

POSTER

Transportation and Personal Mobility

S. ISHIHARA, Y. TOKUTOMI, M. NAGAMACHI, K. MORINAGA, K. ISHIHARA, A. KANBE. A low-cost standing aid robot with linear actuators. *Gerontechnology* 2018;17(Suppl):192s; <https://doi.org/10.4017/gt.2018.17.s.187.00> **Purpose** Standing-up is indispensable for independent living. When this ability is lost, care needs and costs rise and self-dignity is decreased. Although the use of exoskeletons is expanding, they are typically designed for individuals with paralyzed lower limbs so they can walk. Existing medical exoskeletons are too heavily equipped and their average price is above \$30,000 USD. **Methods** In this study, we have developed several prototypes for standing-aid robotics with common, low-price linear actuators (*Figure 1*). Electric linear actuators are widely used. For example, mechanical hospital beds (“Gatch Bed”) contain one or several linear actuators. Actuators that have torque to push-up the weight of a human are off-the-shelf products and are sold for under \$100 USD. The first of our prototype attached linear actuators to lower-extremity orthosis. It safely pushed-up lower limbs. The problem was the actuators weight (900g). Because of its weight, a helper has to detach the actuator for smooth walking after standing up. Then, we made a 2nd and 3rd prototypes, those could be set instantly under the user’s thigh. Different joints are being examined. **Results & Discussion** We have measured leg electromyography and they are decreased with use of a push-up aid (*Figure 2*).

Keywords: rising aid, robotics

Address: Hiroshima International Univ., 555-36, Kurose-Gakuidai, Higashi-Hiroshima, Hiroshima, 724-0695 Japan;

E: i-shige@he.hirokoku-u.ac.jp

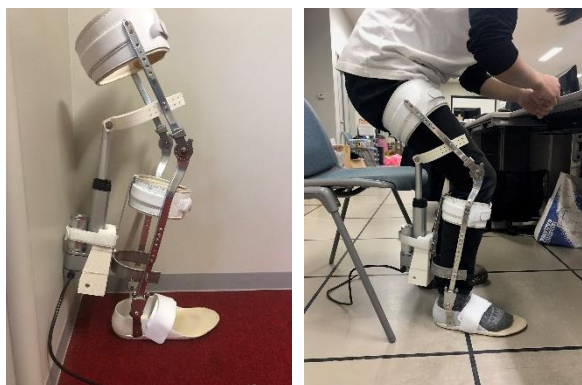


Figure 1. Actuator attached lower-limb orthosis

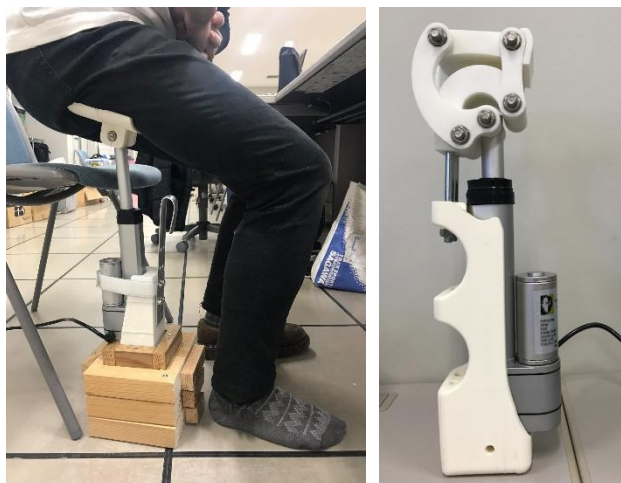


Figure 2. Push-up robotics to set under user’s thigh