

Evaluating the need for a new clinical decision support tool in knee arthroplasty rehabilitation

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Background

- Physical therapists use range of motion (ROM) and functional measures like the Timed Up and Go (TUG) to monitor patient recovery after total knee arthroplasty (TKA).¹
- We recently devolved a clinical decision support tool which predicts ROM and TUG recovery after knee replacement; we believe this tool may augment physical therapists' ability to predict and monitor patients' post-TKA recovery.

Purpose

To assess physical therapists' confidence and accuracy in predicting post-TKA recovery of ROM and TUG prior to implementation of our clinical decision support tool.

Design

Prediction confidence - survey

- Eight physical therapists from two ATI Physical Therapy clinics in Greenville, SC
- Physical therapists completed surveys during the pre-implementation training for our clinical decision support tool

Survey

How confident do you feel predicting the rate of recovery for knee flexion ROM and TUG for individuals with TKA?

0	1	2	3
Not at all confident	Somewhat confident	Confident	Very Confident

Prediction accuracy – retrospective analysis

- Physical therapists collect data for all patients with TKA as part of a quality improvement initiative at the participating clinics
- Dataset includes patient demographics, ROM, TUG, and other clinical measures collected throughout routine TKA rehabilitation
- At the first postoperative visit, therapists predict the patient's discharge knee flexion ROM and TUG values
- 477 patient records screened for inclusion

Inclusion criteria

- Observations $\leq$ 21 days from discharge
- Patient records with episode duration $\geq$ 30 days

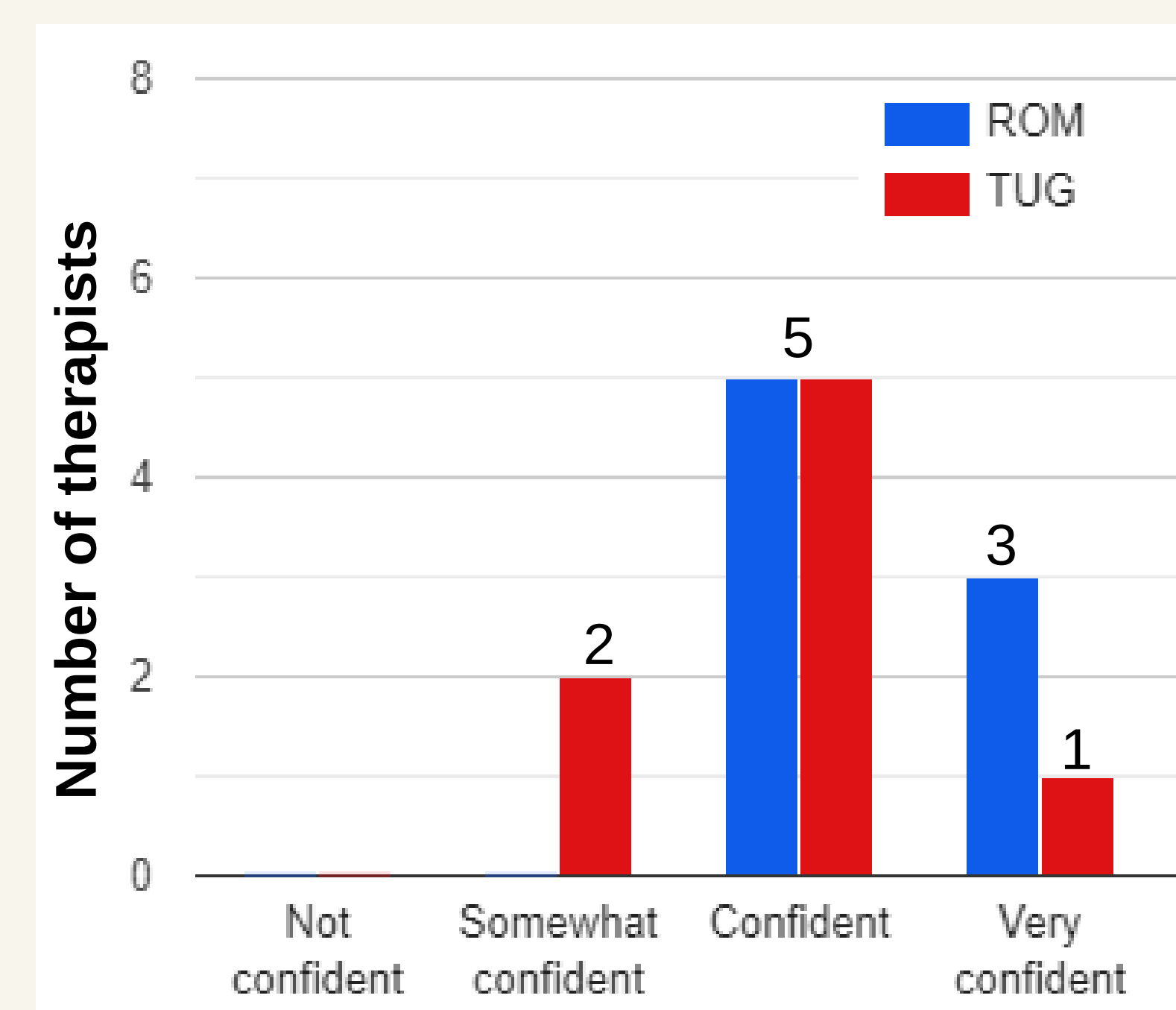
Statistical analysis

- Predicted vs. observed ROM and TUG at discharge
 - Correlation (Pearson's r)
 - Agreement (Bland-Altman plot)

