Peak torque per unit cross-sectional area differs in strength-trained and untrained young adults

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It is unclear whether gender differences in the relative strength of the upper and lower body are due to differences in muscle mass distribution or dissimilarity of use. There is also controversy as to whether prolonged resistance training increases strength per unit cross-sectional area (CSA). To help resolve these questions, maximum isometric torque per unit muscle and bone (M + B) CSA was measured in the upper arm and thigh of 26 trained (13 males; 13 females) and 26 untrained (13 males; 13 females) young adults. Muscle and bone CSA values were calculated from limb circumferences and skinfolds. Maximal isometric torque values were recorded by a LIDO isokinetic dynamometer. There was no significant difference (P > 0.05) in mean upper arm or thigh torque per unit M + B CSA between the trained males and untrained females. However, mean torque per unit M + B CSA was significantly higher for the trained subjects of both genders compared with the untrained subjects of both genders for the upper arm (28.9%; P < 0.0001) and thigh (18.8%; P < 0.0001). These results suggest that muscle quality (peak torque/CSA) is equal between genders, and that the increase in muscle strength per unit area that occurs with resistance training is not gender-dependent.