

Evaluation of performance for selective lower leg muscle activity during walking on Computer Controlled treadmill system

Takeshi Sato*, Takayuki Watanabe**
Hiroshi Yasuoka***, Kazuyo Muramoto****

**Jissen Women's University, Tokyo, 191-8510 Japan
(Tel: 81-42-585-8895; e-mail: sato-takeshi@jissen.ac.jp)*

***Hachinohe University, Aomori, 031-8588 Japan
(e-mail: nabetaka@hachinohe-u.ac.jp)*

**** Tokyo University of Information Sciences, Chiba 265-8501 Japan
(e-mail: yasuoka@rsch.tuis.ac.jp)*

***** Department of Physical Education, Nippon Sport Science University,
Tokyo, Japan, (e-mail: muramoto@nittai.ac.jp)*

Abstract: The purpose of this study were to evaluate Electromyogram (EMG) activity with a change of walking speed on computer controlled treadmill and to difference EMG activity for each speed of forward and backward walking. Healthy subjects participated in this experience walked for each speed 5 minute in order of three different speed; 2,4,6 km per hour on the computer controlled treadmill and EMG activity from lower limb muscles (rectus femoris, vastus medialis, biceps femoris, tibialis anterior, medial gastrocnemius and soleus) were recorded. The EMG data rectified and data processing all waves, and calculated the integrated EMG (iEMG) and motor units activity. Statistical processing used one way repeated measures ANOVA ($\alpha=0.05$). Consequently, EMG activity has increased with the rise of walking speed. At the same speed for difference of forward and backward walking, especially selective TA muscle activity was significantly high value than forward walking. It was consider that muscle atrophy of aging was prevented on backward walking. More specifically it has experimental speculation that backward walking was to perform common activities of daily living for elderly to prevent motor disfunctions.

Keywords: Walking, Motor Units, Performance, Ergonomics, Computer controlled systems
