A prediction model for fear-induced activity limitation after total knee arthroplasty in people aged 60 years and older: Prospective cohort study

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TITLE PAGE

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knee; replacement; fear of falling; activity restriction; Nintendo Wii Balance Board

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A preliminary prediction model for fear-induced activity limitation after total knee arthroplasty in people aged 60 years and older: Prospective cohort study

Abstract

Objective: To assess the presence of FIAL in a sample of patients one year post total knee arthroplasty (TKA) and to develop a preliminary prediction model to predict the risk of FIAL.

Design: Prospective cohort study.

Setting: A tertiary teaching hospital in Singapore

Participants: Seventy-two patients (mean age, 70±6 years) undergoing primary, unilateral TKA participated

Interventions: Not applicable.

Main Outcome Measures: Preoperative candidate predictors were age, gender, body mass index, previous falls history, number of comorbidities, self-report physical function, gait speed, knee range-of-motion, knee pain, and standing balance. Outcome measure at one year follow-up was the level of FIAL, measured by the Survey of Activities and Fear of Falling in the Elderly.

Results: Thirty-one patients (41%; 95% CI: 0.31-0.55) had FIAL, of which 15 had moderate to severe FIAL. Multivariable predictors of FIAL included previous habitual gait speed and velocity of postural sway in the anterior-posterior axis. A 2-variable nomogram-based prediction model was constructed and this model showed moderately good discrimination (optimism corrected c-index = 0.76) and adequate calibration.

Conclusions: In our sample of patients with TKA, FIAL is common and early identification of patients at risk of FIAL would bring them into appropriate modes of preventive care. Our prediction model shows some promise in identifying patients with FIAL but prospective validation studies are needed.

Key words: knee; replacement; fear of falling; activity restriction; Nintendo Wii Balance Board

List of Abbreviation

BMI   body mass index
FIAL   fear induced activity limitation
ROM    range of motion
SAFFE  Survey of activities and fear of falling in the elderly
TKA    total knee arthroplasty
SF-36   Medical Outcomes Study 36-Item Short-Form Health Survey
Fear induced activity limitation (FIAL) is the avoidance or curtailment of daily activities due to a fear of falling\(^1\). To be sure, in older adults, some level of fear of falling is rational and when the fear of falling does not interfere with daily activities, it may even be helpful in preventing falls\(^2-4\). The situation, however, becomes problematic when the fear of falling induces the older adults to avoid or restrict their daily activities\(^1-4\). Specifically, FIAL contributes to a vicious cycle of physical deconditioning and frailty which, in turn, perpetuate or increase the fear of falling, the risk for falls, and the severity of FIAL\(^1-4\). Furthermore, because older adults with FIAL may become socially isolated due to a reduction in social interaction, FIAL can impact negatively on their mental well-being\(^2-4\). Clearly, early recognition and prediction of FIAL is vital so that interventions can be initiated to prevent these negative outcomes.

To date, several studies have evaluated FIAL in community-living older adults\(^1,4,5\) and in patients with rheumatoid arthritis\(^6\). To our knowledge, however, no studies have focused on older adults who have undergone a total knee arthroplasty (TKA). And yet, understanding FIAL and its predictors may be particularly important in this patient population for 2 reasons. First, although a TKA can relieve knee pain and restore self-report function in patients with advanced stages of knee osteoarthritis (OA), falls\(^7,8\) and fear of falling\(^8,9\) – both of which are strong risk factors for FIAL\(^1,4\) – continue to be considerable problems in these patients. Second, compared with age-matched, knee-healthy controls, patients with TKA have greater physical impairments and functional limitations even one year after surgery\(^10\), and it is plausible, at least in a subgroup of patients, for FIAL to contribute to or perpetuate these persistent impairments and limitations.
Given the aforementioned considerations, the objectives of this study were to (i) assess
the presence of FIAL in our sample of patients one year post TKA and (ii) develop a
preliminary prediction model to predict the risk of FIAL. When developing the model,
we deliberately focused on preoperative variables with the rationale that if the healthcare
professional could identify, at the preoperative level, patients who are at risk of having
FIAL one year post surgery, it would prompt the recommendations of early and targeted
“prehabilitation” – a treatment concept with accumulating recent evidence for its
therapeutic potential.11-13
METHODS

