Original Article

Reliability of the Identification of Functional Ankle Instability (IdFAI) Scale Across Different Age Groups in Adults

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Abstract

Background: Functional ankle instability (FAI) is the tendency of the foot to 'give way'. Identification of Functional Ankle Instability questionnaire (IdFAI) is a newly developed questionnaire to detect whether individuals meet the minimum criteria necessary for inclusion in an FAI population. However, the reliability of the questionnaire was studied only in a restricted age group. **Aim:** The purpose of this investigation was to examine the reliability of IdFAI across different age groups in adults. **Materials and Methods:** One hundred and twenty participants in the age group of 20-60 years consisting of 30 individuals in each age group were asked to complete the IdFAI on two occasions. Test-retest reliability was evaluated by intraclass correlation coefficient ($ICC_{2,1}$). **Results:** The study revealed that IdFAI has excellent test-retest reliability when studied across different age groups. The $ICC_{2,1}$ in the age groups 20-30 years, 30-40 years, 40-50 years and 50-60 years was 0.978, 0.975, 0.961 and 0.922, respectively with Cronbach's alpha >0.9 in all the age groups. **Conclusion:** The IdFAI can accurately predict if an individual meets the minimum criterion for FAI across different age groups in adults. Thus, the questionnaire can be applied over different age groups in clinical and research set-ups.

Keywords: Functional ankle instability, IdFAI, Reliability

Introduction

Functional ankle instability (FAI) is described as the tendency of the foot to 'give way'. Functional instability (FI) is defined as the subjective feeling of ankle instability or recurrent, symptomatic ankle sprains (or both) due to proprioceptive and neuromuscular deficits.[1] Individuals reporting giving way in the absence of a mechanical deficit are usually classified as having FAI. Incidents of the ankle "giving way," are reported in 40% to 60% of individuals who suffer at least one ankle sprain.[2,3] FAI has been shown to prevent approximately 6% of patients from returning to their occupation,[4] and due to residual symptoms, 5-15% of patients remain occupationally handicapped from at least 9 months to 6.5 years.[4,5]

Self-reported questionnaires are a common method used in identifying individuals with ankle instability. Since FAI lacks a "gold standard'' measure, a variety of self-reported ankle instability measures have been created, which include the Ankle Instability Instrument (AII), Ankle Joint Functional Assessment Tool, Chronic Ankle Instability Scale, Cumberland Ankle Instability Tool (CAIT), Foot and Ankle Ability Measure (FAAM), Foot and Ankle Instability Questionnaire, Foot and Ankle Outcome Score, and the Identification of Functional Ankle instability (IdFAI).

To date, of the numerous self-report questionnaires that have been published to identify individuals with FAI, only few have reported both reliability and validity information.[6-9]

The Identification of Functional Ankle Instability questionnaire (IdFAI) developed by Simon and Donahue is specifically designed to detect whether individuals meet a minimum criteria necessary for inclusion in an FAI population.[10]

The IdFAI is based on two previous FAI instruments: The CAIT (Cumberland Ankle Instability Tool) and the AII (Ankle Instability Instrument). The underlying concept of the IdFAI is to consolidate the elements of each instrument and combine them in a manner that results in a simple and concise means to identify individuals with FAI. One of the main elements included in the IdFAI, which is not in any other questionnaire, is a specific definition of giving way. This definition was provided to ensure that all individuals understood the term and answered questions based on the same definition. The definition included in the questionnaire is: "Giving way" is described as a temporary uncontrollable sensation of instability or rolling over of one's ankle.[11]

Simon and Donahue in their further research proved that IdFAI is a reliable and valid instrument; however, it was not tested in group of FAI patients. One of the limitations of the investigation was the restricted age of the participant sample: The college-aged students (average age was 19.80 years).[12] The other age groups remained unexplored. As this instrument involves recall of symptoms, consistency in reporting accurately, it necessitates achieving its reliability over different age groups. Therefore, there was a need to expand the inclusive ages to ensure that the IdFAI achieves similar results across all the age groups in adults.

Materials and Methods

Total 120 healthy individuals in the age group of 20-60 years were included irrespective of having FAI or not. These 120 subjects consisted of 30 individuals in each of the age groups ranging from 21-30, 31-40, 41-50 and 51-60.

All participants gave informed consent and the Institutional Ethical committee approved this study. Participants were not screened for mechanical ankle instability prior to completing the questionnaire. Only information about the dominant limb was obtained while completing the questionnaire. Participants completed IdFAI questionnaire that focuses specifically on questions related to FAI. It consists of 3 factors: First factor focuses on the history of ankle sprain, second factor focuses on the initial ankle sprain, and the third factor focuses on the instability during ADL. A total score of 10 or lower indicates that the participant is unlikely to have FAI, whereas a total score of 11 or higher indicates that a participant is likely to have FAI.

