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# STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

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- Article Review \*\*\*New\*\*\* The TWIST Tool Predicts When Patients Will Recover Independent Walking After Stroke: An Observational Study
- **Trivia night** - FEBRUARY 7 - check out the prizes for winners!



## STROKE SIG ARTICLE REVIEW

Academy of Neurologic Physical Therapy



**Completed by:** Arco Paul, PT, PhD, NCS

**Summary topic title:** The TWIST Tool Predicts When Patients Will Recover Independent Walking After Stroke: An Observational Study

**Article reference:** Smith MC., Barber AP., et al. The TWIST Tool Predicts When Patients Will Recover Independent Walking After Stroke: An Observational Study. *Neurorehabilitation and Neural Repair* 2022. DOI: 10.1177/15459683221085287

**Link to full article if available:** <https://doi.org/10.1177/15459683221085287>

### Definitions:

- **TWIST tool:** A bedside assessment tool for predicting Time to Walking Independently after STroke.
- **Functional Ambulation Category (FAC):** A 6-point outcome measure to assess walking ability, where a FAC score of >4 indicates independent walking. This measure was used to internally validate the TWIST tool.
- **Berge Balance test (BBT):** A measure of sitting and standing balance, with scores ranging from 0-56.
- **MRC strength grades:** Medical Research Council muscle strength grades from 0 to 5.

### Background and Purpose of article:

- The likelihood of regaining independently walking ability is probably one of the most worrying questions faced by individuals recovering from stroke.
- Recovery of independent walking is known to depend on various factors including stroke severity, lower limb strength, balance and trunk control, age, sensory impairment, and visual/visuo-spatial impairments.

- The TWIST tool that was originally reported by Smith et al in 2017, which at that time used the Trunk Control Test (TCT) and hip extension strength scores to predict the probability of independent walking ability at 6- or 12-months post-stroke.

- The purpose of this article was to further develop and validate the tool by investigating additional predictors and time points of recovery.

### **Methods of interest:**

- Adults aged > 18 years were included within 1-week post-stroke, if they had new weakness (MRC strength grade <5/5) in any lower limb muscle group and were unable to walk independently (indicated by FAC score of <4).

- The 7 clinical predictors were ultimately investigated to refine the TWIST tool were: age, MRC strength grades for hip flexion, knee extension and ankle dorsiflexion, TCT, BBT, and Star Cancellation test (for testing visuospatial neglect).

- The timepoints that were used for prediction were 4, 6, 9, 16 and 26 weeks post-stroke. FAC scores were collected during those timepoints to determine if patients had achieved independent walking ability (FAC >4) or were still dependent (FAC <4).

- Regression analysis was used to identify the predictors.  $\beta$ -coefficients were used to assign weights to each selected predictor and develop the TWIST scoring system.

### **Results of interest:**

- The TWIST tool ultimately included patient's age, knee extension MRC strength and Berg Balance test scores as predictors that determine the probability of achieving independent walking ability at 4, 6, 9, 16 and 26 weeks post-stroke.

- The **TWIST score ranges from 0-4** and is calculated by summing each predictor score as follows,

- **Age** scored as 0 (for >80y) or 1 (for <80y)

- **Knee extension strength** scored as 0 (for <3/5) or 1 (for >3/5)

- **BBT** scored as 0 (for <6), 1 (for 6-15) or 2 (for >16)

- **A plain language interpretation for each TWIST score is as follows,**

- 0 - About 1 out of 10 people achieve independent walking by 4 months, and 1 in 5 people achieve independent walking by 6 months post-stroke

- 1 - About 1 in 5 people achieve independent walking by 2 months, and 2 out of 3 people achieve independent walking by 6 months post-stroke

- 2 - About 1 in 3 people achieve independent walking by 6 weeks, and 9 out of 10 people achieve independent walking by 4 months post-stroke

- 3 - Around half of people achieve independent walking within a month, and 4 out of 5 people achieve independent walking by 6 weeks post-stroke.

Almost everyone with this score achieves independent walking by 9 weeks post-stroke

- About 4 out of 5 people achieve independent walking within a month and almost everyone achieves this within 6 weeks poststroke

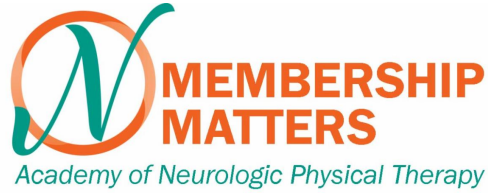
- This prediction tool is at least 83% accurate for all time points analyzed.

### **Discussion and clinical implications:**

- The TWIST tool uses routine bedside tests at 1-week post-stroke to accurately predict the probability of an individual patient achieving independent walking by 4, 6, 9, 16, or 26 weeks post-stroke



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