COMPETATIVE ROCK CLIMBING: PHYLIOLOGICAL AND ANTHROPOMETRIC ATTRIBUTES

D.M.Binney, T.Cochrane*
University of Sheffield Centre of Sports Medicine
University of Stafford School of Health*

Purpose

Studies by *Watts et al. (1993, J. Sports Sci, 11, 113-117),* and *Grant et al. (1996, J. Sports Sci, 14, 301-309)* have described the anthropometric, and physiological characteristics of rock climbers but no studies have investigated which characteristics predict climbing performance in competition. Since athletic performance is strongly dependent on choosing relevant training modalities, coaches and athletes need to know what are the 'winning' characteristics they should be training.

Methods

Ten male and 8 female (26.9 ± 6.4; 30.1 ± 3.6 years, mean age ± S.D respectively), elite British competitive rock climbers were assessed at the end of a 4 month UK competitive season. Competition performance was generated by an average linear combination of the season's results. The physiological and anthropometric variables measured were as follows. Maximum isometric crimp grip strength (MVC) to body mass ratio, sustained isometric crimp grip endurance at 60 and 40 percent of MVC, climbing specific forearm endurance and body composition.

Results

Physiological and anthropometric data for males and females is shown in table 1. Significant correlation at $P < 0.05$ with competition performance was obtained for: the climbing specific forearm endurance test ($r_s = 0.92$; 0.82 males and females, respectively); and % body fat for the females $r_s = - 0.86$.

Table 1. Mean (± S.D.) values for reported variables grouped by sex

	Males	Females
Climbing specific forearm endurance (s)	288 ± 117	181 ± 63[a]
% Body fat	9.6 ± 3.5	21.3 ± 4.0[b]
Isometric crimp grip strength MVC (kg)	57.4 ± 9.0	44.4 ± 9.7[a]
Isometric crimp grip strength to body mass ratio	0.94 ± 0.13	0.78 ± 0.17
Isometric crimp grip endurance at 60% MVC (s)	71 ± 10	72 ± 19
Isometric crimp grip endurance at 40% MVC (s)	139 ± 29	133 ± 29

[a] $P < 0.05$ for males vs females. [b] $P < 0.01$ for males vs females.

Conclusion

This research identifies climbing specific forearm endurance as a key predictor of climbing performance in elite male rock climbers. This variable was also an important predictor of performance in elite female rock climbers as was % body fat (inverse correlation). Crimp grip strength to body mass ratio and crimp grip strength per se were not significantly related to performance, neither was isometric crimp grip endurance at 60 or 40 percent of MVC. The simple climbing specific forearm endurance test developed in this study may be used by athletes to assess their fitness and judge their training programmes as they prepare for elite competition.