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journal or publication title	Disability and rehabilitation
volume	39
number	1
page range	50-58
year	2017
権利	This is an Accepted Manuscript of an article published by Taylor & Francis in Disability and Rehabilitation on 2017 , available online: http://www.tandfonline.com/10.3109/09638288.2016.1138555 .
URL	http://hdl.handle.net/2241/00144963

doi: 10.3109/09638288.2016.1138555

RESEARCH PAPER

Cross-cultural adaptation, reliability, and validity of the Japanese version of the Cumberland ankle instability tool

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Key words: CAIT; cross-cultural adaptation; Japanese version, reliability and validity

ABSTRACT

Purpose To study validity and reliability of a Japanese version of the Cumberland Ankle Instability Tool and to determine the optimal cut-off score.

Methods In this study, the questionnaire was cross-culturally adapted into Japanese. The psychometric properties tested in the Japanese version of the CAIT were measured for criteria validity, internal consistency and test–retest reliability in 111 collegiate soccer athletes. We also established the questionnaire cut-off score for discriminating between individuals with and without CAI.

Results There was a significant correlation between the Japanese version of the CAIT and the Karlsson score ($r = 0.604, p < 0.001$). The questionnaire had a high internal consistency (Cronbach's $\alpha = 0.833$) and reliability [intraclass correlation coefficient (ICC) = 0.826, 95% confidence interval (CI): 0.732–0.888]. The optimal cut-off score was ≤ 25 , which was consistent with previous reports.

Conclusions The Japanese version of the CAIT has been shown to be a valid and reliable questionnaire for determining the presence of CAI. We expect that researchers and clinicians will use the Japanese version of the CAIT in Japan.

Implications for Rehabilitation

- Chronic Ankle Instability (CAI), which not only increases recurrence rate of ankle sprain but also decreases athletic performance, is a residual symptom after ankle sprain.
- Cumberland Ankle Instability Tool, which has the reliability and validity to assess CAI,

will be critically useful in assessment procedure for CAI.

- It is preferable for clinicians and researchers to use the native language version of the CAIT.

Introduction

Ankle sprain is one of the most common injuries in sports activities. The incidence and recurrence rate of ankle sprain is high in team sports such as soccer. [1,2] As many as 73% of all athletes have recurrent ankle sprain and 59% of these athletes have significant disability and residual symptoms impairing their athletic performance. [3] Approximately 20–30% of athletes with acute ankle sprains develop mechanical ankle instability (MAI) and/or functional ankle instability (FAI), resulting in residual symptoms called chronic ankle instability (CAI). [4,5] Athletes with FAI show impairment on jump performance that demands a change of direction, such as a side hop and figure-8 hop. [6] The impairment in this athletic performance result from eversion muscle weakness, diminished proprioception [7] and impaired postural control. [8] These impairments are associated with a significantly increased risk of ankle sprain. [9] On the other hand, athletes with MAI have mechanical insufficiencies, including pathological laxity, and impaired arthrokinematics. They have the potential of synovial and degenerative changes. [10] However, FAI and MAI are present in CAI, and both are not completely independent and should be assessed together. [11] Pathologic laxity is assessed clinically by physical examination such as a manual test and stress radiography. [12] Examination of stress using MRI also has advantages in the assessment of mechanical instability. [13] Quantitative and visible evaluation with diagnostic imaging permits measurement of the severity of MAI. However, functional instability has been difficult to quantitatively measure. In Japan, the Karlsson score [14] and the Japanese Society for Surgery of the Foot standard rating system [15,16] have been used to subjectively assess FAI or CAI. [17] Although another questionnaires to assess CAI are used

in many studies, [17] these questionnaires have not been translated into Japanese. The inconsistency in participant selection criteria across studies presents a potential obstacle to collectively assess CAI. Thus, standards for participant selection criteria are required.

Hiller et al. [18] developed the Cumberland Ankle Instability Tool (CAIT; Appendix 1), which is a reliable and valid questionnaire for identifying patients with FAI. The CAIT is a 9-item questionnaire that is designed to evaluate several aspects of FAI. The total score of the 9 items ranges from 0 (severe instability) to 30 (normal stability). The International Ankle Consortium recommends that self-reported ankle instability should be confirmed using valid and reliable questionnaires such as the CAIT. [19] Hence the CAIT will be used in various countries because it has already been translated into Portuguese [20] and Spanish. [21] However, the CAIT has some problems that include the use of various independently selected cutoff scores (i.e. ≤ 23 , ≤ 24 , ≤ 25 and ≤ 27) [18, 22–24] to determine CAI. In addition, the questionnaire was developed in English, thereby limiting its applicability to English speakers. There are several populations that do not speak English and are consequently unable to use the English CAIT. In the case of that clinicians and researchers assess a patient for CAI in this fields, it is reliable and valid that they use a native language questionnaire and standard criteria for CAIT cutoff score. In Japan, some researchers [25,26] have used a questionnaire that was written in English to identify participants with CAI. However, the questionnaire has not been shown to be valid and reliable. Therefore, the purpose of this study was to develop a Japanese version of the CAIT and to determine the cutoff score.

