

Baseline Ankle Dorsiflexion Does Not Predict Functional Recovery in a Military Ankle Rehabilitation Program

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INTRODUCTION

- Lateral ankle sprains are among the most common musculoskeletal injuries in military Service members.
- Restricted weight-bearing dorsiflexion (WBDF) range of motion frequently accompanies these injuries and is routinely measured at PT evaluations.
- **Purpose:** Determine whether baseline WBDF ROM is related to functional rehabilitation response.
- **Hypothesis:** Greater WBDF restriction predicts smaller functional improvements after a structured ankle rehab program.

METHODS AND MATERIALS

- **Participants:** n = 143 active-duty Service members with lateral ankle sprain within the prior 12 weeks, across 3 military treatment facilities.
- **Intervention:** Structured 6-week ankle rehabilitation program; pre- and post-intervention assessments.
- **Predictor:** Baseline WBDF via knee-to-wall test on the involved (or more-severe, if bilateral) limb.
- **Functional outcomes** (bilateral + limb symmetry indices, LSIs):
 - Y-Balance Test (YBT)
 - Side Hop
 - Edgren Side Step
 - T-Test
- **Analysis:**
 - Pearson correlations (baseline WBDF × change scores), Benjamini-Hochberg correction, $\alpha = 0.05$.
 - ANCOVA (Post ~ Pre + WBDF) to test added predictive value beyond baseline performance.

All functional outcomes improved after the 6-week program

Group mean +/- SD (n = 143)

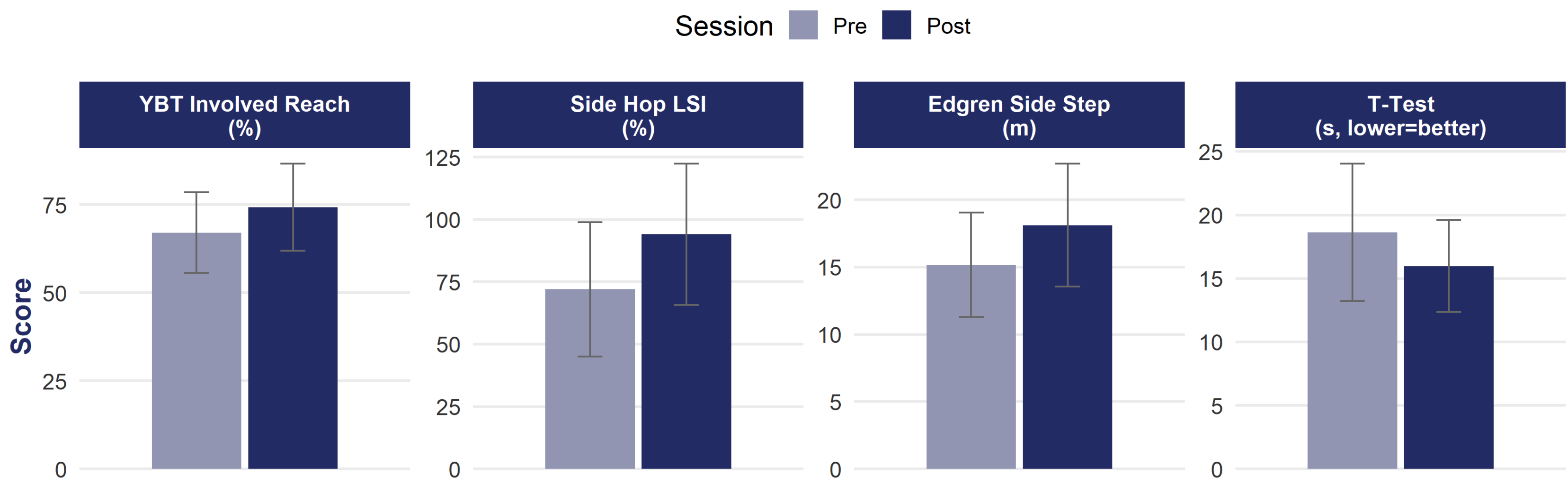


Figure 1: Functional performance improved across all measures after the 6-week program (group mean ± SD, n = 143).

RESULTS

- Mean baseline WBDF = 7.2 ± 3.5 cm (involved limb)
- All outcomes improved for all participants (Fig 1):
 - YBT (involved): +7.3%
 - Side Hop LSI: 72% → 94%
 - Edgren Side Step: +3.0 m
 - T-Test: -2.84 s
- After multiple-comparison correction, WBDF did not significantly predict improvement on any limb-specific or bilateral outcome (Table 1).
- Only 2 LSI correlations reached significance – and both were weak (Fig 2):
 - YBT LSI: $r = -0.22$, $p < .05$ (~5% of variance)
 - Side Hop LSI: $r = -0.25$, $p < .05$ (~6% of variance)
- ANCOVA: WBDF added no meaningful variance beyond baseline scores (all partial $\eta^2 < 0.06$).

