The Japanese Society of Physical Fitness and Sport Medicine

【国際セッション3】

THE EFFECT OF MUSCLE STRETCHING ON THE MECHANICAL AND PHYSIOLOGICAL CHARACTERISTICS OF THE TRICEPS SURAE MUSCLE

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＜ABSTRACT>

Stretching has been well-documented as the exercise improving flexibility, however, both biomechanial and physiological adaptive responses in flexibility was unknown. So the purpose of this study was to investigate the functional significance of flexibility by muscle architectural components and neural component of monosynaptic reflex during stretching. Subjects were twenty-eight Japanese female university students of Ochanomizu University. Thirteen students have taking dance classes more than ten years (Group F). Rest of them were served as the control who had taken dance classes less than five years or no dance experience (Group C). Group F showed significant greater range of motion (ROM) in dorsiflexion. Comparing the ankle dorsiflexed position (DP) to the ankle in neutral position (NP), the fascicle length of lateral heads of gastrocnemius (LG) and soleus (SOL) muscle, which was estimated by the muscle thickness and pennation angle of the image by ultrasonography, significantly increased for Group C in DP. On the other hand, Group F showed significant increase in fascicle length of SOL in DP, while there was no significant change in fascicle length of LG between DP and NP. The ratio between maximal amplitude of H wave and maximal amplitude of M wave (H/M ratio) induced by H-reflex was calculated and compared between two groups (Group F and C) and two conditions (DP and NP). Group F showed significant lower H/M ratio than Group C. H/M ratio for Group C significantly decreased in DP, though there was no significant difference in Group F. Significant negative correlation was observed between ROM of dorsiflexion and H/M ratio both in DP and NP. Significant correlation was also obtained between the changes in fascicle length of SOL during dorsiflexion and H/M ratio. The results of this study indicated that long succession of dance training induced greater flexibility of the ankle joint and neural inhibition to soleus H reflex. In addition, the neural adaptive responses associated with the great increase of ROM had significant negative correlation with the muscle extensibility of SOL. The architectural changes in triceps surae muscle might be various depending on each muscle and different adaptive responses by stretching both physiologically and mechanically.

Keywords ; Stretching, flexibility, dance, fascicle length, H-reflex

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