STRENGTH VARIABILITY IN UNTRAINED COLLEGE STUDENTS
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Objective: Athletic Trainers utilize measures of maximal strength when designing and implementing rehabilitation and conditioning programs; many of these programs rely upon a pre-determined percentage of a one-repetition max (1-RM). While 1-RM tests are repeatable and reliable in previously trained individuals, some college student-athletes are not experienced with weight training. The objective of this study was to investigate the test-retest reliability of isotonic strength measurements of lower extremity muscle groups in untrained college students. Design and Setting: Isotonic 1-RM strength tests of the knee extensors and knee flexors were performed on three days with 72 hours between testing sessions. The testing was performed in a weight room on a college campus. Subjects: Thirty two college students were divided into two groups, trained (n=16, 11m/5f, age: 20.5±1.3, ht: 172.7±6.8; wt: 74.1±11.1kg, BMI: 24.8±3.2) and untrained (n=16, 11m/5f, age: 20.1±1.6; ht: 170.4±10.7cm; wt: 79.4±12.9kg; BMI: 27.3±3.8), based on ACSM guidelines. Measurements: Participants performed 1-RM tests for knee extension and knee flexion using dynamic variable resistance machines (Paramount; Los Angeles, CA). A paired sample T-test was performed with the significance level set at 0.05 for comparisons between trials.

Results: The untrained college students were significantly stronger during the second session for both knee extension (mean difference = 5.5kg or 8.7%, p = 0.014) and knee flexion (mean difference = 2.4kg or 5.1%, p = 0.027). There was no difference in the untrained between session two and three. There were no differences between the trials in the trained groups. Conclusions: Results of this study indicates significant difference in the 1-RM of untrained college students on repeated 1-RM tests. While the initial 1-RM test is strenuous for the untrained population, it is unlikely that this alone would be the catalyst for the differences between sessions. The improvements are more likely the combined result of learning how to perform maximal voluntary contractions, familiarization with the experimental situation, and increased psychological comfort level during the second session. These results suggest that as athletic trainers develop appropriate rehabilitation plans, careful consideration should be taken to accurately determine the maximum strength of untrained college students. To that end, repeated 1-RM tests several days apart should be conducted as the first attempt appears to underestimate the individual’s true strength.

Key Words: Strength Testing, Conditioning, Rehabilitation

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