

# Reliability of the “Expanded Get-Up-and-Go-Test” (ETGUG) in assessing basic movement ability in patients qualified for surgery due to pulmonary cancer

Badanie niezawodności Wydłużonego Testu ‘Wstań i Idź’ (ETGUG) zastosowanego do oceny podstawowej sprawności ruchowej osób zakwalifikowanych do zabiegu operacyjnego z powodu raka płuca

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## Key words

pulmonary disease, pulmonary cancer, movement ability, ETGUG, reliability

## Abstract

**Background:** The Expanded Get-Up-and-Go-Test (ETGUG) allows for the measurement of the basic movement functions of daily life. This test has not been universally applied to date and no sufficient surveys as to its reliability have so far been conducted.

**Aim:** To examine the intra-rater and inter-rater reliability of measurements done using ETGUG in patients admitted for surgery treatment as a result of lung cancer.

**Research project:** Assessment of the diagnostic test.

**Method:** 22 men aged from 24 to 85 years (mean 64.45 ±11.38) were examined before a planned lobectomy due to lung cancer. The test was performed three times during one hour; examinations 1 and 3 were conducted by the same examiner. The total test time and times of the test stages were registered: from the initiation of rising from a chair up to reaching the 2-nd meter (0-2), march from the 2-nd to the 8-th meter (2-8), 180° turn (8-12), march from the 12-th to the 18-th meter (12-18) march stopping, 180° turn – chair sitting (18-20). The Intraclass Correlation Coefficients (ICC) of the measurements 1 and 3 (intra-rater), and measurements 2 and 3 (inter-rater) were calculated. The total times of the 1-st and the 3-rd measurement were compared (test t) to check if a possible learning effect occurs.

**Outcomes:** The reliability of the intra-rater measurements demonstrated a good degree of relevance (ICC >0.75) for total time measurements (ICC = 0.78) and medium grade relevance (ICC > 0.50 < 0.75) of the stage times measurements 0-2, 2-8, 8-12, 12-18, 18-20 (ICC respectively: 0.71; 0.74; 0.62; 0.58; 0.70). In the case of an inter-rater examination, a good relevance for the total time (ICC=0.88) and of the measurements of the stage times 2-8, 8-12, 18-20 (ICC respectively: 0.83; 0.77; 0.80) and the medium grade relevance of measurements 0-2 and 12-18 (ICC respectively: 0.63, 0.73) were achieved. The time of the Test 1 performance (15.94 ±2.48) was significantly longer than for Test 3 (15.21 ±2.42).

**Conclusions:** The Expanded Get-Up-and-Go-Test demonstrates a good reliability of measurements as conducted by various surveyors. As a test performance a learning effect was noted, it is recommended to apply a trial test and to repeat the examination of intra-rater reliability after a preliminary trial test performance.

## Słowa kluczowe

choroba płuca, rak płuca, sprawność ruchowa, ETGUG, niezawodność testu

## Streszczenie

**Założenia:** Łatwy w wykonaniu Wydłużony Test ‘Wstań i Idź’ (ETGUG) umożliwia pomiar podstawowych w życiu codziennym funkcji ruchowych. Test ten nie jest dotąd powszechnie stosowany i nie przeprowadzono wystarczających badań jego wiarygodności.

The individual division on this paper was as follows: A – research work project; B – data collection; C – statistical analysis; D – data interpretation; E – manuscript compilation; F – publication search

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**Cel:** Zbadanie zgodności powtarzanych pomiarów wykonywanych testem ETGUG przez jednego badającego (intra-rater) i przez dwóch badających (inter-rater), przeprowadzonych u chorych na raka płuca.

