

Precision and Reliability of Self-Assessed Neck Strength in UK Youth Rugby Using a Novel Protocol and Fixation Device

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³The Blues – Youth Development, London, UK

⁴Centre for Health and Rehabilitation, University College Absalon, Roskilde, DK



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2.4 – 3.6

80–120 injuries per 1,000 player-match-hours (!)

21.5 head injuries/1000
player-match-hours

2/3



RUGBYPASS



RugbyWA

Neck strength might be
a risk mitigator...

Neck Strength as a Protective Factor:

For every one-pound increase in neck strength, the odds of concussion decreased by 5%

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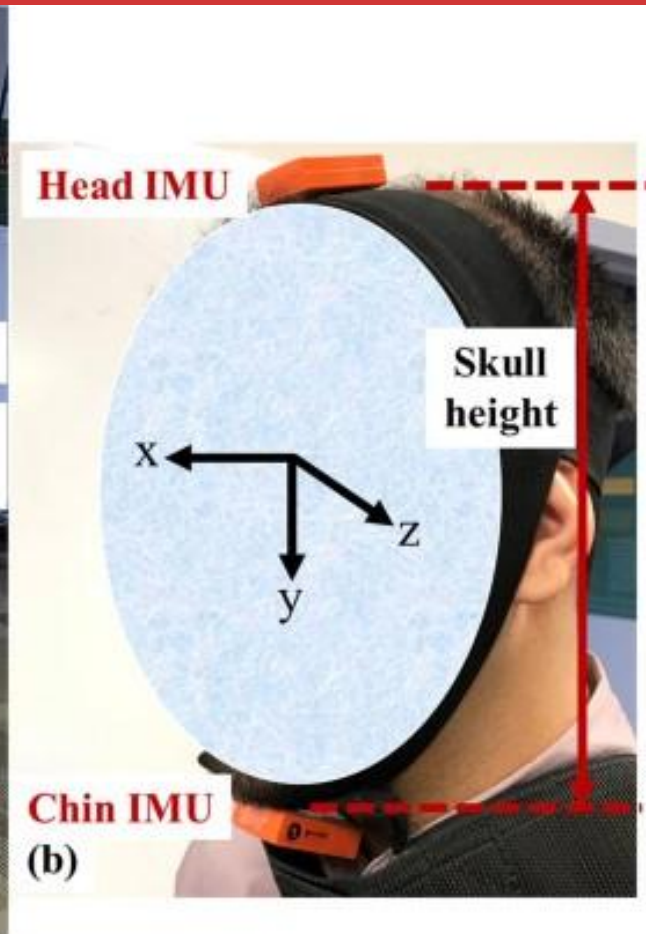
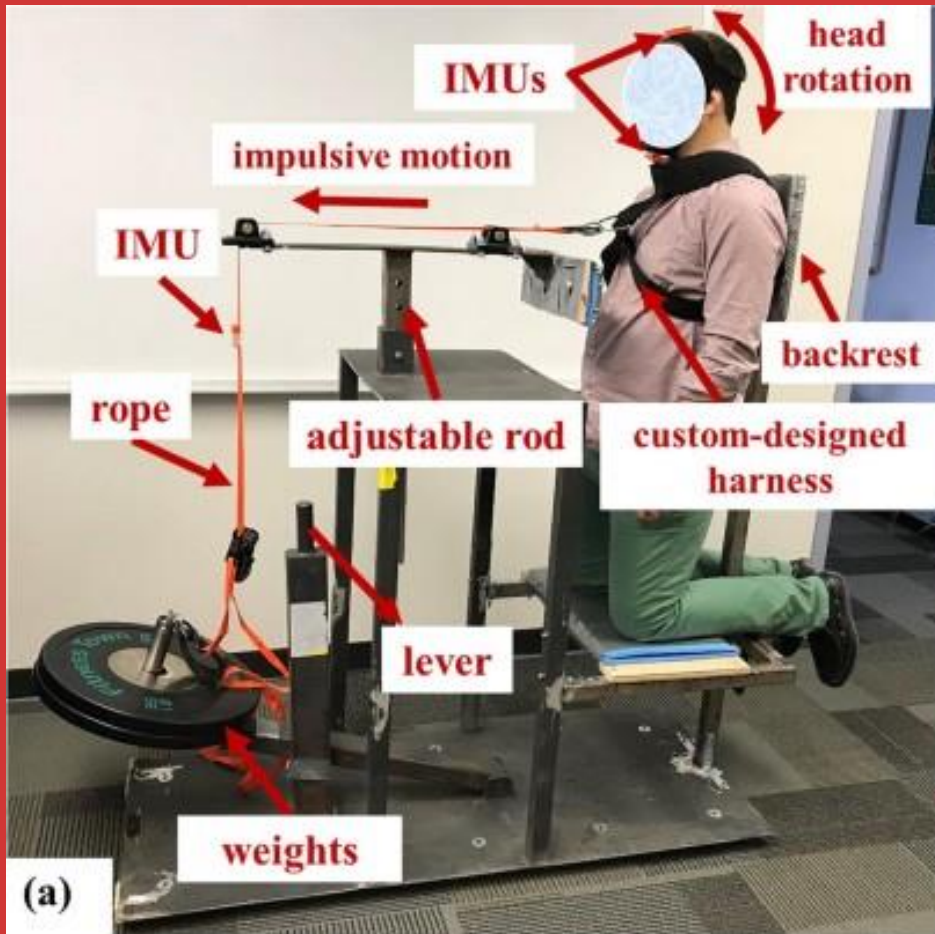


Getting stronger necks might protect
you from concussions...

