Self-reported physical functioning was more influenced by pain than performance-based physical functioning in knee-osteoarthritis patients

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Abstract

Background and Objectives: To test the hypothesis that self-reported physical functioning is more influenced by pain than performance-based physical functioning.

Methods: 163 knee-osteoarthritis patients completed the performance-based DynaPort\textsuperscript{®} KneeTest (DPKT), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and SF-36 (self-report measures of pain and physical functioning) before, 3, 6, and 12 months after knee replacement.

Results: Correlations between (two) self-reported measures of functioning and (two) pain measures were higher (0.57–0.74) than correlations between the performance-based measure of functioning and the two pain measures (0.20 and 0.26). In factor analysis, WOMAC and SF-36 pain and physical functioning subscores loaded on the first factor (eigenvalue 3.2), while DPKT KneeScore2 loaded on the second factor (eigenvalue 0.92). Before surgery, correlations between performance-based and self-reported physical functioning were higher in patients with less pain (0.43) compared to patients with more pain (0.17), for the WOMAC (as expected), but not for the SF-36. After surgery, when the pain had diminished, the correlations between performance-based and self-reported physical functioning were higher, especially for the WOMAC.

Conclusions: Our hypothesis was convincingly supported by the results of the WOMAC, and somewhat less by the results of the SF-36. We consider this as evidence for a lack of content validity of the WOMAC.  

Keywords: DynaPort KneeTest; Performance test; Physical functioning; Questionnaire; Validity; WOMAC

1. Introduction

There is an ongoing debate about the validity of performance-based measures vs. self-report questionnaires to assess physical functioning in patients with hip and knee osteoarthritis (OA) [1–9]. A performance-based measure is one in which an individual is asked to perform one or more specific tasks that are evaluated in a standardized manner using predefined criteria, such as counting repetitions or timing of the activities [10]. A self-report measure is one in which an individual is asked to indicate his/her perceived level of functioning during daily activities, described in standardized questions.

A number of arguments have been proposed in favor of one or the other method. Some authors prefer self-report questionnaires because these are claimed to be easier to use, less time-consuming, and less of a burden to patients [8]. Others argue that self-report questionnaires are preferred because they cannot be influenced by observer bias [5]. Performance-based methods have been considered less valid because they measure physical functioning in an artificial situation, are influenced by the subject’s motivation to participate, and may provide little information about how a person copes in his/her own environment [6,7]. On the other hand, performance-based methods are claimed to be less influenced by psychologic factors such as expectations and beliefs [9], cognitive impairments [4], culture, language, and education level [1,7]. Furthermore, it has been suggested that performance-based measures may identify...
early deficits in physical functioning (“preclinical disability”) before they are identified by self-reports [2,3].

There is a paucity of studies that empirically investigate these claims. Numerous studies report moderate correlations between performance-based measures and self-report measures [11–15], but most hypotheses about possible explanations have not been empirically tested.

Recently Stratford et al. [13] suggested two possible explanations for the modest correlation between performance-based measures and self-report measures of physical functioning in 93 patients awaiting hip or knee arthroplasty. These explanations were: (1) lack of reliability of the performance-based measures; and (2) lack of content validity of the performance-based measures. They argued that performance-based measures based on time alone inadequately represent the breadth of health concepts associated with functional status. In a study in 93 patients awaiting total hip or knee replacement they found a moderate correlation of a self-report measure (the Lower Extremity Functional Scale—LEFS) with a performance-based measure of physical functioning (40-meter fast self-paced walk). To increase the reliability of the performance-based measure, three performance-based functioning scores (self-paced walk, timed up-and-go, and stair test) were summed. In contrast with their hypothesis, the correlation of the LEFS with the sum of the three timed scores was not higher than the correlations of the LEFS with the individual timed scores. They concluded that measurement error could not explain the modest correlation between self-report measures of physical functioning and performance-based measures of physical functioning. In contrast, by adding scores for pain and exertion to the performance-based time score, the correlation with self-reported physical functioning increased. They considered this as evidence for a lack of content validity of the performance-based test [13].

