A New Device for Measuring Spinal Kyphosis: Validity and Reproducibility of Measurements Obtained Using a Small Gyro-embedded Device

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**Purpose:** This study aimed to examine the reproducibility and validity of a new quantitative method for measuring spinal kyphosis using a small gyro sensor.

**Method:** Subjects were 96 community-dwelling middle-aged and elderly (mean age, 72.7 ± 6.2 years) people who performed a gymnastic exercise. We measured spinal kyphosis using 2 methods: (1) the kyphosis angle (KA) using a small gyro-embedded posture-measuring device and (2) the kyphosis index using a flexible ruler. We examined the reproducibility of the new method by obtaining 2–3 consecutive measurements and adequate number of measurements for KA. We also assessed the validity of KA measurement using the device. Statistical analysis: We used interclass correlation coefficients (ICCs) of KA reproducibility and a Pearson’s product-moment correlation coefficient between KA and kyphosis index for determining the validity of KA measurement.

**Results:** ICC (1,1): the reproducibility of repeated measurements was 0.967 (95% confidence interval [95% CI], 0.951–0.978) for 2 measurements and 0.956 (95% CI, 0.941–0.970) for 3 measurements, suggesting a high reproducibility for KA measurement using this method. The result of more than 0.95 for ICC (1,1) suggests that a single measurement of KA is sufficient. For the validity of KA measurement, a statistically significant correlation was shown between KA and kyphosis index.

**Conclusion:** Thus, KA measurement using a small gyro-embedded posture-measuring device is highly reproducible in consecutive measurements as well as highly valid; this may be a useful quantitative method for measuring spinal kyphosis in the research or clinical environment.