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How High Can A Climber Go?

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The maximum time an athlete is able to continue climbing to exhaustion may be the only determinant of his/her performance. A new European study, led by researchers from the University of Granada, the objective of which is to help trainers and climbers design training programs for this type of sport, shows this to be the case.

Until now, performance indicators for climbing have been low body fat percentage and grip strength. Furthermore, existing research was based on the comparison of amateur and expert climbers. Now, a new study carried out with 16 high-level climbers breaks with this approach and reveals that the time it takes for an athlete to become exhausted is the only indicator of his/her performance.

Vanesa España Romero, the main author of the work and researcher at the University of Granada explains to SINC how "these findings could help trainers or athletes in the design of sport climbing training programs so that Spain can continue to lead the way in this sporting activity throughout the world".

The study, published in the European Journal of Applied Physiology, analyses the physiological parameters that determine performance in this sport at its highest level. The participants, eight women with an average rating of 7a (the scale of difficulty of a climbing route is graded from 5 to 9, with sub-grades of a, b and c) and eight men with an average rating of 8a, were divided into an "expert group" and an "elite group".

The researchers assessed the climbers with body composition tests (weight, height, body mass index, body fat %, bone mineral density, and bone mineral content), kinanthropometry (length of arms, hands and fingers, bone mineral density and bone mineral content of the forearm), and physical fitness tests (flexibility, strength of the upper and lower body and aerobic capacity measured at a climbing center).

The results show there to be no significant differences between expert and elite climbers in any of the tests performed, except in climbing time to exhaustion and in bone mineral density, both of which were higher in the elite group. "Therefore, the maximum climbing time to exhaustion of an athlete is the sole determinant of performance", the researcher confirms.

A demanding and vertical practice

Sport climbing began as a form of traditional climbing in the mid 80s, and is now a sport in its own right. The International Federation of Sport Climbing is currently requesting its inclusion as an Olympic sport.

The increase in the number of climbers and the proliferation of climbing centers and competitions have contributed to its interest in recent years, although there is limited scientific literature on climbing effort.

The most important research relates to energy consumption (ergospirometry, heart rate and lactic acid blood concentrations), the designation of maximum strength and local muscular resistance of climbers (dynamometry and electromyography), and to establishing anthropometric characteristics.

According to experts, a fundamental characteristic of sport climbing is its "vertical dimension", making it unique given its postural organization in space, and from a physiological point of view, the effect a gravitational load has on movements.

In short, to complete a climb successfully, athletes should maintain their effort for as long as possible to improve their chances of reaching the ultimate goal.

References: Vanesa España-Romero, Francisco B. Ortega Porcel, Enrique G. Artero, David Jiménez-Pavón, Ángel Gutiérrez Sainz, Manuel J. Castillo Garzón y Jonatan R. Ruiz. "Climbing time to exhaustion is a determinant of climbing performance in high-level sport climbers". European Journal of Applied Physiology (2009) 107:517-525, noviembre de 2009.

Image Caption: There are two forms of climbing: the sport (left) and classical (right). Credit: SINC / Col. John Corcuera (left) and Romero et al (right).

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