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Content Validity of a Korean-Translated Version of a Fullerton Advanced Balance Scale: A Pilot Study

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Abstract

The purpose of this study were to translate the Fullerton Advanced Balance (FAB) scale into Korean and to verify the content validity by utilizing a back-translation method with a view to assessing balance function and the risk of falling in a clinical research setting. This research was conducted in six steps. First, three Korean physical therapists translated the FAB scale into Korean. Second, two bilingual professors of physical therapy and a physical therapist evaluated translation conformity of Korean-translated FAB scale. In the third and fourth steps, twelve physical therapists evaluated the degree of translation comprehension, and a translator back-translated the Korean FAB scale into the original language. Fifth, a bilingual professor of physical therapy and two native speakers evaluated the technical and conceptual equivalence between the original and translation versions. In this process, inappropriate translated items were revised using recommended substitute words or sentences, and all items were evaluated on the basis of three points or more on a rating scale in terms of translation comprehension, and the technical and conceptual equivalence of the back-translation. In the sixth and last step, the translation verification committee completed the final Korean version. The above process indicated that the content validity of the Korean-translated FAB scale was established by means of systematic translation methods, and it can therefore be used to assess balance function and the risk of falls in a clinical research setting.

Key Words: Back-translation; Content validity; Fullerton advanced balance scale.

Introduction

Falls are the leading cause of functional disability, and mortality in the elderly people over 65 years (Fortinsky et al, 2008). The occurrence of falls causes physical injuries such as a fractures, joint dislocation, traumatic brain damage, as well as decreased independent activities and quality of life. Also, fear of falling consistently correlates to psychosocial conditions such as an anxiety and depression (Legters, 2002; Nevitt et al, 1989). Hospitalization rate due to falling was 1,566 and mortality rate was 36 per 100,000 of the Korea population in the elderly people over 65 years (Korea Centers for Disease Control and Prevention, 2009).

Many factors contribute to an increased fall risk in older adults, including impairments in balance, decreased muscular strength, and impaired vision due to aging. Hazard environments such as rough and slippery terrain in the home and community are also risk factors (American Geriatric Society, 2001; Baker et al, 2005). However, falls could be prevented if the risk factors were identified and if early assessment and appropriate intervention were implemented (Hernandez and Rose, 2008). Of the factors listed above, balance is one of the most important ways to predict fall prevention measures (Fortinsky et al, 2008). Balance assessment methods are divided into single-item component (e.g., range of motion, muscular strength, vision) and

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multidimensional function that include related balance factors (Weerdesteyn et al, 2008). The single-item component method is easy to measure but has the limitation that it only evaluate one factor relating to balance function. On the other hand, multidimensional function method is useful because it evaluate a variety of factors related to balance, and it also expresses balance function as a total score (Kim, 2013).

Several assessment tools have been used to evaluate the balance function, including Timed Up and Go Test (Newton, 1997), Functional Reach Test (Duncan et al, 1990), Berg Balance Scale (BBS) (Berg et al, 1992), Dynamic Gait Index (Hall et al, 2004) and Fullerton Advance Balance (FAB) Scale (Rose et al, 2006). Because these assessment tools were developed in other countries, the process of translation, adaptation and cross-cultural validation of the tools for use in other countries, cultures, and languages requires the adoption of the most well-established, comprehensive and rigorous methodological approaches (Sousa and Rojjanasrirat, 2011; Sperber, 2004). Therefore, such tools should ideally be translated into Korea language and undergo a valid translation process so that they can be used in Korea. However, in many instances, literal translation is difficult to achieve, particularly when the linguistic structure of the target language is distinctly different from that of the source language. If the original language of assessment tool was translated inadequate or incorrect words, or if idiomatic expression from other cultures were literally translated, the meaning of the original will not be expressed accurately and the results of assessment will be compromised (Yoo, 2003). In addition, if the assessment tool is used in researches without having undergone rigorous procedures of translation and verification, the reliability and validity of the research itself is likely to be undermined (Custers et al, 2000; Lim et al, 2007).

In general, when the instrument is translated, there should be both technical equivalence and conceptual equivalence. Technical equivalence refers to equivalence in terms of grammar and syntax, while conceptual equivalence refers to the absence of concept differences between the original and target versions of instrument (Yoo, 2003). Various procedures have been proposed to ensure translation accuracy, and back-translation is generally the method most recommended. The back-translation method involves translation of the target language version of a document back to the original language by a translator who is not familiar with the instrument being translated; the back-translated items are then compared to the original items so that any discrepancies can be identified. This method permits the detection of errors in the translation, such as the omission of phrases or words that may change the meaning of the item, as well as the identification of words or phrases that cannot be accurately or literally translated (Bulliger et al, 1998; Sperber, 2004).

