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### Analysis of relationships between Spinal Deformity and walking ability in Parkinson's Disease patients

Yutaka Nakamura<sup>1</sup>, Yutaka Machida<sup>2</sup>, Taiki Hanawa<sup>1</sup>, Masayoshi Kanai<sup>1</sup> and Satoshi Asano<sup>1</sup>

<sup>1</sup>Higashi-Saitama General Hospital, Japan

<sup>2</sup>Tokyo Rinkai Hospital, Japan

**Objective:** To determine the impact on walking ability of Spinal Deformity and imbalance as distinct from movement disorder in Parkinson's Disease (PD).

**Background:** Despite a higher prevalence of Spinal Deformity and imbalance secondary to PD, few reports are isolating their relationships to walking ability in PD, and spinal corrective surgery remains controversial.

**Methods:** Having followed 38 PD patients from 2008.12 - 2018.4, we excluded 8 who could not take the standing whole Spine X-ray, and analyzed 30 (15 male, 15 female, mean age 72.6yrs). The Hoehn-Yahr distribution was 3, 12, 10, 4 and 1 patients across stages 1-5 respectively. Deformity was assessed by (1) various classified Spinal Deformities and imbalance; (2) Cobb Angle (CA); (3) trunk shift (TS); (4) Thoracic Kyphosis (TK) at T2-12; (5) Lumbar Lordosis (LL) at T12-S1; (6) sagittal vertical axis (SVA); and (7) pelvic incidence (PI). Walking ability was measured using Timed Up and Go test (TUG). We also checked UPDRS part III, and Bone Mineral Density (BMD).

**Results:** 18 of 30 patients (60%) had Spinal Deformity and imbalance distributed across the following classifications: Thoracic Scoliosis-1, Thoracic Kyphosis-2, Lumbar Scoliosis-12, Pisa Syndrome-3, Camptocormia-2. Averages were 11.3°CA of Spinal Deformity, 18.3mm TS of Pisa Syndrome, 44.2°TK, 28.2°LL, 57.4mm SVA, and 50.4°PI. TUG means were 13.7 seconds and 22.21 steps. Mean UPDRS was 38.0±27.5. Mean BMD was 0.59 g/cm<sup>2</sup> at the femoral neck and 0.861 g/cm<sup>2</sup> at L2-4. LL, UPDRS and BMD at the femoral neck significantly correlated to TUG (P<0.05).

**Conclusions:** Accordingly, where UPDRS improved responsively to L-dopa walking ability also improved. In addition to movement complication affecting walking disability (TUG) in PD, we clarified correlations to LL, and BMD that should be considered when assessing treatment options. - Although controversial, spinal corrective surgery to improve LL remains an option.

#### Biography

Yutaka Nakamura is a Chief of Saitama Spine Center, Higashi-Saitama General Hospital. License And Certification: Japanese Board of Orthopaedic Surgery, Japanese Board of Spine Surgery, Japan Spine Research Society Councilor, Certified Physician of Japanese Rehabilitation Society, Scoliosis Research Society active member.

e: yunaka.nakamura@gmail.com