**Robot Assisted Training for the Upper Limb after Stroke (RATULS): a multi-centre randomised controlled trial comparing robot-assisted training; an enhanced upper limb therapy programme; and usual care.**

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**Background:** Robot-assisted training may improve outcomes after stroke. We compared the clinical effectiveness of robot-assisted training (RT) to an enhanced upper limb therapy programme (EULT) and to usual care (UC).

**Methods:** RATULS was a multicentre RCT undertaken in four UK centres. Stroke patients with moderate/severe upper limb functional limitation, between one week and five years following first stroke, were randomised to receive RT, EULT, or UC. The primary outcome was upper limb function “success” (defined using the Action Research Arm Test) at three months. Secondary outcomes were: ARAT score; upper limb impairment (Fugl-Meyer Assessment (FMA)); activities of daily living (Barthel ADL Index); and quality of life (Stroke Impact Scale (SIS)) measured at three and six months. Analyses were intention to treat.

**Findings:** 770 participants were randomised. The primary outcome of ARAT “success” was achieved in: RT 103 (44%); EULT 118 (50%); and UC 85 (42%). There was little evidence that either RT or EULT improved upper limb function compared to UC (adjusted Odds Ratio (aOR) 1·17 (98⅓% CI 0·70 to 1·96), (aOR 1·51 (98⅓%CI 0·90 to 2·51)), or that RT differed from EULT (aOR 0·78 (98⅓% CI 0·48 to 1·27)).

RT had less upper limb impairment (FMA motor subscale) compared to UC at three and six months: adjusted mean difference 2·79 (98⅓% CI 0·66 to 5·01) and 2·54 (98⅓% CI 0·10 to 5·06) respectively. RT had worse SIS ADL performance than EULT at three months (adjusted mean difference -4·81 (98⅓ CI -9·48 to -0·12)). No other potentially clinically important differences were seen between RT and UC or RT and EULT.

EULT had less upper limb impairment, better mobility and better ADL than UC at 3 months (adjusted mean differences: FMA motor subscale 2·96 (98⅓% CI 0·86 to 5·02); SIS mobility 5·81 (98⅓% CI 0·45 to 11·20); SIS ADL 5·55 (98⅓% CI 0·87 to 10·21)). No other clinically important differences were seen between EULT and UC.

**Interpretation:** There was little evidence that RT and EULT improved upper limb function post stroke compared to UC. Although RT improved upper limb impairment, this did not translate into improvements in upper limb function or ADL compared to UC. EULT improved impairment, mobility and ADL at three months compared to UC.