

Adaptation of the AAHPERD test battery for institutionalized older adults

Bateria de testes da AAHPERD: adaptação para idosos institucionalizados

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Abstract – The American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) test battery assesses the functional fitness of older adults in five motor fitness tests. The objective of this study was to adapt and test the AAHPERD in institutionalized older adults and to define normative values of functional fitness for this population. A pilot test was conducted on older adults living in nursing homes, which confirmed the need to adapt the flexibility and aerobic endurance tests. The first test was redesigned so that the elderly person did not have to sit on the floor. The second test was changed from a half-mile to a 6-minute walk. The tests were adapted and tested in a sample of 92 older adults from six long-term care homes. The successful application of the AAHPERD adapted for older adults living in nursing homes permitted the establishment of normative values for the five motor tests. The adapted version of the AAHPERD is an easily applied, low-cost tool of low risk since it was adapted to the physical and functional conditions of institutionalized older adults. This physical test battery will contribute to the evaluation of older adults and exercise prescription.

Key words: Functional fitness; Institutionalized older adults; Nursing home.

Resumo – AAHPERD - American Alliance for Health, Physical Education, Recreation and Dance é uma bateria que avalia a aptidão funcional de idosos por meio de cinco testes físicos. O objetivo deste estudo foi adaptar a AAHPERD para testar em idosos institucionalizados e definir os valores normativos de aptidão funcional para esta população. Realizou-se um teste piloto em idosos institucionalizados, quando se confirmou a necessidade de adaptação dos testes de flexibilidade e de resistência aeróbica. O primeiro teste foi redesenhado para que o idoso não precisasse sentar-se no chão e no segundo, foi substituída a caminhada de meia milha pela caminhada de 6 minutos. A AAHPERD foi adaptada e submetida à testagem em uma amostra de 92 idosos residentes em seis Instituições de Longa Permanência para Idosos (ILPI). A aplicação bem sucedida da versão AAHPERD aos idosos institucionalizados permitiu a criação de valores normativos nos cinco testes físicos. Portanto, a AAHPERD adaptada é um instrumento de fácil aplicação, de baixo custo e de baixo risco na execução dos testes físicos, pois seus testes físicos foram adaptados para as condições físicas e funcionais de idosos institucionalizados. É uma bateria de testes físicos que contribuirá para a avaliação dos idosos e prescrição de exercícios.

Palavras-chave: Aptidão funcional; Testes; Idoso institucionalizado; Instituição de longa permanência para idosos.

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INTRODUCTION

The process of aging itself can compromise the functional capacity of older adults, but physical inactivity is without doubt the factor that accelerates and aggravates the loss of functional fitness¹. Physical inactivity is a major problem in nursing homes which rapidly leads to a state of dependency of older adults². Therefore, careful assessment of functional fitness in institutionalized older adults using adequate tools is an essential requisite to implement group programs and to prescribe personalized physical activity at nursing home. Such assessment should prevent or delay the development of dependency among institutionalized older adults.

The American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) functional fitness assessment³ is an older test battery developed for the older adults, which is an easily applied, low-cost tool of low risk since the tests resemble activities of daily living². This battery of functional fitness assessment consists of five motor fitness tests: agility/dynamic balance, coordination, strength, flexibility, and aerobic endurance³. The validity (content, criterion, discrimination) and reliability (internal consistency) of the instrument have been confirmed in several studies. Shaulis et al.⁴ evaluated the reliability of the instrument by applying the five tests three times over a period of 2 weeks to men and women aged 60 to 81 years. Good intraclass correlations were obtained for men and women, respectively: 0.97 and 0.98 for flexibility; 0.98 and 0.96 for agility; 0.89 and 0.71 for coordination; 0.94 and 0.81 for strength, and 0.99 and 0.96 for aerobic endurance³.

Zago and Gobbi⁵, Brazilian researchers, translated the AAHPERD to Portuguese and performed a transcultural adaptation⁶, revalidating the instrument for application to active Brazilian adults. These authors also reported normative values that were not available for the original battery and that permitted the classification of older adults according to functional capacity and overall functional fitness index.

