Efficacy of Balance Measurement Tests in Fall-risk Patients

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Patients who are at risk of falling are not limited to the elderly. Fall-risk patients can include children, patients with muscular disorders, stroke patients, and more (Blum, 2008; Franjoine, 2003; Holbein-Jenny et al., 2005). Because balance is a widespread issue, the ways in which balance is measure should be tested for efficacy. Many of the tests we use today have been used for several decades, including the Berg Balance Scale, one of the most common balance tests used by physical therapists (Miranda-Cantellops, 2022). The following literature review recounts some of the popular articles in the field of physical therapy that discuss the efficacy of different balance-based assessments for a variety of patients.

Literature Review

The Berg Balance Scale in Stroke Patients

The Berg Balance Scale, also called the BBS or “The Berg”, is one way that physical therapists (PTs) measure the progression of balance in any given patient. The BBS was initially created for geriatric patients, but PTs use the BBS in most cases of adult fall-risk patients. The BBS is a test that is conducted by the clinician who observes the patient and gives them a score of 0 to 4 – 0 being unable to complete a task, and 4 being able to complete the task without assistance or falter – for 14 different activities. The test also requires a chair, stopwatch, ruler, and a step, and consists of a variety of both static and dynamic exercises. There are 56 possible points. Patients who score between 0 and 20 are considered part of the high fall risk category, those between 21 and 40 are in the medium fall risk category, and those with scores between 41 and 56 are in the low fall risk category (Blum, 2008).

In a study that involved 655 physical therapists, the BBS was the most common assessment of balance in patients with stroke-related fall risk. Given its common use in physical therapy, a systematic review, published by the American Physical Therapy Association (APTA), of the strengths and limitations of the BBS was conducted. Researchers reviewed articles published between 1966 and July 2007. Their criterion included aspects such as reliability, validity, if the BBS detects change in patients, time it takes to administer, feasibility, and acceptability. This list is not exhaustive. This study's criterion was largely based on stroke patients. Results showed an excellent score for both reliability and validity, and a moderate to excellent score for detecting change in stroke patients. In contrast, the BBS seemed to be an unreliable source of fall prediction for patients with chronic stroke. It was also noted that the BBS only contains one sedentary balance activity, which is likely to produce inaccurate results for balance while seated. This may affect patients with severe disabilities (Blum, 2008).

The Pediatric Balance Scale

The Pediatric Balance Scale (PBS), is an unofficial version of the Berg Balance Scale and is used as an assessment of balance in children. In order to function safely at home, school, or in the community, children must have acceptable balance and postural control. Pediatric physical therapists have currently use standardized assessments, such as the Bruininks-Oseretsky Test of Motor Proficiency, the Peabody Developmental Motor Scale, and the Gross Motor Function Measure to test their patients' balance, but research suggests that these assessments do not yield adequate information for children with mild to moderate motor and balance impairment. A study was conducted to discover whether the BBS, or the pediatric version rather, would be more useful in assessing children with mild to moderate motor and balance impairment (Franjoine, 2003).

The study used the BBS as a pilot test using 13 children ranging from 4-years-old to 12-years-old. The children were tested twice, one week apart, in the same setting by a pediatric PT with 13 years of experience. 69% of participants had difficulty completing two or more of the required activities that involved static posture and 62% of participants had trouble following directions and staying focused. Thus, the BBG was modified into a pediatric version and tested. The adjustments included decreasing time standards, simplifying directions, and reordering activities in a way that allowed for better focus. In the second round of testing, 20 children with mild to moderate balance abnormalities, both males and females of similar ages, were evaluated using the PBS. The PBS was much more successful for testing children compared to the BBS. It had high test-retest and high interrater reliability from 10 pediatric PTs with at least 10 years of experience. However, this stud did not address the validity of the PBS, so it cannot be counted as an official measure of balance in children (Franjoine, 2003).

The Berg Balance Scale, the Multi-Directional Reach Test, and the Activities-specific Balance Confidence Scale in Elderly Home-care Residents

Besides the Berg Balance Scale, there are other balance tests that clinicians can use to assess fall-risk in older adults. Researchers from the Department of Physical Therapy at Slippery Rock University in Pennsylvania conducted a study that used the BBS, the Multi-Directional Reach Test (MDRT), and the Activities-specific Balance Confidence Scale (ABC) to evaluate balance, as well as the reliability and validity of these tests, in elderly residents of a personal care home. The MDRT is a PT-lead assessment where the clinician observes the patient in exercises focused on reaching activities. The ABC is a written or verbal questionnaire between the clinician and the patient that contains questions regarding the patient’s confidence in executing

balance-related activities. A total of 26 male and female participants were tested twice, using all three assessments (Holbein-Jenny et al., 2005).

Results showed that the BBS, MDRT, and ABC give accurate measures of balance in this type of population. However, although the ABC was valid, it was difficult to use this test on elderly fall-risk patients due to the fact that it is a self-report test. Researchers suggest that the ABC may need an updated version more appropriate for patients in an elderly home setting. Moreover, multiple patients had difficulty understanding directions during the MDRT. Specifically they would not stay still during static reaching exercises, where they were tested on their balance while simultaneously reaching for an object without moving the rest of their body. Some patients would reach in awkward positions, making the measurements more difficult than they needed to be. This issue was taken into account when considering the validity of the MDRT. In addition, many patients had a fear of falling when carrying out the BBS test, which may have had an impact on their true balance capabilities. Even so, PTs were able to gather sufficient data to make an assessment of balance using all three tests (Holbein-Jenny et al., 2005).

Future Research

It is important that an accurate measurement of balance is taken in fall-risk patients to determine the severity of their disability. Most of the current balance tests that are used today are fairly accurate, but may need slight modifications based on different populations, as research suggests. Future research will need to include updated questions and activities that differ based on patient type.

References

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