The Bottom Line

The Bottom Line is a translation of study findings for application to clinical practice. It is not intended to substitute for a critical reading of the research article. Summaries are written by members of The Bottom Line Committee or by invitation of the Editor in Chief.

[Muir SW, Berg K, Chesworth B, Speechley M. Use of the Berg Balance Scale for predicting multiple falls in community-dwelling elderly people: a prospective study. *Phys Ther*. 2008;88:449–459.]

What problems did the researchers set out to study, and why?

There is clear evidence that treatment of modifiable risk factors can reduce the risk for falls in community-dwelling elderly people; therefore, it is critical to accurately identify those at risk. Although originally developed to assess balance, the Berg Balance Scale (BBS) is now frequently used in research and practice to evaluate fall risk. Some studies have suggested that people with a score of ≤45 (out of 56) are at risk for falls. Muir and colleagues wanted to evaluate this dichotomous use of the BBS more closely using a prospective method and a variety of statistical tests. In particular, they evaluated the predictive ability of the BBS for 3 types of fall outcomes in community-dwelling elders: any fall (≥1 fall), multiple falls (≥2 falls), and injurious falls.

Who participated in the study?

A random sample of 187 community-dwelling elderly people with a mean age of 79±6 years (65% were men). This was a subgroup of a larger sample that participated in "The Project to Prevent Falls in Veterans" at the University of Western Ontario.

What new information does this study offer?

In this sample, the cutoff BBS value of 45 did not adequately identify most of the future fallers. Falls occurred frequently among people with scores above 45. The risk for falling *did* increase as BBS raw scores decreased. For the "any fall" outcome and for the "injurious falls" outcome, risk increased with BBS scores of 45 to 49 and increased progressively as scores declined. For the "multiple falls" outcome, there was an increased risk with scores of 40 to 44, with a marked increase in risk for scores <40.

How did the researchers go about this study?

Study participants received a comprehensive geriatric assessment that included the BBS. Prospective information on daily falls was then collected for a year using monthly mail-in "fall calendars." Individuals who indicated a fall in a given month were interviewed by telephone about the specifics of the fall, including whether the fall resulted in an injury requiring a visit to a physician. The results were analyzed to determine whether the ≤45 BBS cutoff score accurately predicted the occurrence of the 3 fall outcome categories. Raw BBS scores were similarly examined. This enabled an analysis of the BBS as a dichotomous versus a continuous scale.

How might the results of this study apply to physical therapist practice?

In clinical practice, it is tempting to determine fall risk by using the BBS as a dichotomous scale. The authors remind us that, as with many things, this is an overly simplistic view of falls. The causes of falls are multifactorial, and balance impairment might or might not be a contributing factor in any given event. Based on the results of this study, clinicians should not use a BBS score of <45 as an imaginary bar above which fall risk is nil and below which fall risk is significant. It is logical, however, to interpret fall risk as increasing as a score becomes lower. The BBS was especially discriminative for the "multiple falls" outcome, and the authors recommend this as the outcome of interest when using the BBS to evaluate future fall risk. Finally, clinicians should also consider the other well-documented risks for falls when screening a client.

What are the limitations of the study, and what further research is needed?

This work was part of a larger intervention study that provided fall prevention information to some of the subjects. If those recommendations were followed and were successful, perhaps fewer falls occurred than would have otherwise. This study, therefore, might underestimate the predictive ability of the BBS. The results might not be generalizable to the broad population of older adults because the subjects volunteered to participate in a fall prevention study. In addition, although the sample was relatively large, the number of subjects with injurious falls and multiple falls was small. Large studies with

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more fall events are needed to fully evaluate the BBS scores. In addition, future research must evaluate risk in multiple domains, given that a typical client has multiple factors contributing to fall risk and to falls themselves.

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