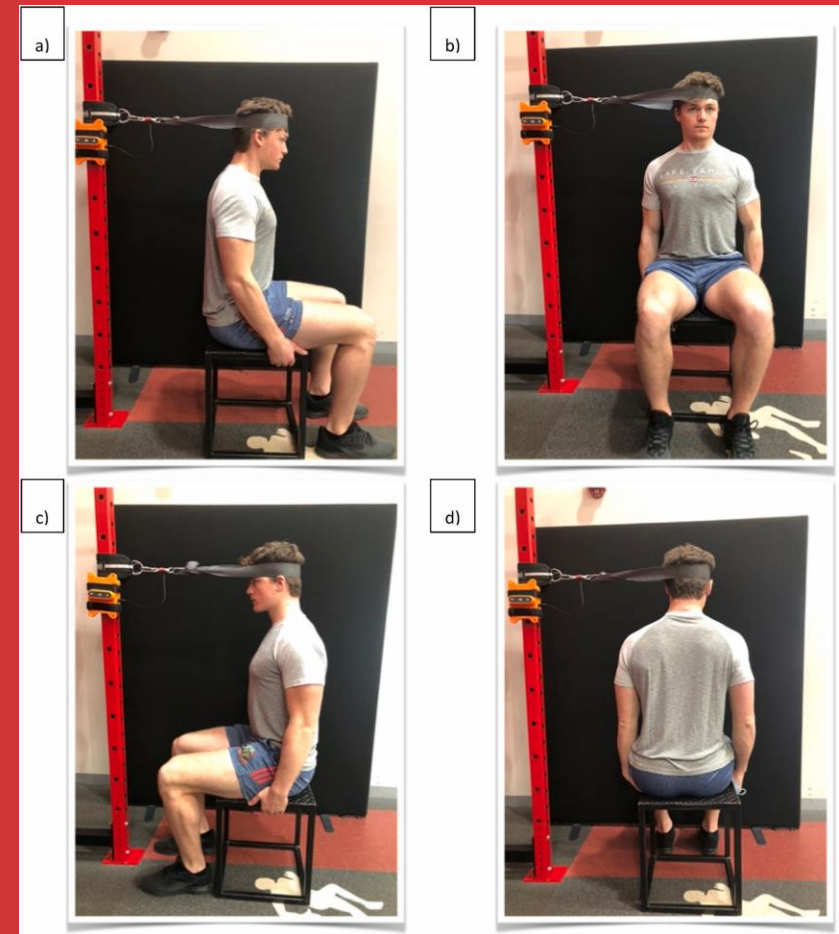
...but how do we know if our athletes
are actually getting stronger??



Collins et al. (2014)



Nazarahari et al. (2020)



Fuller et al. (2022)





What if...

Neck strength could be assessed
with minimal supervision?

SELF-ASSESSED?

Original Research

Reliability and Validity of the ActivForce Digital Dynamometer in Assessing Shoulder Muscle Force across Different User Experience Levels

Christos Karagiannopoulos¹ ^a, Sean Griech¹ , Brian Leggin²

¹ Doctor of Physical Therapy Program, DeSales University, ² Penn Therapy and Fitness, Good Shepherd Penn Partners

Keywords: ActivForce, microFET2, hand-held dynamometer, psychometric properties, clinical experience

