Oral Presentation 03

Reliability of the German Translation of the Balance Evaluation Systems Tests by People with Schizophrenia Spectrums Disorders and their Healthy Controls

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Background

People with Schizophrenia Spectrum Disorders (PwSSD) show motor deficits, including motor slowing, spontaneous dyskinesias, parkinsonism, and Neurological Soft Signs (NSS). Balance deficits are classified as NSS. Up to now, apparative measuring instruments have mostly been used to record the balance performance in PwSSD in the laboratory. In particular, gait has been well studied. However, gait is only a partial component of postural control. Therefore, it would be important to investigate all components of postural control. In order to plan an efficient treatment as a physical therapist, it is important to identify the deficient system of postural control. This is made possible by the Balance Evaluation Systems Test (BESTest). This consists of six systems with 36 items that together cover the postural control system. 1. System: Biomechanical Constraints: Factors affecting static balance: including loss of strength in the stance leg (aot. Item 4: Hip/Trunk Lateral Strength); 2. System: Stability Limits: Movement of the body's center of gravity beyond the support surface (aot. Item 7: Functional Reach Forward); 3. System: Transitions - Anticipatory Postural Adjustment: Change of the body's center of gravity when changing body position (aot. Item 11: Stand On One Leg); 4. System: Reactive Postural Response: Restoration of balance after loss due to an external stimulus (aot. Item 16: Compensatory Stepping Correction - Forward); 5. System: Sensory Orientation: Reduction of somatosensory information and effect on body sway (aot. Item 19 D: Eyes Closed, Foam Surface); 6. System: Stability in Gait: Testing dynamic balance with various additional tasks (aot. Item 27: Timed "Get Up & Go" with Dual Task). The BESTetst shows good to excellent reliability and validity in various populations. Two shorter versions of the BESTest exist: the Brief BESTest and the Mini-BESTest. The BESTest was translated and culturally adapted into German.

Purpose: The purpose of the study was to assess the Reliability with the intraclass coefficient (ICC) and the Kendall's Coefficients of Concordance (W) to confirm the evaluation objectivity.

Methods: To estimate the objectivity of the evaluation, the participants were videotaped during the motor test of the BESTest and the interrater reliability was calculated. Nine video recordings were selected for this purpose, which were characterized by good recording quality for evaluation on the computer. Three physical therapists and two physical therapy students in their final year were recruited as raters.

Instruments: Balance Evaluation Systems Tests: The BESTest scores on a 4-point scale from zero to three points, with a higher score indicating better balance ability. The maximum score in all six systems is 108 points, which are distributed among the individual systems with point values between 15 and 21.

Analysis: Statistical analysis included the calculation of the ICC (3,1), two-way mixed model, adjusted. Interpretation of the ICC is assessed according to Koo and Li, 2016, with values below .50 indicating poor reliability. Values between .50 to .75 indicate moderate reliability, values between .75 to .90 indicate good reliability, and values greater than .90 indicate very good reliability. The requirement of the ICC that the

values of the BESTest are normally distributed was violated. Therefore, Kendall's Coefficients of Concordance (W) is also reported for further validation.

Results: Table 1 shows the intraclass correlation coefficient ICC of the five raters for the individual systems and the overall BESTest. All agreements are significant and in summary, the overall BESTest shows moderate interrater reliability. Among them, four systems: system 2 "Stability Limits", system 3 "Transitions -Anticipatory Postural Adjustment", system 4 "Reactive Postural Response" and system 5 "Sensory Orientation" show good reliability. No system shows poor reliability. The concordance coefficient W according to Kendall turns out to be higher for the overall test.

Table 1: *Interrater reliability of the BESTest by systems and overall test.*

BESTest Systems	ICC Mean Value (95% CI)	p-Value	Concordance coefficient W according to Kendall	p-Value
1. System: Biomechanical Constraints	.65 (.52-.76)	<.001	.68	<.001
2. System: Stability Limits	.80 (.73-.86)	<.001	.85	<.001
3. System: Transitions -Anticipatory Postural Adjustment	.80 (.73 -.87)	<.001	.78	<.001
4. System: Reactive Postural Response	.81 (.74-.87)	<.001	.82	<.001
5. System: Sensory Orientation	.80 (.72-.87)	<.001	.69	<.001
6. System: Stability In Gait	.56 (.45-.67)	<.001	.63	<.001
BESTest Overall test	.71 (.67-.75)	<.001	.74	<.001

Notes: ICC = intraclass correlation coefficients, CI = confidence interval.

Conclusions and Implication

In the present work, 9 videos were evaluated on the BESTest with PwSSD and their HCG to calculate the ICC and the Kendall`s Coefficients of Concordance (W). The objectivity of the evaluation determined by the interrater reliability of the original test is moderate.

Similar results have been reported in other populations studied, but the ICC was always higher. The reason for the lower score in this present study may be that only videos were assessed here, rather than assessment in an actual testing situation as in the studies cited above. For the two videos that were rated as poor, it became apparent that the angle to evaluate the Functional Reach was not optimally executable. In addition, due to the lack of space, it was also not possible to have a good perspective to observe the System 6 "Stability in gait". However, through the testing and the video recordings in the field, it shows the difficulties that one also has in "real life" compared to a laboratory situation when assessing a balance performance. Assessing interrater reliability using a video recording has the advantage of being able to rewind the recordings and watch them a second time. This procedure was also allowed to the raters in this present work. In further studies, the psychometric properties of the BESTest in PwSSD should be examined.

Ethics Approval: A positive ethics vote by the Ethics Committee of the Medical Faculty of Heidelberg University is available (S-624/2016).