

Validation of a Chinese translation of the identification of functional ankle instability questionnaire

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To the Editor: Ankle sprains account for about 40% of all sports injuries, and 20% to 33% of ankle sprains will cause ankle instability.^[1] Functional ankle instability (FAI) does not yet have an accurate and widely accepted measurable definition, although many surgeons have treated it for years when it is combined with anterior talofibular ligament injury, calcaneofibular ligament injury, or both. In China, some unnecessary ligament-repairing surgeries may be performed just because of imaging evidence of ligament injury and possible (but not sure) FAI, leading to some unsatisfactory results. Several self-reported questionnaires have been developed to help define FAI but no validated Chinese version existed, although China has the highest number of patients with FAI. The International Ankle Consortium has recommended the Ankle Instability Instrument, the Cumberland Ankle Instability Tool, and the Identification of Functional Ankle Instability (IdFAI) questionnaire, which is based on the first two questionnaires, to assess FAI.^[2] The IdFAI has the highest accuracy of the three questionnaires.^[3] The original English version of IdFAI has been translated into many languages, and the Japanese, Korean, Brazilian, and Persian versions have been validated. We developed a Chinese version of the IdFAI (IdFAI-C) and determined its validity by assessing its discriminative validity, internal consistency, accuracy, and test-retest reliability.

We translated the questionnaire according to guidelines for the process of cross-cultural adaptation of self-report measures. First, two independent bilingual translators, one foot-and-ankle surgeon and one English teacher, both native Chinese speakers, separately translated the IdFAI into Chinese and met to resolve any differences. Then, two independent bilingual translators, both native English speakers, translated the initial Chinese version back into English and compared it to the original English version to confirm the translation. Two additional foot-and-ankle surgeons, two other experienced English teachers (native Chinese speakers), and the first four translators met to

create a preliminary version suitable for testing. Finally, 20 Chinese college students completed the preliminary version and were interviewed to determine whether they understood each question correctly. The final version of IdFAI-C is included in the Supplementary Table 1; <http://links.lww.com/CM9/A314>. To validate the questionnaire, college students were recruited through the Internet from March 17 to 29, 2019. The students all volunteered to take part in the research and signed an electronic consent. Because we need enough volunteers with symptoms of instability, we wrote in the recruiting statement that “sports-active volunteers are more welcome.” Exclusion criteria included: (1) Students who had had lower-limb surgeries or lower limb fractures; (2) Students who had had severe leg injuries during the previous 3 months that required more than 1 day of rest after injury. All enrolled students were asked to complete the IdFAI-C within 10 min. One month later, 100 of these students were asked to complete the IdFAI-C a second time, also within 10 min.

As in the development of the original IdFAI, we used the widely accepted “minimal acceptable criteria” for FAI as the discriminative measure: First, an individual must have suffered at least one ankle sprain in the affected limb and second, that individual must describe symptoms or incidences of “giving way” in that same limb.^[4] Students who met the criteria were expected to score higher. The Youden index (sensitivity + specificity – 1) was calculated for each cutoff score to determine the optimal diagnostic score. We also calculated a receiver operating characteristic curve to assess discriminative validity.^[5] Diagnostic accuracy is reported as the percentage of true positive results among all results at the optimal cutoff score. The internal consistency of the IdFAI-C was evaluated with Cronbach’s α . The test-retest reliability was assessed with the intra-class correlation coefficient from scores provided by the same 100 volunteers who completed the questionnaire again after 1 month.

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Table 1: Performance characteristics of the Chinese translation of the identification of functional ankle instability questionnaire.

Cutoff score	Sensitivity	Specificity	Youden index
4	0.97	0.56	0.53
5	0.97	0.62	0.59
6	0.97	0.67	0.64
7	0.94	0.73	0.67
8	0.88	0.78	0.66
9	0.79	0.82	0.61
10	0.67	0.83	0.50

The optimal cutoff point is 7.

Of 358 volunteers from 51 different colleges and 21 different cities across China, 74 were excluded: 20 students had had lower-limb surgeries; 28 students had had lower limb fractures; 50 students had had severe leg injuries during the previous 3 months that required more than 1 day of rest after injury. During review of the collected questionnaires, another 16 invalid ones were excluded because of inconsistent answers in the same questionnaire. The 268 enrolled students (mean age, 25 ± 6 years old; 142 women) were eligible for the study. Of these, 126 exercised more than three times a week and for more than 90 min a week, and 176 had a history of ankle sprain. The Youden index indicated that 7 was the optimal cutoff score for defining FAI [Table 1]. Students with FAI usually scored 8 or above, and those without FAI usually scored 7 or below. The area under the receiver operating characteristic curve for this cutoff score was 0.89 (95% confidence interval, 0.86–0.93), which indicates that the questionnaire can adequately distinguish between students with and without FAI. The optimal cutoff value of 7 was 94% sensitive and 73% specific for FAI. The diagnostic accuracy of the translation was 0.79. Cronbach's α was 0.80, indicating high internal consistency. The corresponding intra-class correlation coefficient was 0.98, indicating high test-retest reliability.

Our Chinese translation has higher sensitivity and lower specificity than the original English version. Moreover, we used a cutoff point of 7, which is obviously lower than that used in other versions. On the one hand, many Chinese people do not like to visit a doctor after sports injury unless severe deformity, disability, or bleeding was seen. They prefer to have a rest at home and use some traditional Chinese patent medicine. So when they answer question 3 (If you have seen an athletic trainer, physician, or healthcare provider, how did he/she categorize your most serious ankle sprain?), most of them will choose "Have not seen someone." As a result, the total IdFAI-C score tend to become lower. Consistently, we found that nearly half of the participants who had had a history of ankle sprain (84/176) had not seen a professional. On the other hand, we believe the differences in the Chinese version might

partially come from difficulties in translation. For example, one of the minimal acceptable criteria for FAI was the idiom, "a feeling of 'giving way' in the same ankle." The problem is that Chinese does not have an adequate expression for the idiom, "giving way," the meaning of which is not apparent from the definitions of the individual words. Although we eventually agreed on a Chinese term "Shi Kong Gan," it may not capture the nuance of "giving way," but we found no better term. Some of the 20 students who were asked to evaluate the translation also felt uncertain about the exact meaning of the Chinese term, but when we added an explanation sentence to the questionnaire after the term they could get it. Therefore, in the final version of the translation, we added this sentence for explanation.

This study also had some limitations. First, it focused on college students, other age groups were not included. However, the discriminative ability of the IdFAI-C may be different in different age groups and different professions. Moreover, the ones who volunteered to participate in the research may have different characteristics when compared with non-respondents. However, our study only involved volunteers, which probably caused bias.

In conclusion, the IdFAI-C has high discriminative validity, high reliability, and good accuracy, making it suitable for Chinese physicians and foot-and-ankle surgeons to use in clinical practice.

Conflicts of interest

None.

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