

LETTER TO THE EDITOR

PSYCHOMETRIC PROPERTIES AND PRACTICAL ATTRIBUTES OF THE TRUNK CONTROL TEST IN STROKE PATIENTS

Sir,

A recent paper by Duarte et al. (1) analysed the relationship of the trunk control test (TCT) at admission with length of stay (LOS) and a series of functional measures at discharge in 28 stroke patients. The TCT correlated with walking speed, walking distance and balance, and predicted, together with admission FIM, a large percentage of variance in LOS and discharge FIM.

Their results confirm the construct validity of the TCT (convergence with balance and walking measures) and its role as a valid predictor of ability in activities of daily living (ADL) in stroke patients. However, further comments on their results and conclusions are warranted. The TCT showed a large ceiling effect: about 30% of the patients in Figure 3 had top scores on admission, and the score cluster at the top of the scale range would have strongly increased at discharge, as a mean FIM score of 109.5 (out of a maximum of 126) suggests. In such condition, it would be: (i) difficult to consider the TCT as a promising “outcome measure” (2); the ceiling effect denotes a reduced ability to discriminate between subjects, and adversely influences the responsiveness of an instrument (3); and (ii) of limited interest “to repeat TCT at discharge to provide further evidence of correlation with the other outcome variables”, due to the low variability in TCT scores that produces artificially low (and poorly interpretable) correlation coefficients (4).

For these reasons, we stress the conclusions of our previous paper studying stroke patients with higher disability level (i.e. that “the TCT probably works best around or below the floor of the motor FIM subscale ...”) (5), and maintain the usefulness of a combined evaluation of trunk control and functional independence in basic ADL only in stroke patients at an early stage (and with important disability), as a pivotal predictor of mid-term functional outcome (see also 6).

We appreciated the paper by Duarte et al. and think that their

comments on this issue could add further notions on the psychometric criteria and practical attributes that should be considered in the assessment of a measure. Moreover, a discussion of the strengths and weaknesses of the TCT in relation to the particular population under scrutiny and the research goals could help the reader to be more confident about the appropriate use of the TCT in clinical settings (and could also be lead to suggestions for selecting alternative instruments for specific contexts or goals).

REFERENCES

1. Duarte E, Marco E, Muniesa JM, Belmonte R, Diaz P, Tejero M, Escalada F. Trunk control test as a functional predictor in stroke patients. *J Rehabil Med* 2002; 34: 267–272.
2. Andresen EM. Criteria for assessing the tools of disability outcomes research. *Arch Phys Med Rehabil* 2000; 81 (Suppl 2): S15–S20.
3. Fitzpatrick R, Davey C, Buxton MJ, Jones DR. Evaluating patient-based outcome measures for use in clinical trials. *Health Technol Assess* 1998; 2: 1–74.
4. Portney LG, Watkins MP. Foundations of clinical research. Applications to practice. 2nd edn. New Jersey: Prentice Hall Health; 2000. p. 506–507
5. Franchignoni FP, Tesio L, Ricupero C, Martino MT. Trunk control test as an early predictor of stroke rehabilitation outcome. *Stroke* 1997; 28: 1382–1385.
6. Hsieh CL, Sheu CF, Hsueh IP, Wang CH. Trunk control as an early predictor of comprehensive activities of daily living function in stroke patients. *Stroke* 2002; 33: 2626–2630.

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Reply to the Letter to the Editor by Franco Franchignoni

Concerning these valuable comments about psychometric properties of the TCT, we agree that it shows a large ceiling effect, probably due to the pre-selection of stroke patients in our rehabilitation unit: TCT scores range from 12 to 100. Certainly 10 patients (35.7%) had top scores. However, linear regression parameters do not seem to be influenced by this fact. First of all residuals tested by Kolmogorov-Smirnov test (Shapiro-Wilks

corrected) did not show significant departures from normality (the lowest *p*-value was 0.320). On the other hand non-parametric Spearman correlation was practically identical (Table I) and what is more: when patients with top scores were excluded, correlations were of equal sign, fairly close magnitude and statistical significance maintained in spite of the small sample size.

	All patients $n = 28$				Excluded patients with top scores $n = 18$	
	Pearson's correlation		Spearman's correlation		Pearson's correlation	
	'r'	<i>p</i> -value	'r'	<i>p</i> -value	'r'	<i>p</i> -value
Discharge FIM	0.738	<0.001	0.644	<0.001	0.674	0.002
LOS	-0.722	<0.001	-0.771	<0.001	-0.490	0.039
TW10CS*	-0.644	<0.001	-0.593	0.001	-0.577	0.012
TW10MS¶	-0.654	<0.001	-0.574	0.001	-0.598	0.009
COG	-0.601	0.001	-0.545	0.003	-0.537	0.022
Posturography speed	0.482	0.011	0.440	0.022	0.537	0.026

* TW10CS: time to walk 10 metres at a comfort speed. ¶ TW10MS: time to walk 10 metres at a maximal speed. LOS: length of stay; COG: centre of gravity.

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BOOK REVIEW

Essentials of Physical Medicine and Rehabilitation, Walter R. Frontera
Julie K. Silver eds., pp. 836, 2001. Price 95. ISBN: 1 56053 443 5.
Hanley Belfus Inc., Philadelphia.

This book is divided into two major sections: the first comprises 91 chapters, in which various aspects of musculoskeletal disorders are covered; the second describes the rehabilitation of some 54 chronic conditions.

Each chapter follows the same structure, starting with synonyms and the ICD-9 code for each condition, followed by its definition, symptoms, physical examination, functional limitations, diagnostic procedures, treatment methods, and potential disease and treatment complications. The text reads easily and drawings, tables and pictures illustrate the most common disorders.

The book is in essence a summary of a range of conditions and is

intended for a wide readership including general practitioners and specialists in orthopaedics, rheumatology, neurology and general internal medicine. Allied healthcare providers will also find the contents interesting in their daily practice. For physical medicine rehabilitation specialists the book is not sufficiently comprehensive. They can, however, recommend it to members of their multidisciplinary team, for whom it will be a good basis on which to proceed, supplemented with other, more specific physical medicine rehabilitation textbooks.

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