Force platform system and balancing ability

C-S. CHANG, W-H. HUANG. ***The relationship between force platform system measurement parameters and the balancing ability of the elderly****. Gerontechnology 2014; 13(2):177;* doi:10.4017/gt.2014.13.02.138.00 **Purpose** As one of several issues facing an ageing society, falls are one of the most frequent types of accidents impacting the lives of elderly people when they lose their balance as a result of the degeneration of bodily functions[1,2]. The Berg Balance Scale (BBS) is an instrument designed to measure the ability of the elderly to maintain their balance[3]. In clinical use, healthcare or other professionals need to conduct a 30 minute assessment of the balancing abilities of an elderly person using oral instructions and visual observations. However, these methods tend to be subjective and time consuming. In recent years, many scholars have focused on more objective methods to assess a person's ability to balance ability[4,5]. However, only limited information is available related to these techniques. **Method** This study used a force platform system and ergonomics seats to obtain the Ground Reaction Force (GRF) of the elderly who were in the process of standing up. *Table 1* describes the basic parameters and key points. The amplitudes derived from the time-force diagram, as well as the assessment factors derived from time differences of various key points and BBS scores, were used for a pairwise t-test, in order to determine the differences between the BBS scores and various derived assessment factors. **Results & Discussion** *Figure 1* shows relationship between the GRF and time, and the positions of various key points. The results suggest that two groups of derived time parameters, (Ls -Lp)/2 and (Ts -Tp)/2 have no significant differences when compared with BBS score (*Table 2*). In other words, the objective data based on the force platform system measurements can be used to replace the older assessment method that tests the ability of the elderly to balance as measured subjectively by healthcare or other professionals the using BBS scale. In addition, measurement by instrument can considerably shorten the assessment time.

Table 1. Test subject information factors

Factor	Description
B	Hips force curve
L	Legs force curve
T	Sum of hips and legs force curve
Ts	Starting point of hips and legs force
Bs	Starting point of hips force
Ls	Starting point of legs force
Tp	Sum of the highest points of hips and legs force
Lp	Highest point of leg force

Table 2. Paired-samples t-test of BBS (Berg Balance Scores) by derived factors

Factors	Ts	Tp	(Ts-Tp)/2	Ls	(Ls-Lp/2
Significance	*	*		*	

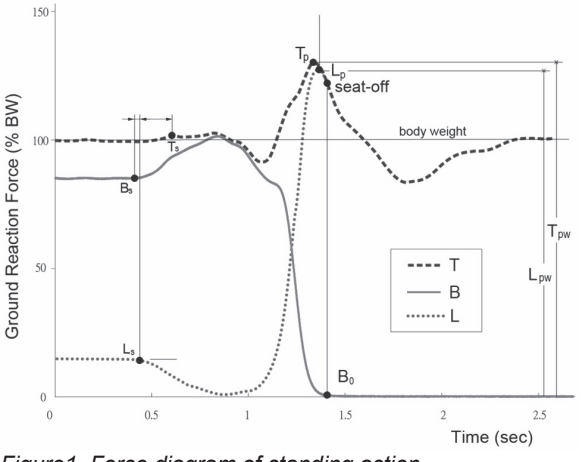

Figure1. Force diagram of standing action

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