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A Comparative Review of Pediatric Traumatic Brain Injury Assessments

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A Comparative Review of Pediatric Traumatic Brain Injury Assessments

Danielle Costantini and Kyle Ailes

1a Ask: Research Question

What is the comparison between three common pediatric assessments for traumatic brain injury (TBI) in the outpatient setting?

2a Acquire: Search Terms

Databases: ProQuest, ProQuest PsychARTICLES

Search Terms: Glasgow Coma Scale, Pediatrics, Validity, TBI, Beery-Buktenica Developmental Test of Visual-Motor Integration, Trail-Making Test, Comprehensive Trail-Making Test, Cognition

2b Acquire: Selected Articles

Beers et al. (2012): A non-randomized, comparison study with a purpose to determine the validity of the Glasgow Outcome Scale-Extended Pediatrics (GOS-E PEDS) for pediatric traumatic brain injury (TBI) clients, when compared to the adult GOS version.

Sutton et al. (2011): A non-experimental study with a purpose to determine criterion and construct validity of the Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI) scores of pediatric TBI and ADHD patients.

Allen, Thaler, Ringdahl, Barney, Mayfield (2012): A non-randomized study with a purpose to evaluate the accuracy of statistics for the Comprehensive Trail-Making Test (CTMT) scores compared to the TMT assessment, as well as classification of diagnosis between a TBI and control group.

3a Appraise: Study Quality

Beers et al. (2012): Level III. A non-randomized, descriptive study of four common neuropsychological assessments. Limitations included a limited sample size and not having validity reported with participants not in the clinical setting. Participants invited in the study who only had mild TBI impairments could have possibly interfere with correlation findings. No other groups with different diagnoses were studied, which lacks validity when compared to other individuals.

Sutton et al. (2017): Level III. A non-randomized, descriptive study of three common neuropsychological assessments. Limitations included inaccurate findings of VMI scores to distinguish individuals with TBI and ADHD, as well as assessments being compared measuring different abilities in relation to both diagnosis. The TBI population assessed did not include those with lesser degrees of TBI, and instead only moderate to severe TBI. This study used a convenience sample, which impacts the reports of results.

Allen, Thaler, Ringdahl, Barney, Mayfield (2012): Level III. A non-randomized, descriptive study of two neurological assessments. Limitations included lack of prior statistics from previous TMT studies to compare results to, as well as a majority of selective sample of TBI patients having causes from closed-head injuries. Only three age groups were selected to be studied with different amounts of children in each group, and different evaluation times following post diagnosis. The CTMT also is used with other populations referred for other than a TBI diagnosis.

3b Appraise: Study Results

Assessment	Population	Method	Psychometrics	Outcomes	Benefits
GOS-E PEDS (Beers, et al.)	Brain injury Infants through 16 years old	Administered through observation	Validity of .865 compared to the GOS of .0824 Inter-Rater: .85	Assesses eye opening, verbal response, and motor response by observation to prompts and cues	<ul style="list-style-type: none"> • 15 minutes • High reliability • More valid than GOS in outcome measures for pediatric TBI • Free
VMI (Sutton, et al.)	Brain injury, Pediatric disorders, Cognitive impairment, developmental delays, vision and perception impairments Pediatrics to adolescents (Ages 2 and up)	Administered by an occupational therapist using standardized testing measures 30-item booklet with design-copying tasks Test until 3 consecutive failures	Test-Retest: .84-.88 Inter-Rater: .93-.98 Internal-Consistency: .81-.89	Assesses effectiveness of intervention programs Identifies difficulties in visual-motor integration	<ul style="list-style-type: none"> • 10-15 minutes • Internal consistency, inter-rater and test-retest reliability are high • \$145.00
CTMT (Allen, et al.)	Stroke, Brain tumor, Multiple sclerosis, Closed head injury Pediatrics to adolescents (Ages 8 and up)	Administered by an occupational therapist using standardized testing measures Consists of 5 visual and search tasks for attention, concentration, distraction, and cognitive flexibility	Composite Score: .90 coefficient or higher for all ages	Diagnosis of TBI or central nervous compromise Frontal lobe deficits determined	<ul style="list-style-type: none"> • 5-12 minutes • High reliability • Validity needs to be researched • \$145.00

4 Apply: Conclusions for Practice

Each study of assessments suggests that they were significantly valid and reliable when compared to similar measures. The VMI and CTMT are similar in cost, however the GOS-E PEDS is a free assessment through clinical observation. Each assessment typically measures different responses and skills, however they have the same outcome in diagnosing the severity or implications of a TBI. Therefore, the psychometric properties of each assessment should be uniquely applied to each pediatric client when administering. The GOS-E PEDS is more observational-based to responses and cues for cognitive arousal that may be inhibited by a TBI. The VMI is more visuo-motor and cognitive skills application-based that may hinder performance. The CTMT is more focused on the attention and ability to shift between cognitive tasks. To assume one assessment alone is appropriate enough to assess TBI in pediatric clients is not a supported decision when considering the differences in the assessments itself. To assume the validity and reliability of these assessments is strong however.

References:

Available Upon Request