Materials and methods

Adaptation procedures

Translation of the English CAIT into Japanese was performed using the guidelines for the process of cross-cultural adaptation of self-reports measures [27] as a reference. Two bilingual experts were Japanese, one who was a medical doctor and the other who was a NATA-certified athletic trainer, each translated the English CAIT into Japanese. Differences in the translation were discussed and a consensus was reached. Back-translation was conducted by another bilingual translator who was blinded to the original English CAIT. Differences in the two versions were discussed and a consensus was reached. Finally, some modifications were made to correct cultural differences and to preserve equivalence with the English version of the CAIT. For example, the term “on the ball of my foot” was translated as “on the tip of their toes”, which means generally “on the fore fleshy part of my foot” in Japanese. In addition, the term “hopping” was translated into Japanese as “jumping on one leg”. The Japanese version of the CAIT is presented in Appendix 2.

Participants

A total of 111 native Japanese speakers were recruited from a university men’s soccer club and the following those male soccer players were included in this study: CAI group (61 participants with CAI) and Control group (50 control participants). The inclusion criteria for the CAI group included a history of at least two severe ankle sprains and reported episodes of a feeling of ankle instability and/or “giving way”

and/or chronic pain in the ankle during daily life or sports activity. These inclusion criteria were determined on the basis of previous studies. [28,29] The Control group had none of the above ankle issues. The exclusion criteria were based on previous studies [19,30] and included the following: (a) a history of previous surgery of musculoskeletal structures and fracture requiring realignment of either limb of the lower extremity, (b) acute injury to the musculoskeletal structures of the other lower extremity joints in the previous 3 months, which impacted joint integrity and function, resulting in at least one day of interrupted desired physical activity, and (c) performing balance training on a routine basis. In case of the participants had bilateral CAI, the self-reported more unstable ankle were included in the CAI group. The Japanese version of the CAIT and the Karlsson score were not used as inclusion criteria for any group. Participant demographics are described in Table 1. To assess reliability, 41 of the 111 participants included in the retest group (Table 2), which corresponded to 82 feet (Table 2), answered about both legs and completed a retest of the Japanese version of the CAIT 3 weeks after the initial test. The individuals in the retest group had not injured themselves in the previous 3 weeks.

This study was approved by the University of Tsukuba's Comprehensive Human Sciences Ethical Committee. All subjects provided written or oral consent to participate in the study after being provided with an explanation of the study's intent and methods (No.26-75).

Psychometric properties and discriminative ability

To assess for validity and reliability three psychometric properties of the Japanese version of the CAIT

were analysed: criterion-related validity, internal consistency, and test-retest reliability. Validity was assessed by criterion-related validity whether the Japanese version of the CAIT correlated with a related questionnaire for CAI. Reliability divided into consistency and repeatability was assessed by internal consistency and test-retest reliability, respectively. Discriminative ability was assessed to determine whether the Japanese version of the CAIT could distinguish between subjects with and without CAI.

Criterion-related validity. The criterion-related validity of the Japanese version of the CAIT was assessed using the Karlsson score. Both questionnaires were administered to both groups. The Karlsson score as an external criterion was written in comparatively simple English and designed to evaluate the ankle joint stability and function. The Karlsson score is an 8-item questionnaire and the total score of the 8 items ranges from 0 to 100. A score of ≥ 80 points is classified as an acceptable (excellent or good) result, whereas a score of < 79 points is classified as an unacceptable (fair or poor) result. [14] The scoring scale is a useful aid to assess ankle joint function in a standardized manner. Therefore, the questionnaire has been used to evaluate FAI in some studies targeted towards Japanese people. [26,31]

Internal consistency. The Internal consistency of the Japanese version of the CAIT was assessed using Cronbach's α coefficient. [32] A questionnaire is considered internally consistent if the item are at least moderately correlated with each other and each item is correlated with the total score ($\alpha = 0.75-0.95$). [32] In the retest group the Japanese version of the CAIT score of the first test was used for this analysis.

Test–retest reliability. To determine test–retest reliability, the Japanese version of the CAIT was administered to a retest group of 41 participants, which corresponded to 82 feet, 3 weeks after the initial test. Test–retest reliability was assessed using the intraclass correlation coefficient (ICC_{2,1}). For this analysis, we used scores obtained in the first and second tests for patients in the retest group who completed the Japanese version of the CAIT.

Discriminative ability. Discriminative ability was tested to determine whether the Japanese version of the CAIT could distinguish between subjects with and without CAI. A receiver operating characteristic (ROC) curve [33] was constructed to confirm the cutoff point of the Japanese version of the CAIT. The cutoff point was determined using the Youden index. [34] For this analysis, we used scores obtained in the first test for all participants who completed the Japanese version of the CAIT and data with or without CAI defined in this study.