**Projekt badawczy:** Ocena wiarygodności narzędzia diagnostycznego.

**Metoda:** Badano 22 mężczyzn w wieku od 24 do 85 lat (śr. 64,45 ± 11,38) przyjętych do oddziału torakochirurgicznego celem wykonania lobektomii. Test ETGUG, przeprowadzili trzykrotnie dwaj badający. Rejestrowano czas całkowity wykonania testu oraz czasy etapów testu: od rozpoczęcia wstawania z krzesła do osiągnięcia 2. metra (0-2), marsz po prostej od 2. do 8. metra (2-8), zwrot o 180° (8-12), marsz powrotny po prostej od 12. do 18. metra (12-18), zahamowanie marszu – zwrot o 180° – siadanie na krześle (18-20). Dla sprawdzenia niezawodności pomiarów wykonywanych przez jednego badającego (intra-rater) porównano wyniki prób 1 i 3; dla sprawdzenia niezawodności pomiarów wykonywanych przez dwóch badających (inter-rater) porównano wyniki prób 2 i 3. Obliczono współczynniki korelacji wewnątrzklasowej (ICC). Dla sprawdzenia, czy występuje efekt uczenia się wykonywania testu przez badanego, porównano testem t-Studenta wartości czasu całkowitego 1. i 3. próby.

**Wyniki:** W przypadku pomiarów powtarzanych przez jednego badającego uzyskano dobrą zgodność dla pomiarów czasu całkowitego (ICC=0,78) oraz umiarkowanego stopnia zgodność pomiarów czasów etapów 0-2, 2-8, 8-12, 12-18, 18-20 (ICC odpowiednio: 0,71; 0,74; 0,62; 0,58; 0,70). W przypadku pomiarów powtarzanych przez dwóch badających uzyskano dobrą zgodność dla pomiarów czasu całkowitego (ICC=0,88), oraz pomiarów czasów etapów 2-8, 8-12, 18-20 (ICC odpowiednio: 0,83; 0,77; 0,80) oraz umiarkowaną zgodność pomiarów czasów 0-2 oraz 12-18 (ICC odpowiednio 0,63, 0,73). Czas wykonania próby 1. (15,94 ± 2,48) był istotnie dłuższy niż próby 3. (15,21 ± 2,42).

**Wnioski:** Test ETGUG wykazuje dobrą niezawodność pomiarów wykonywanych przez różnych badających. Ze względu na stwierdzony efekt uczenia się wykonywania testu przez badanego rekomendowane jest wykonywanie testu próbnego i konieczne jest powtórzenie badania zgodności pomiarów wykonywanych przez jednego badającego po wcześniejszym wykonaniu testu próbnego.

## INTRODUCTION

Evaluation of the patient both in the process of qualification for treatment as equally within the perspective of planned rehabilitation requires the use of instruments that will allow one to obtain a reliable evaluation of those functions essential for undertaking the activities of daily life. The easily applied Expanded Timed Get Up and Go test (ETGUG), proposed by Wall et al.<sup>1</sup>, enables the measurement of the basic motor functions used in daily life, including march from a sitting position, march over a short distance as well as change in the direction of march.

The *Get Up and Go* (GUG)<sup>2</sup>, *Timed Get Up and Go* – (TUG)<sup>3</sup> were created to evaluate the basic functional state of older patients, which decides on degrees of independence in daily life. These tests enable a prediction of patient motor fitness allowing for a safe, uninhibited leaving of the home<sup>3</sup>. However, the fundamental result obtained in the tests of *Get up and Go*, in the case of the GUG and TUG tests, was the identification of individuals at threat from falls. Characteristic is the display of results correlation for the TUG test and the results of the Barthel Index<sup>3</sup>, showing the possibility of evaluating physical independence

shown through the ability to conduct a range of basic life tasks such as lying down and getting up from bed, sitting and getting up from a chair, a toilet as well as walking a distance of a few metres. Through a showing of the correlation with the scale of activeness evaluation in daily life it is possible to assess the degree of independence in the undertaking of basic life activities. It has been shown that patients completing the TUG test in a time of over 30 seconds required support and help in rudimentary motor activities such as standing up and sitting on a chair or a toilet and were not able to climb up stairs without assistance or to walk unaccompanied down the street<sup>3</sup>.