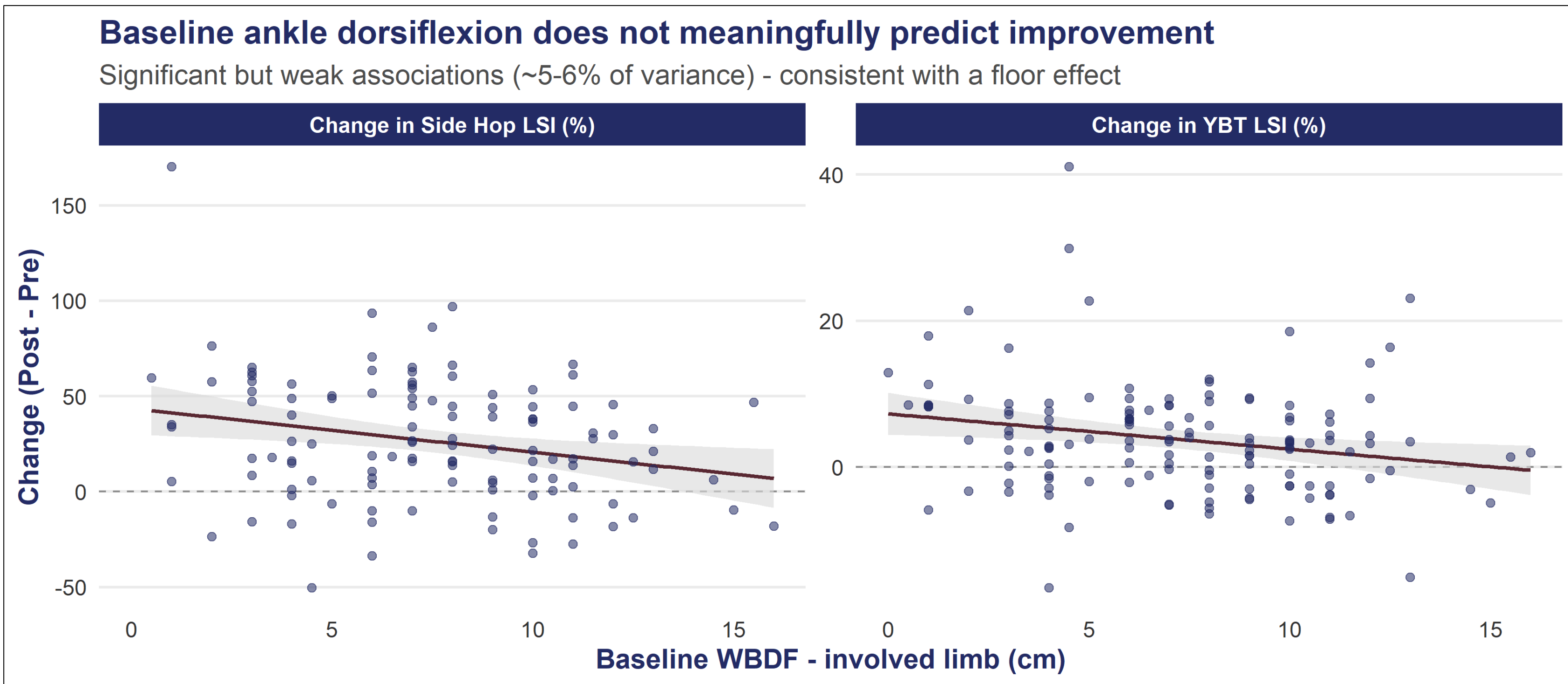


Figure 2: Baseline weight-bearing dorsiflexion (WBDF) showed only weak associations with change in limb symmetry (YBT LSI $r = -0.22$; Side Hop LSI $r = -0.25$), explaining ~5–6% of variance.

