ADL). This study suggests that robotic rehabilitation using the HAL lumbar type is safe for treating disuse syndrome, although further study for verification of its efficacy is required.