Statistics

All analyses were conducted using SPSS version 21 (Chicago, IL). Paired *t*-tests were used to compare participants' demographics between groups.

Criterion-related validity. Criterion-related validity was assessed using Spearman's correlation coefficient between the Karlsson score and the Japanese version of the CAIT. The Spearman's correlation coefficient were as follows: poor, <0; slight, 0.00–0.20; fair, 0.21–0.40; moderate, 0.41–0.60; substantial, 0.61–0.80 and almost perfect, >0.81. [35]

Internal consistency. Internal consistency was assessed using Cronbach's α coefficient. A positive rating for internal consistency was considered when factor analysis was applied and Cronbach's α coefficient was between 0.70 and 0.95. [32]

Test-retest reliability. Test-retest reliability was assessed using the intraclass correlation coefficient (ICC_{2,1}) as reference previous study. [20] The ICC_{2,1} scores were as follows: poor, <0; slight, 0.00–0.20; fair, 0.21–0.40; moderate, 0.41–0.60; substantial, 0.61–0.80 and almost perfect, >0.81. [35]

Discriminative ability. An ROC curve was constructed with the “Japanese version of the CAIT” as a dependent variable and “group member” (CAI group or Control group) as the independent variable. To identify a significant ROC curve, the area under the curve (AUC) was calculated using a one-tailed test. After calculating the diagnostic sensitivity and specificity for each potential cutoff score, the ideal cutoff point was determined using the maximum Youden index, which was calculated as follows: sensitivity + specificity – 1.

Each cutoff score was evaluated using the positive likelihood (LR+) [sensitivity/(1 – specificity)] and the negative likelihood (LR–) [(1 – sensitivity)/specificity].

Statistical significance was set at <5%.

Results

There were no significant differences in demographic characteristics between the CAI and Control groups.

The demographic characteristics are presented in Table 1.

Criterion-related validity

Criterion-related validity was assessed using Spearman's correlation coefficient. There was a moderate correlation between the Japanese version of the CAIT and the Karlsson score ($r = 0.604, p < 0.001$; Figure 1).

Internal consistency

Cronbach's α coefficient for the Japanese version of the CAIT score showed a high internal consistency (0.833). Cronbach's α coefficient if each item was deleted and each correlation coefficient between the score of each item and total scores except the each item were shown in Table 3. In the item analysis, no improvement was observed each time a particular item was deleted from the scale, except for item 9, which showed a slight increase when it was omitted (Table 3).

Test-retest reliability

In the retest group, the mean first and second test scores of the Japanese version of the CAIT were 27.38 SD 3.10 and 27.93 SD 3.29, respectively. The Japanese version of the CAIT had almost perfect reliability [$ICC_{2,1} = 0.826$; 95% confidence interval (CI): 0.732–0.888, $p < 0.001$].

Discriminative ability

The mean scores of the Japanese version of the CAIT for the CAI group ($n = 61$) and Control group ($n = 51$) were 22.56 SD 4.89 and 28.42 SD 1.65, respectively (Table 1). The ROC curve showed that the Japanese version of the CAIT score significantly discriminated between the groups ($AUC = 0.932, p < 0.001$). The ROC curve is shown in Figure 2. The maximum Youden index (0.685) indicated that the

Japanese version of the CAIT score of 25 was the cutoff point to distinguish between the groups. High sensitivity (0.705) and specificity (0.980) were calculated at the cutoff point. The LR+ and LR- values were 35.35 and 0.30, respectively (Table 4).

Discussion

The CAIT was developed in English, thereby limiting its applicability to English speaking populations; non-English speakers are unable to use the English CAIT. Previous research in Japan has shown that some questionnaires written in English were used to assess CAI. However, the participants were Japanese speakers rather than English speakers. Few tools are available to assess CAI in Japanese speakers.

Therefore, our goal was to translate the CAIT into Japanese and to assess the questionnaire's validity, reliability and discriminative ability. Translation was performed using a guideline, and some changes were made and some terms were added. Compared with the English CAIT, no significant differences were observed in the psychometric property of the translated CAIT. Therefore, it was shown that the Japanese version of the CAIT was a reliable and valid questionnaire.

Criterion-related validity was assessed between the Karlsson score and the Japanese version of the CAIT using Spearman's correlation coefficient. The questionnaire had a moderate correlation with the Karlsson score. A previous study has shown that there is a high correlation between the CAIT and subject's overall perception of ankle instability. [18] The Karlsson score is also an assessment tool for ankle joint function, and thus, there is a correlation with the Japanese version of the CAIT.