The application of subsequent modifications *Expanded Timed Get Up and Go* (ETGUG)<sup>1</sup> and *Expanded Timed Up and Go* (ETUG)<sup>4</sup> has allowed for a significantly broader evaluation of fitness, supplying the therapist with more information on the subject of the patient's functional deficiencies. In the ETGUG and ETUG tests, besides the measurement of total time, there was also conducted a measurement of the time of completion for the individual sub-tasks of the test: standing from a seated position and walking, walking a distance of six metres, a 180° turn, walking back and sitting<sup>1,4</sup>. Through a separate measurement of

the individual tasks, the completion of which was considered essential for independent mobility (locomotor fitness) it is possible to obtain clinically useful information allowing for a better isolation of the areas of functional deficiency. For the evaluation of total time may be treated as information on the reduced fitness of the patient, while measurements of the times from the individual stages allow one to precisely determine the cause of reduced fitness and to apply appropriately directed preventative actions.

It has also been shown, in a way similar to the TUG test, that the ETGUG test is a good instrument in the evaluation of the functional fitness of individuals with significant limitations in the undertaking of everyday activities, through the confirmation of the existence of a results correlation on the Barthel Scale with the ETGUG results. On the basis of the results obtained a conclusion was drawn that the results of the ETGUG test correspond not to only the locomotor ability but also general functional ability<sup>5</sup>.

Modification of the test conducted by Botolfsen et al.<sup>4</sup> involved the subjugating of the ETUG test to the TUG test through the use of chairs with elbow supports and applying a 3-metre long walk instead of the six metres used in the ETGUG test. The most

<sup>A</sup> In the ETUG<sup>4</sup> test evaluation is not conducted as a continuous task, hence the first measurement is an evaluation of the time of getting up without the subsequent march.

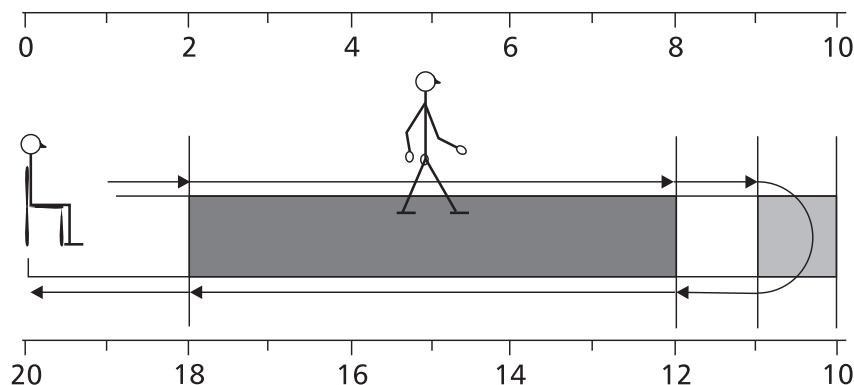
<sup>B</sup> In the ETUG<sup>4</sup> test the patient marches a distance of 6 metres, but measurement is of the middle three metres covered with a varied speed.

significant difference however was the conducting of each of the subtasks in the series separately, with a break and new instruction prior to the undertaking of the next subtask, and not like in the ETGUG test as a single consecutive task. The authors explained the modification by a desire to make the ETUG similar to the TUG test, and also by a desire to avoid errors in measurement resulting from an inability to determine the moment a given subtask finished in the case of measuring a single consecutive task as was the case in all the earlier applied 'Get up and Go' tests – GUG, TUG, ETGUG<sup>1,2,3</sup>. The authors quote the example of the first measurement – up to the straightening of the knees, where it is difficult to determine when the patient finds himself in a straightened position for many patients continue gait with bent knees<sup>4</sup>.

The ETGUG and ETUG test serves in the evaluation of somewhat other aspects of locomotive ability. Both tests evaluate the ability to get up from a seated position, but the ETGUG test also does this in a continuous movement and therefore in a way closer to everyday activities, in which a person must get up from a chair (bed, toilet) and undertake a few steps (go over to a table, the telephone etc.). The ETUG test separately analyses arising from a chair and separately the undertaking of march. The differences in the analysing of the arising action were shown by the research carried out by Kerr<sup>6</sup>, comparing the STST test (*Sit To Stand Test*) with the STSW (*Sit-To-Walk test*). In the Sit to Stand Test there was noted a statistically longer time for the first phase preceding the separation from the stool's surface in comparison with the time obtained in the STSW test.

The ETGUG test, despite being theoretically more useful in assessing patient locomotive ability, has not so far been widely used and there have not been conducted enough tests as to its reliability.

