

Thesis Title The Rate of Development of and Recovery
from Neuromuscular Fatigue in Various
Athletes.

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ABSTARCT

The studies on the rate of development of and recovery from neuromuscular fatigue by using right index finger(RI) and left index finger(LI),right bigtoe (RBT) and left bigtoe(LBT) in three athlete groups eg., table tennis national(T1)(n=9) and university(T2)(n=8) team, basketball player national(B1)(n=9) and university (B2) (n=7) team and weightlifter national(W1)(n=9) and university (W2)(n=9) team and a control group. All subjects had a range in age of 18-32 yrs,weight of 55-100 kgs. A denominator was used for the measurement of tapping speed which divided into 2 parts.First,to measure the continuously maximum tapping speed for 2 min, and then intermittent maximum tapping for 5 sec with 30 sec rest period for 4 times. This is named

as "Normal tapping speed test (NTT)". Second, to measure the 5 sec maximum tapping before, during and after occluding the brachial artery by using a sphygmomanometer at their individual systolic blood pressure + 10 mm.Hg at the right upper arm for 4 min, a so-called "Occluded tapping speed test (OTT)". The integrate electromyography (IEMG) was recorded during NTT with varying load (0, 100, 200 gm). It was found that the maximum tapping speed in the initial phase of NTT (I) was fastest and then the speed was rapidly decreasing. Later, tapping in the fatigue phase of NTT (F) was decreased at the slower rate until looked like stable. After rest, the tapping in the recovery phase of NTT (R) was rapidly increased and then the increasing rate was slower. In OTT, the tapping speed was decreased with increasing time of occlusion condition (Oo). Both in NTT and OTT, the tapping speed in each load was the mirror image of the IEMG. It is noticeable that the more increasing in the load, the more decreasing in the IEMG, and the more decreasing in the maximum tapping speed. This preliminary experiment may confirm that these tests really concern with fatigue phenomenon. The results of the rate of the maximum tapping speed test in all groups were:

1. The I, F and R of RI and LI in T1, B1, W1 were significantly faster than that in C. The F in T2, and the R in T2, B2 and W2 of RI were significantly faster than in C. The I in T1, T2, B2 and W1, the F in B2, and the R in W1 of RBT were significantly faster than that in C. The I in B2, the R in T1, B1 and B2 of LBT were significantly faster than

that in C. Moreover, the I in W1 by using RI was significantly faster than that in B1. The F in W1 of RI was significantly faster than that in T2. The R of RI in T1, T2, B2 and W2 were significantly less than that in W1. The R of RI in B2 was significantly less than that in B1. The R of LI in T1 was significantly less than that in T1. The half fatigue time of NTT($F_{1/2}$) of RI in T1, B1, B2 and W1, that by using LI in T1, B1, B2 and W1, that of LBT in B1 and W1 were significantly longer than that in C. Moreover, that of LI in B1 was also significantly longer than that in T1. The $R_{1/2}$ NTT of RI in B1 and W1 were significantly shorter than that in C.

2. The occlusion tapping speed in (O_0) in T1, W1 and W2, and the recovery tapping speed (R_0) in T1, B1, B2, W1 and W2 by using RI were significantly faster than that in C. The half occlusion time of OTT by using RI in B1 and B2 were significantly slower than that in C.

3. There were positive correlations between I, F and R of RI. Moreover, F and R of RI was positive correlation. There was positive correlation between I and F of RBT. There were positive correlations between I_0 , F_0 , and R_0 of RI. There were positive correlations between the Vo_{2max} and the $F_{1/2}$ of RI. In addition, the handgrip strength, leg strength, reaction time (RMF-RI) and reaction time (RH-RBT) was highly correlated with the I. Tapping speed correlated well with general physical fitness and type of athlete. This test can be used in the study properties of motor systems in terms of fatigue and recovery of fatigue.