However, based on their results, we would draw the opposite conclusion, and consider their results as evidence for a lack of content validity of the self-report measures of physical functioning. Stratford et al.’s results show that self-reported levels of functioning refer not only to the time to complete the task, but also to pain and exertion, while these measures claim to measure only functioning, not a combination of pain and functioning. Many self-report questionnaires, like the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) [16] and the MOS 36-item Short Form Health Survey (SF-36) [17], claim to measure pain and functioning as two different constructs, with different subscales.

Following this line of reasoning, our hypothesis is that self-report measures of physical functioning will be more influenced by the amount of pain experienced than performance-based measures of physical functioning. As a consequence, we expect that the correlation between self-report measures of physical functioning and performance-based measures of physical functioning is higher in patients with less pain. The aim of this study was to test this hypothesis in a population of patients undergoing knee replacement surgery.

2. Patients and methods

2.1. Design

We compared the validated DynaPort® KneeTest (DPKT) (McRoberts B.V., The Hague, The Netherlands) [18–20] as a performance-based measure of physical functioning with the self-report WOMAC [16] subscale physical functioning and the self-report MOS SF-36 [17] subscale physical functioning, in subgroups of knee-OA patients with different levels of pain, as measured with the WOMAC and SF-36 pain subscales.

2.2. Patients

Patients who underwent total knee replacement surgery between January 1997 and December 2003 were included in two different prospective studies: (1) a prospective cohort study on the effects of a new knee prosthesis (TRAC, BIOMET), carried out in the Gemini Hospital, Den Helder, The Netherlands; and (2) a randomized clinical trial comparing two types of knee prosthesis (TRAC, BIOMET vs. AGC, BIOMET), carried out in the Atrium Hospital, Brunssum, The Netherlands. In both studies, DPKT scores and WOMAC and SF-36 questionnaires were obtained from as many patients as possible, before, and at 3, 6, and 12 months after knee replacement surgery. This study was based on all patients who completed the DPKT and the WOMAC and SF-36 questionnaires before surgery (independent of whether they completed the follow-up measurements).

2.3. Performance-based measure of function

The DPKT was designed to measure quality of movement in tasks representing activities of daily living that are considered problematic for knee patients. A detailed description of the test is provided by Van den Dikkenberg et al. [20]. In short, six belts, containing accelerometers, are attached around the waist, over the sternum, around the left thigh, and around both shanks of the test persons. They perform 23 activities in the test, such as walking, stair climbing, stepping up, and sitting down on blocks of different heights. In a recent validation study, the test was shortened from 29 to 23 activities and the scoring system was slightly modified (see Appendix) [18]. During the performance of the activities, the signals from the accelerometers are stored in a portable data recorder. Afterward, relevant movement features are extracted from the signals (e.g., accelerations, movement time, range of motion, and gait parameters). A quality of movement score is calculated for each activity, for four clusters of activities (locomotion, rise and descend, lift and move, and transfers) and for the
total test (called KneeScore2). All scores are calculated as the number of standard deviations that a person is below or above the mean score of a control group of “healthy” subjects. The scoring algorithm (including the data of the control group) is available from the authors. Construct validity was supported by a high correlation between the DPKT KneeScore2 and the physical therapists’ opinion of the patients’ quality of movement \( (r = 0.68–0.86) \) [18,19]. Because the DPKT appeared to be highly reliable (ICC for intertester reliability was 0.90 [95% CI 0.83–0.94]) [18], lack of reliability cannot be an explanation for the modest correlation between the self-report measures of physical functioning and the performance-based measure of physical functioning in this study.

