# 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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#### Trial design Screening/baseline assessment/randomisation 770 adults 1 week to 5 years post stroke with moderate to severe arm functional limitation. **Enhanced upper limb** Robot assisted training Usual care (UC) (RT) (n=257) therapy (EULT) (n=259) (n=254)Provided for 45 min, 3 days Provided for 45 min, 3 days Participants received usual per week for 12 weeks per week for 12 weeks post stroke care Three month outcome assessment 1. Upper limb function (Action Research Arm Test) 2. Upper limb impairment (Fugl-Meyer Test) 3. Activities of daily living (Barthel ADL Index) 4. Quality of life (Stroke Impact Scale, EQ-5D-5L) 5. Adverse events including upper limb pain Six month assessment Outcome measures as above plus resource usage

### Study centres

Queen Elizabeth Hospital, Glasgow
(NHS Greater Glasgow and Clyde)
222 participants

North Tyneside General Hospital
(Northumbria Healthcare NHS Foundation Trust)
237 participants

Queen's Hospital, Romford
(Barking, Havering and Redbridge
University Hospitals NHS Trust)
194 participants

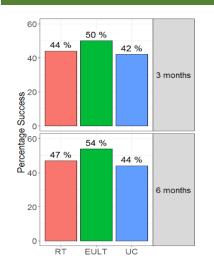


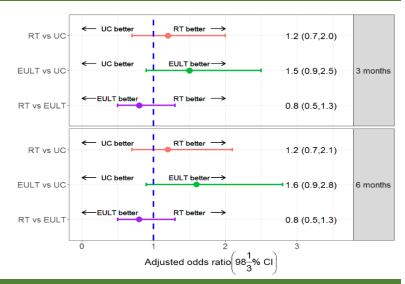




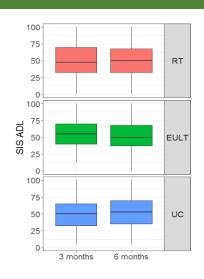
## Results

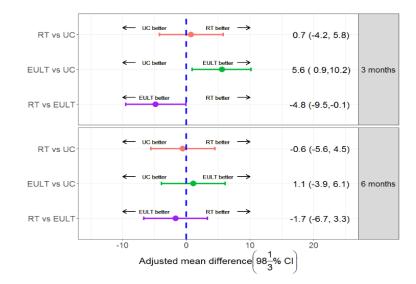
#### Upper limb function: ARAT success (primary outcome)



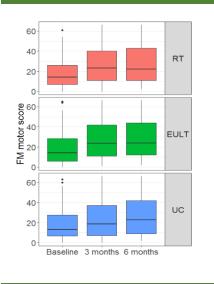


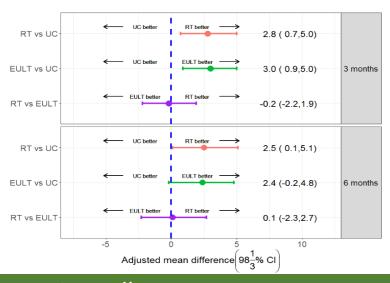
#### Activities of daily living: Stroke Impact Scale





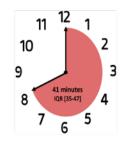
#### Upper limb impairment: Fugl-Meyer motor score





#### Intervention adherence

#### Median time on robot within RT sessions



RT

87%
sessions attended

Median number of sessions:
35 [IQR 31-36]

EULT

84%
sessions attended

Median number of sessions
34 [IQR 29-36]

Median therapy time

within EULT sessions

Total duration on robot for RT programme:

Median 23 hr 28 min

[IQR 18hr 53min-25hr 46min]

Total duration of therapy for EULT programme: Median 24 hr 40 min [IQR 20hr 24min-26hr 15min]

## Conclusions

#### Primary outcome: ARAT success at 3 months

- RT using the MIT-Manus robotic gym (shoulderelbow, wrist and hand modules) did not improve upper limb function when compared to EULT or UC
- EULT did not improve upper limb function when compared to UC

#### Activities of daily living: Stroke Impact Scale

 EULT led to improvements in ADL compared to RT or UC





#### Upper limb impairment: Fugl-Meyer motor score

 RT and EULT led to improvement in upper limb impairment compared to UC

#### Further information

- For more information please visit: <u>http://research.ncl.ac.uk/ratuls/</u>
- Trial results to be published in The Lancet on 22<sup>nd</sup> May 2019



