【**Review Article**】

Overview of Physical Activity Assessments by Accelerometer-based Activity Monitors and their Potential Application for Physical Activity Promotion

Hiroyuki Sasai[1,2], Yuki Hikihara[3,4], Kanzo Okazaki[5],
Yoshio Nakata[1], Kazunori Ohkawara[4,6]

Abstract

In this paper, we review the general mechanisms of accelerometer-based activity monitors and validation studies of the activity monitors commonly used in Japan. We also summarize intervention studies aiming to promote physical activity by using activity monitors as motivational tools and discuss future research implications in this field. Activity monitors generally house an accelerometer, internal clock, analog/digital converter, processor, data storage, and battery. Activity monitors vary greatly depending on their sensor properties, filtering process, summarization by epoch, and conversion from acceleration signals to activity outputs. In addition to hip-worn monitors, wrist-, ankle-, and thigh-worn monitors have become increasingly common in recent years. A few representative Japanese activity monitors have already been validated against doubly labeled water and Douglas bag methods under field and laboratory settings, respectively. Future research should use sophisticated statistical models to discriminate posture allocations and activity classifications in individuals with various lifestyles. At present, there is a lack of quality intervention studies using activity monitors. Considering the rapid dissemination of consumer activity monitors, intervention studies designed to promote physically active lifestyles by using activity monitors would be novel and significant.

Key words: accelerometer-based activity monitor, validation study, physical activity promotion

1）Faculty of Medicine, University of Tsukuba, Ibaraki, Japan
2）Japan Society for the Promotion of Science, Tokyo, Japan
3）Faculty of Engineering, Chiba Institute of Technology, Chiba, Japan
4）Department of Nutritional Science, National Institute of Health and Nutrition, Tokyo, Japan
5）Faculty of Liberal Arts, Tohoku Gakuin University, Miyagi, japan
6）Graduate School of Informatics and Engineering, University of Electro-Communications, Tokyo, Japan