Patients. Our study sample comprised patients aged 60 and older undergoing unilateral TKA for primary knee OA at one hospital from June 2010 to January 2011. Patients were recruited within a month before their surgery as part of a randomized trial investigating the effects of postoperative electrical muscle stimulation. Patients were excluded if they (i) had secondary knee OA due to trauma, inflammatory or metabolic rheumatic diseases; (ii) had previous lower extremity surgery in the past year; (iii) had significant back, hip or feet pain; (iv) were unable to walk 10 meters independently without an assistive device; or (v) had any medical conditions that would compromise physical function or affect their abilities to complete testing. A total of 104 eligible patients participated in our original clinical study. So that our results were more comparable with those from the geriatrics literature, we excluded 16 patients who were below 60 years of age. A further 16 patients were excluded from the final analysis due to the following reasons: (i) underwent unicompartmental knee arthroplasty instead of TKA (n=2); (ii) found to be unfit for the operation (n=6); (iii) declined to continue participation (n=5); and (iv) developed postoperative medical complications that adversely affected the outcomes (n=3). Thus, the final sample comprised the remaining 72 patients. Ethical approval was obtained for this study.

Sociodemographic Characteristics. Patients attended a test session at the outpatient physiotherapy department after providing written informed consent. For our analysis, beside treatment assignment, we focused on age, gender, body mass index, history of fall occurrence in the past year, number of comorbidities, self-report physical function, gait speed, knee impairments, and standing balance – variables that are routinely or easily obtained in a preadmission setting and have been
correlated elsewhere with FIAL, falls, or activity limitations. Number of comorbidities were obtained using a checklist modeled after the Self-Administered Comorbidity Questionnaire. Self-report physical function and bodily pain were assessed using the physical function and bodily pain subscales of the Medical Outcomes Study Short Form 36 (SF-36) general health survey.

**Habitual Gait Speed.** To assess gait-speed, patients were timed using a stopwatch as they walked 10 meters at their usual pace. Patients stood directly behind the start line and were clocked from the time the first foot crossed the start line until the lead foot crossed the finish line. Patients were instructed to finish at least 2 meters past the finish line to eliminate the deceleration effects from stopping the walk. Each patient performed 2 valid trials and the faster trial was recorded.

**Knee Range of Motion.** A Lafayette Gollehon extendable goniometer was used to measure passive knee range-of-motion. Knee extension range-of-motion was measured with the patients in supine position with the heel elevated on a firm wedge. Knee flexion range-of-motion was measured with the patients in long sitting position. Two sets of measurements were taken, and the higher measurement was recorded.

**Standing Balance.** Standing balance was assessed using the Wii Balance Board in a protocol previously validated against a laboratory force-plate. To perform the test, patients stood barefooted on the Wii Balance Board in their usual comfortable stance and they were instructed to stand quietly. Two 30-second trials were performed, and the mean of two trials was used. The Wii Balance Board was interfaced with a laptop computer using custom-written software, and anteroposterior (AP) and mediolateral (ML) center-
of-pressure (CoP) coordinates were recorded at 40 Hz and low-pass filtered at 6.25 Hz. A priori, we focused on 4 measures: CoP range and CoP velocity along both AP and ML axes. CoP range represents the distance between the most positive and negative CoP trajectory positions in the respective axes; CoP velocity represents the distance covered by the CoP in the respective axes (path length) divided by the sampling duration. Conventionally, greater postural sway and velocity indicate poorer balance control.

**Outcome Measure**

Trained personnel, blinded to both the study hypothesis and the patients' baseline performance, telephone interviewed the patients one year following their TKA. In our study, FIAL was quantified by the Survey of Activities and Fear of Falling in the Elderly (SAFFE)\(^2\). The SAFFE is an established and commonly-used measure of FIAL\(^1,4,21,22\) and it assesses activity limitation over the past 5 years associated with fear of falling during performance of 11 basic and instrumental activities of daily living. For each activity, patients were first asked whether they usually performed the activity. Patients who responded “yes” to the first question were next asked whether they were performing the activity less than 5 years ago specifically due to a fear of falling. If patients responded “yes,” the activity was given 1 point. On the other hand, patients who responded “no” to the first question were next asked whether they did not perform the activity specifically because of a fear of falling. If patients responded “yes,” the activity was given 1 point. Put simply, an activity scored 1 point if it was performed less often than before or not performed at all, both because of a fear of falling. Subsequently, the FIAL level was determined by summing the scores of all activities\(^1\). In our study, we dichotomized the SAFFE scores because its distribution was right skewed and patients were classified as having FIAL when their SAFFE score was 1 and above. There are statistical and clinical
reasons for choosing this cutpoint. From a statistical perspective, this cutpoint could potentially balance the number of patients with and without FIAL and hence, optimize the events-per-variable ratio in our multivariable analyses\textsuperscript{23}. More important, from a clinical perspective, given the debilitating impact of FIAL, we believe that any hint of a potential FIAL problem would warrant close clinical attention which, in turn, justified the selection of a conservative cutpoint.
Statistical analysis