### 2.4. Self-report measures of function

Two subscales of the disease-specific WOMAC questionnaire [16] were used: one subscale measures the perceived amount of pain (five items) and one subscale measures perceived limitations in physical functioning because of knee or hip complaints, during daily activities (17 items). Two subscales of the generic SF-36 questionnaire [17] were used: one subscale measures the perceived amount of pain in general and limitations in daily activities because of pain (subscale pain, five items), and one subscale measures limitations in daily activities (subscale physical functioning, 10 items) because of any health problem in general. In both questionnaires, pain and physical functioning are scored on 0–100 scales, with higher scores indicating less pain or better functioning respectively.

### 2.5. Hypotheses

To test our general hypothesis that self-report measures of physical functioning will be more influenced by the amount of pain experienced than performance-based measures of physical functioning, the following specific hypotheses were tested.

#### 2.5.1. Hypothesis 1

The correlations between self-reported physical functioning (WOMAC and SF-36 physical functioning scores) and pain (WOMAC and SF-36 pain scores) will be higher than the correlations between performance-based physical functioning (DPKT KneeScore2) and pain (WOMAC and SF-36 pain scores).

#### 2.5.2. Hypothesis 2

Based on the existing dimensional structure of the WOMAC and SF-36, one would expect that in factor analyses a two-factor structure would emerge in which the WOMAC and SF-36 pain scores will load on one factor and the WOMAC and SF-36 physical functioning scores and the DPKT KneeScore2 would load on the other factor. However, it is our hypothesis that the pain and self-reported physical functioning subscales will load on the same factor. We further hypothesize that the DPKT KneeScore2 will not, or to a much lesser extent, load on this factor.

#### 2.5.3. Hypothesis 3

The correlations between performance-based physical functioning and self-reported physical functioning will be higher in patients with less pain. This hypothesis was tested in two ways:

##### 2.5.3.1. Hypothesis 3a

The correlations between performance-based physical functioning (DPKT KneeScore2) and self-reported physical functioning (WOMAC and SF-36 physical functioning subscores) will be higher in patients with less pain (cutoff point median WOMAC or SF-36 pain scores) compared to patients with more pain.

##### 2.5.3.2. Hypothesis 3b

Because it is expected that pain decreases over time after knee replacement surgery, we expect that the correlations between performance-based physical functioning (DPKT KneeScore2) and self-reported physical functioning (WOMAC and SF-36 physical functioning subscores) will increase over time after knee replacement surgery.

### 2.6. Statistical analyses

Hypotheses 1 to 3a were tested on preoperative data. For hypothesis 3b, also follow-up data on 3, 6, and 12 months after knee replacement surgery were used. To test the first and third hypotheses, Pearson’s correlation coefficients were calculated. In addition, for the third hypothesis, we tested the interaction between WOMAC pain and WOMAC functioning in a linear regression analysis, to see whether the relation of WOMAC functioning with the DPKT KneeScore2 was significantly different for patients with more or less pain. To test the second hypothesis, we applied exploratory factor analysis, including the WOMAC and SF-36 physical functioning subscores, the WOMAC and SF-36 pain subscores, and the DPKT KneeScore2. We used principal component analysis with Promax rotation and extracted a forced two-factor model and a forced one-factor model.

### 3. Results

The study population consisted of 163 patients who completed the DPKT and the WOMAC and SF-36 questionnaires before knee replacement surgery. In Table 1 patients’ characteristics before surgery are displayed. Table 2 provides the descriptive statistics for the DPKT KneeScore2 and the WOMAC and SF-36 pain and physical functioning subscores before surgery and at 3, 6, and 12 months follow-up.

#### 3.1. Hypothesis 1

The correlations between the physical functioning measures and the pain scores are presented in Table 3. The
correlations between the WOMAC and SF-36 physical functioning subscales and the WOMAC and SF-36 pain subscales (0.57–0.74) were higher than the correlations between the DPKT KneeScore2 and the WOMAC and SF-36 pain scores (0.20 and 0.26). These findings support our first hypothesis.

