Numerical Evaluation of Wearing Pressure and Cloth Stiffness on Vibration of Human Skeletal Muscle during Athletic Movement

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ABSTRACT

In the design of sportswear which is expected to modify the performance of athletes, it is important to clarify the effects of the wear's rigidity and wearing pressure on the vibrations during exercise because they have been considered to reduce the vibrations of muscles. Therefore, in this study, the relationship between the vibration generated in cyclic movement of thigh with cloth and the physical properties of the wearing cloth is discussed by using a simple FE model of thigh [1, 2]. In the analysis, the FE model consisted of three parts of the thigh muscle, the femur, and the wear in the cross section of thigh. The thigh muscle is fixed to the femur but it is in contact with the wear cloth ignoring friction. The condition of the thigh cyclical movement is set assuming the athlete's 100 m run. Numerical analysis is performed under these conditions, and the variations of vibration behaviour due to changing values of muscle, wear and pressure are evaluated by mechanical consideration. In the results of this FE analysis, it is quantitatively confirmed that more flexible cloth has the effect of restraining vibration, and also its effect can also be observed by applying wearing pressure to thigh.

REFERENCES

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