On the basis of the results reported by Zago and Gobbi⁵ and of a multicenter project supported by CNPq that involved seven Brazilian universities (UFSC/UNESC, FURG, PUCRS, UPF/DE, EERP/USP, UESB/DS), whose main objective was the functional fitness assessment of low-income older adults living in LTCHs in order to develop a proposal for a basic multidimensional care model, the authors of the present study applied the AAHPERD⁵ to institutionalized older adults and observed that they had difficulties in the execution of some tests due to physical and functional limitations. This fact impaired the application of the test battery and overall assessment, as well as the establishment of reference values for this population. It was therefore necessary to adapt and test the AAHPERD functional fitness assessment in institutionalized older adults and to define reference/normal values of the physical tests for this population. Studies investigating functional fitness in older adults living in LTCHs are of the utmost importance to establish physical activity interventions that are

congruent with the true needs of each elderly person and the feasibility within the environmental and sociocultural context of each care facility.

Therefore, the objective of the present study was to adapt and test the AAHPERD test battery in older adults living in LTCHs and to define normative values of functional fitness for this population.

METHODOLOGICAL PROCEDURES

The following steps of the methodological approach were used to adapt the AAHPERD translated to Portuguese and revalidated for application to active older adult⁵ for institutionalized older adults⁷: pilot study applying the Brazilian version of the AAHPERD functional fitness assessment to a sample of institutionalized older adults; identification/confirmation of components of the test battery that are difficult to apply or inapplicable; idealization/creation of the adaptation and redrafting of the battery components to be adapted; submission of the adapted version to a panel of experts; application of the adapted battery to a sample that should be as heterogenous as possible in terms of geographic and cultural aspects (selection of subjects from six LTCHs located in the southern, southeastern, and northern parts of the country); analysis of the results obtained for the sample and statistical analysis of normative values for the battery tests applied to older adults living in LTCHs.

The study was conducted in accordance with Resolution 196/96 of the National Health Council. The general project to which this study belongs was approved by the Ethics Committee of UFSC (Permit N^o. 013/07). The older adults participating in the study signed a free informed consent form.

Pilot study

Application of the Brazilian version of the AAHPERD functional fitness assessment to a sample of 10 institutionalized older adults confirmed that the flexibility and aerobic endurance tests were not adequate for elderly people living in LTCHs, a fact already observed in daily practice at these facilities.

Adaptation of the flexibility and aerobic endurance tests

The flexibility test was modified in such a way that the subject did not have to sit on the floor since osteoarticular disorders are frequent in the elderly, impairing certain movements and body positions. For this purpose, a wooden plank was fitted on two chairs and the subject sat on one chair, extending the legs at 180 degrees on the plank for the test (Figure 1). The aerobic endurance and half-mile walking ability test was replaced with the 6-minute walk test considering the difficulty of older adults to walk 804.67 m (half a mile) and also the lack of physical space in many LTCHs^{8,9}.

The adaptation of the two tests of the AAHPERD battery was adequately redrafted and illustrated and submitted to a panel of experts who analyzed its adequacy and formulated the definitive version.

The adapted version of the AAHPERD battery (Appendix 1) was then applied to a sample of 92 older adults living in six LTCHs located in different geographic and cultural regions of Brazil: Florianópolis, Rio Grande, Porto Alegre, Passo Fundo, Ribeirão Preto, and Jequié.



Figure 1. Flexibility test adapted for older adults living in long-term care homes.

An intentional sample was obtained since the number of subjects depended on the total number of older adults living in each facility who met the inclusion criteria at the time of the study (2008/2): ability to understand and meet the requirements of the test battery, no visual deficiency, not bedridden or a wheelchair user, and not classified as grade III dependency according to Resolution 283/05 (requiring assistance for all self-care tasks and activities of daily living). However, the sample was predicted to be heterogeneous as possible since it was selected in different contexts, a condition necessary for studies developing measurement instruments¹⁰. The sample consisted of 92 older adults, 39 men and 53 women with a mean age of 78 years (SD=7.9) who were living in six LTCHs: 11 de Florianópolis-SC (n=11), Porto Alegre-RS (n=36), Rio Grande-RS (n=9), Passo Fundo-RS (n=8), Ribeirão Preto-SP (n=11), and Jequié-BA (n=17).

Data collection

To preserve the rigor in the application of the AAHPERD test battery, the researchers who had developed the adapted protocol edited a DVD containing the complete material of the AAHPERD battery adapted for institutionalized older adults and didactic instruction for its application. This DVD was sent to the research teams of the seven participating universities where the local coordinators trained their team, which usually consisted of recipients of scientific initiation fellowships (students of the healthcare area) and recipients of technical support fellowships (nurse, physiotherapist, and physical education teacher). The local researchers were previously invited for a research meeting by the general coordination at the headquarters in Florianópolis, where they received basic instructions to guide their teams in the implementation of the project. These researchers also participated in the formulation of the final version of the adapted AAHPERD protocol.

