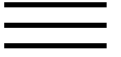


Robot-assisted movement training compared with conventional therapy techniques for the rehabilitation of upper-limb motor function after stroke.

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Presented in part at the American Academy of Physical Medicine and Rehabilitation's annual assembly, 1999, Washington, DC; the 1st Annual Meeting of the Rehabilitation Research and Development Service, 1998, Washington, DC; the International Conference on Rehabilitation Robotics, 1999, Palo Alto, CA; and the 2nd Annual Meeting of the Rehabilitation Research and Development Service, 2000, Washington DC.

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Abstract

Lum PS, Burgar CG, Shor PC, Majmundar M, Van der Loos M. Robot-assisted movement training compared with conventional therapy techniques for the rehabilitation

of upper-limb motor function after stroke. Arch Phys Med Rehabil 2002;83:952-9.

Objective: To compare the effects of robot-assisted movement training with conventional techniques for the rehabilitation of upper-limb motor function after stroke.

Design: Randomized controlled trial, 6-month follow-up. **Setting:** A Department of Veterans Affairs rehabilitation research and development center. **Participants:**

Consecutive sample of 27 subjects with chronic hemiparesis (>6mo after cerebrovascular accident) randomly allocated to group. **Interventions:** All subjects received twenty-

four 1-hour sessions over 2 months. Subjects in the robot group practiced shoulder and elbow movements while assisted by a robot manipulator. Subjects in the control group

received neurodevelopmental therapy (targeting proximal upper limb function) and 5 minutes of exposure to the robot in each session. **Main Outcome Measures:** Fugl-

Meyer assessment of motor impairment, FIM, instrument, and biomechanic

measures of strength and reaching kinematics. Clinical evaluations were performed by a

therapist blinded to group assignments. **Results:** Compared with the control group,

the robot group had larger improvements in the proximal movement portion of the

Fugl-Meyer test after 1 month of treatment ($P<.05$) and also after 2 months of

treatment ($P<.05$). The robot group had larger gains in strength ($P<.02$) and larger

increases in reach extent ($P<.01$) after 2 months of treatment. At the 6-month follow-

up, the groups no longer differed in terms of the Fugl-Meyer test ($P>.30$); however, the

robot group had larger improvements in the FIM ($P<.04$). **Conclusions:** Compared

with conventional treatment, robot-assisted movements had advantages in terms of

clinical and biomechanical measures. Further research into the use of robotic

manipulation for motor rehabilitation is justified. © 2002 by the American Congress of

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Keywords

Arm; Cerebrovascular accident; Movement; Rehabilitation; Robotics; Therapy

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