SIGNIFICANT IMPAIRMENT REDUCTION AND IMPROVEMENT IN FUNCTION

CHRONIC PATIENTS
In a multi-center, randomized controlled trial involving 127 chronic stroke patients with moderate to severe upper-limb impairment, therapy with InMotion Robots demonstrated significant improvement in impairment, function and quality of life as measured by the Fugl Meyer, Wolf Motor Function Test and SIS scales. Of notice, the control group receiving usual care did not improve and the investigators ended the control group for futility.

Average post stroke onset of 4.7 years, avg 33% with multiple strokes, avg Fugl Meyer Score at 18.9 - “the improvements… provide evidence of potential long-term benefits of rehabilitation and challenge the widely held clinical belief that gains in motor function are not possible for long term stroke survivors.”


SUBACUTE INPATIENTS
In a controlled clinical study involving 56 stroke inpatients, the motor skills of the robot treated group improved significantly more than the control group. Analysis showed that interactive robotic therapy with InMotion Robots significantly reduced motor impairment of the treated limbs on the Fugl Meyer scale, decreased motor impairment on the Motor Power Scale and improved FIM motor scores by 5.5 points higher than control group.


EVIDENCE OF REDUCTION IN COST – IMPLICATIONS FOR COST SAVINGS IN HEALTH CARE SYSTEMS
A U.S. based government health care system tracked overall healthcare utilization expenditures of those patients using InMotion Robots for 36 weeks and found their healthcare costs were lower on average by $6400/patient compared to the usual care group.


Current study - 720 patients – underway in the U.K. under the National Health Service. Health Technology Assessment program is using InMotion Robots to assess resource use in addition to clinical outcomes and other measures.
See RATULS > https://research.ncl.ac.uk/ratuls/

SUSTAINED IMPROVEMENTS
Patients from an early clinical study were recalled up to three years later, and those patients who received interactive robotic therapy sustained their improvement over those who did not. Subsequent follow-up studies confirmed the findings.


IMPROVEMENT IN COORDINATION AND FUNCTION FOR CHILDREN
12 children ages 5-12 with Cerebral Palsy and upper-limb hemiplegia received robotic therapy twice a week for 8 weeks. The children showed significant improvement in total Quality of Upper Extremity Skills Test (QUEST) and Fugl-Meyer Assessment Scores.

A questionnaire administered to the children’s parents also showed significant improvement in how the children used the paretic arm during functional tasks at home.

SPATIAL TRAINING VS. GRAVITY COMPENSATED TRAINING
Gravity compensated training alone produces better outcomes than when it is combined during the same session with spatial reaching movements.


EVALUATION AND PREDICTIVE CAPABILITY OF INMOTION ROBOT METRICS
Using objective, quantifiable and reproducible robot metrics can offer faster outcome evaluations and eliminate high variability between clinicians. One study demonstrated the feasibility of developing models to calculate scores for the FMA, MSS and MP from the robot metrics given the high correlation. Another study of 208 patients demonstrated that InMotion robotic measures of kinematics and kinetics can provide superior biomarkers for motor recovery that these measures definitively predicted standard clinical outcome measures, like Fugl Meyer, Motor Power and NIH Stroke Scale.

(Bosecker, C., “Kinematic Robot-Based Evaluation Scales and Clinical Counterparts to Measure Upper Limb Motor Performance in Patients with Chronic Stroke,” NeuroRehabilitation and Neural Repair, Online Aug 14, 2009)

(VIRTUAL) FUNCTIONAL TRAINING VS. IMPAIRMENT BASED TRAINING
Comparison of training functional movement of transport of the arm and grasping object with transport of arm in isolation in 47 chronic stroke patients for 6 weeks showed that training transport of the arm in combination with manipulation of an object (real or virtual), did not provide advantage over training just movement of the arm. Subsequent studies confirm findings.

(Milot, M-H, Reinkensmeyer, D.J. et.al., “A crossover pilot study evaluating the functional outcomes of two different types of robotic movement training in chronic stroke survivors using the arm exoskeleton BONES,” Journal of Neuroengineering and Rehabilitation, 2013, 10:112)

CONSISTENT INCLUSION IN SCIENTIFICALLY RECOGNIZED SYSTEMATIC REVIEWS AND META-ANALYSES
InMotion Robots are consistently included in highly recognized meta-analyses and literature reviews for meeting the strictest and highest level of scientific rigor, including controlled, randomized, blinded and multi-site trials with significant patient populations.


GAINS IN FUNCTIONAL OUTCOMES AS WELL AS IMPAIRMENT MEASURES
All groups realized improved outcomes in the AMAT as well as Fugl Meyer scores, but intensive Motor Learning (ML) as described in the study is not a sustainable clinic-based option. Since stroke survivors get better outcomes when combining ML with robotic technology, rather than just ML alone, a 1:3 therapist to patient ratio in ML can be reasonable and sustainable when combined with technology where therapists provide oversight and supervision rather than direct hands on therapy.


PROMISING RESULTS COMBINING ROBOTICS WITH NEUROMODULATION TECHNIQUES
In 12 chronic stroke patients, motor performance kinematics improved when tDCS was delivered prior to robotic training.


Another yet unpublished study shows promising outcomes combining tDCS with InMotion robotics for a larger group of patients.

To see how Interactive Motion Technologies is redefining recovery™ visit www.interactive-motion.com or call +1 617.926.4800