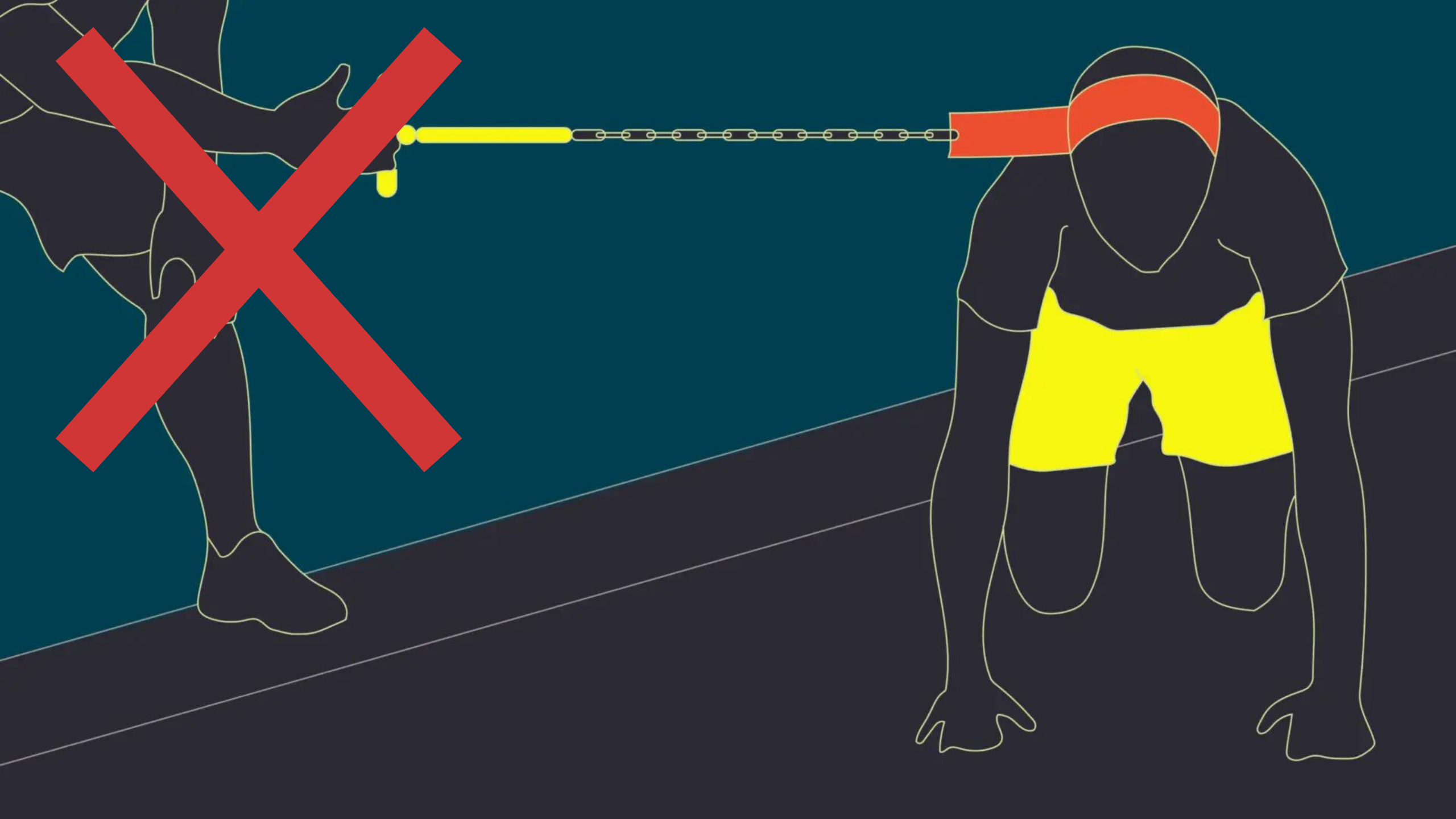
<https://doi.org/10.26603/001c.35577>

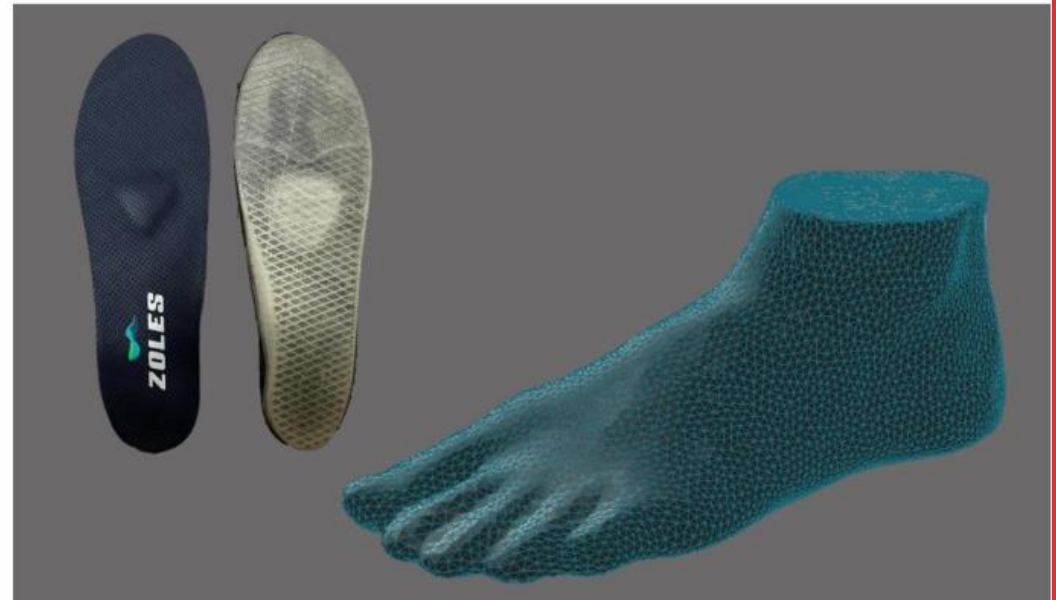
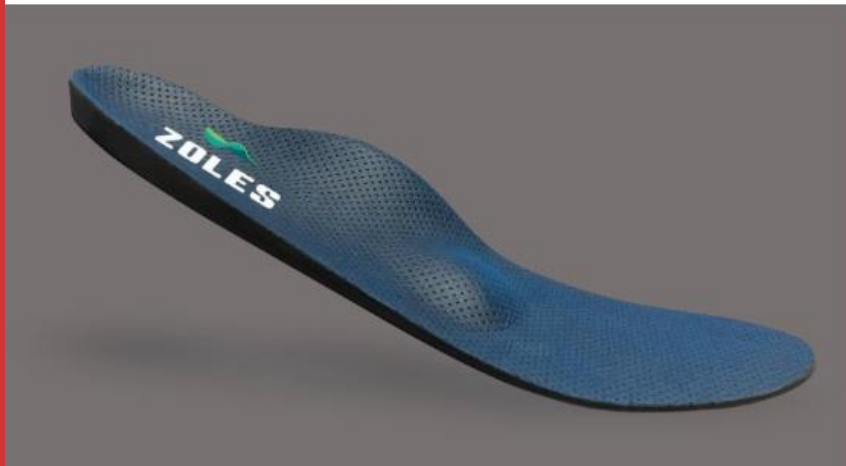
International Journal of Sports Physical Therapy

