

Manual Resistance Training as an Alternative Post-Activation Potentiation Method: A Pilot Study

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ABSTRACT

Post-activation potentiation (PAP) can be defined as an acute effect of improved muscular performance as a result of their contractile history. PAP is typically induced through weight resistance exercises. Manual Resistance Training (MRT) is a form of accommodating resistance, but its feasibility as an alternative method to elicit PAP is not known. **PURPOSE:** 1) To assess if potentiation can be achieved through the use of MRT, and 2) to compare the effectiveness of MRT applications of eliciting PAP to that accomplished through an isokinetic dynamometer. **METHODS:** Six (2 males and 4 females) young adults (mean \pm SD; age = 21.6 ± 1.0 years, weight = 49.8 ± 4.1 kg, BMI = 24.2 ± 3.4 , BF (%) = 25.8 ± 4.1 %) were recruited. Subjects participated in a Maximal Voluntary Contraction (MVC) baseline testing using a 5-sec isometric knee extension test at a 90-degree angle. Following the MVC test, subjects were randomly placed into one of three conditions: Baseline PAP (PAP), Constant Manual Resistance Training (CMRT), and Practical Manual Resistance Training (PMRT). For the PAP condition, subjects performed all knee extensions on a Biodex isokinetic dynamometer. The subjects performed 4-repetitions of knee extensions at 60 deg/sec, then performed 4-repetitions at 180 deg/sec. During the CMRT condition, subjects performed 4-repetitions of knee extensions on a custom-made device that allowed the application of constant resistance controlled by a partner, followed by 4-repetitions on the isokinetic dynamometer at 180 deg/sec. During PMRT condition, subjects performed 4-repetitions of knee extensions with the research assistant applying force on the distal portion of the shank, followed by isokinetic knee extensions at 180 deg/sec. Peak force from the 4-rep isokinetic leg extensions done at 180 deg/sec was used for analysis. Data was analyzed on SPSS 23 IBM. Data normality was assessed using a Shapiro-Wilk test. Data appeared to be non-normally distributed, therefore, a non-parametric Friedman test was used to assess differences between conditions. **RESULTS:** The Friedman test revealed no differences between the PAP (115.93 ± 46.72 Nm), CMRT (108.4 ± 47.0 Nm), and PMRT (113.98 ± 50.7 Nm) groups ($p = 0.241$). **CONCLUSION:** A traditional PAP, CMRT and PRMT methods might be viable methods to induce similar PAP effects on peak torque during knee extension. CMRT and PMRT might represent alternative methods to induce PAP that can be used in practical and sport settings in where no equipment might be available.