



Limitations of Self-reported Estimates of Functional Capacity Using the Walking Impairment Questionnaire

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KEYWORDS Claudication; Peripheral artery disease; Non-invasive diagnosis	Abstract <i>Objective:</i> A potential issue with the Walking Impairment Questionnaire (WIQ) is that it is relatively complex. We estimated the number of errors made by patients when self-completing the WIQ, and assessed the benefit of correcting missing, duplicate or paradoxical (i.e., reported lower difficulty for a higher-intensity task) answers.
	Materials: All consecutive new patients with claudication over a 3-month period. Methods: The WIQ was self-completed before patients performed a constant-load treadmill walking test (maximised to 750 m). Main outcome measure: We analysed the coefficient of determination of the linear relationship between overall WIQ score (mean of the available subscales when at least two subscales are avail- able) and treadmill maximal walking distance (MWD), before and after correction of errors. Results: We studied 73 patients. Thirty-seven questionnaires had to be corrected for one or more errors. The coefficient of determination between the overall WIQ score and MWD was $R^2 = 0.391$ ($n = 56$) and $R^2 = 0.426$ ($n = 73$) before and after correction, respectively. Conclusion: Supervision of self-completed WIQs detects errors in almost half of the question- naires, resulting in a missing overall WIQ score in 23% of cases among uncorrected questionnaires. The overall WIQ score correlates only moderately with MWD, even after correction. Clinical Trial Registration: NIH database: NCT01114178. © 2010 European Society for Vascular Surgery. Published by Elsevier Ltd. All rights reserved.

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In patients with peripheral artery disease (PAD), exerciseinduced limb ischaemia (claudication) limits walking capacity. The distance at which claudication forces the patient to stop walking is referred to as the maximal walking distance (MWD). Although MWD performed on a treadmill is considered the gold standard for evaluating walking capacity in patients with PAD,¹ many physicians do not have a treadmill. Self-reported walking capacity is therefore a widely used approach for estimating walking capacity. Self-reported functional capacity can be predicted by the Walking Impairment Questionnaire (WIQ), which correlates moderately with objective measurements of MWD or changes in walking capacity.^{2–6} The WIQ includes subscales for walking distance and speed and for stair climbing.⁷ It is widely used and is validated as a self-administrated tool.^{5,8,4}

The interest in self-completing questionnaires is to avoid any influence of the physician or nurse on patient responses, and reduce the time and effort needed from the medical staff. A potential issue when patients selfcomplete the WIQ is its relative complexity. Indeed, to complete the WIQ, patients need to answer 14 questions: seven in the walking distance subscale, four in the walking speed subscale and three in the stair-climbing subscale. Furthermore, each question has five different 'difficulty ratings' to choose from.

We aimed to evaluate the practical aspects of putting the WIQ into practice in our medical routine. Specifically, we counted the number of errors made by the patients when self-completing the WIQ, and estimated the proportion of resulting missing final WIQ values, which has rarely been done.⁷ An additional novel aspect was to assess whether or not supervising completion of the form with correction of errors improves the concordance of the WIQ with objective measurements of MWD.

Material and Methods

Study population

A prospective study was performed on all new patients referred to our laboratory for treadmill exercise testing. Treadmill walking tests are used in our department to objectively assess walking capacity in patients with claudication. Only patients speaking French or who had never previously completed the WIQ were included in the present study. The patients' characteristics (body mass and stature), treatments, smoking habits and medical histories were retrieved via interview and from available data. Ankle-tobrachial indices (ABIs) were also measured, unless previous recordings <3 months old were available and the patient's medical condition had not changed since the last recording. The study received local ethics committee approval and conforms to the Declaration of Helsinki. Written, informed consent to participate to the study was obtained from all patients. The study is accessible on the National Institutes of Health (NIH) website under reference NCT01114178.

Self-completion of the WIQ

We used the same French version of the WIQ as in a previous study,³ adapted from Myers et al. (Fig. 1).⁵ In brief, the WIQ

measures the degree of difficulty in walking and climbing stairs. All answers are scored from 0 to 4 (4 = none, 3 = slight, 2 = some, 1 = much difficulty and 0 = unable to do). Patients were provided a blue or black pen by the admission desk to self-complete the WIQ at arrival in the department. They were given approximately 10 min to complete the questionnaire, but, if necessary, additional time was provided. Patients were asked to do their best to complete the questionnaire without medical support or supervision, respond to all questions and tick only one box per answer. Thereafter, the pen and questionnaire were collected by a technician.

Alterations to the self-completed WIQ

Due to the well-known inverse relationship between walking speed and MWD in patients with PAD, answers showing lower levels of difficulty for higher distance (distance subscale), speed (speed subscale) or number of stairs climbed (climbing-stair subscale) were considered 'paradoxical answers'. Duplicate answers were defined as two or more boxes ticked for the same question. The selfcompleted questionnaire was checked by a trained nurse for missing, duplicate or paradoxical answers before the patient was admitted to the exercise-test room. When necessary, missing, duplicate or paradoxical answers were discussed with the patient and modified or completed with a red pen using the following rules and order:

- * For each missing answer, the patient was asked to explain the reason for this. If the question was skipped accidentally, the patient was asked to complete the missing question. If the reason was, "I never perform such a task" the patient was asked to assume what would be the answer if he/she ever had to perform that task. If the patient was still unable to answer, or declared to never perform the task, the task was coded 'unable to do'.
- * For duplicate answers to a question, the patient was asked to choose one of their initial responses. If unable to choose, the higher level of difficulty was arbitrarily kept.
- * For paradoxical answers within a subscale, a discussion between the patient and the nurse underlined the fact that the answers within a subscale were expected to follow a logical order with unchanged or increasing difficulty with increase in task level (speed, distance or number of stairs). The patient was provided with the red pen and allowed to modify the initial answers. The questionnaires were stored separately from patient's files and blindly analysed.

Measurement of usual walking speed

Once the questionnaires were collected and corrected, the patients were asked to walk to the test room at their usual speed. The technician or nurse walked slightly behind the patient so as not influence their usual walking speed. The two rooms are approximately 19 m apart, and between them are two white lines on the floor separated by 10 m. The time taken to walk between these lines was recorded with a stopwatch to allow calculation of the patient's usual 10-m walking speed.

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