Static Stretching does not impair sport specific measures of upper-limb force and power in rock climbing

Matt Kilgas, Kevin Phillips, Phil Watts

Exercise Science Laboratory

Northern Michigan University

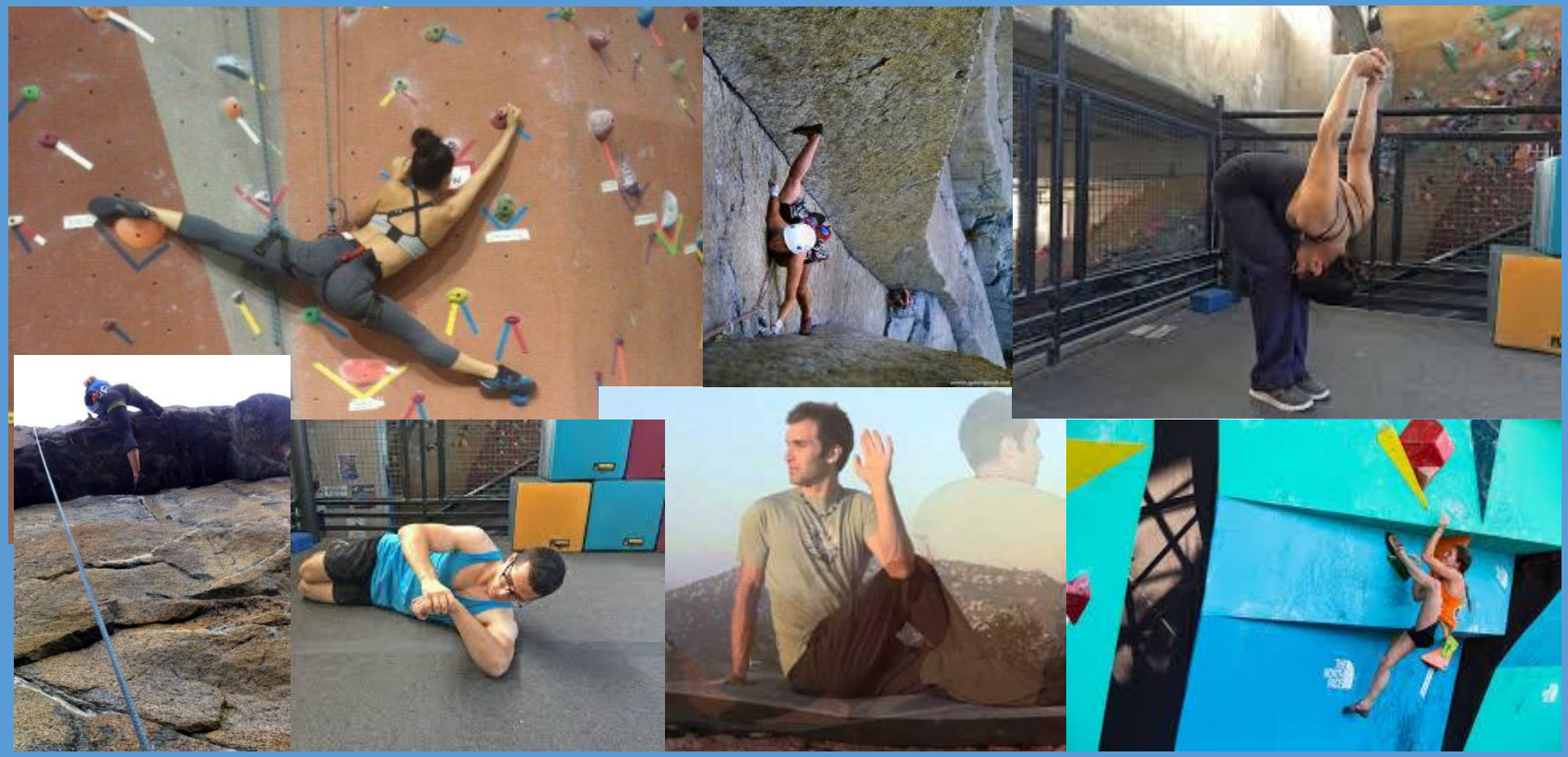
Marquette, Michigan USA

mkilgas@nmu.edu

Static Stretching on Strength and Power

- Static Stretching (SS) has been shown to reduce:
  - maximal voluntary contraction
  - isometric force
  - isokinetic torque
  - one repetition maximum lifts
  - vertical jump height
  - Sprint speed
  - Balance

To Stretch or not to Stretch?