Cronbach's α coefficient of the Japanese version of the CAIT was 0.833. A coefficient value from 0.70 to 0.95 represents very good internal consistency. [32] The coefficient of the English CAIT is 0.83 [18] and that of the Brazilian Portuguese version is 0.86–0.88, [20] which is approximately equal to that obtained in this study. To determine the influence of each item on Cronbach's α coefficient, we systematically excluded each item from the Japanese version of the CAIT. The coefficient was slightly increased when item 9 was deleted, but no improvement was observed for the rest of the items. In the Spanish version of the CAIT, Cronbach's α coefficient was slightly increased when items 5 and 6 were deleted, because items 5 and 6 refer to unusual activity such as feeling unstable when standing on one leg or hopping from side to side. [21] In contrast, no individual items were inserted into the instrument in the Brazilian Portuguese version of the CAIT. [20] In our study, no improvement was observed when each of items 5 and 6 were deleted, which may be because all participants were collegiate soccer athletes who performed these movements, such as standing on one leg and hopping from side to side, on a daily basis. Moreover, deleting item 9 slightly increased Cronbach's α coefficient because item 9, which is strongly influenced by memory, might be weakly relevant in case of present ankle stability.

Test–retest reliability of the Japanese version of the CAIT was assessed using ICC_{2,1} with the initial and follow-up score in the retest group. The ICC_{2,1} value was 0.826 with a 95% CI of 0.732–0.888 ($p < 0.001$). The value was classified as 'almost perfect' according to Landis's classification, but slightly inferior to the value of the English version (0.96), [18] Brazilian Portuguese version (0.95) [20] and Spanish version (0.979) [21] of the CAIT. In these studies, the interval of the tests was 1 or 2 weeks; in

contrast, the present study was longer than these intervals. On testing repeatability, the subject's memory influences the second test, particularly when the term is short; however, a long term may alter the state of the subject's memory. Thus, the reliability of the Japanese version of the CAIT is slightly inferior to that of the other versions.

The discriminative ability and cut-off score of the Japanese version of the CAIT was determined by describing the ROC curve (AUC = 0.932) and calculating the Youden Index (maximum index: 0.685) at a score of 25.5. The sensitivity (0.705), specificity (0.98), LR+ (35.35) and LR- (0.30) were calculated at this cut-off score. Hiller et al. (2006) showed that for the English CAIT, a score of ≤ 27 was the cut-off to distinguish between participants with and without a history of ankle sprain. However, to distinguish between CAI and uninjured groups, Wright et al. [24] recalibrated the ideal cut-off score to ≤ 25 , which was the same as the score of the Japanese version. The high sensitivity (0.951) and specificity (1.000), LR+ (not applicable) and LR- (0.049) of the English CAIT were calculated at a score of 25.5. LR+ was not calculated at this score, and the next nearest cut-off value resulted in an LR+ of 27.171. The clinimetric properties are described in Table 5. LR+ of the Japanese version of the CAIT was slightly higher than that of the English CAIT. Therefore, the questionnaire may more accurately select patients with CAI. However, LR- was 0.30, which is an inadequate score to identify patients without CAI. Although the Japanese version of the CAIT score of ≤ 25 has some differences from English version, this is the optimal cut-off to distinguish between patients with and without CAI.

Study limitations

The present study has some limitations. First, MAI of the participants was not assessed using an objective assessment of structures, such as stress X-ray. MAI influences the unstable feeling with and without FAI, and thus, the CAIT score may be affected by the presence and absence of MAI. Moreover, copers [36] who have a history of ankle sprain but no ongoing instability were not classified in this study. Wright et al. [24] showed that the ideal CAIT cutoff score was slightly lower when copers were divided into those with CAI and those who were uninjured, compared with when they were not divided. Similarly, the score of the Japanese version may change when copers are separated from those with other ankle statuses. Although FAI and MAI were not completely independent, MAI and copers should be separated from CAI in future research. These approaches may more rigorously identify the severity of ankle instability.

Conclusions

The Japanese version of the CAIT is a valid and reliable questionnaire for assessing CAI. The ideal cutoff score to assess the presence or absence of CAI is 25. In addition, the questionnaire can be easily applied and can immediately and correctly provide clinicians and researchers with the patient's ankle status. In Japan, it is preferable for clinicians and researchers to use the Japanese version of the CAIT and a cutoff score of 25 when assessing patients for CAI.

Acknowledgements

The authors wish to express their gratitude to Dr. Claire Hiller for her permission and advice in this study

and every collegiate soccer athletes who kindly agreed to tale part in this research.

Declaration of Interest

The authors report no declaration of interest.

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Appendix Legends

Appendix 1. The CAIT Questionnaire

Appendix 2. The Japanese version of the CAIT

Table Legends

Table 1. Participant characteristics

Table 2. Retest group characteristics

Table 3. Internal consistency

Table 4. Inspection capability at each potential CAIT cutoff

Table 5. Comparison of CAIT clinimetric properties between studies

Figure Legends

Figure 1. Relationship between the Japanese version of the CAIT score and the Karlsson score ($r = 0.604$,

$*p < 0.001$). Each point represents an individual subject ($n = 111$).