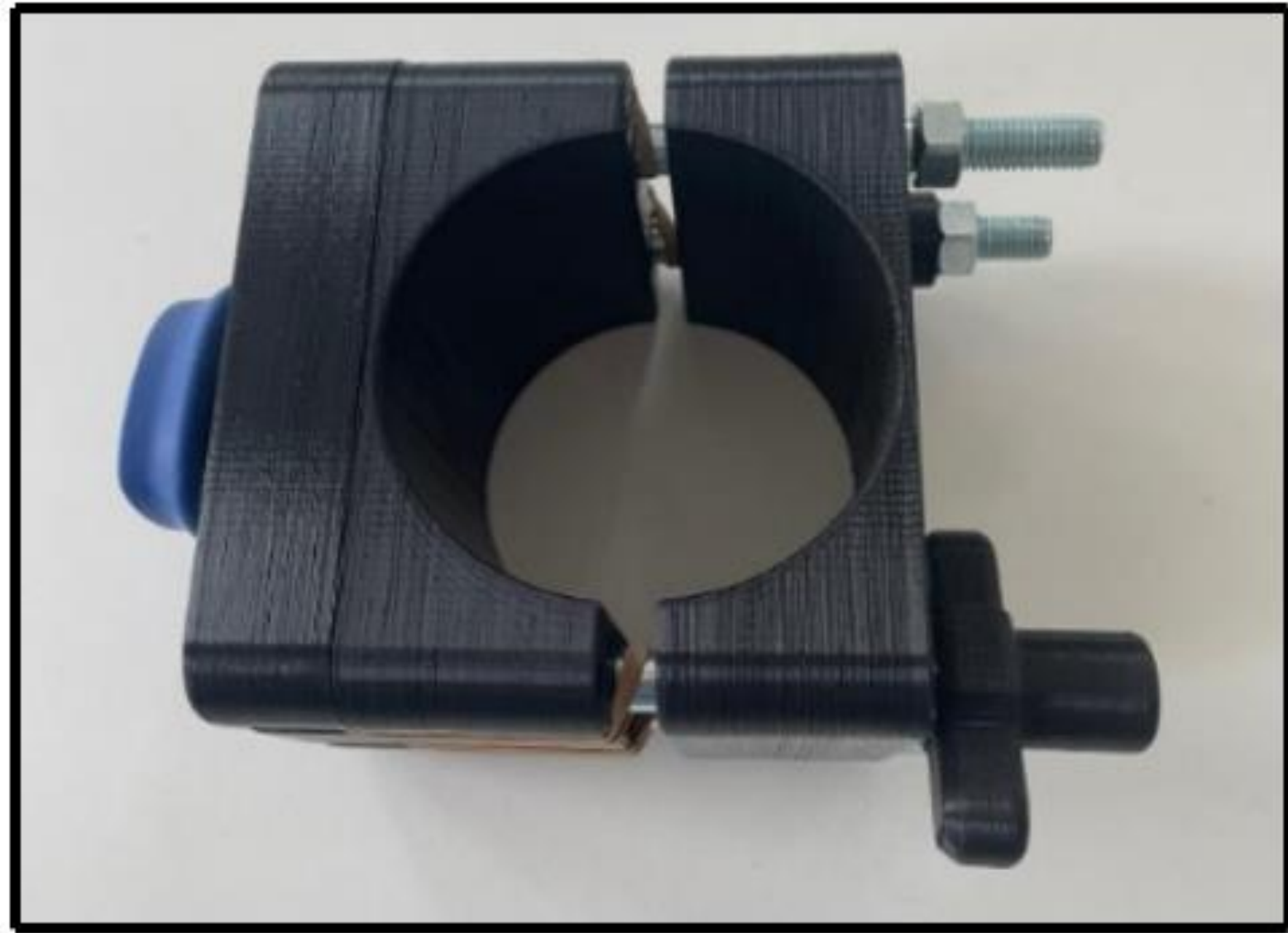
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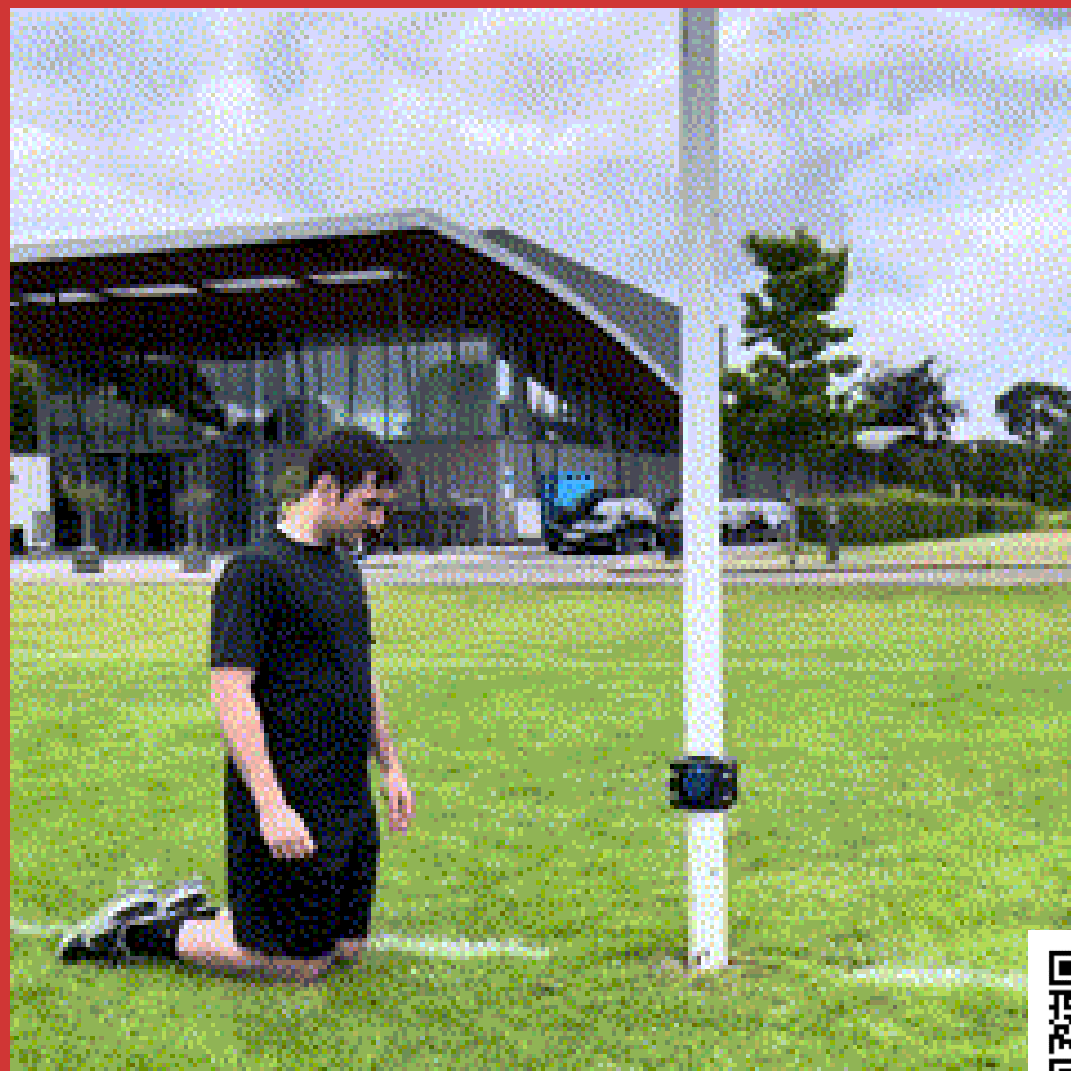