Although the BBS is mainly used to assess the risk of falling in older adults, it has several limitations. For example, it is not suitable for predicting a fall in a group of higher functioning older adults due to its propensity to display ceiling effects. Moreover, BBS items are strongly associated with reduced lower extremity function, but they do not include items that evaluate impairments in multiple sensory systems such as the vestibular system and vision, which have been found to contribute to balance and a heightened fall risk in independently functioning older adults (Boulgarides et al, 2003; Brauser et al, 2000; Rose et al, 2006).

The FAB scale is a performance-based measure that was developed by Rose et al (2006) in order to identify the subtle changes in balance and to assess the multiple dimensions of balance. In addition to evaluating the multiple dimensions of balance such as both static and dynamic environments, sensory reception and integration, and anticipatory and reactive postural control, the FAB scale includes items

that are specifically designed to change the balance abilities of independently functioning older adults (Rose et al, 2006).

Several studies have been conducted to assess balance function and the risk of falls using the BBS, and the reliability and validity of the BBS have therefore been verified in Korea (Jung et al, 2006; Lee et al, 2006; Park, 2008). However, as yet, no study has been carried out using the FAB scale in Korea, and little research has been conducted to verify this assessment tools using rigorous translation procedures (Lee et al, 2011; Lim et al, 2007). The purpose of the present study was to translate the FAB scale into Korean and verify its content validity by means of a back-translation method with a view to assessing balance function and the risk of falls in a clinical research setting.

Methods

Research subjects and procedures

This research subjects and procedures for this study were selected based on past researches (Lee et al, 2011; Lim et al, 2007; Neuman et al, 2004). Essentially, the research was conducted using the following procedures; translation of the FAB scale into Korean; translation conformity and comprehension; assessment of the technical and conceptual equivalence of back translation; and completion of Korean version of the FAB scale (Table 1).

Instrument

The FAB scale is a multi-item balance assessment test designed specifically to measure balance in higher-functioning active older adults (Klein et al, 2011; Rose et al, 2006). The scale consisted of 10 items describing balance impairment in the performance of static and dynamic balance activities in different sensory environments. Each item is graded on a four-point Likert scale (range 0~4), with 0 indicating that the person is unable to perform 4 indicating that an activity is impossible to perform. The total score ranges from 0 to 40, and is used as a predictor variable in studies. A scores 25 or lower on the FAB scale indicates a high risk of falls and a need for immediate intervention. The FAB scale has shown high test-retest level (r=.96), as well as intra-reliability (r=.92~1.00) and inter-reliability (r=.91~.95). Also, it has indicated good correlation with the BBS (r=.075, p<.001) (Hernandez and Rose, 2008; Horak et al, 2009; Klein et al, 2011; Rose et al, 2006).

Translation procedures

The FAB scale was first translated into Korean language by three physical therapists who had expe-

Table 1. Research subjects and procedures

Research procedures	Subjects
Translation of the FAB[a] scale into Korean	3 physical therapists
Conformity of translation	2 bilingual physical therapy professors 1 physical therapist
Comprehension of translation	12 physical therapists
Back-translation	1 translation expert
Technical and conceptual equivalence of back-translation	1 bilingual professor of physical therapy 2 native speakers of English
Completion of Korean-version of the FAB scale	Translation verification committee (three bilingual physical therapy professors and two physical therapists)

[a]Fullerton advance balance.