We used descriptive statistics to characterize the study sample. We used univariable logistic regression to first explore the association of each candidate variable (Table 1) with the FIAL outcome and variables with \( P < 0.20 \) were then entered into a multivariable model with backward stepwise selection. To ensure that potentially important predictors were selected, we retained variables with a liberal \( P \leq 0.20 \). To account for model overfitting, the regression coefficients in the multivariable model were estimated using penalized maximum likelihood methods. To assess multicollinearity between the predictors, we calculated variance inflation factor for the final regression model. For ease of interpretation of our results, we presented the prediction model as a nomogram.

Model performance was assessed in 2 ways. First, model discrimination was measured by the concordance index (\( c \)-index), where a value of 1 represents perfect discrimination and 0.5 represents chance discrimination. Because a prediction model can always be expected to perform better (optimistically) in the original derivation sample than in new but similar samples, we used a bootstrap internal validation technique to correct (shrink) the \( c \)-index for “optimism”. Second, model calibration was assessed using a calibration plot and model goodness-of-fit was assessed using the le Cessie-van Houwelingen-Copas-Hosmer test. Of note, a lack of adequate model fit is indicated by \( P < 0.05 \).

All statistical analyses were done with R software, version 2.15.0, using the rms package. \( P < 0.05 \) was regarded as significant.
RESULTS

Table 1 shows the patients’ characteristics. The patients were predominantly female (82%) and the mean SF-36 physical function score was 41.3 (SD, 20) which was ~5 points higher than expected (36.5 points, P=0.05, one-sample t-test) based on our hospital registry data\textsuperscript{29}. Among our 72 patients, 31 (41%; 95% CI: 0.31–0.55) had FIAL (≥1 activity limited) one year post TKA. Of these patients, 15 had moderate to severe FIAL (≥3 activities limited). At the univariable level, a previous history of falls, SF-36 physical function, habitual gait speed, and anterior-posterior postural sway measures were, or tended to be, associated with postoperative FIAL (P’s ranged from <0.01 to 0.14).

In the multivariable model, significant predictors of FIAL included habitual gait speed (OR, 0.16; 95%CI, 0.05-0.54, per IQR increase) and CoP Velocity-AP (OR, 2.33; 95%CI, 1.06-5.14, per IQR increase). Specifically, increasing habitual gait speed variable from its lower quartile (25\textsuperscript{th} percentile) to its upper quartile (75\textsuperscript{th} percentile) was associated with an 84% (95%CI, 46% to 95%) decrease in the odds of FIAL; increasing CoP Velocity-AP variable from its lower quartile (25\textsuperscript{th} percentile) to its upper quartile (75\textsuperscript{th} percentile) was associated with a 2.3-fold (95%CI, 1.06- to 5.1-fold) increase in the odds of FIAL one year post TKA. The correlation between the two predictors was -0.23 and the variance inflation factor was 1.00, indicating that multicollinearity was not influencing the regression results.

Figure 1 shows the preliminary nomogram which allows FIAL probabilities for individual patients to be estimated by drawing a straight line from the “Total Points” axis to the FIAL probability axis. The total number of points for each patient is obtained by...
summing the points for each of the 2 predictors. For example, a patient with a habitual
gait speed of 1.0m/s (27.5 points) and a standing CoP Velocity-AP of 1.4cm/s (42.5
points) has a total score of 70 nomogram points. Accordingly, this patient is predicted to
have a 35% probability of having FIAL one year post TKA. The optimism-corrected c-
index of the prediction model was 0.76, indicating moderately good discrimination.
Figure 2 shows the calibration plot with the dotted line representing the observed
association between the observed FIAL proportion and the predicted FIAL probabilities
and the dashed line representing perfect agreement between the observed and predicted
values. The 2 lines were close to each other, indicating that the prediction model showed
good calibration. Finally, the goodness-of-fit test indicates that the model displayed
adequate fit ($P=0.07$).
DISCUSSION

We found that in our sample of patients one year post TKA, FIAL is common with a frequency of 2 of 5 patients. Furthermore, we showed that the combination of preoperative habitual gait speed and velocity of postural sway in the AP axis may predict postoperative FIAL. This model showed moderately good discrimination ($c$-index = 0.76) and adequate calibration.

