運動時の筋長の違いがトレーニングにより生じる筋肥大の程度に及ぼす影響
―上肢筋群を対象に―

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The Effect of Muscle Length During Resistance Training on Muscle Hypertrophy: Examination on Upper Limb Muscles

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ABSTRACT

The triceps brachii long head（TBL）is a biarticular muscle that crosses the shoulder and elbow joints, and therefore its length is influenced by the position（angle）of each of these two joints. With this background of the biarticular nature of the TBL, this study examined the effect of muscle length during resistance training on muscle hypertrophy, by comparing two elbow extension training regimes performed at different, otherwise identical, shoulder joint positions. Using a cable machine, 21 healthy young adults conducted dynamic elbow extension（range of motion: 90-0°）training, with the shoulder joint of one side fixed at 180° flexion and the other at 0°（i.e. the elbow facing upwards and downwards, respectively）, whereby the TBL was in a long（L）and short（S）length condition, respectively. The training was performed with the load of 70% of one-repetition maximum, 10 reps/set, 5 sets/session, 2 sessions/week, for 12 weeks. After the intervention, MRI-based cross-sectional area（CSA）of the total triceps brachii（the sum of the three muscles）significantly increased in both conditions,

with a greater degree for the L (23%) than S (16%). On an individual muscle basis, the CSA significantly increased in all muscles for both conditions, with a significant difference in the degree between conditions only found in the TBL (L: 33% vs S: 21%) and not in the other two (monoarticular) muscles. These results suggest that the muscle hypertrophic effect of resistance training can be enhanced by conducting training at a long muscle length position.

要　旨

本研究では，二関節筋である上腕三頭筋長頭（TBL）に着目し，運動時の筋長の違いがトレーニングにより生じる筋肥大の程度に及ぼす影響を検証した．健常若年男女21名が，片方の腕を肩関節屈曲180°固定のLong条件（L），もう一方を0°固定のShort条件（S）とし，ケーブルマシンを用いた動的肘関節伸展（可動域90～0°）トレーニングを週2日，12週間行った．負荷は最大挙上重量の70%とし，回数は10回反復/セット，5セット/日とした．トレーニングにより，MRIから測定した上腕三頭筋の横断面積は両条件で増加したが，その程度はL（23%）がS（16%）よりも有意に大きかった．筋別にみると，各筋の横断面積は両条件で有意に増加したが，その程度はTBLでのみL（33%）がS（21%）よりも大きかった．本研究の結果から，筋長が長い状態でトレーニングを行うことにより，筋肥大効果が促進されることが示唆された．