Wall et al.<sup>1</sup> testing the reliability of the ETGUG conducted only tests on the significance in the differences of the measurements conducted by two independent testers (inter-rater reli-



**Figure 1**

**The plan of performance of the 'extended Up and Go Test'**

**Stage 0-1** – from sitting to standing as well as **1-2** – commencing walking; **stage 0-2** – from sitting through standing to covering the second meter (standing and starting to walk); **stage 2-8** – walking before turning; **stage 8-12** – returning back; **stage 12-18** – return walk; **stage 18-20** – sitting (slowing down, stopping, turning round and sitting down); **stage 0-20** – the complete ETGUG test time; (distance given in meters)

ability). This test was applied in a group of 10 healthy young individuals as well as among 10 elderly people at risk of falls.

Botolfsen et al.<sup>4</sup> conducted an evaluation of the reliability of the measurements carried out in the ETUG test but this was already a modification of the ETGUG test, differing markedly from that of Wall et al.<sup>1</sup>.

Taking into consideration the scope of the information obtained it is proposed that the ETGUG test be used

with individuals suffering from diseases of the respiratory system who represent highly differentiated functional limitations<sup>5,7,8,9</sup>. An easy instrument in application for the evaluation of motor ability, such as is represented by the ETGUG test, may be useful not only in scientific research but also in the practical rehabilitation of patients. The implementation of such a test requires, however, an earlier check as to its reliability in this group of patients.

**Table 1**

**Total time and that of individual stage times in seconds obtained by patients in the ETGUG test – Tests 1, 2 and 3 recorded by two testers (A and B) (n=22)**

Whole task and test stages	Test/attempt 1 - Tester A		Test/attempt 2 - Tester B		Test/attempt 3 - Tester A	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
<b>0-20</b>	15.94	2.48	15.31	2.18	15.21	2.42
<b>0-2</b>	2.38	0.59	2.1	0.44	2.2	0.48
<b>2-8</b>	3.51	0.63	3.55	0.63	3.49	0.62
<b>8-12</b>	3.19	0.42	3.1	0.37	3.01	0.46
<b>12-18</b>	3.7	0.59	3.63	0.5	3.6	0.63
<b>18-20</b>	3.15	0.93	2.93	0.84	2.92	0.69

0-20 – total ETGUG test time (march from 0 to 20 metres); 0-2 – time from start to covering 2<sup>nd</sup> metre; 2-8 – march time over a distance of 6 metres (from 2<sup>nd</sup> to 8<sup>th</sup> metre); 8-12 – turning round time; 12-18 – march time over a distance of 6 metres (from 12<sup>th</sup> to 18<sup>th</sup> metre); 18-20 – sitting time (from 18<sup>th</sup> metre to the adoption of a sitting position);  $\bar{x}$  – mean value; SD – standard deviation

**AIM**

The testing of the reliability of measurements conducted by means of the ETGUG test through single tester (intra-rater) and by two testers (inter-rater), conducted on individuals qualified for lobectomy as a result of lung cancer.

**METHODS**

22 men aged from 24 to 85 were subjected to testing (mean age 63.04 ±11.24), who had been admitted to a thoracic surgery ward for a lobectomy as a result of lung cancer. The ETGUG test was used in the work conducted according to the methods outlined by Wall et al.<sup>1</sup>, with the modification proposed by Włoch<sup>9</sup>, in which the act of standing was viewed as the stage from sitting to the completion of the second metre (0-2), as a combined stage 0-1 and 1-2 (from sitting to straightening the knees and from straightening the knees to covering the second metre).

The two testers conducted tests on the hospital corridor three times during the course of an hour, with the maintaining of at least 15-minute breaks between tests. The first and third test were conducted by the same tester. By means of a stop watch the total time was registered for test completion as well as the time required to achieve the following test stages: from the commencement of standing up from the chair to the reaching of the 2 metre point (stage 0-2, commencement of gait from a seated position), march along a straight line from metre 2 to metre 8 (2-8), turning round 180° (8-12), the return march in a straight line from the twelfth to the eighteenth metre (12-18), the stopping of the march – a 180-degree turn – sitting on the chair (18-20, sitting). The scheme of test completion is presented in Figure 1.