3.2. Hypothesis 2

Table 4 provides the results of the factor analyses. In the forced two-factor solution, the WOMAC pain and physical functioning subscores and the SF-36 pain and physical functioning subscores loaded on the first factor, which accounted for 64% of the variance (eigenvalue 3.2). The DPKT KneeScore2 loaded on the second factor, which accounted for an additional 18% of the variance (eigenvalue 0.92). The SF-36 physical functioning subscore loaded also on the second factor, but to a lower extent than on the first factor (factor loading 0.69 vs. 0.78). Because the eigenvalue of the second factor was below 1, we also tried a forced one-factor solution. Both WOMAC and SF-36 pain and physical functioning subscores loaded highly on this factor, with factors loadings ranging from 0.83–0.91. The DPKT KneeScore2 loaded to a much lower extent on this factor, with a factor loading of 0.51. These findings support our second hypothesis.

3.3. Hypothesis 3a

The correlation between the WOMAC physical functioning subscore and the DPKT KneeScore2 was 0.43 for patients with lower than median WOMAC pain levels (scores ≥45 points, n = 69) and 0.17 for patients with higher than median WOMAC pain levels (scores <45 points, n = 94). This finding supports our hypothesis 3a.

In linear regression analysis, however, the interaction between WOMAC pain and WOMAC functioning was not statistically significant. The correlation between the SF-36 physical functioning subscore and the DPKT KneeScore2 was 0.46 for patients with lower than median SF-36 pain levels (scores ≥33 points, n = 76) and 0.53 for patients with higher than median SF-36 pain levels (scores <33 points, n = 87). This finding does not support our hypothesis 3a.

3.4. Hypothesis 3b

WOMAC and SF-36 pain scores increased (indicating less pain) after surgery (WOMAC from 46.9 to 76.8 and SF-36 from 35.2 to 65.6 12 months after surgery). Table 5 provides the correlations between the DPKT KneeScore2 and the WOMAC and SF-36 physical functioning subscores before and 3, 6, and 12 months after knee replacement surgery. The WOMAC physical functioning subscale correlated higher with the DPKT KneeScore2 after surgery compared to before surgery (0.48–0.51 vs. 0.34). The SF-36 physical functioning subscale correlated higher with the DPKT KneeScore2 at two out of three measurements after surgery compared to before surgery (0.55, 0.59 vs. 0.50). Only 3 months after surgery the correlation between the SF-36 physical functioning subscore and the DPKT KneeScore2 was lower compared to before surgery (0.40 vs. 0.50). Most of these results support our hypothesis 3b.

4. Discussion

Most results of this study confirmed our hypothesis that self-report measures of physical functioning are more influenced by the amount of pain experienced than performance-based measures of physical functioning. The results were more convincing for the WOMAC than for the SF-36.

Although the patient sample was not a consecutive sample, the patient characteristics are comparable with those of the study population of Stratford et al.’s study [13]. Stratford et al. found in factor analysis that the performance-based measures of physical functioning (self-paced walk, timed up-and-go, and stair test) loaded on a different factor.
than the pain measures (pain associated with the performance of the tests), while the self-report measure of physical functioning (LEFS) loaded on the same factor as the performance-based measures of physical functioning (factor loading 0.35), but even higher on the pain factor (factor loading 0.44) and the exertion factor (0.41). These findings support our hypothesis that self-report measures of physical functioning are more influenced by the amount of pain experienced than performance-based measures of physical functioning.

Other evidence that self-report measures of physical functioning correlate higher with pain than performance-based measures of physical functioning in a similar patient population, can be found in a study of Kennedy et al. [12]. In their study, perceived pain (as measured with a visual analog scale and with the Lower Extremity Activity Profile—LEAP) correlated higher (0.37–0.50) with self-reported physical functioning (as measured with the LEAP) than with performance-based physical functioning (0.21–0.34) (as measured with a fast self-paced walk test, a stair climb test, and a timed up-and-go test) in patients with hip- or knee-OA, awaiting hip or knee replacement surgery [12].

Low correlations between performance-based measures of physical functioning and pain have been reported in other studies in patients with knee- or hip OA as well.

