

FINGER FLEXOR STRENGTH AND THE EFFECT OF ACUTE HANDGRIP FATIGUE IN ADVANCED LEVEL BOULDERERS

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Bouldering is a discipline of rock climbing that involves short (~4m-high) typically overhanging problems without ropes. Bouldering places a high demand on the finger flexors and consists of ~8s isometric holds across 30-40s climbing problems, with ~115s rest between attempts¹. Strength and endurance of the fingers appear to discriminate rock climbing ability², however this has not been tested in boulderers or outside a laboratory setting. The aim of this study was to investigate if climbing specific finger strength relates to ability in advanced boulderers, and to assess the effects of acute fatigue and recovery.

Method

- 13 advanced boulderers (12 males, 1 female; age 22±3 years; height 172.5±8.2cm; mass 65.8±5.3kg; IRCRA³ scale 19-22)
- Dominant arm finger flexion strength was measured using an open-hand crimp hold on a 20mm edge (figure 1)
- Peak force was recorded at 80Hz using a climbing specific Tindeq Progressor 300 dynamometer (Trondheim, Norway; figure 2), and reported in Newtons/ body mass (N.kg⁻¹)
- Participants climbed a circuit on a training wall (figure 3), and repeated until failure due to fatigue
- Immediately after failure, participants repeated the open-hand crimp strength test and this was repeated every 2 minutes until 20 minutes

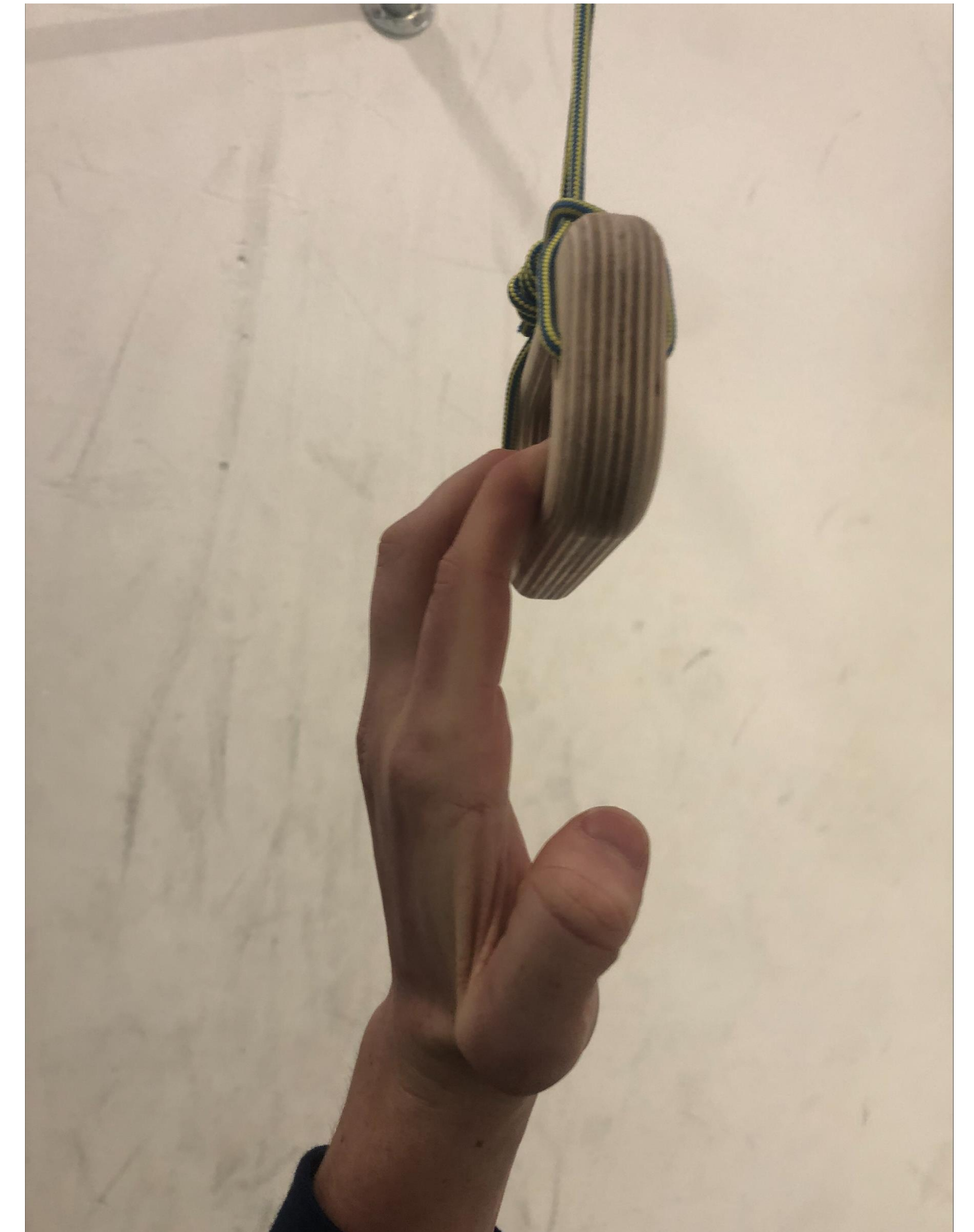


Figure 1



Figure 2



Figure 3

Results

- Baseline - peak force was 7.86±1.40 N.kg⁻¹ and significantly correlated with self-reported climbing grade ($r=0.810$, $P < 0.001$)
- Peak force was significantly reduced immediately after the fatiguing protocol (6.24±1.03 N.kg⁻¹; $P < 0.001$) and remained significantly reduced at both 10 (6.73±0.95 N.kg⁻¹; $P < 0.001$) and 20 min (7.05±1.29 N.kg⁻¹; $P < 0.001$)
- Gradient of recovery for the first 10-minutes was steeper for the higher ability boulderers (IRCRA 22, $m=0.059$) than those graded IRCRA 21 ($m=0.046$) and 19-20 ($m=0.038$)

Conclusion

Boulderers climbing at higher grades demonstrate higher finger flexor strength and recover from a fatiguing effort at a faster rate. Two-minute rest periods between force measurements appears to impact force generation recovery, suggesting that advanced boulderers typically require longer rest between bouldering attempts. This may impact competition, where boulderers will have a 5-minute time period in which they have unlimited attempts to complete the set problem⁴.

REFERENCES

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