

Research Summary – Grasp and Release Test (GRT) – Upper Limb

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Post et al. 2006</p> <p>Validation study of the short version of the Van Lieshout test (VLT-SV)</p> <p>Two specialized rehabilitation centres in The Netherlands</p>	<p>N = 55 Age = 42.1 +- 13.5 Time after injury = 11 years +- 8.5 83.6% males</p>	<p>Convergent Validity: Excellent convergent validity of GRT and Van Lieshout Test (Spearman correlation coefficient Left hand 0.87, right hand 0.90)</p>		
<p>Mulcahey et al. 2004</p> <p>Single group pre/post design.</p> <p>GRT was administered in 2 separate trials prior to any hand intervention;</p>	<p>N=19 (21 hands) Age range: 7-20 years</p> <p>All had cervical level SCI. 3 participants (5 hands) had strong C6 or C7 function and underwent bilateral surgical tendon transfers; 16 had C5 or weak C6 level SCI and</p>	<p><u>Relationship between GRT objects at post-rehabilitation and 12 month Functional Independence Measure (FIM) Scores</u></p> <p>Relationships b/w 12-month FIM scores and the peg, block, paperweight and total number of objects successfully</p>	<p>Test-retest, Inter-rater, Intra-rater: Fork, paperweight & videotape: ICC = 1.0 Block: ICC=0.87 (P<.01) Peg: ICC=0.93 (P<.01) Can: ICC=0.99 (P<.01)</p>	<p>Responsiveness: <u>Change between baseline and post-rehabilitation GRT scores</u> Fork: z=3.05 (P<.01) Paperweight:z=2.83 (P<.01) Can: z=2.66 (P<.01) Total GRT objects manipulated: z=3.40 (P<.05)</p>

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<p>period between 2 GRT sessions ranged from 1-14 days (average=6.5 days). GRT was re-administered to each participant following rehabilitation of tendon transfer surgery or Freehand system implantation which ranged from 3-4 months postsurgery.</p> <p>Shriners Hospitals for Children, Philadelphia, Pennsylvania</p>	<p>underwent unilateral surgical implantation of the Freehand System.</p>	<p>manipulated were nonsignificant.</p> <p>Fork & 12-month FIM: $\rho = 0.624$ ($P < .01$) Can & 12-month FIM: $\rho = 0.700$ ($P < .01$) Videotape & 12-month FIM: $\rho = 0.503$ ($P < .05$)</p> <p>Predictive validity coefficients: Can: $r = 0.88$ Tap: $r = 0.79$ Fork: $r = 0.90$</p> <p>All significant at $P < .05$.</p>		<p>$z =$ Wilcoxin matched pairs signed-rank test</p>

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<p>Wuolle et al. 1994</p> <p>The GRT was developed and GRT scores were compared in 5 patients with and without a neuroprosthesis</p> <p>Case Western Reserve University – Veterans Administration Medical Center</p>	<p>N=5 individuals (4M, 1F) with tetraplegia who were outfitted with a portable hand neuroprosthesis Injury level: C5 (N=3) and C6 (N=2)</p>	<p>Injury-level differences between C5 and C6: With the easiest objects (blocks and pegs), one C5 patient (patient 4) had more completions with the neuroprosthesis than without the neuroprosthesis, one C5 patient (patient 3) had no difference, and the two C6 patients (patients 1&2) had fewer completions with the neuroprosthesis. All of the patients had significantly more completions with the four more difficult objects (with the exception of the fork for patient 2 and the tape for patient 4).</p>	<p>Test-retest, Inter-rater, Intra-rater: The range of performance across trials and the range of the session medians can be quite large compared to the grand median. The ratio of half of the range of the session medians divided by the grand median (analogous to a coefficient of variation) ranges from 5% (patient 1, peg) to 133% (patient 4, can) for completions with the neuroprosthesis; 3% (patient 1, peg) to 100% (patient 4, block) for completions without the neuroprosthesis; and 8% (patient 4,</p>	

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			<p>block) to 83% (patient 1, can) for failures without the neuroprosthesis.</p> <p>Variability within a session (each object is tested 5 times each session) can also be significant even if the median performance is consistent across sessions. The number of completions by patient 1 with the peg using the neuroprosthesis showed no significant variation in the medians across sessions ($P > .05$, Kruskal-Wallis test). However, the range of performance within a session was as</p>	

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			much as 15-23 completions, suggesting that multiple trials are necessary to obtain reasonable estimates of those medians.	