Exertional rhabdomyolysis in a 21-year-old, healthy female after performing three sets of the biceps curl exercise to failure with 30% 1RM: A case report

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Exertional rhabdomyolysis in a 21-year-old, healthy female after performing three sets of the biceps curl exercise to failure with 30% 1RM: A case report.

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Abstract

Background: The optimal resistance training program to elicit muscle hypertrophy has been consistently debated and researched. Although 3 sets of 10 repetitions at 70-80% of the 1-repetition maximum (1RM) has been widely recommended (20%–30% 1RM), high-intensity training (1 set of 30-40 repetitions) resistance training can elicit similar muscle hypertrophy. The exact mechanism leading to muscle hypertrophy remains unclear, and perhaps because less weight is lifted for a longer duration. In the process of testing this hypothesis in a research study in our laboratory, a subject was diagnosed with exertional rhabdomyolysis.

Case Report: A 21-year-old Caucasian female volunteer participated in a research study that aimed at comparing the acute effects of low-load (30% 1RM), high-repetition versus high-load (80% 1RM) forearm curl exercise. The primary outcome measured was muscle cell damage. Ultrasound was used to measure the magnitude of muscle thickness and intensity post-exercise. The subject was enrolled in a study that compared the acute effects of low-load, low-repetition versus high-load, high-repetition resistance training. The subject completed a total of 343 forearm flexion cycles with a 5.4-kilogram load, which elicited rhabdomyolysis after 3 sets of low-load, low-repetition forearm flexion cycles. Several hours later, she was called and informed that her blood test results indicated a CK concentration of 11,683 U/L (Figure 1). Creatine kinase (CK), an enzyme commonly present in muscle cells, increased significantly above normal levels.

Discussion: The subject as the elbow stabilizer ensured she completed the full range of motion of the elbow joint. The total work performed by the muscle is much higher than traditional, high-load, low-repetition resistance exercise. Performing low-load, high-repetition resistance exercise to failure, the aim of this case report is to document the events leading up and into this subject's diagnosis. Exertional rhabdomyolysis is a condition characterized by the excessive breakdown of striated muscle. It is usually caused by strenuous exercise in which the muscle fibers experience more damage than normal. The exact mechanism leading to muscle hypertrophy remains unclear, and perhaps because less weight is lifted for a longer duration.

Conflict of Interests: The authors declare no conflict of interests. Acknowledgments: The authors of this study would like to thank the subject for her willingness to share her experiences and medical information necessary to document this case report.

References