rienced assessment and treatment using a balance assessment tool. The conformity of the translated FAB scale was then verified by two bilingual (English and Korean) physical therapy professors and one physical therapist who were not familiar with the FAB scale. Conformity was evaluated using 5-point ordinal scale consisting of the levels 1 (very bad), 2 (bad), 3 (moderate), 4 (good), 5 (very good). Items evaluated with a rating of 2 (bad) or less by two or more of the three translation conformity reviewers were modified through the recommendation of substitute words or sentences until a rating of 3 or more was achieved. After the first revision, the degree of translation comprehension of the FAB scale was verified by twelve physical therapists who had experienced treating patients with balance impairments. The comprehension degree was evaluated using a 5-point ordinal scale consisting of the levels 1 (not quite understood), 2 (not understood), 3 (moderately well understood), 4 (understood), 5 (well understood). Items evaluated with a rating of 2 (not understood) or less by two or more of the twelve reviewers were modified through the recommendation of a substitute words or sentences by the translation verification committee. A translation expert was then commissioned to carry out back translation, and the technical equivalence and conceptual equivalence of the back translation were evaluated between the original and translation versions by a USA professor in possession of a master's degree, in addition to two native speakers. Equivalence was evaluated using a 5-point ordinal scale consisting of levels 1 (not at all similar), 2 (not similar), 3 (moderately similar), 4 (similar), 5 (very similar). A rating of 2 (not similar) or less by one or more of the three reviewers resulted in the item being modified to a level of 3 (similar) or more. Finally, a translation verification committee consisting of three bilingual physical therapy professors and two physical therapists completed Korean version of the FAB scale after all verification processes had been carried out (Appendix 1).

Results

Conformity of translation

As a result of translation conformity, each item that scored a rating of 2 (bad) or less was revised through the recommendation of a substitute words or sentences until a level of 3 or more was achieved (Table 2).

Comprehension of translation

As a result of the degree of translation comprehension, all items received a rating of more than 3 (moderate). The lowest item was "step up and over" (3.63) and the highest item was "stand on one leg" (4.36) (Table 3).

Technical equivalence and conceptual equivalence of back-translation

In technical equivalence and conceptual equivalence, all items were evaluated as 3 (moderate) or more. The "step up and over" and "stand on foam, eyes closed" items were evaluated as 3 (moderate) in technical equivalence by two of the three reviewer, but their conceptual equivalence was evaluated as 4 (similar) or more (Table 4).

Discussion

The purpose of the present study was to translate the FAB scale into Korean and verify its content validity by means of a back-translation method so that it could be used as a balanced assessment tool in clinical research setting. The aim of systematic translation is to maintain the validity of the questionnaire itself, and to maintain similarities between sentence structure and the conceptual identity the source text, thereby maintaining the source text's structure and meaning (Chae et al, 2008). The greatest difficulty that researchers experience in a study using an assessment tool from a different culture is appropriately translating the tool from a different language into one's home language by reducing the