Figure 2. ROC curve for the Japanese version of the CAIT score. The curve represents the ROC curve, and

the diagonal line represents the reference line for the significant ROC curve. *Cutoff value with the highest

Youden index.

Table 1. Participant characteristics

	CAI group (<i>n</i> = 61)		Control group (<i>n</i> = 50)		<i>p</i> -Value
	Mean	SD	Mean	SD	
Age (ys)	19 ±		19 ±		0.687
Height (cm)	172.66	4.97	173.63	5.39	0.326
Weight (kg)	66.06	4.93	67.04	6.25	0.360
Body fat (%)	11.42	1.86	11.21	2.09	0.572
CAIT score	22.56	4.89	28.56	1.65	0.000*

There is significant difference between two groups (**p* < 0.05)

Table 2. Retest group characteristics

	Retest group (<i>n</i> = 41)	
	Mean	SD
Age (ys)	18 ±	
Height (cm)	171.02	4.73
Weight (kg)	64.45	5.81
Body fat (%)	10.39	2.03

Table 3. Internal consistency

	Corrected Item: total correlation	Cronbach's α if item was deleted
Item 1	0.629	0.805
Item 2	0.760	0.796
Item 3	0.761	0.797
Item 4	0.605	0.816
Item 5	0.502	0.825
Item 6	0.469	0.825
Item 7	0.715	0.797
Item 8	0.488	0.823
Item 9	0.357	0.859

No improvement was observed every time that one item was deleted from the scale, except for item 9

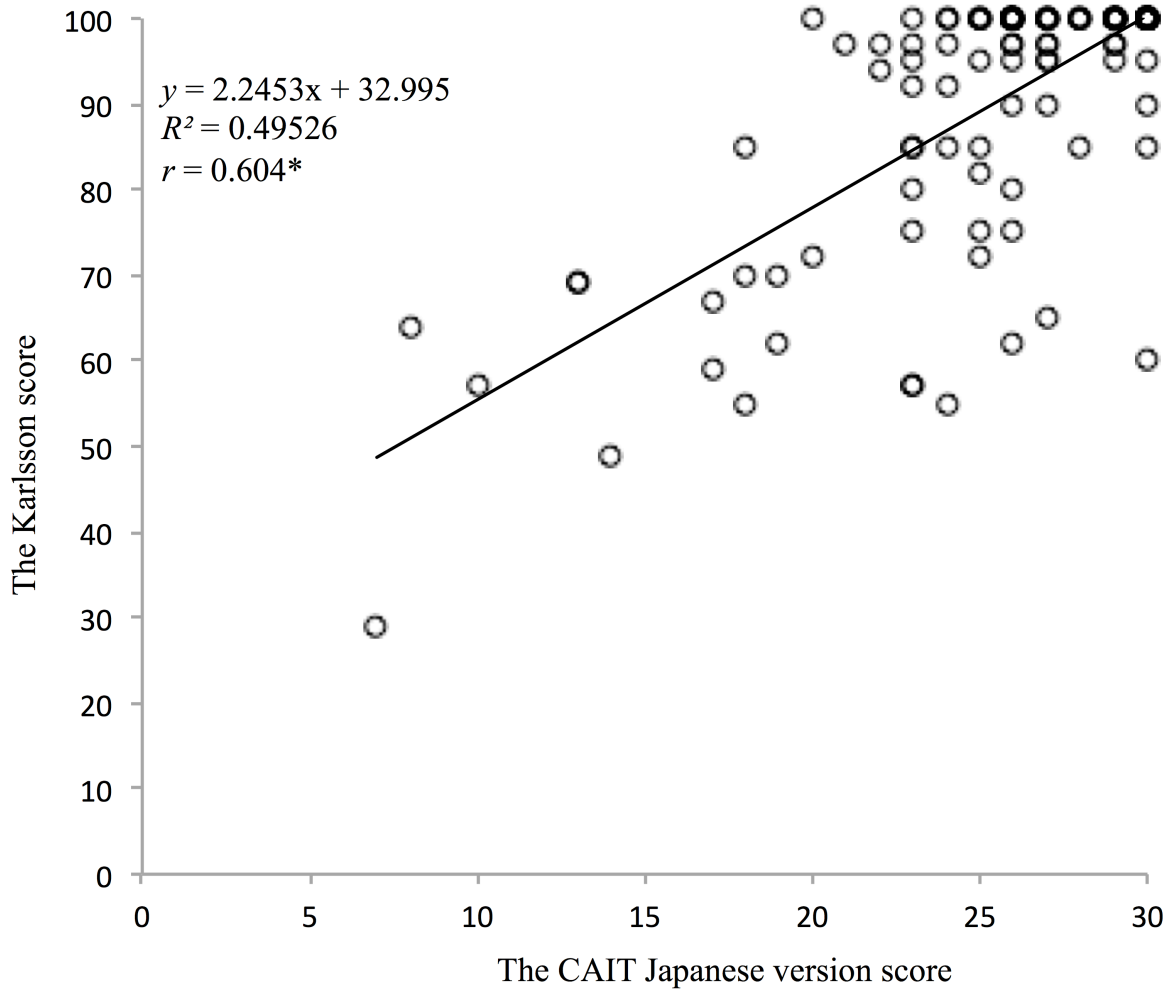
Table 4. Inspection capability at each potential CAIT cut-off

