

# Short report: Functional mobility assessment at home

## *Timed Up and Go test using three different chairs*

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**I**mpaired mobility is an important cause of disability and discomfort for elderly people. Prevalence of disability in mobility increases from 26% among people 70 years old to 51% among those 80 and older.<sup>1</sup> General practitioners (GPs) often underestimate or fail to recognize functional disabilities.<sup>2,4</sup> A useful way of assessing mobility is the timed "Up and Go" test developed by Podsiadlo and Richardson,<sup>5</sup> which has proven interrater reliability and consistent results over time.

The Up and Go test has content validity, in that it evaluates a well recognized series of maneuvers used in daily life, and concurrent validity, in that it correlates well with more comprehensive measures of balance, gait speed, and functional ability: on the Berg Balance Scale,  $r = -.81$ ; for gait speed,  $r = -.61$ , and on the Barthel Index of Activities of Daily Living,  $r = -.78$ .<sup>5</sup> Most elderly people who need more than 30 seconds for the test have difficulties with basic tasks, such as getting on or off a toilet, climbing stairs, and going outside alone, and cannot live on their own without assistance. Most people who can do the test in less than 20 seconds seem to be independently mobile. Patients who take between 20 and 29 seconds for the test should be monitored carefully to discover whether they can manage on their own or need support.

Frail elderly people living in the community who cannot get to their physicians' offices can be assessed

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at home. They might not have the "standard arm-chair" (**Figure 1**) recommended for the Up and Go test, and it was not clear to what extent the different geometry of a chair would influence results of the test. A literature search on use of the timed Up and Go test in general practice found one article, but the authors did not investigate the influence of different chairs on the time needed for the test.<sup>6</sup> To allow GPs to use the test in patients' homes, we investigated whether using the types of chairs commonly present in the homes of elderly people influenced outcomes of the test.

## METHODS

All people who came to see the GP during consulting hours in a residential home (a special home for the elderly with no extra medical facilities) during 1 day were invited to participate. All people who could in any way walk more than 10m were included; there were no exclusion criteria. Information on disorders possibly affecting mobility was collected from participants' medical files.

Participants were asked to do the timed Up and Go test three consecutive times (with 3 minutes' rest between assessments) using three different chairs. Before performing the test each person was given the following instructions: "Sit with your back against the back of the chair. Rest your arms on the armrests or on the sides of the seat of the chair, and keep your walking aid at hand. At the word *go* please get up and walk at a comfortable and safe pace to the line, turn around and return to the chair, and sit down again." The test was performed in groups of three. Each time, three people were asked to sit in the chairs, and the chairs were randomly alternated among the three people.

After looking around the living rooms of 30 elderly people in the residential home, we chose two types of chairs because they more or less represented the chairs most elderly people have in their homes (**Figure 1**). Almost every home had a dining-table

# RESEARCH

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## Functional mobility assessment at home



**Figure 1. The three chairs used in the Up and Go test:** A) Standard armchair, sitting height 46 cm, armrest height 66 cm, seat length 45 cm; B) High-backed chair, sitting height 48 cm, no armrests, seat length 46 cm, soft seat, straight back; C) Easy chair, sitting height 46 cm (back of seat 4 cm lower), armrest height 68 cm, seat length 46 cm, soft seat, tilted back.

chair (high-backed, without armrests) or an easy chair (soft, with armrests and a “deeper sit”).

The time (in seconds) required by each participant to perform the test with each chair was registered with a stopwatch by the first investigator (J.A.H.E.). We calculated 95% confidence intervals (CI) for the time needed per chair; if the 95% CIs for the two chairs overlapped, the difference was considered not statistically significant. A sample size of 25 participants was needed to test the chairs, assuming that a difference of 5 seconds between the mean times required for the two chairs was clinically significant ( $\alpha = .05$ ,  $\beta = .2$  and an estimated standard deviation [SD] of 3.5 seconds on the mean difference).

Ethics approval was obtained from Leiden University Medical Centre.

## RESULTS

All 33 residents of the home agreed to participate. Average age was 84.3 years (range 82.1 to 86.5). There were 14 men and 19 women. Twelve people had a history of problems related to arthrosis; six had had strokes, two had intermittent claudication, three had vertigo, and 10 had no specific cause for mobility problems.

