

Effects of Miometric and Pliometric Muscle Actions on Delayed Muscle Soreness

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OBJECTIVES:

Twenty healthy untrained females, aged 18-48 years were studied to determine how miometric (shortening) and pliometric (lengthening) muscle actions impact delayed onset muscle soreness in the quadriceps. They were randomly assigned into two groups of 12 each. Subjects in group 1 performed 3 sets of knee extensions (shortening muscle actions), at 80% of their one repetition maximum. To isolate the miometric action, the researcher would hold the movement arm after each full knee extension so the subject could return to the beginning position (knee flexion) without resistance. This procedure was repeated until fatigue. The subjects would then switch to the opposite leg and perform the same number of knee flexions (pliometric muscle actions) at 80% of their one repetition maximum. To isolate pliometric action, researchers would raise the movement arm so the subject could move to full extension without resistance. Then the subject would perform the knee flexion only with the resistance.

Group 2 followed the identical procedure except they used 120 percent (instead of 80%) of their one repetition maximum during the knee flexions (pliometric muscle action). All subjects returned approximately 48 hours after the initial exercise session to attempt to repeat or surpass their initial performance.

RESULTS:

Group 1 reported similar delayed onset muscle soreness for both legs. Group 2 reported significantly increased delayed onset muscle soreness in only the leg performing the knee flexions (pliometric muscle action) with resistance. There was no significant difference in the number of repetitions performed between the initial and 48 hour exercise sessions for each group.

SUMMARY:

Contrary to the opinion of many professionals, these data suggest that when similar resistances (80%) are used, pliometric muscle actions on their own do not result in greater muscle soreness. However, it is clear that greater resistance (120%) during the pliometric muscle action did result in greater soreness. Therefore, it seems that pliometric muscle actions themselves are not to blame for increased muscle soreness. Instead, either the greater resistance (120%), or the greater amount of negative work compared with the positive work (120% vs. 80%), or both, are responsible for greater muscle soreness. In addition, increased muscle soreness in group 2 did not appear to affect their exercise performance. Please note that Keiser equipments pneumatic resistance is very low-impact and also provides a regulated strength curve. These advantages may be responsible for the lack of delayed onset muscle soreness. Similar studies done on weight stack equipment may not produce the same results.

KEISER PIECES USED:

Leg extension machine.