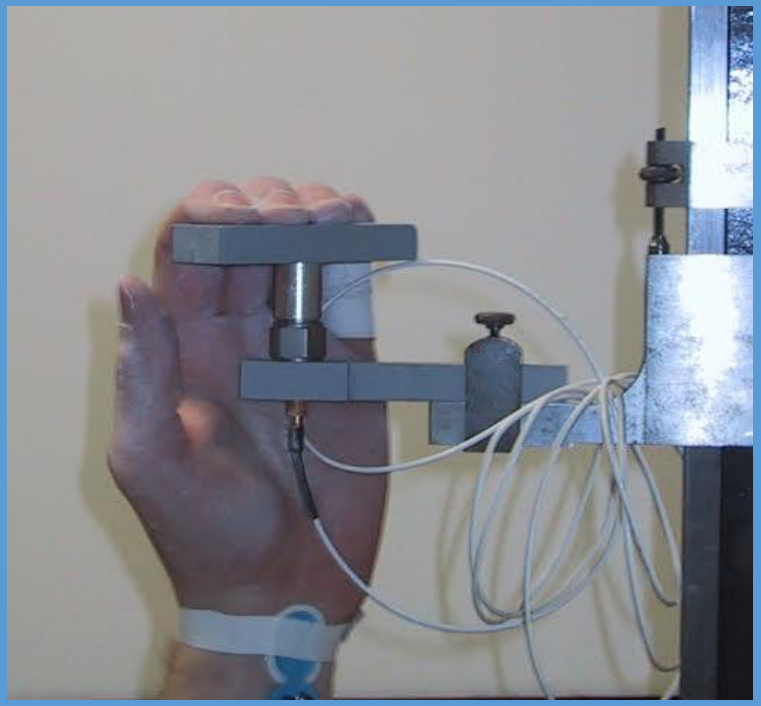


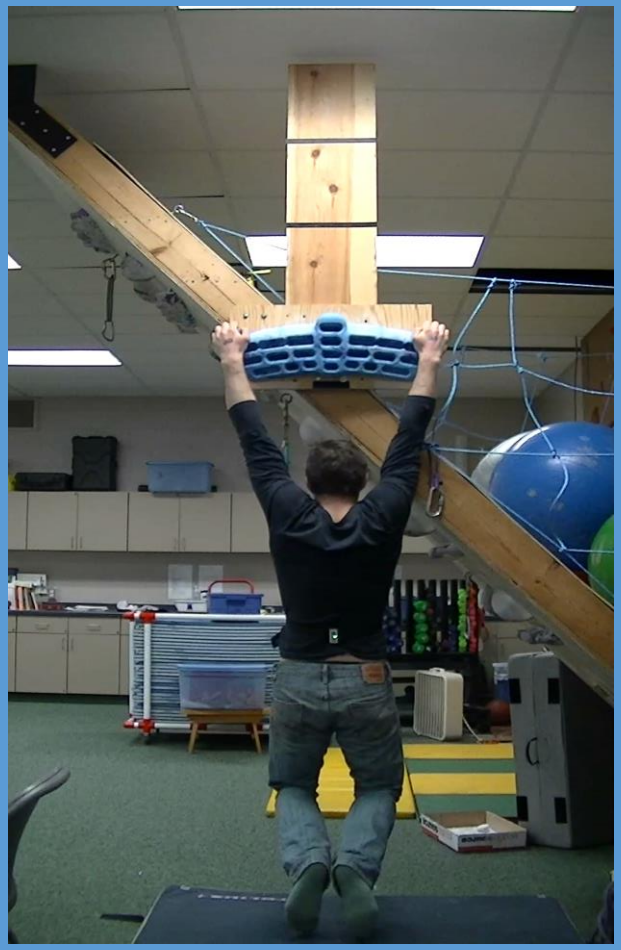
Methods

- 19 recreational Rock Climbers (13 male, 6 Female)

