Biomechanical Analysis of the Arm and Trunk in Push-up according to Height Change of the Foot

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In situations where outdoor exercise is restricted due to COVID-19, home training that can be done at home is popular. In particular, movements such as push-ups and squats that you can do with your bare body without using tools play an important role in health management. However, biomechanical studies on these basic movements are insufficient. This study aims to analyze the biomechanical characteristics of the arm and trunk muscles according to the height change of the foot when performing a push-up motion. Healthy subjects that were participated in the experiment performed the push-up motion 5 times under three conditions of 60 degrees, 90 degrees, and 120 degrees of angles between the arms and trunk in the push-up neutral position. The angles of the arm and trunk used in this experiment were defined as 60 degrees when the foot height is lower than the trunk in the basic push-up position (incline posture), 90 degrees when the foot height is the same as the height of the trunk, and 120 degrees foot height is higher than the trunk in basic push-up position (decline posture). The muscle activities of the left and right triceps brachii and pectoralis major muscles of the subject’s arm and trunk were collected using surface electromyography equipment (Wave Plus wireless EMG system, Cometa, Italy). As a result of the analysis, as the angle of the arm and trunk increased, the triceps brachii muscle and the pectoralis major muscle tended to be increased, and the difference in size of each muscle by angle increased the triceps brachii. It is expected that the database of the upper body muscles of the push-up motion analyzed in this study can be used in the development of personalized home training exercise protocols in the future.

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