

External Validation of the “Walking Estimated Limitation Calculated by History” (WELCH) Questionnaire in Patients with Claudication

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WHAT THIS PAPER ADDS

The routine use of the Walking Impairment Questionnaire is limited by the number of errors when self-completed and by its scoring complexity. We recently proposed a new simple and easily scored four-item questionnaire to standardise patient reporting of walking capacity: the “Walking Estimated Limitation Calculated by History” (WELCH) questionnaire. This study confirms that the accuracy of the WELCH in predicting the inability to walk for 5 minutes on the treadmill is satisfactory in patients reporting claudication. The WELCH seems an attractive tool for routine clinical use.

Objective: To externally validate the recently proposed “Walking Estimated Limitation Calculated by History” (WELCH) questionnaire.

Methods: A prospective study was performed on 450 new patients referred to our laboratory for treadmill testing (constant load 3.2 km/h and 10% slope for 15 minutes and then incremental increases). Results are presented as mean \pm SD or median [25th–75th percentiles] or number (percentage). An ankle brachial index <0.90 defined the presence of peripheral artery disease (PAD). Typical “vascular-type claudication” is a lower-limb pain or discomfort that is absent at rest, appears at exercise, forces stopping, and disappears within 10 minutes of exercise stopping. The Spearman r coefficient of correlation between maximal walking time (MWT) on treadmill and WELCH scores was calculated for patients with (PAD+) or without (PAD–) PAD, and reporting typical vascular-type claudication (VTC+) or not (VTC–).

Results: The WELCH score was obtained in all included patients. The number (%) of patients with a WELCH score <25 was 37 (54%), 198 (65%), 14 (44%), and 18 (38%), and the Spearman correlation coefficient between WELCH score and treadmill MWT was 0.588, 0.609, 0.581, and 0.591 in the VTC–/PAD+, VTC+/PAD+, VTC–/PAD–, and VTC+/PAD– groups respectively (all $p < .001$). In PAD+/VTC+ patients, the WELCH positive predictive value for the inability to walk for 5 minutes on the treadmill was 79%.

Conclusion: The WELCH score correlates moderately with treadmill-walking capacity in patients with or without PAD, and with or without typical VTC. It appears to be a simple to complete and easily scored instrument to help clinicians standardise the subjective estimation of walking capacity in their patients.

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INTRODUCTION

Walking limitation is a frequent symptom in elderly patients. Lower-limb pain or fatigue on exertion may result from peripheral artery disease (PAD) or various non-vascular diseases (e.g., lumbar spine, cardio-pulmonary,

or osteo-articular diseases). The use of standard questionnaires facilitates and standardises the quantification of walking impairment and provides information additional to exercise testing.^{1,2} Among the available tools to estimate walking capacity, the recently proposed “Walking Estimated Limitation Calculated by History” (WELCH) questionnaire is of interest because it is simple for patients to complete and is easily scored.³ Previous publications have shown that its correlation with the maximal walking time (MWT) observed during a standard treadmill test is comparable with the one observed with the more complex Walking Impairment Questionnaire.³ Further, the initial validation of the WELCH suggested that a score <25

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Please answer each of the following 4 items by placing an "X" in the box that best describes your situation. Please mark only one box per item. If you never perform an activity, estimate what it would be like if you did perform it. For the first 3 items, if you think that you would not be able to perform a specified task for at least 30 seconds without stopping to rest, please answer "impossible".

For each of the three following activities, how long can you perform the task easily on level ground & without stopping when ...

1/ ... walking slowly (slower than usual speed of relatives, friends, or other people of your own age)?

Impossible	30 seconds	1 minute	3 minutes	10 minutes	30 minutes	1 hour	3 hours or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4	5	6	7

2/ ... walking normally (same as usual speed of relatives, friends, or other people of your own age)?

Impossible	30 seconds	1 minute	3 minutes	10 minutes	30 minutes	1 hour	3 hours or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4	5	6	7

3/ ... walking quickly (faster than usual speed of relatives, friends, or other people of your own age)?

Impossible	30 seconds	1 minute	3 minutes	10 minutes	30 minutes	1 hour	3 hours or more
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4	5	6	7

Compared to the usual walking speed of your relatives, friends, or people of your own age, do you think that you personally usually walk ... (Tick only one box)

<i>much slower</i>	<input type="checkbox"/>	1
<i>moderately slower</i>	<input checked="" type="checkbox"/>	2
<i>a bit slower</i>	<input type="checkbox"/>	3
<i>at the same speed</i>	<input type="checkbox"/>	4
<i>faster</i>	<input type="checkbox"/>	5

THANK YOU: You should have 1 box per item ticked... please check.

$$\text{WELCH score} = [(4 + 3 + 1) - 1] \cdot 2 = 14$$

Figure 1. Example of the scoring of a "Walking Estimated Limitation Calculated by History" (WELCH) questionnaire. Note that item values and coefficients are presented to facilitate the reading of the figure, but are not available to the patient.

predicts the inability to walk for 5 minutes on a treadmill with 75% sensitivity and 80% specificity in PAD patients. In PAD patients, a walking time of <5 minutes on a treadmill characterises severe claudication according to the Rutherford classification.^{1,2} As the performance of predictive models is generally higher with data on which they are constructed compared with new data,⁴ so-called "external validation" was required to confirm our initial findings with a new group of patients. Whether the previous cut-off point (WELCH score <25) proposed to detect patients with severe claudication (i.e., MWT <5 minutes) is valid in a prospective study of a new population with PAD has not been reported.

METHODS

Study population

A prospective study was performed from January 2012 on all new patients referred to our laboratory for treadmill testing for the diagnosis or follow-up of claudication.⁵ Eligibility criteria included ability to walk on a treadmill, native French speakers, age >18 years, stable symptoms for >3 months, absence of known or apparent cognitive or psychiatric disorders, and ability to read alone. Written informed consent was obtained from all patients. Patients who were referred more than once during the study period were only included once. Patient characteristics, medical

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