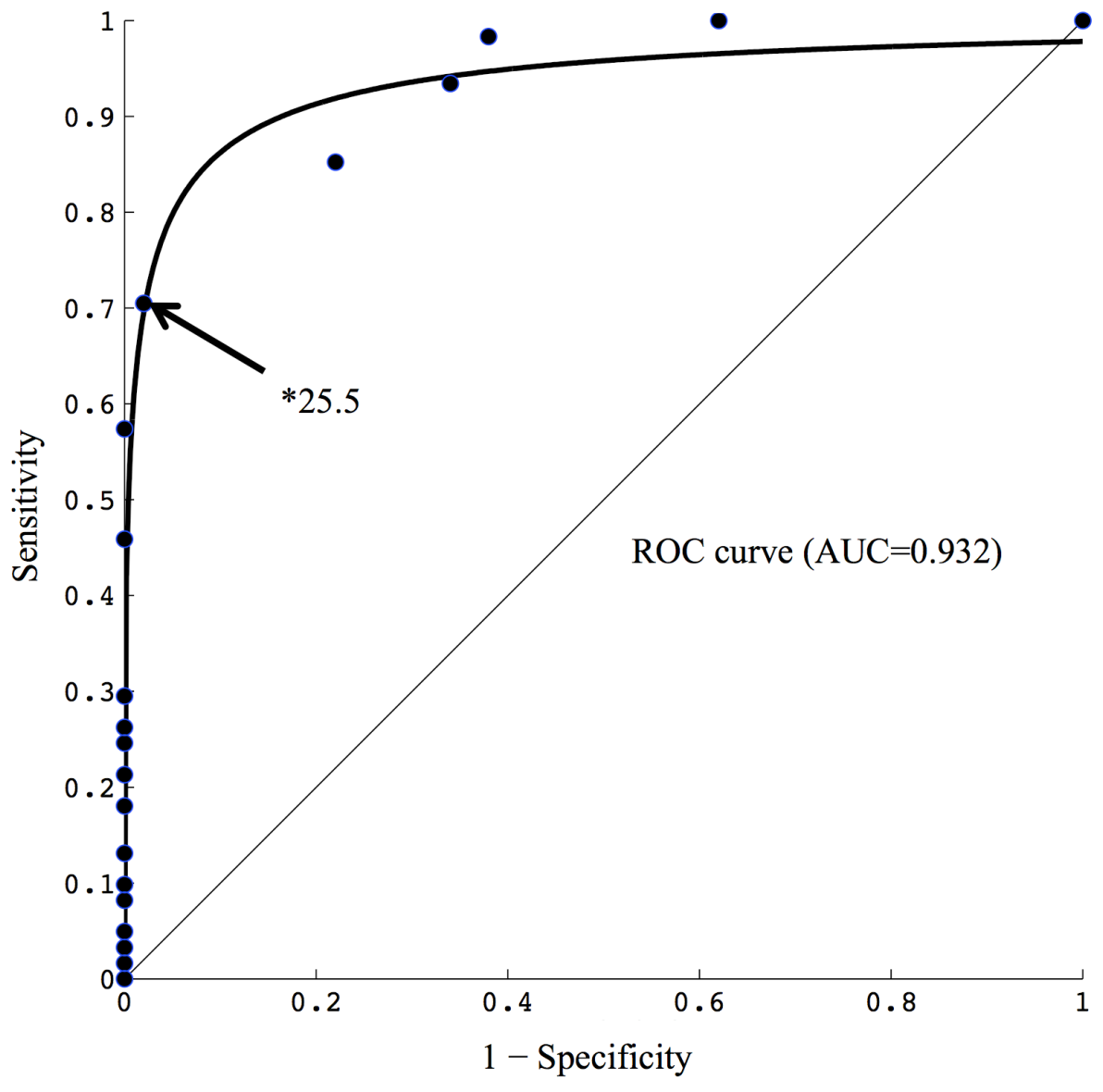
CAIT	Sn	1 – Sp	Sp	Youden Index	LR+	LR–
6.0	0.000	0.000	1.000	0.000	NA	1.000
7.5	0.016	0.000	1.000	0.016	NA	0.984
9.0	0.033	0.000	1.000	0.033	NA	0.967
11.5	0.049	0.000	1.000	0.049	NA	0.951
13.5	0.082	0.000	1.000	0.082	NA	0.918
15.5	0.098	0.000	1.000	0.098	NA	0.902
17.5	0.131	0.000	1.000	0.131	NA	0.869
18.5	0.213	0.000	1.000	0.180	NA	0.820
19.5	0.180	0.000	1.000	0.213	NA	0.787
20.5	0.246	0.000	1.000	0.246	NA	0.754
21.5	0.262	0.000	1.000	0.262	NA	0.738
22.5	0.295	0.000	1.000	0.295	NA	0.705
23.5	0.459	0.000	1.000	0.459	NA	0.541
24.5	0.574	0.000	1.000	0.574	NA	0.426
25.5	0.705	0.020	0.980	0.685	35.25	0.301
26.5	0.852	0.220	0.780	0.632	3.872	0.189
27.5	0.934	0.340	0.660	0.594	2.747	0.100
28.5	0.984	0.380	0.340	0.604	2.589	0.025
29.5	1.000	0.620	0.380	0.380	1.612	0.000
31.0	1.000	1.000	0.000	0.000	1.000	NA