Table 4
Factor analyses (principal component analysis with Promax rotation)

<table>
<thead>
<tr>
<th></th>
<th>Forced 2-factor solution</th>
<th>Forced 1-factor solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOAMC physical functioning</td>
<td>0.92 0.46</td>
<td>0.91</td>
</tr>
<tr>
<td>SF-36 physical functioning</td>
<td>0.78 0.69</td>
<td>0.85</td>
</tr>
<tr>
<td>WOAMC pain</td>
<td>0.88 0.24</td>
<td>0.83</td>
</tr>
<tr>
<td>SF-36 pain</td>
<td>0.86 0.32</td>
<td>0.83</td>
</tr>
<tr>
<td>DPKT KneeScore2</td>
<td>0.32 0.96</td>
<td>0.51</td>
</tr>
<tr>
<td>Variance explained</td>
<td>64% 18%</td>
<td>64%</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>3.2 0.92</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Bold = factor loadings >0.50.

Table 5
Correlations between DPKT KneeScore2 and the WOMAC and SF-36 physical functioning subscores before (0) and 3, 6, and 12 months after knee replacement surgery

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOAMC physical functioning</td>
<td>0.34  (163)</td>
<td>0.51 (94)</td>
<td>0.50 (97)</td>
<td>0.48 (73)</td>
</tr>
<tr>
<td>SF-36 physical functioning</td>
<td>0.50  (163)</td>
<td>0.40 (92)</td>
<td>0.55 (89)</td>
<td>0.59 (75)</td>
</tr>
</tbody>
</table>

The only other study that compared the DPKT with the WOMAC questionnaire is the study of Witvrouw et al. [15]. They also found a low correlation between DPKT KneeScore1 (original scoring method) and the WOMAC pain score ($r = 0.36$), although slightly higher than in our study (0.20), and a high correlation between WOMAC physical functioning and WOMAC pain subscales (0.72, obtained by personal communication). Low correlations between performance-based measures of physical functioning (walking, stair climb, and chair rise) and the WOMAC pain score (0.33–0.45) were also found in the study of Lin et al. [21] in 106 patients with hip and knee OA.

On the contrary, moderate to high correlations ($0.48–0.83$) between self-report measures of physical functioning, like the WOMAC, Lequesne OA index, SF-36, and Nottingham Health Profile (NHP), and pain have been found for in patients with hip or knee OA in several studies [22–26]. For the WOMAC, considerably high correlations were found between the pain and physical functioning subscales (0.79–0.84) in several validation studies [23–25,27,28].

The results of the above-mentioned studies show that, in general, self-report measures of physical functioning are more influenced by the amount of pain experienced than performance-based measures of physical functioning, which supports our hypothesis. Our third hypothesis—the correlations between performance-based physical functioning and self-reported physical functioning will be higher in patients with less pain—was confirmed more convincing for the WOMAC than for the SF-36. This may be explained by the fact that the correlation between the WOMAC pain and physical functioning subscales was higher (0.74) than the correlation between the SF-36 pain and physical functioning subscales (0.57) (Table 3). This was also found in the studies of Bombardier et al. [23] and Söderman et al. [25].

This brings us back to the debate about the validity of performance-based measures vs. self-report questionnaires: which of them is more valid to assess physical functioning? The answer depends on your definition of physical functioning. Stratford et al. [13] seem to adopt a broad definition of functioning, including not only time, but also pain and exertion. From that point of view, self-report measures like WOMAC can be considered valid. On the other hand, pain and functioning are often considered to be two different concepts. Many self-report questionnaires, like the WOMAC and SF-36, claim to measure pain and functioning as two different constructs, with different subscales. From that
point of view, we argue that self-report measures of physical functioning that are highly correlated with pain are less valid to assess physical functioning because they measure two concepts instead of one.

