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# Difference in weight distribution according to upright standing methods in hemiplegic patients

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**Background:** Asymmetry in weight distribution is the main cause of frequent fall in hemiplegic patients. Weight distribution during upright standing in early rehabilitation is important for the determination of asymmetry. Currently used upright standing training methods for stroke patients are tilt table (T/T), standing frame (S/F) and parallel bar (P/B). Among these, S/F is a relatively new training method and its exact indication and usefulness is not understood. Additionally, to our knowledge, changes of weight distribution on these methods have not been reported.

**Objective:** Our research questions were 1) how does the weight distribution change according to T/T, S/F and P/B in sub-acute stroke patients? 2) Especially what does the upright posture on S/F differ from others in terms of weight distribution?

**Methods:** Six patients (2 males and 4 females, mean age 73.7 years) in sub-acute stage of stroke were included in the study. Weight distribution in upright posture was assessed with the computerized wireless balanciometer (CWB) during their 'P-bar standing tries' level of recovery. The patients were divided into two groups according to the motor power of knee extensor on the hemiplegic side. In group A (n=3), the motor power was less than '3' in manual motor grade. Others (n=3) were assigned into group B (motor power >3). Group A were provided with knee stabilizer on their hemiplegic side during standing. CWB is composed of insoles with 3 sensors located on medial and lateral side of foot front and heel region. The percentage of weight that was carried at each sensor was recorded wirelessly. The patients were asked to stand 'comfortably still' for more than 30 seconds for 1 trial, and the trial repeated for 3 times to obtain median value.

**Results:** The average percentage of total body weight on hemiplegic side were calculated for tilting table, standing frame and p-bar which were 33.9% (SD 11.4), 17.8% (SD 18.0) and 14.2% (SD 23.5) each. And the average percentage of total body weight on the hemiplegic side for P-bar in group A and B were 13.7% (SD 22.7) and 31.3% (SD 26.2) each. And the value was 29.5% (SD 12.1) and 38.3% (SD 11.1) in tilting table.

**Conclusion:** In upright posture on S/F or P/B, asymmetry of weight distribution between hemiplegic and intact side aggravated in comparison to that on T/T. This phenomenon was more evident in patients with weaker knee extensors. Therefore S/F is an upright training tool similar to P/B in terms of weight distribution and should be applied with concomitant balance training to facilitate the use of hemiplegic lower extremity for the early treatment to obtain symmetry of weight distribution.

## Biography

Shi-Uk Lee has completed his PhD from Seoul National University and Post-doctoral studies from Stanford University School of Medicine. He is the Director of Department of Physical Medicine and Rehabilitation at Seoul National University, Boramae Medical Center. He is Professor in Department of Rehabilitation Medicine, Seoul National University College of Medicine.

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