Test protocol and
3D-print files
available [here!](#)





Is this a precise and
reliable method in
assessing neck strength?

Methods

- 🧠 Test-retest reliability study
- 🧠 20 Youth Rugby Union Players
- 🧠 Tested twice on day 1, and once on day 2
 - 🧠 Three repetitions for each direction
- 🧠 Within- and between-day reliability via ICC (3,k)
- 🧠 Precision via SEM and MDC

$$SEM = SD \times \sqrt{1 - ICC}$$

$$MDC = SEM \times 1.96 \times \sqrt{2}$$

Methods

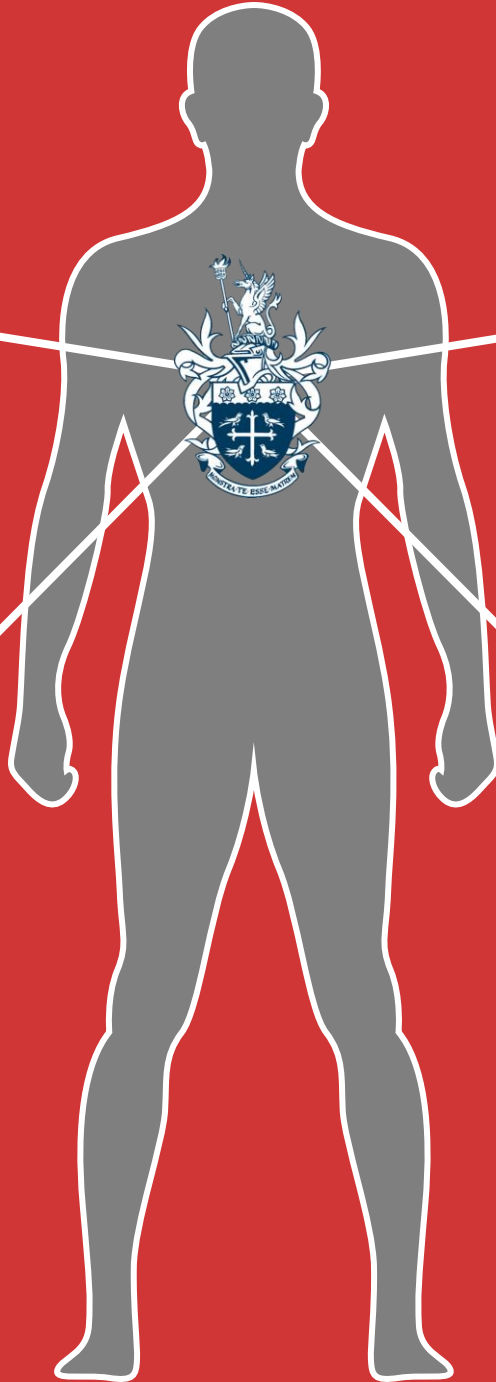
**AB
SAL
ON**

14-22
years

50%
Girls

1.72m
(0.12)

78kg
(17.6)

