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Lower arm muscle activities in handling a slanted computer mouse, in order to prevent repetitive strain injuries - the role of the pronator teres muscle

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In small quadrupeds, internal rotation of the humerus and subsequent supination of the forearm are related to locomotion. Internal humeral rotation is correlated with backward movement of the limb during the stance phase. In the opossum, an early predecessor of primates including man, the internal humeral rotation imposes supination on the forearm during the propulsion stroke.

In planar movement of the *human* hand, e.g. a vertical shift over a flat surface, rotation of the humerus is involved. Forward movement implies an internal rotation, backward movement an external rotation. This external rotation imposes some degree of pronation on the lower arm. As a consequence, excessive repetitive forward-backward shifting of the hand (palm downwards) may result in overactivity of the *m. pronator teres*, and may eventually lead to pathological conditions like repetitive strain injuries (RSI). Such injuries do often occur in PC-workers, as a consequence of their handling of the computer mouse.

The present study focused on the anatomical features of the pronator teres muscle investigated in normal human anatomical specimens by means of dissection, morphometry and roentgenphotogrammetry. Humeral (superficial) and ulnar (deep) heads of *m. pronator teres* fuse, their common tendon inserting on the *tuberositas pronatoria* of the radius. Vectorial decomposition of forces indicates that the effective contribution of *m. pronator teres* to pronation of the forearm may be considered as somewhat limited. *M. pronator teres*' vector of elbow flexion appears to be about 4 x its pronating vector.

Further reduction of the pronating muscle activities in shifting of the hand (palm downwards) when handling the PC-mouse, may be attained by preventing the lower arm to use its full range of pronation. Using lightly slanted computer mice thus prevents the hand to display fully palm-downwards positions. Consequently, decreased pronator teres activities in PC-workers using such mice were demonstrated (Chen & Leung, 2007).

REFERENCE

Chen H-M, Leung C-T (2007) The effect on forearm and shoulder muscle activity in using different slanted computer mice. *Clinical Biomechanics*, 22, 5, 518-523