To assess the reliability of the measurements carried out by one tester (intra-rater) the results of test 1 and test 3 were compared. To compare the reliability of the measurements carried out by two testers (inter-rater) the results of test 2 and test 3 were compared. The values of the coefficients of intraclass correlations (ICC) for all

the measurements were calculated<sup>10</sup>. The border values of the degree of measurement conformity was adopted after Portney and Watkins<sup>11</sup> (ICC < 0.5: poor measurement reliability; ICC 0.5-0.75: moderate measurement reliability; ICC > 0.75: good measurement reliability; ICC > 0.90: reliability totally adequate for clinical application).

To check whether there could occur a learning effect in patient test realisation, the value of the total time for measurement 1 and 3 was compared by the t-Student test.

The statistical analysis was conducted in the PQStat program.

**RESULTS**

The averaged measurement results in the three consecutive ETGUG tests are presented in Table 1.

The results of the reliability of the measurements conducted by one tester (intra-rater) are presented in Table 2.

In the case of repeated measurements by one tester good repeatability was obtained (ICC > 0.75) for measurements of total time (ICC = 0.78) as well as a moderate degree of repeatability for the measurements of time stages 0-2, 2-8, 8-12, 12-18, 18-20 (ICC respectively: 0.71; 0.74; 0.62; 0.58; 0.70).

**Table 2**

<b>The results of the reliability of measurements taken by a single tester (A) (intra-rater) – comparison of the results of Tests 1 and 3 (n=22)</b>			
<b>Whole task and test stages</b>	<b>Reliability of measurements conducted by a single tester (intra-rater) (test/attempts 1 and 3)</b>		
	<b>ICC</b>	<b>p</b>	<b>Reliability</b>
<b>0-20</b>	0.78	< 0.00001	good
<b>0-2</b>	0.71	< 0.0001	moderate
<b>2-8</b>	0.74	< 0.0001	moderate
<b>8-12</b>	0.62	< 0.001	moderate
<b>12-18</b>	0.58	< 0.01	moderate
<b>18-20</b>	0.71	< 0.0001	moderate

0-20 – total ETGUG test time (march from 0 to 20 metres); 0-2 – time from start to covering 2<sup>nd</sup> metre; 2-8 – march time over a distance of 6 metres (from 2<sup>nd</sup> to 8<sup>th</sup> metre); 8-12 – turning round time; 12-18 – march time over a distance of 6 metres (from 12<sup>th</sup> to 18<sup>th</sup> metre); 18-20 – sitting time (from 18<sup>th</sup> metre to the adoption of a sitting position); criteria according to Portney and Watkins: ICC < 0.5: poor reliability, ICC 0.5-0.75: moderate reliability, ICC > 0.75 good reliability, ICC > 0.90 sufficient reliability for clinical application

**Table 3**

<b>The results of the reliability of measurements taken by two testers (Inter-rater) – comparison of the results of Test 2 and 3 (n=22)</b>			
<b>Whole task and test stages</b>	<b>Reliability of measurements conducted by various testers (inter-rater) (tests/attempts 2 and 3)</b>		
	<b>ICC</b>	<b>p</b>	<b>Reliability</b>
<b>0-20</b>	0.88	< 0.000001	good
<b>0-2</b>	0.63	< 0.001	moderate
<b>2-8</b>	0.83	< 0.000001	good
<b>8-12</b>	0.77	< 0.00001	good
<b>12-18</b>	0.73	< 0.0001	moderate
<b>18-20</b>	0.81	< 0.00001	good

0-20 – total ETGUG test time (march from 0 to 20 metres); 0-2 – time from start to covering 2<sup>nd</sup> metre; 2-8 – march time over a distance of 6 metres (from 2<sup>nd</sup> to 8<sup>th</sup> metre); 8-12 – turning round time; 12-18 – march time over a distance of 6 metres (from 12<sup>th</sup> to 18<sup>th</sup> metre); 18-20 – sitting time (from 18<sup>th</sup> metre to the adoption of a sitting position); criteria according to Portney and Watkins: ICC < 0.5: poor reliability, ICC 0.5-0.75: moderate reliability, ICC > 0.75 good reliability, ICC > 0.90 sufficient reliability for clinical application