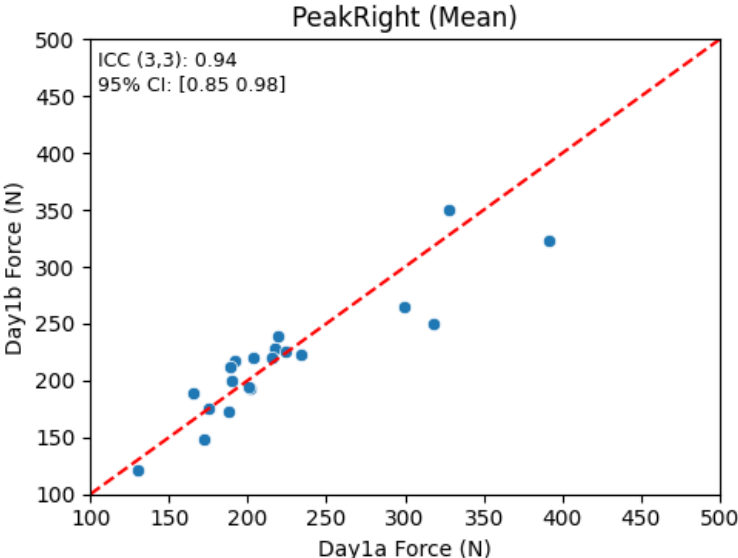
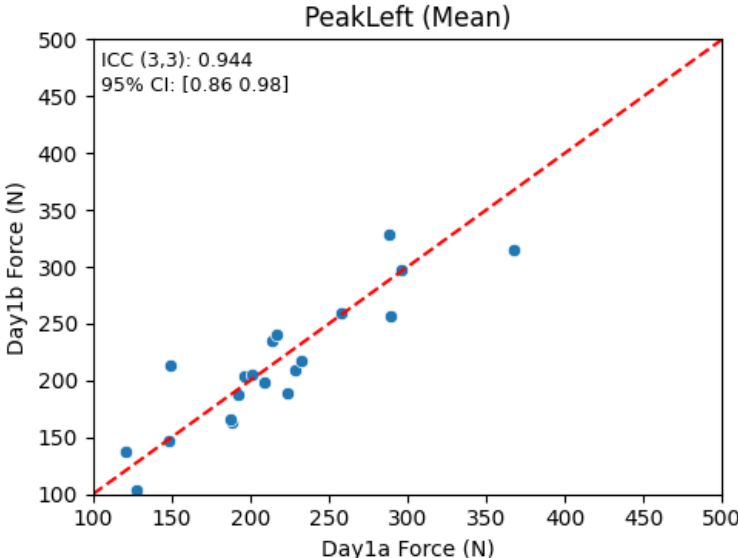
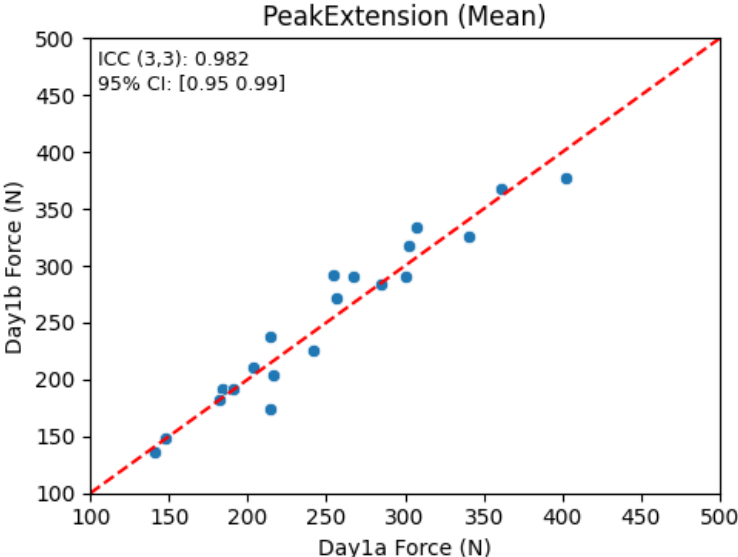
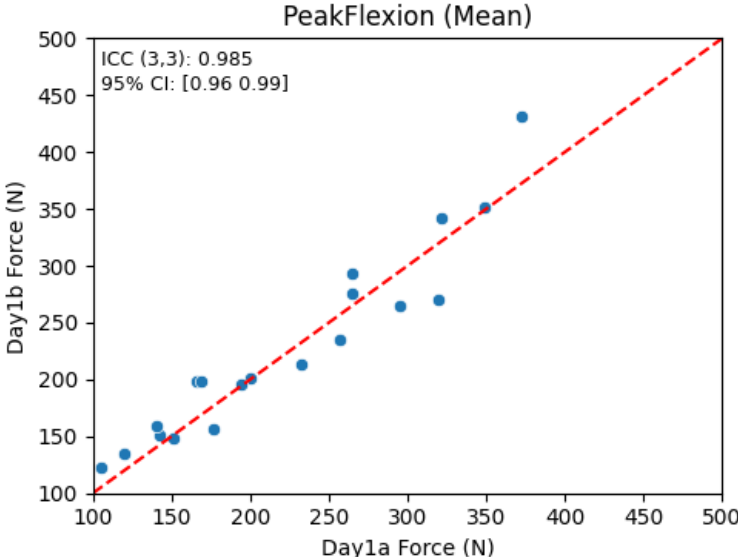