Results

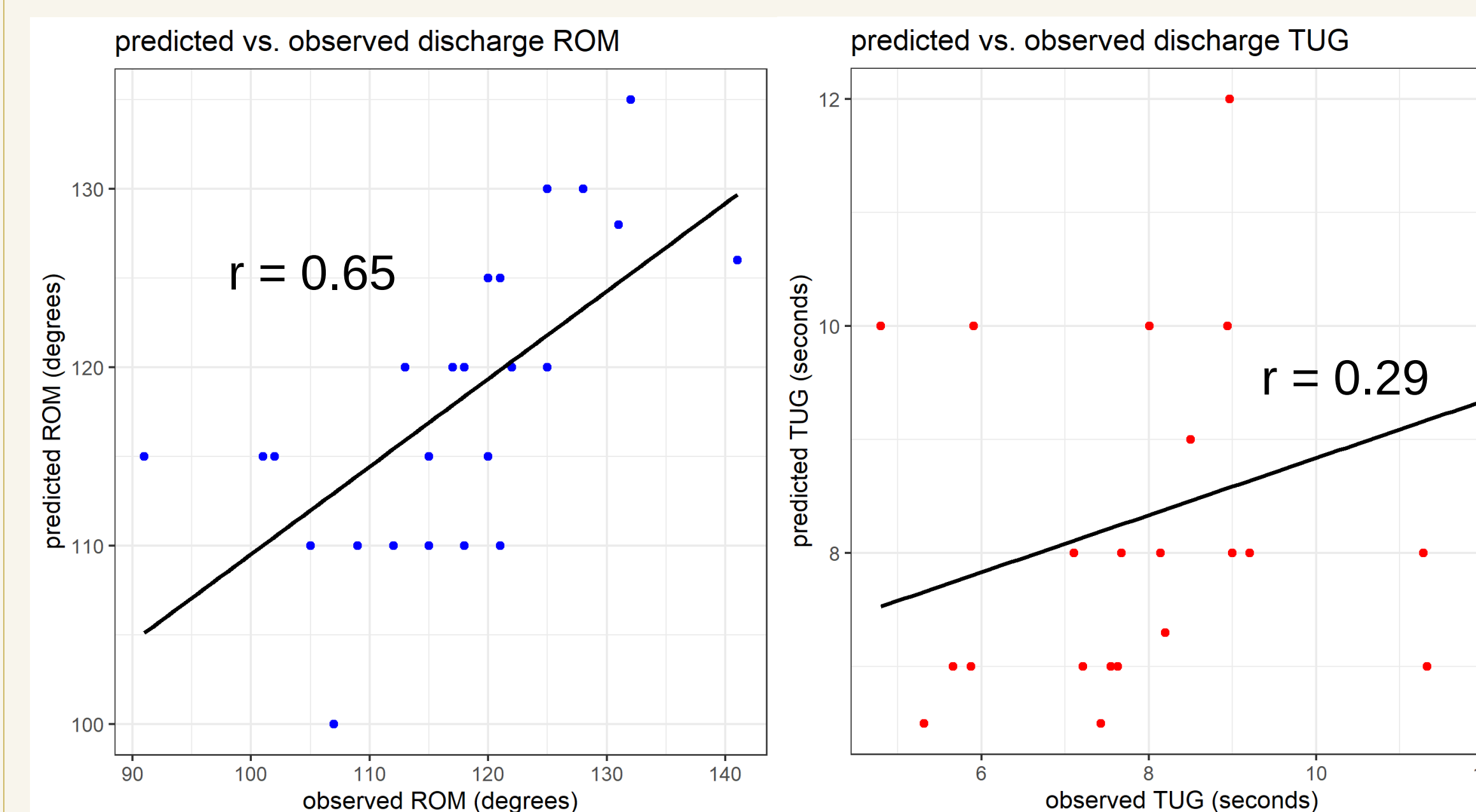
Records analyzed: 25 for ROM and 22 for TUG