Previous studies in well-functioning older adults reported a prevalence of FIAL that ranged from 5% to 19%\textsuperscript{5, 30}. In comparison, even when we consider the lower-bound estimate of the FIAL prevalence in our study (31%), it was higher and more comparable to rates reported in studies in much older adults (38% to 47%)\textsuperscript{1, 14} or in less well-functioning adults (31% to 42%)\textsuperscript{6, 31}. Taken together, our results indicate that FIAL is a common problem post TKA. At first glance, this finding seems surprising in light of longitudinal evidence of a nearly 3-fold improvement in self-report physical function from preoperatively to one year postoperatively\textsuperscript{32}. Nevertheless, as mentioned in the Introduction, even after a TKA, falls prevalence ranged from 24% to 40%\textsuperscript{7, 8, 33}, and many patients continue to have impairments reciprocally related to FIAL\textsuperscript{1, 4} – namely, impaired knee joint proprioception\textsuperscript{33}, muscle weakness\textsuperscript{10}, functional limitations\textsuperscript{10}, and a fear of falling\textsuperscript{8, 9}. Our data are a sobering reminder that although TKA has been heralded as a highly cost-effective procedure for end-staged knee OA, feeling better is not necessarily the same as feeling good as nearly half our patients may be susceptible to a downward spiral of frailty.

In our study, we developed a model to predict postoperative FIAL. Although we found no studies sufficiently similar to ours to make direct comparisons, our putative predictors

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of FIAL have intuitive interpretations. For instance, a previous history of falls may contribute to FIAL risk discrimination \((P=0.14, \text{Table 1})\) and this finding was consistent with most previous reports \(^{4, 5, 14, 30, 31}\). Also consistent with previous studies \(^{1, 5, 30}\), we found that habitual gait speed was most predictive of FIAL and this association possibly involved physiological and behavioural pathways. A slow gait speed reflects poor physical functioning in an older adult, and it is influenced, amongst other things, by balance and strength impairments\(^{34}\). On the other hand, a slow gait speed may reflect an adaptive, behavioural mechanism to prevent falls, and older adults who were fearful of falling may adopt a cautious gait and walked more slowly\(^{5, 35}\). Given the multifactorial nature of gait speed, it is not surprising that this variable wielded a strong influence on FIAL prediction.

Of interest, although CoP-based balance measures have prognostic and predictive relevance for falls\(^{36, 37}\) and fear of falling\(^{38}\) in older adults, previous FIAL models do not consider forceplate-derived balance measures understandably because existing forceplates are neither field-friendly nor practicable enough to be used in large patient cohorts. In contrast, by repurposing the Wii Balance Board for balance testing\(^{19}\), we were able to incorporate these measures in our study. Specifically, our study shows the potential predictive utility of these Wii Balance Board derived balance measures – in particular, the CoP Velocity-AP measures – in identifying patients with FIAL. Although balance protocols may vary, similar observations have been noted by epidemiological studies on the predictive value of standing CoP Velocity-AP measures in determining fall risk\(^{37}\) and in discriminating older adults with and without musculoskeletal pain\(^{39}\). Whereas these previous studies used purpose-built force platforms, we used a readily available, inexpensive, and portable alternative device which deserves further exploration in future studies.

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Our study has implications. First and most compelling, our data highlight an under-reported clinical problem in TKA and early, preventive interventions are needed to improve physical function and lessen fall risk in patients with TKA – a patient population with a paradoxically high risk of hip fracture. Second, given that our prediction model comprised gait speed and standing balance, both of which are potentially modifiable, our results generally support gait, balance, and strength training as the mainstay of TKA rehabilitation. Third, our results are methodologically interesting. Specifically, by demonstrating the predictive value of the standing balance measures in identifying FIAL, our results support the repurposing of the Wii Balance Board – a cheaply-available gaming device – as a potential balance assessment tool. Nevertheless, given our sample size, our results should be viewed as proof-of-concept for our balance protocol and again, further testing is needed to evaluate its use.