Mean number of seconds needed for the test with the standard armchair was 23.9 seconds (95% CI 19.2 to 28.7), with the high-backed chair was 23.9 seconds (95% CI 18.8 to 29.0), and with the easy chair was 25.4 seconds (95% CI 20.0 to 30.8) (**Table 1**). Mean difference between highest and lowest score for each chair per person was 3.4 seconds (SD 3.2; minimum 0, maximum 14).

**Table 1. Time in seconds needed for the Up and Go test**

MEDICAL CONDITION	NO. OF PATIENTS	MEN/WOMEN	MEAN AGE (RANGE)	STANDARD ARMCHAIR MEAN TIME (95% CI)	HIGH-BACKED CHAIR MEAN TIME (95% CI)	EASY CHAIR MEAN TIME (95% CI)
Stroke, vascular disease	8	6/2	80.8 (75.1-86.4)	22.4 (17.5-27.3)	22.0 (17.5-26.5)	23.3 (18.0-28.5)
Arthrosis and other joint disorders	12	5/7	86.9 (84.4-89.4)	33.3 (23.3-43.3)	33.5 (22.2-44.8)	36.2 (24.3-48.0)
Vertigo	3	0/3	76.3 (68.8-83.9)	21.0 (6.8-35.1)	21.7 (5.7-37.7)	23.3 (10.4-36.2)
No specific diagnoses	10	3/7	86.5 (84.2-88.8)	14.9 (12.3-17.5)	14.6 (12.0-17.2)	14.9 (12.7-17.1)
TOTAL	33	14/19	84.3 (82.1-86.5)	23.9 (19.2-28.7)	23.9 (18.8-29.0)	25.4 (20.0-30.8)

The elderly people with arthrosis or other joint disorders needed more time to perform the test with each chair. No significant difference in mean time needed for each chair was found among those with other disorders (eg, stroke, vertigo).

## DISCUSSION

This study shows that the timed Up and Go test can be performed with various types of chairs. Armrests, tilted backs, or soft seats had little influence on test results. Despite the fact that the high-backed chair had no armrests, the mean number of seconds needed for the test with this chair was the same as for the standard armchair. Most of the elderly people in our study pushed themselves up with their arms on the sides of the seat of the chair.

The main difference between the easy chair we used and the standard armchair was that people sink more deeply into an easy chair. The knee is bent at an angle  $>90^\circ$ ; getting over this "dead" angle made it more difficult to get up. Although participants needed more time to rise from this chair, the difference in time was not statistically significant. We concluded that difficulty in getting up from chairs is caused mainly by chronic disorders and only in small part by the type of chair. When the test is performed at home, the person being tested will be familiar with the chair. While using a familiar chair could improve self-confidence, this factor is unlikely to influence significantly the time needed to rise and return.

## CONCLUSION

The study of Podsiadlo and Richardson<sup>5</sup> has already shown that the timed Up and Go test is practical and reliable for assessing mobility in physicians' offices. The results of our study indicate that the test can also be performed using the chairs commonly available in the homes of elderly people. Hence, GPs can use the Up and Go test during housecalls to get a quick impression of the mobility of frail elderly people. ❀

### Contributors

**Dr Eekhof** did the primary investigation and analysis, acquired the data, and wrote the first draft of the article. **Ms De Bock** contributed to the analysis and wrote the second draft.

**Drs Schaapveld and Springer** helped interpret the data and contributed to the discussion. All the authors participated in study design. **Dr Springer**, as Head of the Department, had ultimate responsibility for the study.

### Editor's key points

- The Up and Go test has been shown to predict functional disabilities in mobility accurately.
- This study shows that test results do not differ significantly when different types of chairs are used.
- This implies that testing at home using whatever chairs are available can help gauge functional disabilities.

### Points de repère du rédacteur

- L'épreuve «Debout et marche» est éprouvée pour prédire avec exactitude les incapacités fonctionnelles dans la mobilité.
- Cette étude fait valoir que les résultats de l'épreuve ne diffèrent pas de manière significative selon le type de chaises utilisé.
- Par conséquent, la réalisation de l'épreuve à domicile à l'aide de n'importe quelle chaise peut aider à mesurer l'incapacité fonctionnelle.

### Competing interests

None declared

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