Survey



Physical therapists were confident in their ability to predict post-TKA outcomes

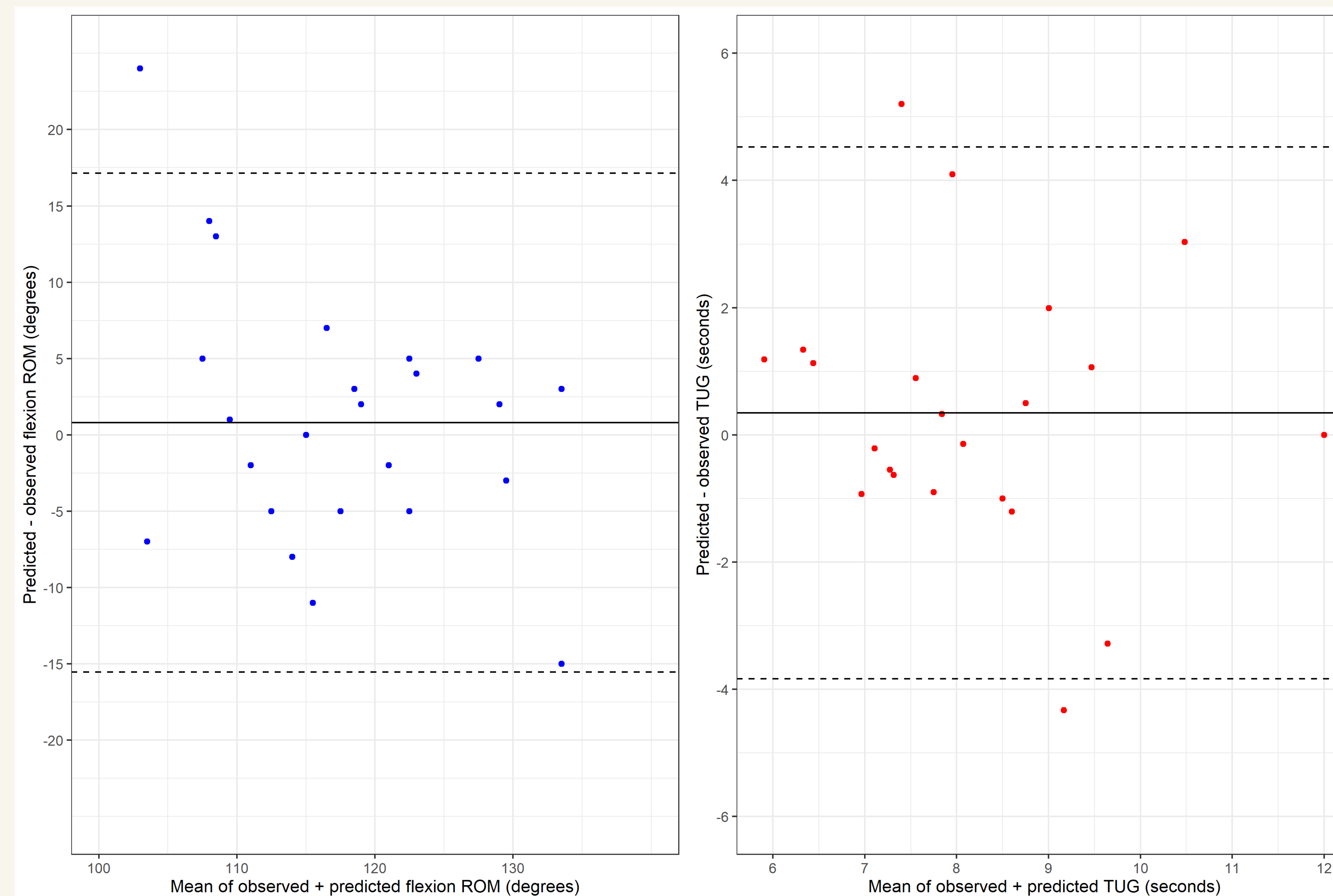
Predicted vs. Observed Correlation²



Moderate ROM correlation ($r = 0.65$)

Weak TUG correlation ($r = 0.29$)

Predicted vs. Observed Agreement³



ROM limits of agreement:
 0.8 ± 16.3 degrees

TUG limits of agreement:
 0.3 ± 4.2 seconds

Discussion

- Overall, physical therapists were confident in their ability to predict ROM and TUG recovery in post-TKA rehabilitation (ROM > TUG).
- The correlations between predicted and observed discharge values suggests our clinical decision support tool may be most helpful for predicting and monitoring TUG recovery.
- The limits of agreement between predicted and observed values exceeded the minimal detectable change for both ROM⁴ and TUG.⁵ This lack of agreement suggests our clinical decision support tool may provide clinically-meaningful improvements in physical therapists' ability to predict and monitor post-TKA recovery.

Limitations

- Many patient records did not meet our inclusion criteria; our results may not be generalizable to all patients with TKA at the participating clinics.
- Physical therapist predictions were anchored to discharge instead of a discrete postoperative timepoint; therapist accuracy may differ when predicting recovery at specific timepoints.

Conclusions

Physical therapists were confident in their ability to predict post-TKA recovery outcomes. However, our results suggest that therapists' prediction accuracy could be meaningfully improved—especially for TUG recovery. Our clinical decision support tool may provide physical therapists with a relative advantage over standard practice for predicting and monitoring patient recovery after TKA. We are currently evaluating the tool's preliminary effectiveness and implementation potential at the participating ATI Physical Therapy clinics.

References

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