COMPARISON OF ELECTROMYOGRAPHIC ACTIVITY BETWEEN ACTIVE AND PASSIVE MUSCLE TRAINING MOVEMENT

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INTRODUCTION: Passive Repeatedly Plyometric (PRP) training machine was developed on the scientific of neuromuscular system such as recruited more motor units, stretch reflex, storage elastic energy and so on. It used a motor to drive a cam, and the cam can control trainee's movement passively and repeatedly. So it has some advantages to control the training load, speed of muscle contraction, and length of muscle contraction during training. Some researches have demonstrated that PRP was an efficient strength training approach, and it could significantly improve strength and power than traditional weight training (Liu *et al*, 2001). Moreover, Wang *et al* (2001) and Wen *et al* (2001) found out that EMG activity in PRP were significantly higher than in traditional weight training. In fact, trainee must push the bar upward with maximum strength during PRP training. So muscles of trainee accomplished isometric contraction, and then concentric and eccentric contraction passively with maximum muscle strength. In other word, the trainee's muscles should follow isokinetic contraction way during PRP training. EMG activity was unclear in this case so far. Therefore, the purpose of this study was to investigate the EMG activity among PRP with and without maximum isometric contraction during training, as well as active muscle contraction by free weight training.

METHODS: This study used electromyographic and electrical goniometer to understand how EMG activity was generated during three kinds of training methods. Ten collegians were recruited voluntarily for this study. Each subject performed the same movement frequency in all training method. The subjects performed the PRP training without maximum isometric contraction and half squat by free weight training with their own body weight as the load. At first, each subject performed general warm-up involving three sets of 5 half-squats at 10% of 1RM followed by 10 min. of lower extremities' static stretch activity. When completed warm-up, the surface EMG activity of rectus femoris and biceps femoris were recorded by Biovision system (sampling rate was at 1000 Hz). Before electrode application, the skin surface of each muscle was shaved, cleaned with alcohol, and gently abraded, and a small amount of conductive gel was applied to each electrode. All myoelectric signals were transformed to integrated electromyogram (IEMG) by DasyLab 6.0 version. Electrical goniometer was also attached at knee joint for discriminated muscle contract phase.

RESULTS AND CONCLUSION: The findings of this study not only could understand electromyographic activity on both PRP and free weight training, but also could demonstrate how PRP was superior to traditional weight training. And further, it could provide a more solid base to establish an efficient strength training method.

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