Table 4

Average times for the completion of the entire task and the ETGUG test stages in Test 1 and 3. The significance of the difference between Test 1 and 3 (test t)					
Whole task and test stages	Measurement 1 - Tester A		Measurement 3 - Tester B		p
	$\bar{x}$	SD	$\bar{x}$	SD	
0-20	15.94	2.48	15.21	2.42	<b>p &lt; 0.05</b>
0-2	2.38	0.59	2.2	0.48	<b>p &lt; 0.05</b>
2-8	3.51	0.63	3.49	0.62	p > 0.05
8-12	3.19	0.42	3.01	0.46	<b>p &lt; 0.05</b>
12-18	3.7	0.59	3.6	0.63	p > 0.05
18-20	3.15	0.93	2.92	0.69	<b>p &lt; 0.05</b>

0-20 – total ETGUG test time (march from 0 to 20 metres); 0-2 – time from start to covering 2<sup>nd</sup> metre; 2-8 – march time over a distance of 6 metres (from 2<sup>nd</sup> to 8<sup>th</sup> metre); 8-12 – turning round time; 12-18 – march time over a distance of 6 metres (from 12<sup>th</sup> to 18<sup>th</sup> metre); 18-20 – sitting time (from 18<sup>th</sup> metre to the adoption of a sitting position)

The results for measurement reliability for measurements conducted by two testers (inter-rater) is presented by Table 3.

In the case of repeated measurements by two testers (B and A: 2/3) there was obtained almost very good repeatability for the total time (ICC = 0.88) (criteria according to Portney and Watkins<sup>11</sup>: very good repeatability - ICC > 0.90), good repeatability in the stage time measurements 2-8, 8-12, 18-20 (ICC respectively: 0.83; 0.77; 0.80) as well as moderate repeatability in the time measurements 0-2 as well as 12-18 (ICC respectively 0.63, 0.73).

The time for completing test 1 (15.94 ± 2.48) was significantly longer than test 3. (15.21 ± 2.42) (p < 0.05) (Table 4). Similarly the times for the completion of stages 0-2, 8-12 and 18-20 of test 1 were significantly longer than in test 3 (Table 4)

## DISCUSSION

In using the criteria indicated by Portney and Watkins<sup>11</sup> (ICC < 0.5: poor measurement reliability; ICC 0.5-0.75: moderate measurement reliability; ICC > 0.75: good measurement reliability; ICC > 0.90: reliability fully sufficient for clinical application) the results obtained may be treated as evidence of moderate to good reliability of the measurements carried out by the ETGUG test. In no case in the

measurements or the time taken for the completion of the test or its stages was there obtained a result that fully justified the use of the ETGUG in clinical practice. It follows to state, however, that the criteria of Portney and Watkins<sup>11</sup> were rigorous ones and that applying the criteria adopted by other authors would be more useful in the interpretation of results for the ETGUG test. Fleiss<sup>12</sup> accepts a very good reliability of the test on the achievement of an ICC value of over 0.75.

Regardless of the criteria adopted there remains the question as to what degree the cause of differences in the subsequent test results of ETGUG test completion are the actual differences in the time of patient test realisation, and to what degree we are dealing with the inaccuracy of measurements as carried out by the tester.

The measurements concluded during the course of the ETGUG test are on the whole characterised by a short duration time. This presumably influences the possibility of a measurement error. It seems that particularly the measurements of the stages 0-1 and 1-2 according to Wall et al.<sup>1</sup> may be burdened by measurement error as a result of the short time and difficulties in registering the moment of knee straightening. In order to eradicate this error in the research herein presented, in accordance with the suggestion of Botolfsena et al.<sup>4</sup> as well as Wloch<sup>9</sup>, there was not conducted the measure-

ment 'up to straightening the knees' and it was replaced with a combined measurement of the time of getting up and moving to the second metre (0-2). The adoption of such a methodology for carrying out the ETGUG test also justifies the testing of the time stage correlations 0-1, 1-2 and 0-2 with the force of the extensor muscles of the knee joint, in which there is shown a stronger correlation for the time of the stage 0-2 than for the 'substages' 0-1 and 1-2<sup>9</sup>.