Table 2. Conformity of Korean translation

Item	Scale	Before modification	After modification
1	0	독립적으로 바르게 선 자세를 할 수 없다.	혼자 힘으로 바르게 선 자세를 할 수 없다.
	1	독립적으로 바르게 선 자세를 할 수 있지만, 서 있는 자세를 유지하지 못하거나, 눈감은 상태를 10초 동안 유지하지 못한다.	혼자 힘으로 바르게 설수 있지만, 자세를 유지하지 못하거나 10초 동안 눈을 감지 못한다.
	3	눈을 감고 바르게 선 자세를 30초 동안 유지할 수 있으나, 바로 옆에서 감독이 필요하다.	눈을 감고 바르게 선 자세를 30초 동안 유지할 수 있지만, 가까이에서 지켜볼 필요가 있다.
2	0	두 걸음 넘게 움직이지 않으면 연필에 닿을 수 없다.	세 걸음 이상 발을 움직여야 연필에 닿을 수 있다.
	1	연필에 닿을 수 있지만, 두 걸음을 움직인다.	두 걸음을 움직이면 연필에 닿을 수 있다.
3	1	몸을 회전하는 동안 옆에서 감독이 필요하거나, 구두 지시가 필요하다.	몸을 회전하는 동안 가까이에서 지켜보거나, 구두 신호가 필요하다.
	2	양 방향으로 모두 360도 회전 할 수 있지만, 네 걸음 넘게 움직이게 된다.	양 방향 모두 네 걸음 이상 움직이면서 360도 회전 할 수 있다.
4	3	양 방향에서 한쪽 발을 발판에 딛고 올라 넘어 갈 수 있으나, 한 방향 또는 양 방향에서 감독이 필요하다.	양 방향에서 발을 발판에 딛고 올라 넘어갈 수 있으나, 한 방향 또는 양 방향에서 가까이에서 지켜볼 필요가 있다.
5	1	열 걸음을 걷는 동안 실수가 5번을 초과한다.	열 걸음을 걷는 동안 5번 이상 실수한다.
	3	열 걸음을 걷는 동안 2번 또는 그 이하로 실수하게 된다.	열 걸음을 걷는 동안 2번 이하로 실수한다.
6	1	독립적으로 한 발을 들 수 있지만, 5초 이상 자세를 유지하지 못한다.	혼자 힘으로 한 발 서기가 가능하지만, 5초 이상 자세를 유지할 수 없다.
	2	독립적으로 한 발을 들 수 있고, 자세를 5초 초과 12초 미만으로 유지할 수 없다.	혼자 힘으로 한 발 서기 자세를 6초 이상 12초 이하로 유지할 수 있다.
7	1	독립적으로 스펀지 위에 올라 설 수 있고 선 자세를 유지하지만, 눈을 감지 못하거나 눈을 감으려 하지 않는다.	혼자 힘으로 스펀지 위에 올라 설수 있지만, 눈을 감지 못한다.
	3	독립적으로 스펀지 위에 올라 설 수 있고, 눈을 감은 상태로 선 자세를 10초 초과 20초 미만으로 유지할 수 있다.	혼자 힘으로 스펀지 위에 올라서서 눈 감고 선 자세를 11초 이상 20초 미만으로 유지할 수 있다.
8	0	멀리 뛰기를 시도할 수 없거나, 시도했지만 한 발 또는 두 발이 바닥에서 떨어지지 않는다.	멀리뛰기를 할 수 없고, 시도 하더라도 발이 바닥에서 떨어지지 않는다.
	1	두 발 멀리뛰기를 시도했지만, 한 발이 바닥에서 떨어지지 않거나 한 발이 먼저 바닥에 닿는다.	두 발 멀리뛰기를 시도했지만, 한쪽 발만 뛰게 된다.
9	3	정해진 속도에 맞춰 선을 따라 열 걸음 걸을 수 있지만, 머리 회전이 한 쪽 또는 양쪽 방향에서 30도 이하로 돌린다.	정해진 박자에 맞춰 선을 따라 열 걸음 걸을 수 있지만, 머리 회전이 한 방향 이상에서 30도 이하로 돌리게 된다.
10	0	균형을 회복하기 위한 시도가 없고 균형을 회복하기 위해서는 타인의 신체적 도움이 필요하다.	전혀 균형을 잡지 못하고 다른 사람의 도움을 받아야 균형 회복이 가능하다.

Table 3. Comprehension of translation (N=12)

Number	Item	Comprehension
1	Standing with feet together and eyes closed	4.10±.70[a]
2	Reaching forward to an object	3.90±.70
3	Turn in full circle	3.90±.70
4	Step up and over	3.63±1.11
5	Tandem walk	3.90±.83
6	Stand on one leg	4.36±.67
7	Stand on foam, eyes closed	4.18±.75
8	Two-footed jump	3.81±.65
9	Walk with head turns	4.00±.63
10	Reactive postural control	4.10±.70

[a]mean±standard deviation.

Table 4. Technical equivalence and conceptual equivalence of back-translation (N=3)

		Reviewer 1		Reviewer 2		Reviewer 3	
No	Item	Technical equivalence	Conceptual equivalence	Technical equivalence	Conceptual equivalence	Technical equivalence	Conceptual equivalence
1	Standing with feet together and eyes closed	4	5	4	5	4	4
2	Reaching forward to an object	4	5	4	5	4	5
3	Turn in full circle	4	4	4	4	4	4
4	Step up and over	3	4	4	4	3	4
5	Tendem walk	4	4	4	5	4	5
6	Stand on one leg	4	5	4	5	4	5
7	Stand on foam, eyes closed	3	4	3	4	4	4
8	Two-footed jump	4	4	4	4	4	5
9	Walk with head turns	4	4	4	4	3	4
10	Reactive postural control	4	5	4	4	4	5

differences in languages and cultures (Candell and Hulin, 1986). There are four methods of keeping the equivalence between an assessment tool in the source language and in the target language: back translation, two-language translation, translation verification committee approach, and the pretest procedure (Brislin, 1970). In this study, back translation and the translation verification committee approaches were used, and following the procedure presented by Bullinger et al (1998) a translation, a back translation, a comparison of differences between the source and back-translation versions, a committee review, and a qualitative analysis were performed.

