

Effects of Laser On Endurance of the Rotator Cuff Muscles

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Background: The purpose of this study was to measure the effects of therapeutic laser (TL) on endurance of the shoulder external rotator muscle group during isokinetic dynamometry.

Study: Twenty healthy subjects participated in a double blind, cross-over design study, approved by the University of Tennessee at Chattanooga IRB. Informed consent was obtained from all subjects meeting the inclusion criteria. Subjects were trained and tested using the BIODEX System 3 Pro isokinetic dynamometer. The protocol consisted of a 5 minute warm-up on an upper extremity ergometer, followed by testing. Subjects had their dominant arm positioned at 30 degrees of shoulder horizontal adduction and 45 degrees of shoulder abduction, and performed 21 repetitions of external rotation in each of 12 sets, at 60 degrees/second, with standardized rest between sets. Subjects were acclimated to the isokinetic testing to eliminate a possible training effect prior to being entered into the treatment portion of the study. In the last two sessions, subjects randomly received TL or placebo laser (PL). Laser, 810 nm and 980 nm with a combined output power of 10 watts, was applied immediately prior to testing to the infraspinatus and teres minor muscles at an average fluence of 10 J/cm² (1.8 W/cm²).

Results: A factorial ANOVA was performed to compare TL to PL at all 12 sets for peak torque, peak torque normalized by body weight, average torque, total work, and power. In sets 1–9 there was no statistically significant difference (NSSD) between any of the variables. In set 10 results varied from NSSD to $p < 0.01$ depending on the variable. In sets 11 and 12 TL treated subjects displayed greater endurance for all variables ($p < 0.001$).

Conclusion: Laser increased endurance of the shoulder external rotators in the latter stages of endurance exercise.