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Neurophysical Outcome Scale (NPOS)

Neurologic dysfunction is a common sequel of traumatic brain injury (TBI), but the assessment of this dysfunction is frequently overlooked in TBI research. A standardized measure of this domain in TBI currently does not exist, and the lack of neurologic dysfunction assessment in this population represents a substantial gap where such an instrument could compliment primary outcome measures in clinical trials. To address this gap, the Neurophysical Outcome Scale (NPOS) was developed for TBI outcome research through modification and addition of items specifically relevant to patients with TBI based on the National Institutes of Health Stroke Scale.

Content validity of the NPOS was established through a consensus panel of TBI experts including a neurointensivist, physiatrist, two neurosurgeons, a clinical neurologist, and four neuropsychologists specializing in TBI. The panel was canvassed and suggestions were implemented regarding item additions and modification of the NIHSS to construct a measure more appropriate to assessing patients with TBI. In a sample of 50 participants (mean age = 33.3, SD = 12.9) < 18 months (mean = 3.1, SD = 3.2) following moderate (n=8) to severe (n = 42) TBI, internal consistency of the NPOS was high (Cronbach's coefficient alpha = 0.942). Test-retest reliability also was high ($\rho = 0.97$, $p < 0.0001$), and individual item kappas between independent raters were excellent ranging from 0.83 to 1.0. Overall interrater agreement between independent raters (Kendall's Coefficient of Concordance) for the NPOS total score was excellent ($W = 0.995$). Convergent validity was demonstrated through significant Spearman rank-order correlations between the NPOS and concurrently administered Disability Rating Scale ($\rho = 0.75$, $p < 0.0001$), Rancho Los Amigos Scale ($\rho = -0.60$, $p < 0.0001$), Supervision Rating Scale ($\rho = 0.59$, $p < 0.0001$), and the Functional Independence Measure ($\rho = -0.56$, $p = 0.0003$). Construct validity was assessed with Spearman rank-order correlation between the NPOS total score and a clinical neurologist's comprehensive quantified neurologic examination ($\rho = 0.76$, $p < 0.0001$) or 57.8% shared variance between the two measures.

CONCLUSION: These results suggest that the NPOS is a reliable and valid measure of neurologic functioning in patients with moderate to severe TBI.