Participants were asked to complete the IdFAI on two separate occasions 14 days apart. An investigator was present during all testing sessions and additional information was provided if required. Individuals were allowed as much time as necessary to complete the questionnaire.

Statistical analysis

Test-retest reliability was evaluated using intraclass correlation coefficients ($ICC_{2,1}$) for each factor and the total score on the IdFAI between test days 1 and 2 for different age groups. Cronbach's alpha was calculated to estimate internal consistency of the items.

The statistical analysis was performed with the Statistical Package for Social Sciences (SPSS) version 16.0.

Results

Out of 120 participants, 50 (42%) were males and 70 (68%) were females. The majority of the individuals (n = 108, 90%) had right limb dominance, and the remaining individuals had left limb dominance. Ninety (75.60%) individuals had a history of an ankle sprain while the remaining 30 (24.40%) did not. Table 1 shows the demographic details of all participants in each group.

Reliability

Reliability of the individual factors was ICC = 0.956 (standard error of measurement [SEM] = 0.33) for history (factor 1); ICC = 0.923 (SEM = 0.315) for initial ankle sprain (factor 2); ICC = 0.975 (SEM = 0.134) for instability during ADL (factor 3) and 0.959 (SEM = 0.635) for the overall questionnaire. The Cronbach's alpha coefficients were 0.978, 0.960 and 0.987 for the 3 factors, respectively, and 0.959 for the overall instrument.

Reliability was found across different age groups. Table 2 shows the ICC and Cronbach's alpha in all the age groups. Between the two test occasions, there was an exact agreement for 95 (79.16%) participants, and an additional 25 (20.84%) participants differed by only 1 or 2 points.

Table 1: Demographic details of all participants in each group				
Age group (yrs)	Total no. of individuals	No. of males	No. of females	Average age (yrs)
20-30	30	7	23	22±2.4
30-40	30	14	16	34±3.6
40-50	30	12	18	44±2.5
50-60	30	17	13	54±3.9

Table 2: Intraclass correlation coefficient and cronbach's alpha in all age groups

Age groups	Intraclass correlation coefficient (ICC$_{2,1}$)	Cronbach's alpha
20-30 yrs	0.908	0.978
30-40 yrs	0.907	0.975
40-50 yrs	0.891	0.961
50-60 yrs	0.832	0.922

Discussion

In our study, the IdFAI demonstrated overall excellent test-retest reliability (ICC$_{2,1}$ = 0.959) in a sample of 120 independent limbs, across different age groups. The history of ankle instability (factor 1), the initial ankle sprain (factor 2) and the instability during ADL (factor 3) achieved excellent reliability. Similar results were also obtained by Simon and Donahue in their study (ICC$_{2,1}$ = 0.92) done on 110 independent limbs.[12]

The IdFAI has excellent test-retest reliability when studied across different age groups. The ICC$_{2,1}$ in the age groups 20-30 years, 30-40 years, 40-50 years and 50-60 years was 0.978, 0.975, 0.961 and 0.922, respectively with Cronbach's alpha >0.9 in all the age groups indicating excellent internal consistency of the items on the scale in all the age groups.

In the study done by Simon and Donahue, the IdFAI scale was found to be reliable in a group of college students (mean age 19.80 years).[12] In our study, the reliability of scale was found to be excellent across all age groups ranging from 20-60 years. The study demonstrates that IdFAI can accurately predict if an individual meets the minimum criterion for FAI across different age groups. Thus, the questionnaire can be applied over different age groups in clinical and research set-ups.

It is also important to determine whether the IdFAI will classify participants as either having FAI or not having FAI in a similar manner on different days .On the first day of testing, 30 participants were identified as having FAI, and on the second day, 34 participants were identified. Seven individuals changed status (FAI or no FAI) between the 2 test days, and their scores varied 1 or 2 points. The study also showed that between the two test occasions, there was exact agreement for 95 (79.16%) participants, and an additional 25 (20.84%) participants differed by only 1 or 2 points.

As FAI is determined by self-reported questionnaire, it is necessary that subjects remember their symptoms and history consistently and report it correctly while answering. In our study, we found that subjects were able to report their symptoms on two occasions, 14 days apart, with excellent reliability.

Conclusion

In this study, IdFAI clearly demonstrated overall excellent test-retest reliability across different age groups in adults. The IdFAI is intended to give both researchers and clinicians a simple and effective tool to determine an individual's ankle stability status. It will help ensure that individuals meet a minimum set of criteria for FAI and therefore should continue to be used in further research.

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