

DIFFERENCES IN MUSCLE PERFORMANCE BETWEEN STRENGTH ATHLETES, PHYSIQUE COMPETITORS, AND UNTRAINED INDIVIDUALS

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INTRO

- Muscular characteristics may differ depending on the strength training regimen¹⁻⁴

PURPOSE

- To examine muscle strength and size of men and women strength and physique athletes with a cross-sectional study design

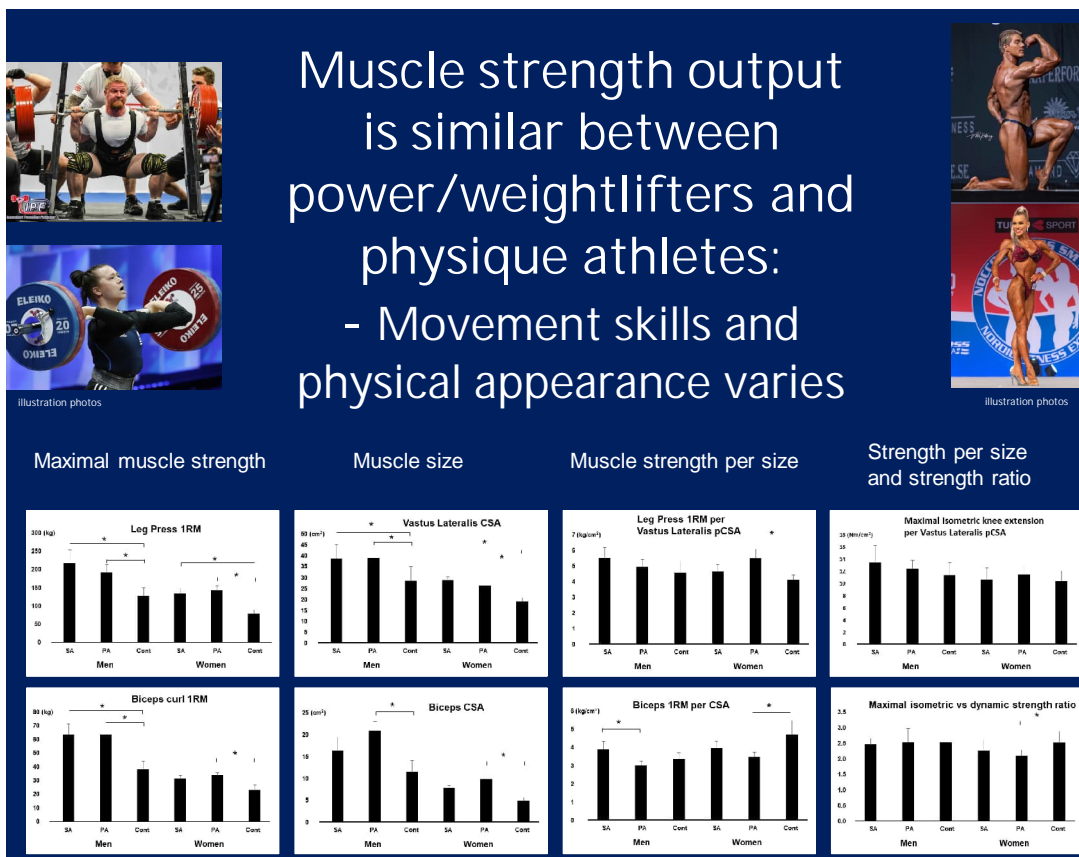
METHODS

Subjects:

- 12 strength (SA, 6 men, 6 women) and 13 physique athletes (PA, 7 men, 6 women)
 - all active international-level competitors
- Untrained controls (CONT, 7 men, 7 women)

Measurements:

- Body fat % by bioimpedance, fat-free mass index (FFMI) was calculated
- Maximal isometric knee extension torque
- One repetition maximum (1RM) in barbell biceps curl and horizontal leg press device. FFMI adjusted ratio between ISOM and leg press 1RM was calculated.
- The cross-sectional area (CSA) of the biceps brachii and vastus lateralis (VL) by ultrasound. From VL, the fascicle pennation angle was measured, and physiological CSA (pCSA) was calculated.



RESULTS

- In both M and W, FFMI, VL CSA, maximal knee extension torque, and 1RM in leg press were greater ($p < 0.05$) in SA and PA than in CONT.
- In M, biceps curl 1RM was greater ($p < 0.05$) in SA and PA than in CONT, and biceps CSA and VL pCSA were greater ($p < 0.05$) in PA than in CONT.
- Biceps 1RM normalized to CSA was lower ($p < 0.05$) in PA than in SA in M, and lower ($p < 0.05$) in PA than in CONT in W.
- In W, biceps 1RM and CSA, and leg press 1RM normalized to VL pCSA were greater ($p < 0.05$), and the maximal knee extension torque ratio to leg press 1RM was lower ($p < 0.05$) in PA than in CONT.

CONCLUSION

- The strength-to-size ratio in the biceps was lower in PA, indicating training specificity by maximizing muscle hypertrophy
- No differences were observed between the groups in isometric to dynamic strength ratio: no dynamic strength deficit in CONT
- Maximal knee extension torque adjusted with VL pCSA, was similar between the groups: no functional changes in the contractile machinery; muscle strength was primarily determined by muscle size
- No differences between SA and PA: distinguish by sports-specific motor skills and physical aesthetics rather than muscular strength output