Abbreviations: NA; not applicable, Sn; sensitivity, Sp; specificity, LR+; positive likelihood, LR–; negative likelihood

Table 5. Comparison of CAIT clinimetric properties between studies

Test Characteristic	Hiller et al (cutoff \leq 27)	Wright et al (cutoff \leq 25)	Japanese version (cutoff \leq 25)
Sensitivity	0.860	0.951	0.705
Specificity	0.830	1.000	0.980
LR +	4.890	27.171	35.35
LR–	0.180	0.051	0.30





APPENDIX 1: THE CAIT QUESTIONNAIRE

Please tick the ONE statement in EACH question that BEST describes your ankles.

	LEFT	RIGHT	Score
1. I have pain in my ankle			
Never	<input type="checkbox"/>	<input type="checkbox"/>	5
During sport	<input type="checkbox"/>	<input type="checkbox"/>	4
Running on uneven surfaces	<input type="checkbox"/>	<input type="checkbox"/>	3
Running on level surfaces	<input type="checkbox"/>	<input type="checkbox"/>	2
Walking on uneven surfaces	<input type="checkbox"/>	<input type="checkbox"/>	1
Walking on level surfaces	<input type="checkbox"/>	<input type="checkbox"/>	0
2. My ankle feels UNSTABLE			
Never	<input type="checkbox"/>	<input type="checkbox"/>	4
Sometimes during sport (not every time)	<input type="checkbox"/>	<input type="checkbox"/>	3
Frequently during sport (every time)	<input type="checkbox"/>	<input type="checkbox"/>	2
Sometimes during daily activity	<input type="checkbox"/>	<input type="checkbox"/>	1
Frequently during daily activity	<input type="checkbox"/>	<input type="checkbox"/>	0
3. When I make SHARP turns, my ankle feels UNSTABLE			
Never	<input type="checkbox"/>	<input type="checkbox"/>	3
Sometimes when running	<input type="checkbox"/>	<input type="checkbox"/>	2
Often when running	<input type="checkbox"/>	<input type="checkbox"/>	1
When walking	<input type="checkbox"/>	<input type="checkbox"/>	0
4. When going down the stairs, my ankle feels UNSTABLE			
Never	<input type="checkbox"/>	<input type="checkbox"/>	3
If I go fast	<input type="checkbox"/>	<input type="checkbox"/>	2
Occasionally	<input type="checkbox"/>	<input type="checkbox"/>	1
Always	<input type="checkbox"/>	<input type="checkbox"/>	0
5. My ankle feels UNSTABLE when standing on ONE leg			
Never	<input type="checkbox"/>	<input type="checkbox"/>	2
On the ball of my foot	<input type="checkbox"/>	<input type="checkbox"/>	1
With my foot flat	<input type="checkbox"/>	<input type="checkbox"/>	0
6. My ankle feels UNSTABLE when			
Never	<input type="checkbox"/>	<input type="checkbox"/>	3
I hop from side to side	<input type="checkbox"/>	<input type="checkbox"/>	2
I hop on the spot	<input type="checkbox"/>	<input type="checkbox"/>	1
When I jump	<input type="checkbox"/>	<input type="checkbox"/>	0
7. My ankle feels UNSTABLE when			
Never	<input type="checkbox"/>	<input type="checkbox"/>	4
I run on uneven surfaces	<input type="checkbox"/>	<input type="checkbox"/>	3
I jog on uneven surfaces	<input type="checkbox"/>	<input type="checkbox"/>	2
I walk on uneven surfaces	<input type="checkbox"/>	<input type="checkbox"/>	1
I walk on a flat surface	<input type="checkbox"/>	<input type="checkbox"/>	0
8. TYPICALLY, when I start to roll over (or "twist") on my ankle, I can stop it			
Immediately	<input type="checkbox"/>	<input type="checkbox"/>	3
Often	<input type="checkbox"/>	<input type="checkbox"/>	2
Sometimes	<input type="checkbox"/>	<input type="checkbox"/>	1
Never	<input type="checkbox"/>	<input type="checkbox"/>	0
I have never rolled over on my ankle	<input type="checkbox"/>	<input type="checkbox"/>	3
9. After a TYPICAL incident of my ankle rolling over, my ankle returns to "normal"			
Almost immediately	<input type="checkbox"/>	<input type="checkbox"/>	3
Less than one day	<input type="checkbox"/>	<input type="checkbox"/>	2
1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	1
More than 2 days	<input type="checkbox"/>	<input type="checkbox"/>	0
I have never rolled over on my ankle	<input type="checkbox"/>	<input type="checkbox"/>	3