A frequent problem in the translation process is the lack of words in the home language with the same meaning as the source words (Brislin et al, 1970). Therefore, effort should be made to use words that have the most-similar meaning to the source words. The best method for solving this problem in the translation process is to translate the meaning instead of using the grammatical word (Sechrest and Fay, 1972). In this study, the equivalence of the

communication of meaning was set as the criterion of translation in the initial translation and conformity of translation. During the translation of the FAB scale into Korean, it was difficult to find words that accurately reflected the meaning of certain source words and phrases. For example, there is no Korean word corresponding to 'foam' as written in the FAB source, so the loanword 'sponge' was used, and it was decided to translate the English word 'supervision' as the meaning of 'watch closely' instead of its typical meaning as 'supervision' in Korean translation.

In systematic translation research, the qualification of the researchers participating in the translation and the conformity process are also important. To avoid literal translations, the translator must be proficient in both languages and knowledgeable about the cultures of both countries as well as in the principles of test-development and the writing of items (Jones et al, 2001; Son, 2003; Yoo, 2003). Because verification of translation comprehension requires basic knowledge of the specialist area, 12 physical therapists participated in this study to verify the understanding of the items, and the translator showed an average (3) level of understanding for every item. Furthermore, biases due to regional and cultural differences of the individuals participating in the translation should be reduced. Hence, due to the complexity of the translation process, a modification process through the translation verification committee consisting of various experts is required (Jones et al, 2001; Son, 2003; Yoo, 2003). In this study, a translation verification committee consisting of two bilingual physical therapy professors and two physical therapists made the final decision after gathering neutral opinions from different perspectives, together with the translator.

When an assessment tool is translated, the equivalence of the translation cannot be ensured just by translating the source text into the home language (Brislin, 1970; Sechrest and Fay, 1972) Therefore, it is essential to raise the validity by using back translation in cross-cultural research (Jones et al, 2001; McDermott and Palchanes, 1992). In this study, to enhance the validity of the translation, technical and conceptual equivalence of back translation were evaluated by one bilingual physical therapy professor and two native speakers of English. As a result of the back translation, there were words and phrases that were different from the source text, but all 10 of the items received at least 3 points (average) in the similarity of sentence structures and the communication of meaning. Therefore, there were no items that required revision. After confirming the conformity and comprehension of translation for every item, the Korean version of the FAB scale was finally completed.

A limitation of this study was that the results only present the translated version of the FAB scale. The back translation method is very useful for the initial work that evaluates the quality of a translation, but it is insufficient for establishing the cross-cultural and linguistic equivalence (Hulin et al, 1982). Therefore, the need for statistical methods is raised (Son, 2003). The combined use of the back translation and the reliability and validity study for establishing the equivalence of tests has been reported to be the best method (Kim and Lim, 2003). In future studies, the statistical reliability and validity should be researched by directly applying the translated FAB scale to patients. Furthermore, linguistic validity does not mean that the translation has the specifics of the original psychological measurements (Ku et al, 2005). Therefore, the degree of test equivalence between the original FAB scale and the translated version needs to be analyzed through the Rasch analysis, which was developed on the basis of the item response theory.

Conclusion

In this study, the FAB scale was translated through the back translation method, and the conformity of the Korean translation was verified in order to establish its validity for use in

Korea. The FAB scale was translated into Korean through a systematic translation process. Furthermore, the goodness-of-fit of the translation was verified by a translation verification committee consisting of three bilingual physical therapy professors and two physical therapists, and the translation was revised accordingly. In the back-translation process, the similarities of sentence structures and of the communication of meaning were both tested. After the final Korean version was completed, its content validity was established so that it could be applied in Korea.

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Appendix 1. Korean-version of the Fullerton Advanced Balance (FAB) scale

1. 양발 모으고 눈 감고 서 있기

동작설명	양발을 모으고 두 팔은 팔짱을 낀 상태로 준비가 되면 눈을 감고, 눈을 뜨라는 지시가 있을 때까지 가만히 서 있는 자세를 유지하세요.
□ 0 점	혼자 힘으로 바르게 선 자세를 할 수 없다.
□ 1 점	혼자 힘으로 바르게 설 수 있지만, 자세를 유지하지 못하거나, 10초 이상 눈을 감지 못한다.
□ 2 점	눈을 감고 바르게 선 자세를 10초 이상 30초 미만 동안 유지할 수 있다.
□ 3 점	눈을 감고 바르게 선 자세를 30초 동안 유지할 수 있으나, 가까이에서 지켜볼 필요가 있다.
□ 4 점	눈을 감고 바르게 선 자세를 30초 동안 안전하게 유지할 수 있다.