RESULTS

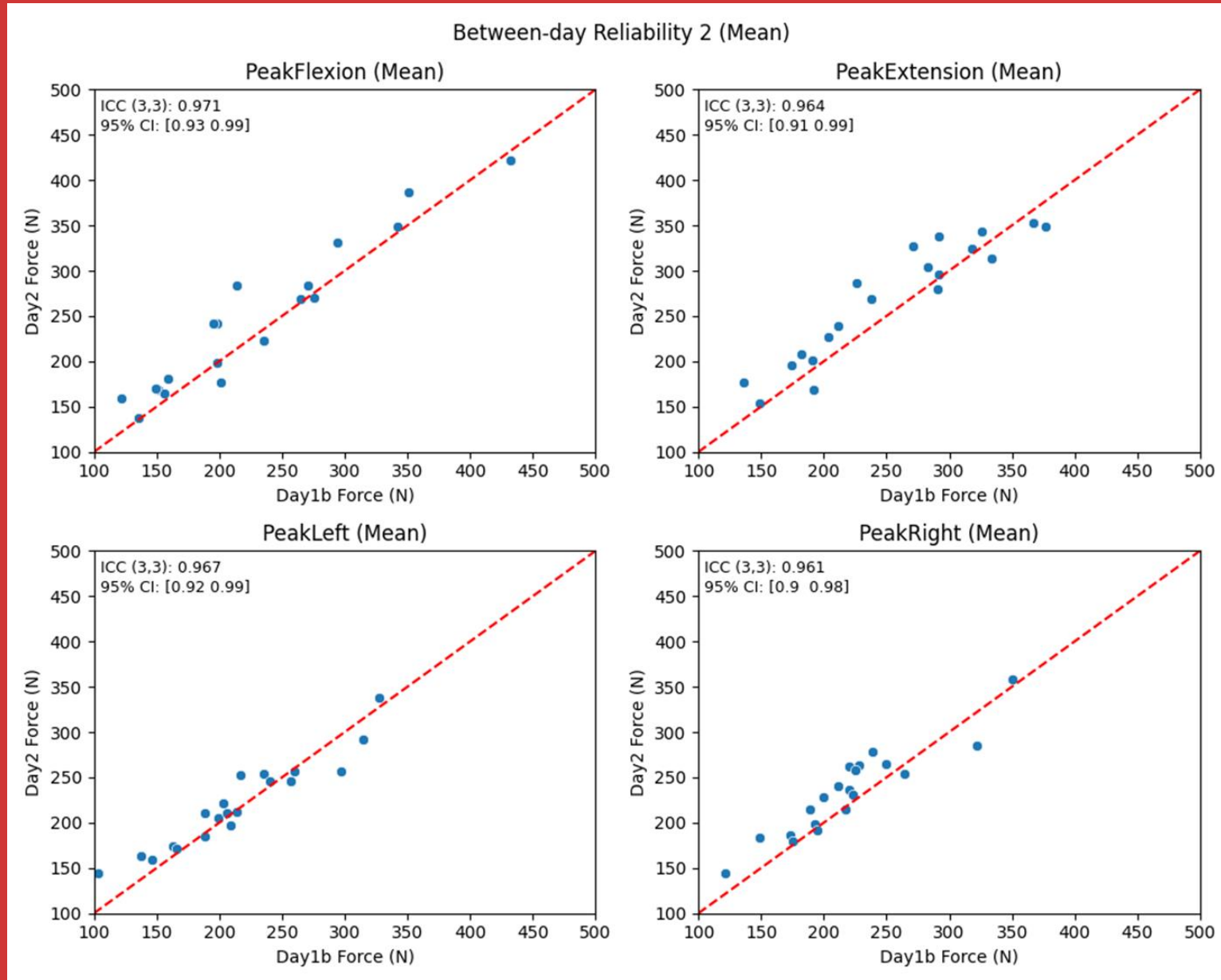
Within-day reliability

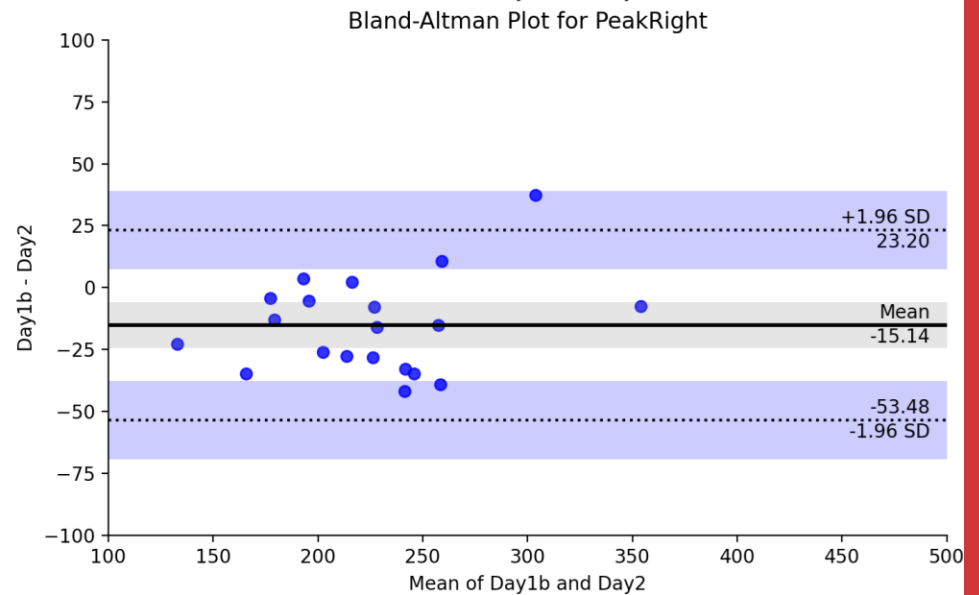
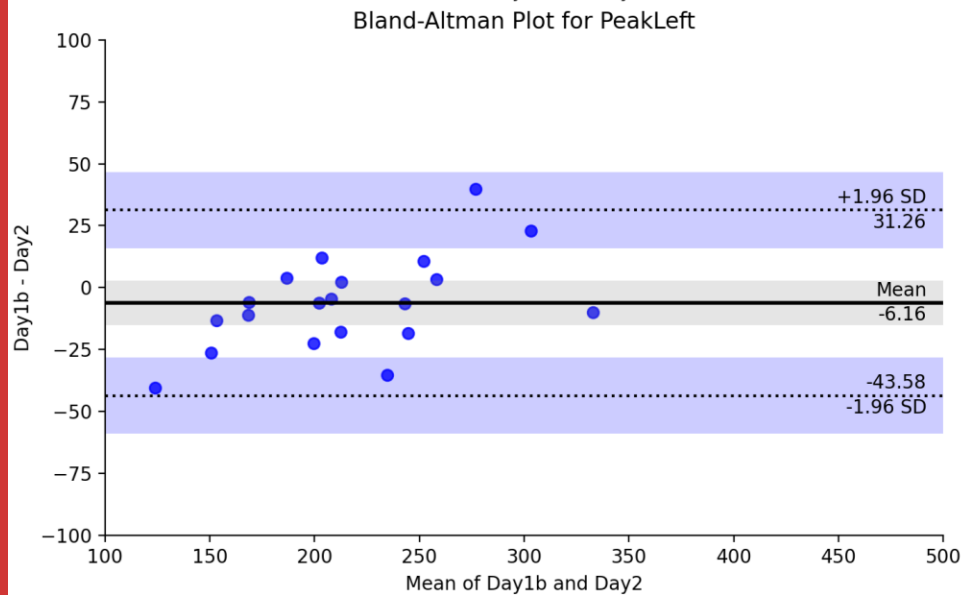
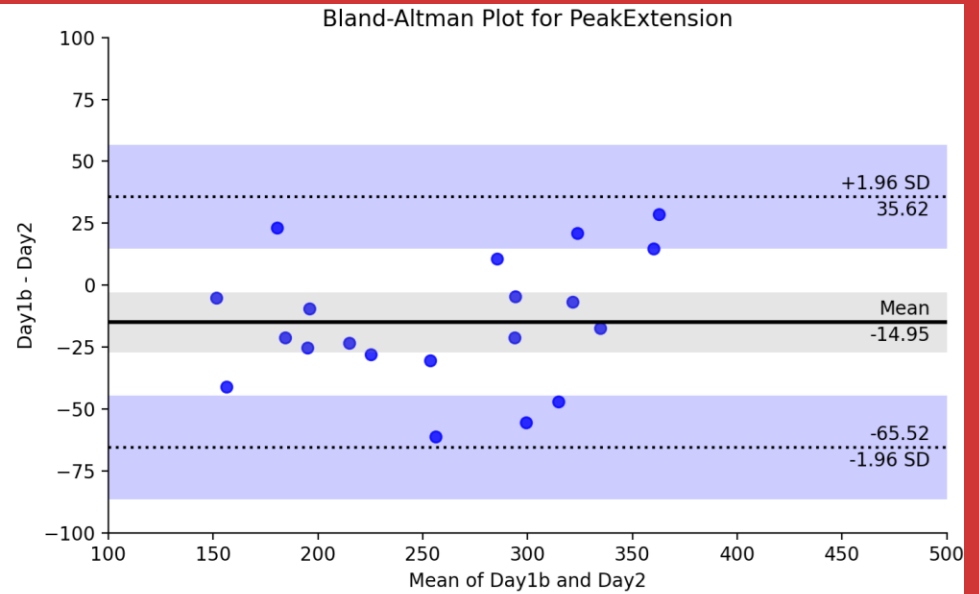
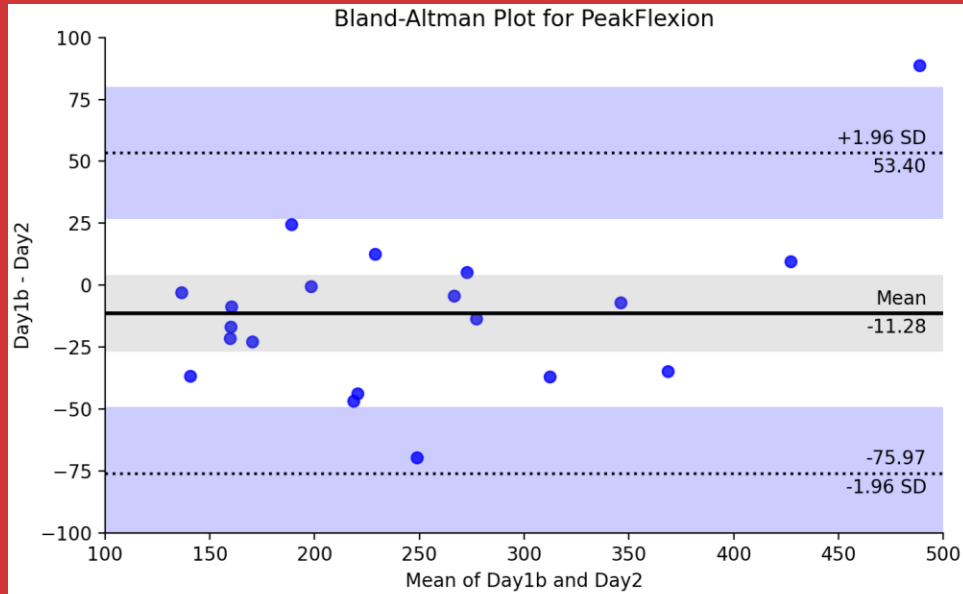


Within-day Reliability (Mean)



Between-day reliability





	Day1a vs Day1b	Day1b vs Day2	p-value	SEM (N)	MDC (N)
Flexion	0.99 [0.96, 0.99]	0.97 [0.93, 0.99]	p<0.0001	16.7 [9.8, 25.9]	46.2 [27.1, 71.8]
Extension	0.98 [0.95, 0.99]	0.96 [0.91, 0.99]	p<0.0001	13.0 [6.9, 20.6]	36.1 [19.0, 57.1]
Left lateral flexion	0.94 [0.86, 0.98]	0.97 [0.92, 0.99]	p<0.0001	9.6 [5.3, 15.0]	26.7 [14.7, 41.5]
Right lateral flexion	0.94 [0.85, 0.98]	0.96 [0.90, 0.98]	p<0.0001	9.9 [7.1, 15.8]	27.4 [19.7, 43.9]

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Thank you



Boris Johnson got a bit overenthusiastic during a street rugby game in Japan



Test protocol and 3D-print files available [here!](#)