Study Limitations

Our study has limitations. First and most important, our sample size was small which resulted in wide 95% CIs of our point estimates and limited our ability to temporally validate our model. For this reason, we acknowledge that although our work is the first to integrate putative FIAL predictors into a prediction model for patients with TKA, we view our model as preliminary and requiring further validation and refinement. Second, our study sample was somewhat healthier than the patients typically seen in our institution probably because we excluded patients who were unable to walk 10 meters unaided and patients with significant back, hip, or ankle pain. Accordingly, the generalizability of our findings may be limited. That said, however, because these excluded patients were likely to have poorer physical function and an increased risk for
FIAL, their inclusion in the study would have potentially improved the discriminative ability of our prediction model and strengthened our conclusion that FIAL is common post TKA. Third, we did not measure preoperative FIAL because completing the SAFFE questionnaire was deemed to be more time consuming (~10mins) compared with obtaining other predictors in this study. Arguably, our 2 predictors in the model may have overlapping predictive abilities with preoperative FIAL given their known predictive validity for falls\textsuperscript{36, 37} and FIAL\textsuperscript{1, 4} in older adults. Nevertheless, we acknowledge that it may be necessary for future investigations to consider preoperative FIAL as a putative predictor and to compare all predictors simultaneously in a multivariable model.

Fourth, we used preoperative variables to develop the prediction model because we envisaged its application in identifying suitable patients for “prehabilitation.” Although the model fit is adequate, we acknowledge that to identify suitable patients for intensive, targeted post TKA rehabilitation, a prediction model incorporating both preoperative and postoperative variables may yield even greater discriminative power. Fifth, although we believe our choice of the SAFFE cutpoint for FIAL is sensible, we acknowledge that no cutpoint is truly optimal or defensible. Accordingly, future similar studies should consider alternative, more sophisticated statistical techniques (perhaps quantile regression\textsuperscript{42} or generalized regression) to analyze the skewed SAFFE data as a continuous variable. Finally, although the SAFFE questionnaire is an established measure of FIAL and it has been used in studies on various geriatric populations\textsuperscript{1, 20-22}, its questions involve a long recall period (5 years) which may impose some difficulty for older adults. For this reason, future studies may benefit from including other measurements of activity limitations and fear of falling\textsuperscript{43} to more comprehensively assess

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the presence of FIAL. Relatedly, our analyses focused on FIAL as the sole outcome of
interest, and future similar work should also incorporate measures of activities limitations
to complement their FIAL findings.

CONCLUSIONS

In conclusion, FIAL is common in patients with TKA. We used a low-cost, clinical
approach to the early identification of patients with FIAL and found that a prediction
model based on 2 easy-to-determine preoperative variables – namely, habitual gait speed
and velocity of postural sway in the AP axis – showed some promise in predicting the
risk of postoperative FIAL. That said, our findings are clearly preliminary and large
prospective studies are needed to validate them.
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13. Walls RJ, McHugh G, O’Gorman DJ, Moyna NM, O’Byrne JM. Effects of preoperative neuromuscular electrical stimulation on quadriceps strength and

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Suppliers

a. Lafayette Instrument, Lafayette, IN
b. Nintendo, Kyoto, Japan
c. Labview 8.5 National Instruments, Austin, TX, USA

Figure Legend

Figure 1. Nomogram of multivariable prediction model for fear induced activity limitation (FIAL) one year post total knee arthroplasty (TKA). To determine probabilities, draw a vertical line from each predictor to the top line, labeled “Points,” to calculate points associated with each predictor. The sum of these points is then marked on the line labeled “Total Points.” Drop vertical lines from there to determine the probabilities of FIAL.

