

ABSTRACT

Torque Characteristics of Three Types of Resistive Exercise

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Purpose

The purpose of this study was to describe the torque characteristics of three common types of resistive exercise used in rehabilitation: pulleys, Thera-Band elastic tubing, and cuff weights.

In order to accomplish the purpose of this study hypotheses were tested for each type of resistive exercise to determine peak torque at 60 and 120 degrees per second, the angle of peak torque at 60 and 120 degrees per second, mid-range torque at 60 and 120 degrees per second, and average torque from 0 to 180 degrees. These hypotheses included tests of three, five, and seven pound cuff weights, red, green and blue tubing, and 1.5, 2.5, and 3.5 killegram pulley weights.

Methodology

The study utilized a descriptive research design in which data were collected in three trials for each of the hypotheses. Ten repetitions were performed for each trial at each speed. The set up for data collection with each of the resistive exercises was structured in such ways as to take into account insights gained from the review of the literature.

Data were collected using the Biodex isokinetic dynamometer, which was set to measure range of motion from 0 to 180 degrees. The dynamometer yielded torque data in foot-pounds and angle of peak torque data in degrees.

In order to analyze the data, the t-test for independent groups was employed.

Findings

Regarding the analysis of the cuff weight data, statistically significant differences were found in torque at mid-range when comparing 60 and 120 degrees per second for the three and seven pound weights.

Regarding the analysis of the tubing data, concentric torque was found to be significantly greater when comparing the two types of contraction at 60 degrees for all three colors of tubing.

Regarding the analysis of the pulley data, statistically significant differences were found between contraction types and speeds, and for all weight categories at mid-range.

Conclusions

Because this study represented an initial attempt to describe the torque characteristics of each of the three resistive exercises in similar, controlled circumstances, further research should be conducted in order to determine whether these same findings can be replicated. Once a baseline is established for the torque characteristics of each of these three resistance exercises, comparisons between them can be effectively researched.