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Laterality of right and left upper limb activity counts using long-term ambulatory recording

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Introduction and objectives
Laterality of right and left upper limb activity in daily living is well known, but there has not previously been an adequate method for quantitative assessment. This study analyzed lateral differences between the activity counts of the right and left wrist.

Methods
Thirty right-handed undergraduates participated in this study. Handedness was assessed by the Edinbrugh handedness inventory. Informed consent was obtained prior to measurement. Each participant wore four accelerometers similar to a wrist watch in shape and size (Actiwatch, Minimitter Co) on the four limbs; right wrist, left wrist, right ankle and left ankle. These accelerometers measured 24-hour activity of daily living. Participants were instructed to press the marker button when going to bed and waking up in the morning. Activity counts during 24 hours were compared between the right/left wrist and right/left ankle, during daytime and during sleep activity.

Results
The 24-hour activity counts for the right wrist (401635 ± 104446) were larger than those for the left wrist (326910 ± 96610) (paired t-test, $p < 0.001$). Left-to-right wrist activity counts ratio was constant among participants (0.81 ± 0.09). The activity counts during daytime and during sleep also showed significant differences between the right and left wrist ($p < 0.001$, $p < 0.005$). However, there was no significant difference between the activity counts in the right and left ankles.

Conclusion
Although some studies reported that activity counts did not differ between wrists, we found greater right wrist activity counts in this study. This discrepancy may be partly due to the fact that all of our subjects were right-handed. It was interesting that these lateral differences were found not only during daytime but also during sleep, and that the ratio of activity accounts for the right versus left was almost constant.

Contribution to the practice/evidence base of occupational therapy
This ratio could be a useful index for evaluating the functional recovery of stroke patients.