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Non Peer-reviewed author version

VAN ZWIETEN, Koos Jaap; LIPPENS, Peter; SCHMIDT, Klaus; DUYVENDAK, Wim; Lamur, Kenneth; NARAIN, Faridi; Varzin, S. & Piskun, O. (2007) Pronator teres muscle and repetitive strain injuries. In: Transactions of the 2nd All-Russian Scientific Practical Conference with international participants “Health as the basis of human potential: problems and how to solve them” October 2 - 4, 2007, Saint-Petersburg State Polytechnic University, Saint-Petersburg, Russia. p. 250-251..

Handle: http://hdl.handle.net/1942/7835

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PRONATOR TERES MUSCLE AND REPETITIVE STRAIN INJURIES

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Peripheral nerve entrapment neuropathies currently occur as ‘tunnel syndromes’ (*cf.* carpal tunnel syndrome). The present study focuses on the anatomical features of the pronator teres muscle and the median nerve (innervating forearm flexors), investigated in normal human anatomical specimens by means of dissection, morphometry and roentgenphotogrammetry.

In planar movement of the human hand, *e.g.* a horizontal 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 forearm. As a consequence, excessive repetitive forward-backward shifting of the hand (palm downwards) may result in stressing the *m. pronator teres,* and may eventually lead to pathological conditions like repetitive strain injuries (RSI) as well as entrapment neuropathies.

Holding the hand with the palm down during prolonged time can induce muscle fatigue, as well as muscle tension, within the pronator teres muscle. Part of such tension can be explained on the basis of active muscle insufficiency (1). Application of vibrostimulation treatment over a period of weeks therefore, recently proved to be successful in a majority of RSI-patients (2).

Humeral (superficial) and ulnar (deep) heads of *m. pronator teres* fuse, their common tendon inserting on the *tuberositas pronatoria* of the radius. *N. medianus* pierces *m. pronator teres,* accompanied by several tissues. A deep tendinous arc lines the muscle heads, crossing over *n. medianus* as to prevent its entrapment within the muscle. Within the pronator teres muscle, the median nerve is travelling through a slit-like space, rather than through a ‘pronator tunnel’.

Mathematical vector analysis 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. Strong pronation can be produced however by a deep muscle of the forearm, *m. pronator quadratus* (3).

In quadrupeds internal rotation of the humerus and subsequent supination are related to locomotion. Internal humeral rotation is correlated with backward movement of the limb during the stance phase. In the opossum (4), an early predecessor of primates including man, the internal humeral rotation imposes supination of the forearm during propulsion stroke.

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