2. 물건을 향하여 손 뻗기

동작설명	발을 움직이지 않고 몸을 앞으로 구부려서 제 손에 있는 연필까지 손을 뻗어 닿은 후 원래 자세로 돌아가세요. [# 준비물: 30 ㎝ 자, 연필 / # 연필의 위치는 환자가 손을 앞으로 90도 뻗은 손끝에서 30 ㎝거리에 위치]
□ 0 점	세 걸음 이상 발을 움직여야 연필에 닿을 수 있다.
□ 1 점	두 걸음을 움직이면 연필에 닿을 수 있다.
□ 2 점	한 걸음을 움직이면 연필에 닿을 수 있다.
□ 3 점	발을 움직이지 않고 연필에 닿을 수 있지만, 가까이에서 지켜볼 필요가 있다.
□ 4 점	발을 움직이지 않고 혼자 힘으로 안전하게 연필에 닿을 수 있다.

3. 제자리에서 회전하기

동작설명	제자리에서 한 바퀴를 회전하고, 잠시 멈춘 후 반대 방향으로 한 바퀴 회전 하세요.
□ 0 점	몸을 회전하는 동안 다른 사람의 신체적 도움이 필요하다.
□ 1 점	몸을 회전하는 동안 가까이에서 지켜보거나, 구두 신호가 필요하다.
□ 2 점	양 방향 모두 네 걸음 이상 움직여서 360도 회전 할 수 있다.
□ 3 점	양 방향에서 360도 회전이 가능하지만, 한쪽 방향에서는 네 걸음 이상 움직이게 된다.
□ 4 점	양 방향에서 모두 네 걸음 이하로 움직이면서 안전하게 360도 회전할 수 있다.

4. 발판을 딛고 올라서 넘어가기

동작설명	오른발을 발판 위에 딛고, 왼발은 발판을 딛지 않고 넘어가세요, 발을 바꾸어 반대쪽으로 넘어가세요. [# 준비물: 넓은 발판(스텝박스) / 크기 : 15 ㎝ 높이 / 35~45 ㎝ 넓이]
□ 0 점	발판 위에 한쪽 발을 올릴 때 균형을 잃거나 다른 사람의 신체적 도움이 필요하다.
□ 1 점	양 방향에서 모두 발판 위에 한쪽 발을 딛고 올라 설수 있지만, 넘어가는 발이 발판에 닿거나 옆으로 우회하며 넘어간다.
□ 2 점	발판 위에 한쪽 발을 딛고 올라 설 수 있지만, 한 방향에서는 넘어가는 발이 발판에 닿거나 옆으로 우회하며 넘어간다.
□ 3 점	양 방향에서 발을 발판에 딛고 올라 넘어갈 수 있으나, 한 방향 또는 양 방향에서 가까이에서 지켜볼 필요가 있다.
□ 4 점	양 방향에서 안전하게 혼자 힘으로 발판을 딛고 올라 넘어갈 수 있다.

5. 일직선 따라 걷기

동작설명	바닥의 직선을 따라 뒷발의 발가락 끝에 앞발의 뒤꿈치가 닿도록 걸어가세요. [# 준비물 : 폭 5 ㎝ 테이프]
□ 0 점	혼자 힘으로 열 걸음을 걸어갈 수 없다.
□ 1 점	열 걸음을 걷는 동안 5번 이상 실수한다.
□ 2 점	열 걸음을 걷는 동안 2번 초과 5번 미만이내로 실수한다.
□ 3 점	열 걸음을 걷는 동안 2번 이하로 실수한다.
□ 4 점	열 걸음을 걷는 동안 실수하지 않고 혼자 힘으로 걸어갈 수 있다.

6. 한 발로 서있기

동작설명	눈을 뜬 상태에서 팔짱을 끼고 주로 사용하는 다리를 들고 가능한 오랫동안 서 있으세요. 이때 다른 쪽 다리에 닿지 않게 주의하세요.
□ 0 점	한 발 서기 자세를 시도할 수 없거나, 넘어지는 것을 대비하기 위한 도움이 필요하다.
□ 1 점	혼자 힘으로 한 발 서기가 가능하지만, 5초 이상 자세를 유지할 수 없다.
□ 2 점	혼자 힘으로 한 발 서기 자세를 6초 이상 12초 이하로 유지할 수 있다.
□ 3 점	혼자 힘으로 한 발 서기 자세를 13초 이상 20초 미만으로 유지할 수 있다.
□ 4 점	혼자 힘으로 한 발 서기 자세를 20초 이상 유지할 수 있다.