Figure 2. Calibration plot to compare the agreement between observed proportion of fear induced activity limitation (FIAL) and predicted probabilities of FIAL based on the prediction model. The distribution of predicted FIAL probabilities is shown at the bottom of the graph. The triangles (with their 95% confidence interval) indicate the observed frequencies by quarters of predicted probability.
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Figure 2. Calibration plot to compare the agreement between observed proportion of fear induced activity limitation (FIAL) and predicted probabilities of FIAL based on the prediction model. The distribution of predicted FIAL probabilities is shown at the bottom of the graph. The triangles (with their 95% confidence interval) indicate the observed frequencies by quarters of predicted probability.
Table 1. Univariable Analysis of Potential Preoperative Predictors for Fear Induced Activity Limitation

<table>
<thead>
<tr>
<th>Potential Predictor</th>
<th>Overall (n = 72)</th>
<th>No FIAL (n = 41)</th>
<th>FIAL* (n =31)</th>
<th>P-value‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment assignment, Control group</td>
<td>35 (49)</td>
<td>22 (54)</td>
<td>13 (42)</td>
<td>0.24</td>
</tr>
<tr>
<td>Age, mean ± SD</td>
<td>70 ± 6.2</td>
<td>69 ± 6.6</td>
<td>70 ± 5.6</td>
<td>0.48</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>55 (76)</td>
<td>26 (71)</td>
<td>29 (84)</td>
<td>0.20</td>
</tr>
<tr>
<td>BMI, kg/m², mean ± SD</td>
<td>26.3 ± 4.4</td>
<td>26.2 ± 4.6</td>
<td>26.5 ± 4.2</td>
<td>0.81</td>
</tr>
<tr>
<td>Comorbidities, n (%)</td>
<td></td>
<td></td>
<td></td>
<td>0.37</td>
</tr>
<tr>
<td>0 condition</td>
<td>15 (21)</td>
<td>9 (22)</td>
<td>6 (19)</td>
<td></td>
</tr>
<tr>
<td>1 condition</td>
<td>31 (43)</td>
<td>19 (46)</td>
<td>12 (39)</td>
<td></td>
</tr>
<tr>
<td>≥ 2 conditions</td>
<td>26 (36)</td>
<td>13 (32)</td>
<td>13 (42)</td>
<td></td>
</tr>
<tr>
<td>SF-36 scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical function, mean ± SD</td>
<td>41.3 ± 20</td>
<td>44.9 ± 19</td>
<td>36.5 ± 22</td>
<td>0.08</td>
</tr>
<tr>
<td>Bodily pain, mean ± SD</td>
<td>55.7 ± 23</td>
<td>56.4 ± 19</td>
<td>54.7 ± 22</td>
<td>0.75</td>
</tr>
<tr>
<td>Falls in the past year, n (%)</td>
<td>15 (20)</td>
<td>6 (15)</td>
<td>9 (29)</td>
<td>0.14</td>
</tr>
<tr>
<td>Habitual gait speed, m/s, mean ± SD</td>
<td>0.77 ± 0.23</td>
<td>0.85 ± 0.21</td>
<td>0.66 ± 0.22</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Knee Range of Motion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee flexion, °</td>
<td>113.5 ± 13.5</td>
<td>112.0 ± 13.0</td>
<td>114.5 ± 14.4</td>
<td>0.44</td>
</tr>
<tr>
<td>Knee extension, °</td>
<td>9.9 ± 7.8</td>
<td>11.3 ± 6.2</td>
<td>7.9 ± 9.3</td>
<td>0.49</td>
</tr>
<tr>
<td>Standing CoP measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML-Range, cm</td>
<td>1.61 ± 0.68</td>
<td>1.52 ± 0.70</td>
<td>1.74 ± 0.65</td>
<td>0.18</td>
</tr>
<tr>
<td>ML-Velocity, cm/s</td>
<td>0.74 ± 0.18</td>
<td>0.71 ± 0.16</td>
<td>0.77 ± 0.19</td>
<td>0.18</td>
</tr>
<tr>
<td>AP-Range, cm</td>
<td>2.48 ± 0.72</td>
<td>2.35 ± 0.66</td>
<td>2.66 ± 0.76</td>
<td>0.07</td>
</tr>
<tr>
<td>AP-Velocity, cm/s</td>
<td>1.10 ± 0.38</td>
<td>0.99 ± 0.29</td>
<td>1.25 ± 0.44</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Notes: FIAL = fear induced activity limitation; SD = standard deviation; CoP = center of pressure; ML = mediolateral; AP = anteroposterior; BMI = body mass index
* Comprised patients with 1 or more activities limited, as indexed by the SAFFE questionnaire.
‡ p-values were based on univariate logistic regression predicting fear induced activity limitation.
§ SF-36 physical function and bodily pain subscales range from 0–100, with higher scores representing better physical function and lesser pain, respectively.