

VERIFICATION OF TEST OF ANTAGONISTIC MUSCLE GROUPS COOPERATION

Katerina Tesarova, Dagmar Bezdekova, Frantisek Vaverka, Jiri Novotny
Faculty of Physical Culture, Palacky University, Olomouc, Czech Republic

KEY WORDS: antagonist muscle cooperation, methodology, reliability, preferred limb.

INTRODUCTION: Manipulation activities pertain to movement manifestations of the upper limbs into target position within a given range. The preciseness of quality of the performed movement depends on the level of cooperation extended by antagonistic muscle groups under control of the central nervous system. A number of studies have been published on the field of motor control dealing with analysis of movement in one joint with one degree of freedom (Zelaznik, 1996; Jaric et al., 2000). The aim of this study is to verify reliability of the test of cooperation of antagonistic muscle groups in a simple forearm movement.

METHODS: A group of healthy men ($n = 39$), aged 19 to 30 years, performed five simple movements from extension to 90 degree elbow flexion at elbow joint on a specialized apparatus, at approximately half the maximum speed and with the maximum possible accuracy. Goniometrically measured angle $\varphi(t)$ served as source for calculating the angle speed $\omega(t)$ and acceleration $\varepsilon(t)$. The best and the worst attempts were rejected according to value A1 (maximum angle). The remaining three attempts and their average values were included in the statistical analysis (Statistica 6). Graphic illustration of the measured values, derived values and evaluated variables are included in Figure 1.

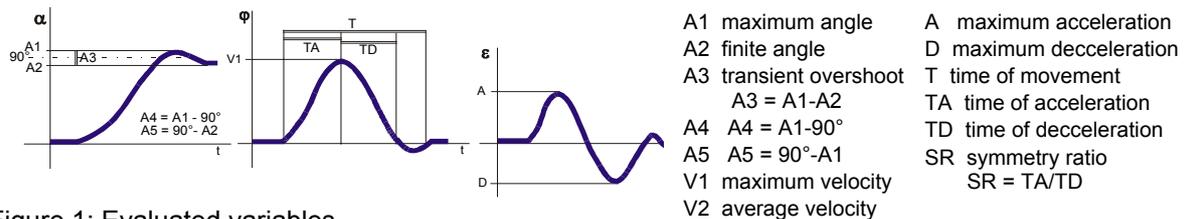


Figure 1: Evaluated variables

RESULTS AND DISCUSSION: Reliability coefficients r_{tt} vary slightly between set of angular variables ($r_{tt} = 0.42 - 0.79$) and time, velocity and acceleration parameters ($r_{tt} = 0.51 - 0.93$). Average values correlate with individual attempts in time, velocity and acceleration parameters in the range $r_{tt} = 0.73 - 0.94$ and in angular variables in range $r_{tt} = 0.56 - 0.96$. The final test score given by average values from three attempts fulfils the requirements set for test reliability. We presume that its reliability to increase with increasing attempts.

CONCLUSION: Following rejection of the best and the worst attempt out of the five measured, we chose a final score as an average of the three remaining. Reliability of average value from three attempts is in good conformity with the basic test condition. We can thus assume that a higher number of attempts can increase reliability of the test.

REFERENCES:

- Jaric, S., Milanovic, S., & Blasic, S. (2000). Changes in movement variables associated with transcendent overshoot of the final position. *Journal of Motor Behavior*, 32(2), 115-120.
- Zelaznik, H.N. (1996). *Advances in motor learning and control*. Human Kinetics.