Furthermore, it leads to confusion when both measures are called measures of physical functioning. For example, the effect of total knee replacement is much higher on WOMAC and SF-36 physical functioning after 3 months (effect sizes 1.2 and 1.0) (Table 2) compared with the effect on MAC and SF-36 physical functioning after 3 months (effect size 0.3). This can be explained by the effect of total knee replacement on pain, which is included in the WOMAC and SF-36 scores, but not in the DPKT score. By looking at the WOMAC scores, orthopaedic surgeons might come to the conclusion that patients’ functioning is strongly improved after total knee replacement, which is in contrast with clinical experience. Others might conclude that the DPKT is invalid, which is not true.

In many validation studies correlations of 0.50 or higher between measurement instruments that are supposed to measure a comparable concept, are usually considered satisfactory for establishing construct validity. Therefore, we consider correlations between pain and functioning scales or self-report measures of 0.50 or higher an indication of lack of content validity of the self-report measure, given the fact that they are supposed to measure two different concepts.

Several studies have indicated this lack of content validity for the WOMAC [23–25,27,28]. Thumboo et al. [28] found that in factor analysis items from the WOMAC pain and physical functioning subscale had a similar degree of correlation with both domains, rather than having a higher correlation with their respective domains. Ryser et al. [29] found that in Rasch analysis on all items of the WOMAC the pain and physical functioning items fitted the same model, indicating that the pain and physical functioning items seem to represent the same construct. They also found that corresponding items of the pain and physical functioning scale (e.g., “pain while standing upright” and “difficulty while standing”) were located close to each other on the logit scale, indicating redundancy. In our factor analyses, we found that corresponding items on the pain and physical functioning scale loaded on the same factor, but the pain and physical functioning items did not form two separate factors (four factors were found; data not shown).

Several factors may contribute to the high correlation between the WOMAC pain and physical functioning subscales. First, the WOMAC physical functioning questions inquire about difficulty with the performance of activities. Based on the findings of Stratford et al. [13], we argue that patients may interpret this as the time to complete the task, but also as perceived pain and exertion. In contrast, the questions of the SF-36 physical functioning subscale inquire about limitations with the performance of activities, which may be interpreted more purely as the ability to complete the tasks. It would be interesting to examine how patients interpret these words in a qualitative study. Second, in the WOMAC questionnaire, half of the activities in the functioning items overlap with activities in the pain items. Recently, Stratford and Kennedy [30] showed that duplicating activities in the pain and physical functioning subscale of the WOMAC compromised the validity of the WOMAC physical functioning subscale, which is in accordance with the findings of Ryser [29]. Third, in the WOMAC, the pain items are placed before the functioning items, which may trigger patients to consider pain when answering the questions about physical functioning. In contrast, in the SF-36 the pain items are placed after the items on physical functioning. Marx et al. [31] demonstrated that both the wording and order of questions appear to have an important effect on how patients respond to questionnaires and raises questions about the validity of self-reports of disability. It would be interesting to examine whether the physical functioning scores of the WOMAC would be different if the pain items were placed after the function items instead of before.

It has been argued that performance-based methods and self-reports measure different aspects of function and offer complementary information [6,32]. Our results seem to support this hypothesis. Performance-based methods measure what a patient “can do,” while self-reports measure what a patient “thinks he/she can do.” Our results show that the latter concept seems to be more influenced by the amount of pain experienced than the former. Furthermore, self-reports are usually asking over some past period of time (e.g., the past week)—yet the performance-based measures are based in the moment of testing.

In summary, our hypothesis that self-report measures of physical functioning are more influenced by the amount of pain experienced than performance-based measures of physical functioning was convincingly supported by the results of the WOMAC, and somewhat less by the results of the SF-36. Further research should tell whether our results also apply to other performance-based and self-report measures of physical functioning, and to other patient groups.

With respect to the WOMAC, we consider our findings and those of the other studies discussed as evidence for a lack of content validity. The WOMAC claims to measure pain and physical functioning as two separate constructs, but there is strong evidence that the subscale physical functioning measures a combination of pain and physical functioning. Investigators should realize this when using the WOMAC.