7. 눈 감고 스펀지에 서기

동작설명	스펀지 위에 어깨 넓이로 발을 벌리고 올라서서, 팔짱을 끼고 준비가 되면 눈을 감으세요. [# 준비물: 45.72×45.72 ㎝ 크기로 바닥이 미끄럽지 않은 스펀지 2개]
□ 0 점	스펀지 위에 올라 설수 없거나, 눈을 뜬 상태에서도 혼자 힘으로 선 자세를 유지할 수 없다.
□ 1 점	혼자 힘으로 스펀지 위에 올라 설수 있지만, 눈을 감지 못한다.
□ 2 점	혼자 힘으로 스펀지 위에 올라서서, 눈 감고 선 자세를 10초 이하로 유지할 수 있다.
□ 3 점	혼자 힘으로 스펀지 위에 올라서서, 눈 감고 선 자세를 11초 이상 20초 미만으로 유지할 수 있다.
□ 4 점	혼자 힘으로 스펀지 위에 올라서서, 눈 감고 선 자세를 20초 이상 유지할 수 있다.

8. 두 발로 멀리뛰기

동작설명	가능한 멀리 안전하게 두 발로 멀리 뛰세요. [# 준비물: 자, 접착테이프] # 바닥의 기준선에서 피검사자의 발 길이 1배와 2배 길이의 거리에 각각 표시할 것
□ 0 점	두 발 멀리뛰기를 할 수 없고, 시도 하더라도 발이 바닥에서 떨어지지 않는다.
□ 1 점	두 발 멀리뛰기를 시도했지만, 한쪽 발만 뛰게 된다.
□ 2 점	두 발 멀리뛰기를 할 수 있지만, 자신의 발 길이보다 짧게 뛴다.
□ 3 점	두 발 멀리뛰기를 자신의 발 길이보다 멀리 뛸 수 있다.
□ 4 점	두 발 멀리뛰기를 자신의 발 길이보다 두 배 이상 멀리 뛸 수 있다.

9. 머리 회전하면서 걷기

동작설명	박자기(metronome) 박자에 맞춰 머리를 왼쪽과 오른쪽으로 돌리면서 선을 따라 앞으로 걸어가세요. [# 준비물 : 박자기 (분당 100회로 설정)]
□ 0 점	정해진 박자에 맞춰 머리를 좌우로 30도 돌리면서 열 걸음 이상 걸어 갈 수 없다.
□ 1 점	혼자 힘으로 열 걸음 이상 걸을 수 있지만, 머리를 정해진 박자에 맞춰 좌우로 30도 돌릴 수 없다.
□ 2 점	정해진 박자에 맞춰 머리를 좌우로 30도 돌리면서 열 걸음 이상 걸을 수 있지만, 똑바로 걷지 못하고 선에서 벗어난다.
□ 3 점	정해진 박자에 맞춰 선을 따라 열 걸음 걸을 수 있지만, 머리 회전이 한 방향 또는 양쪽 방향에서 30도 이하로 돌리게 된다.
□ 4 점	정해진 속도에 맞춰 머리를 좌우로 30도 돌리면서 선을 따라 똑바로 열 걸음 걸어갈 수 있다.

10. 반응적 자세 조절

동작설명	등 뒤에 위치한 제 손 쪽으로 제가 멈추라고 할 때까지 천천히 기대어 보세요. # 환자가 충분히 밀고 있다고 생각되면 갑자기 등에서 손을 뗀다.
□ 0 점	선 자세를 유지할 수 없다: 전혀 균형을 잡지 못하고 다른 사람의 도움을 받아야 균형 회복이 가능하다.
□ 1 점	선 자세를 유지할 수 없다: 두 걸음 이상 움직이면서 다른 사람의 도움을 받고 균형을 회복할 수 있다.
□ 2 점	선 자세를 유지할 수 없다: 두 걸음 이상 움직이지만 혼자 힘으로 균형을 회복할 수 있다.
□ 3 점	선 자세를 유지할 수 없다: 두 걸음을 움직이지만 혼자 힘으로 균형을 회복할 수 있다.
□ 4 점	선 자세를 유지할 수 없다: 한 걸음만 움직여서 혼자 힘으로 균형을 회복할 수 있다.