The modification of the ETGUG test adopted in this research is also justified by an analysis of daily activities whose effectiveness in realisation may be evaluated by means of the ETGUG test. Assuming an erect position from a seated one combined with the commencement of gait occurs significantly more often than mere standing itself without the further initiation of gait.

Measurement error may be dependent on the training and experience of the tester. Botolfsen et al.<sup>4</sup> have shown a greater measurement repeatability in more experienced testers. The development of a training procedure for personnel in the administering of the ETGUG test and similar tests may serve to eliminate the cause of this error.

The source of measurement error may also be the registering of the times of the various stages by means of a handheld stopwatch, equally for the determining of the commencement and completion of a stage, as well as in the delay in marking this moment on the stopwatch. A solution which may improve the accuracy in measurement may be the implementation of an electronic measure of time taken through the means of photocells. It follows, however, to remember that the appeal of the test lies in its simplicity, ease in application, and low costs, while the use of an additional instrument for electronic measurement will increase the costs of testing. Another problem may be also the actual carrying out of electronic measurement by means of photocells, in particular the precise registration of the places of border transfer between the test stages by the parts of the patient's body.

The results obtained are difficult to compare with the results of Walla et

al.<sup>1</sup>, who in testing the reliability of the ETGUG test did not note any significant differences in repeated measurements in the group of healthy individuals and in the group of elderly people not at risk of fall. Both the difference in the tested groups, as equally the method for statistical analysis adopted by Wall et al.<sup>1</sup> (test t) means that the results contained in the present work are new pieces of information and not merely a repeat of results earlier obtained.

Also in comparing the results with those of Botolfsen et al.<sup>4</sup> it follows to bear in mind the significant differences in conducting of the test (the applied modification of ETGUG to ETUG), as equally the means of test reliability. Test reliability was evaluated by Botolfsen et al.<sup>4</sup> not in the actual conditions applied in practice but through the comparison of simultaneously conducted time measurements carried out by various testers in the course of observing a video recording of several attempts at test realisation (the test was completed by 23 women and 5 men with gait and balance disturbances). Attention is drawn, however, by the varied values of the ICC coefficients (intra-rater from 0.75 to 0.97; inter-rater from 0.55 to 0.96), which indicate that error depends on the very measurement of the time taken to complete the individual movement tasks and not simply on the likely variability in the time of their completion in repeated tests. This confirms the suggestion that it follows to search for a more exact measurement of time.

The results given by Botolfsen et al.<sup>4</sup> are similar to the results presented in the current work as an evaluation of the reliability of a repeated test (ICC between 0.54 and 0.85). This confirms the assumption that influence on the test result in subsequent attempts is exerted by the varied completion of the particular test stages by the patient. Such differences appear to be unavoidable, while for the evaluation of ETGUG test reliability it follows to establish which factors may influence their appearance and to what degree this variability in results transfers itself onto the evaluation of functional state.

The significantly longer time in the completion of test 1 in comparison to

test 3 conducted by the same researcher as confirmed in the present research, shows the effect of test completion learning on the part of the patient. It appears justified to recommend a trial ETGUG test before the undertaking of the ETGUG test to obtain measurements of functional ability. Also necessary is examination of the repeatability of measurements taken by a single tester after an earlier conducted trail test.

Additional research is needed in the evaluation of the reliability of the test in a group of woman, as also in to the influence of age, the degree of illness advancement, BMI and other factors possibly affecting the reliability of the ETGUG test.

## CONCLUSIONS

The ETGUG test used on men qualified for operational treatment as a result of lung cancer displays a moderate or good reliability for the time measurements for total test conduction and for individual stages as conducted by various testers. This justifies the conducting of further tests aimed at ETGUG test application for activity evaluation of individuals with diseases of the respiratory system.

It follows to examine whether the introduction of an electronic measurement of time will have an influence on increasing test reliability, allowing for the test to be recommended for clinical practice.

As a result of the confirmed effect of learning on a patient's carrying out of the ETGUG test it is recommended that a trail test be applied.

The repeat testing of reliability of test conducted by a single tester following earlier trail test completion is recommended.

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