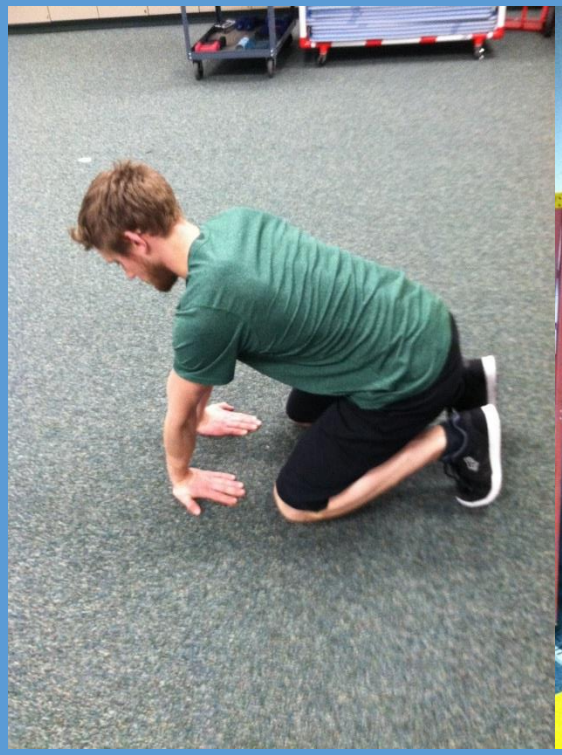
	SS	NS	Sig.
Weight (kg)	65.22 ± 9.58	68.96 ± 10.05	0.42
Height (cm)	172.5 ± 6.78	173.75 ± 5.7	0.668
Arm Span (cm)	172.89 ± 5.9	175.6 ± 7.76	0.408

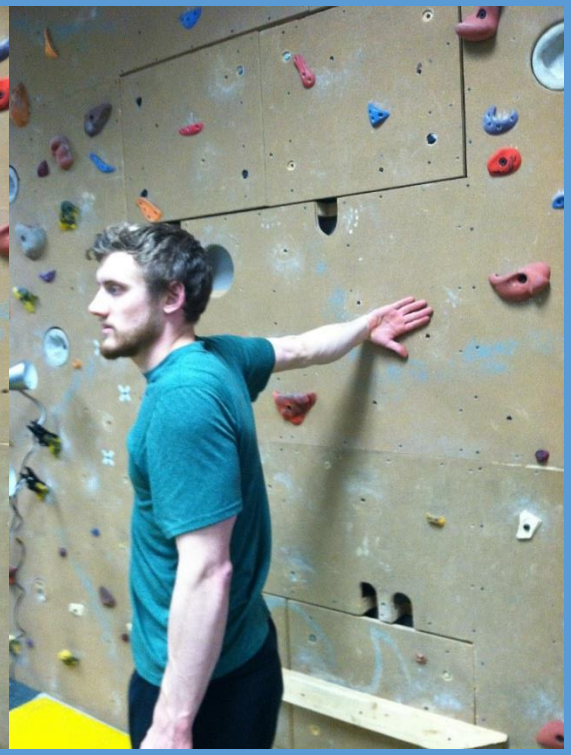
Methods





Stretching protocol





Results

	SS		NS		
	Pre	Post	Pre	Post	Sig.
DMFF	19.26 ± 5.06	18.12 ± 5.46	20.2 ± 4.09	20.29 ± 3.98	0.39
DRFP (kg/s)	27.95 ± 9.73	25.05 ± 7.32	30.18 ± 7.32	28.18 ± 6.61	0.178
NMFF (kg)	18.81 ± 5.8	20.53 ± 8.25	22.98 ± 7.14	22.62 ± 5.28	0.586
NRFP (kg/s)	26.57 ± 8.34	28.25 ± 9.82	32.49 ± 11.9	32.92 ± 8.77	0.532
Jump Height (cm)	52.24 ± 17.73	50.74 ± 19.25	55.39 ± 23.64	54.29 ± 23.02	0.209
Jump Time (s)	0.88 ± 0.25	0.97 ± 0.44	0.81 ± 0.15	0.81 ± 0.16	0.384
Power (w)	1036.43 ± 267.93	1018.92 ± 281.61	1127.87 ± 308.64	1110.05 ± 312.95	0.124

Mean ± standard deviation for the height, weight, Arm span, dominant hand maximal finger flection (DMFF), dominant hand rate of force production (DRFP), non-dominant hand maximal finger flection (NMFF), non-dominant hand rate of force production (nRFP), Jump height, jump time, and power .

Conclusions

- No significant SS induced impairment in any of the variables
  - Limited Stretch shortening cycles
  - Slow contraction speed
- Limitations
  - Large variability between subjects
  - Measurement drift
  - Subject familiarization

Practical Applications

- More research is needed.
  - Stretching and climbing specific power
  - ROM and climbing performance

- Stretching can be included into a warm-up for climbing to increase ROM, without affecting upper-body power

Static Stretching does not impair sport specific measures of upper-limb force and power in rock climbing

Matt Kilgas, Kevin Phillips, Phil Watts
Exercise Science Laboratory
Northern Michigan University
Marquette, Michigan USA

mkilgas@nmu.edu