Relationship between Muscle Stiffness Measured by the Muscle Hardness Meter and Passive Torque or Myotendinous Junction Displacement

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Purpose: The purpose of this study was to investigate the relationship between muscle stiffness (transverse stiffness) measured by muscle hardness meter and passive torque as well as myotendinous junction (MTJ) displacement (longitudinal stiffness), which are considered indexes of the muscle–tendon unit (MTU) and the muscle stretching levels.

Methods: Forty-one healthy young men volunteered to participate in this study. Passive torque and MTJ displacement of the medial head of the gastrocnemius were assessed using an ultrasound machine and a dynamometer during passive ankle dorsiflexion. Simultaneously, muscle stiffness of the medial head of the gastrocnemius was measured using a muscle hardness meter (Myotonometer). Relationship between muscle stiffness and passive torque or MTJ displacement were determined using Spearman rank correlation coefficient.

Results: Significant positive correlations were observed between muscle stiffness and passive torque and MTJ displacement (p < 0.01).

Conclusion: These results suggest that muscle stiffness measured by muscle hardness meter may be an accurate indicator of MTU and muscle stretching levels.