Table 1. Baseline WBDF vs. change in functional outcomes (Pearson)

Outcome	n	r	R2	p (raw)	p (BH-adj)	Sig
Change in YBT Involved Reach	139	-0.164	3%	0.054	0.120	
Change in YBT LSI	139	-0.224	5%	0.008	0.045	*
Change in Side Hop LSI	117	-0.246	6%	0.008	0.045	*
Change in Edgren Side Step	142	-0.051	0%	0.549	0.549	
Change in T-Test	132	-0.202	4%	0.020	0.075	

* significant after Benjamini-Hochberg correction ($\alpha = 0.05$)

Floor effect: lower dorsiflexion = worse baseline symmetry

Low-WBDF limbs start further from symmetry - more room to improve

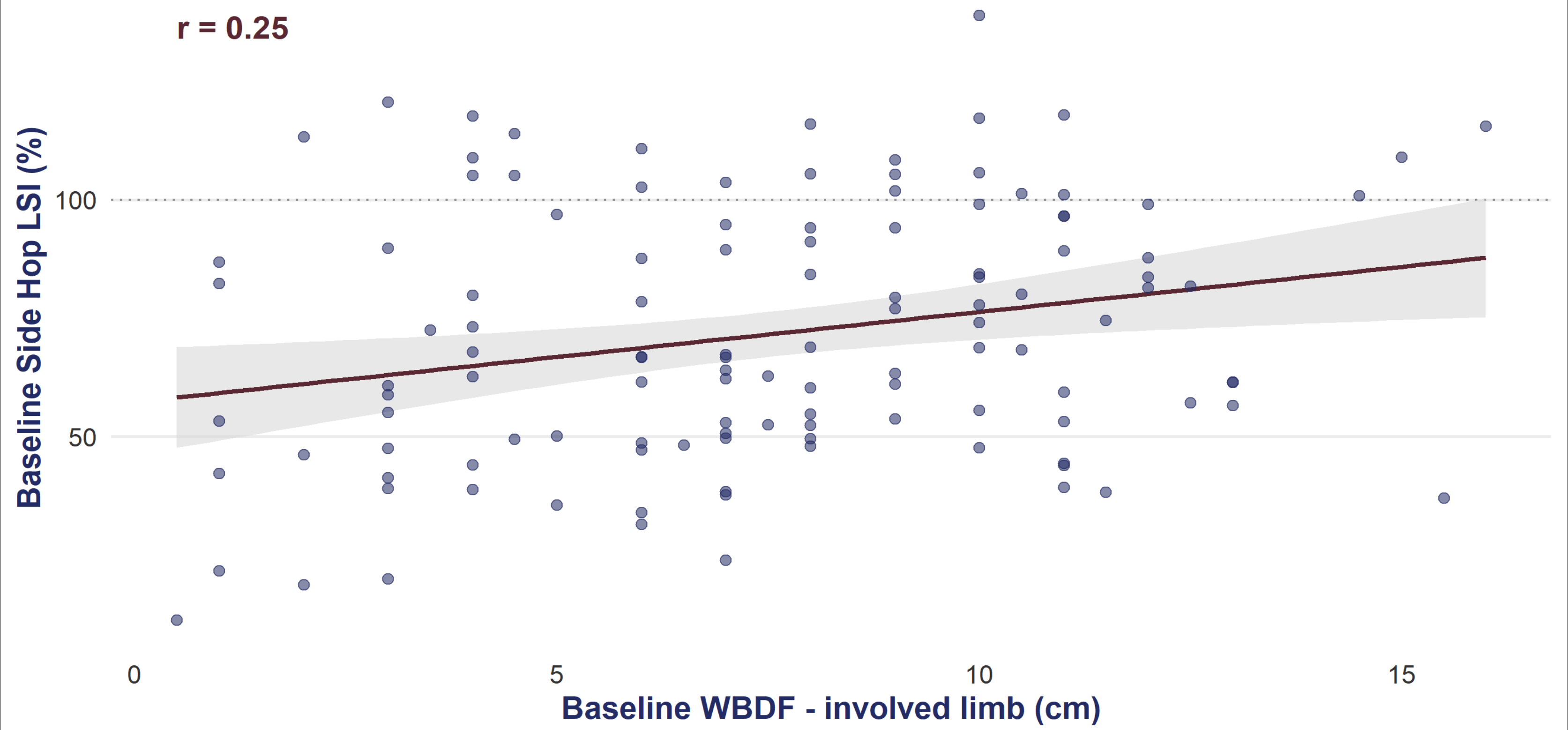


Figure 3. Lower baseline WBDF was associated with worse baseline Side Hop symmetry ($r = 0.25$), giving these limbs more room to improve.

DISCUSSION

- Baseline ankle dorsiflexion did not meaningfully predict short-term functional recovery.
- The two small significant LSI associations are best explained by a floor effect: participants with lower WBDF also had worse baseline symmetry, leaving more room to improve (Fig 3).
- These associations explained only 5–6% of variance
- Service members with restricted mobility improved comparably to those with greater mobility.

CONCLUSIONS

- Knee-to-wall WBDF ROM should not be used to set rehabilitation expectations or predict recovery in military Service members.
- Restricted baseline ankle mobility is not a barrier to short-term functional gains.
- Clinicians should use caution when interpreting WBDF as a prognostic indicator.

DISCLAIMER

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