NOTE. The scoring scale is on the right. The scoring system is not visible on the subject's version.

Appendix 2. The Japanese version of the CAIT.

各質問に対し、あなたの足関節に関して最も当てはまるもの1つに☐を付けて下さい。

	左足	右足	点数
1.以下の状況で足関節に痛みがでますか？			
まったくでない	<input type="checkbox"/>	<input type="checkbox"/>	5
スポーツ中	<input type="checkbox"/>	<input type="checkbox"/>	4
凸凹な地面でのランニング中	<input type="checkbox"/>	<input type="checkbox"/>	3
平らな地面でのランニング中	<input type="checkbox"/>	<input type="checkbox"/>	2
凸凹な地面での歩行中	<input type="checkbox"/>	<input type="checkbox"/>	1
平らな地面での歩行中	<input type="checkbox"/>	<input type="checkbox"/>	0
2.以下の状況で足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	4
スポーツ中に時々(毎回ではない)	<input type="checkbox"/>	<input type="checkbox"/>	3
スポーツ中に頻繁に(毎回)	<input type="checkbox"/>	<input type="checkbox"/>	2
日常生活に時々	<input type="checkbox"/>	<input type="checkbox"/>	1
日常生活に頻繁に	<input type="checkbox"/>	<input type="checkbox"/>	0
3.以下の状況で急なターンをした時に足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	3
ランニング中に急なターンをした時に時々	<input type="checkbox"/>	<input type="checkbox"/>	2
ランニング中に急なターンをした時に度々	<input type="checkbox"/>	<input type="checkbox"/>	1
歩行中に急なターンをした時	<input type="checkbox"/>	<input type="checkbox"/>	0
4.以下の状況で階段を降りる時に足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	3
急いだ場合	<input type="checkbox"/>	<input type="checkbox"/>	2
たまに	<input type="checkbox"/>	<input type="checkbox"/>	1
いつも	<input type="checkbox"/>	<input type="checkbox"/>	0
5.以下の状態で片足立ちをした時に足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	2
つま先立ちをした場合	<input type="checkbox"/>	<input type="checkbox"/>	1
足裏を床にしっかりとつけた場合	<input type="checkbox"/>	<input type="checkbox"/>	0
6.以下の状況で足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	3
片足で左右に数回飛び跳ねた時	<input type="checkbox"/>	<input type="checkbox"/>	2
片足でその場で数回飛び跳ねた時	<input type="checkbox"/>	<input type="checkbox"/>	1
片足で高く1回ジャンプ着地した時	<input type="checkbox"/>	<input type="checkbox"/>	0
7.以下の状況で足関節に不安定感がありますか？			
まったくない	<input type="checkbox"/>	<input type="checkbox"/>	4
凸凹した地面での走行時	<input type="checkbox"/>	<input type="checkbox"/>	3
凸凹した地面でのジョギング時	<input type="checkbox"/>	<input type="checkbox"/>	2
凸凹した地面での歩行時	<input type="checkbox"/>	<input type="checkbox"/>	1
平らな地面での歩行時	<input type="checkbox"/>	<input type="checkbox"/>	0
8.通常、足関節を捻りそうになった時、それを止められますか？			
すぐに止められる	<input type="checkbox"/>	<input type="checkbox"/>	3
たいていは止められる	<input type="checkbox"/>	<input type="checkbox"/>	2
たまに止められる	<input type="checkbox"/>	<input type="checkbox"/>	1
止められない	<input type="checkbox"/>	<input type="checkbox"/>	0
足関節を捻ったことがない	<input type="checkbox"/>	<input type="checkbox"/>	3
9.足関節を捻った後、通常の状態に戻るまでどれくらいかかりますか？			
たいていすぐ戻る	<input type="checkbox"/>	<input type="checkbox"/>	3
1日以内	<input type="checkbox"/>	<input type="checkbox"/>	2
1-2日	<input type="checkbox"/>	<input type="checkbox"/>	1
2日以上	<input type="checkbox"/>	<input type="checkbox"/>	0
足関節を捻ったことがない	<input type="checkbox"/>	<input type="checkbox"/>	3

NOTE: The scoring scale is on the right. The scoring system is not visible on the subject's version.