Conflict of interest statement

Rob C. van Lummel and Rienk M.A. van der Slikke work at McRoberts BV, which is the developer of the performance-based test that was used in this study. They were involved in the design and execution of the study and commented on the manuscript, but they never had a veto on any decision, and were not involved in the data analyses. McRoberts BV did not financially support this study.
Appendix

Activities of the DynaPort KneeTest

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Activity</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locomotion</td>
<td>Walk 9 meter</td>
<td>(first time, cf. activity 3)</td>
</tr>
<tr>
<td>2</td>
<td>Walk 9 meter back and forth</td>
<td>walk 9 meter, turn, walk back</td>
</tr>
<tr>
<td>3</td>
<td>Walk 9 meter</td>
<td>(second time, cf. activity 1)</td>
</tr>
<tr>
<td>4</td>
<td>Walk a longer distance</td>
<td>walkthrough a corridor (if available) and back (in total ± 50 meter)</td>
</tr>
<tr>
<td>Rise and descend</td>
<td>Ascend and descend stairs (three steps, each 20 cm high)</td>
<td>start with the NA leg</td>
</tr>
<tr>
<td>6</td>
<td>Ascend and descend stairs</td>
<td>start with the A leg</td>
</tr>
<tr>
<td>7</td>
<td>Ascend and descend slope 120 cm long (with 33% inclination)</td>
<td>start with NA leg</td>
</tr>
<tr>
<td>8</td>
<td>Ascend and descend slope</td>
<td>start with A leg</td>
</tr>
<tr>
<td>9</td>
<td>Step up and down a block</td>
<td>20 cm, up with NA leg, down with A</td>
</tr>
<tr>
<td>10</td>
<td>Step up and down a block</td>
<td>30 cm, up with NA leg, down with A</td>
</tr>
<tr>
<td>11</td>
<td>Step up and down a block</td>
<td>40 cm, up with NA leg, down with A</td>
</tr>
<tr>
<td>12</td>
<td>Step up and down a block</td>
<td>20 cm, up with A leg, down with NA</td>
</tr>
<tr>
<td>13</td>
<td>Step up and down a block</td>
<td>30 cm, up with A leg, down with NA</td>
</tr>
<tr>
<td>14</td>
<td>Step up and down a block</td>
<td>40 cm, up with A leg, down with NA</td>
</tr>
<tr>
<td>Transfers</td>
<td>Pick up a 4 kg weight</td>
<td>walk to it, pick it up with NA side, go on walking</td>
</tr>
<tr>
<td>16</td>
<td>Pick up a 4 kg weight</td>
<td>walk to it, pick it up with A side, go on walking</td>
</tr>
<tr>
<td>17</td>
<td>Sit down and stand up</td>
<td>on and from block of 40 cm height</td>
</tr>
<tr>
<td>18</td>
<td>Sit down and stand up</td>
<td>on and from block of 30 cm height</td>
</tr>
<tr>
<td>Lift and move objects</td>
<td>Slalom with shopping trolley (with 50 kg in it)</td>
<td>9 m forwards slalom around 2 plastic cones</td>
</tr>
<tr>
<td>20</td>
<td>Slalom with shopping trolley</td>
<td>9 m backwards slalom around 2 plastic cones</td>
</tr>
<tr>
<td>21</td>
<td>Carry a tray with two cups</td>
<td>walk 9 meter straight, carrying the tray</td>
</tr>
<tr>
<td>22</td>
<td>Carry a 5 kg shopping bag</td>
<td>walk 9 meter straight, carrying the bag on NA side</td>
</tr>
<tr>
<td>23</td>
<td>Carry a 5 kg shopping bag</td>
<td>walk 9 meter straight, carrying the bag on A side</td>
</tr>
</tbody>
</table>

NA = not-affected leg; A = affected leg.

* A patient performs the activity ‘walk 9 meter’ in the beginning and the end of the test.

References


[6] Myers AM, Holli...