RESULTS

Applicability of the adapted AAHPERD test battery to institutionalized older adults

The Brazilian version of the AAHPERD test battery⁵ for active elderly was adapted in the present study for application to institutionalized older adults, modifying the flexibility and aerobic endurance tests. When the protocol shown in Appendix 1 was applied to a sample of 92 older adults living in LTCHs, 78 were able to perform all tests, 87 performed the flexibility, coordination and strength tests, 86 performed the agility and dynamic balance test, and 85 performed the aerobic endurance test. Some older adults could not complete one test or the other because of physical problems or diseases. Taken together, the results showed that this instrument is useful for the evaluation of functional fitness in active institutionalized older adults who have difficulties sitting on the floor or walking long distances.

With respect to the application of the AAHPERD test battery, the local research teams reported no difficulties in understanding the instrument and its application was easy and quick, suggesting that any adequately trained healthcare professional or student can apply the AAHPERD test battery as long as they understand the functioning of an LTCH.

Normative values of functional fitness for institutionalized older adults

The adaptation of the AAHPERD test battery for institutionalized older adults required the development of normative values of the different physical tests and of an overall functional fitness index (OFFI), which is the sum of percentile values. Normative values were obtained for the sample by calculating the percentages for each physical test (flexibility, coordination, strength, agility and dynamic balance, and aerobic endurance), resulting in a percentile score for each test. The OFFI corresponds to the sum of the scores of the five tests.

The percentile scores of the physical tests and OFFI were classified into five levels, ranging from very weak to very good (Table 1). The OFFI was calculated based on the 78 subjects who performed all tests of the battery. The same scores were also subdivided into three levels: weak, regular, and good (Table 2).

Table 1. Classification of the percentile scores obtained in each test of the AAHPERD battery and overall functional fitness index for institutionalized older adults.

Physical tests (percentile scores)	Classification	OFFI
0-19	Very weak	0-99
20-39	Weak	100-199
40-59	Regular	200-299
60-79	Good	300-399
80-100	Very good	400-499

OFFI: overall functional fitness index (sum of percentiles of each test).

Tables 3 and 4 show the cut-off values of the tests described in Tables 1 and 2 for the classification into five and three levels, respectively.

Table 2. Classification of the percentile scores obtained in each test of the AAHPERD battery and overall functional fitness index for institutionalized older adults.

Physical tests (percentile scores)	Classification	OFFI
0-33	Weak	0-166
34-67	Regular	167-332
68-100	Good	333-500

OFFI: overall functional fitness index (sum of percentiles of each test).

Table 3. Cut-off values obtained in the flexibility, coordination, agility and dynamic balance, strength and overall aerobic endurance tests according to the classification into five levels.

Classification	Flexibility (cm)	Coordination (s)	Agility (s)	Strength (repetitions)	Aerobic endurance (m)
Very weak	≤ 26	≥ 66	≥ 99	≤ 3	≤ 166
Weak	27 – 34	48 – 65	75 – 95.15	4 – 6	166.6 – 202
Regular	35 – 41	34 – 47.27	63 – 74	7	204 – 264
Good	42 – 49	27 – 32	43 – 62	8 – 9	275.35 – 341.10
Very good	≥ 50	≤ 26	≤ 42	≥ 10	≥ 347.38

Table 4. Cut-off values obtained in the flexibility, coordination, agility and dynamic balance, strength and overall aerobic endurance tests according to the classification into three levels.

Classification	Flexibility (cm)	Coordination (s)	Agility (s)	Strength (repetitions)	Aerobic endurance (m)
Weak	≤ 33	≥ 61	≥ 86.08	≤ 4	≤ 193
Regular	34 – 45	58 – 34.89	85.9 – 63	5 – 7	197.5 – 290
Good	≥ 47	≤ 34.29	≤ 62	≥ 8	≥ 297.6

The classification obtained with the physical tests and OFFI for the sample selected for this study, which is represented by a small number of older adults from three regions of Brazil, imposes limitations on the generalization of the results. However, the applicability of the adapted version of the AAHPERD test battery to institutionalized older adults demonstrated in this study suggests its continuous testing in different regional contexts so that it can be validated in Brazil for geriatric research and practice.

DISCUSSION

Table 5 lists international and Brazilian studies using the original version^{5,13-18} of the AAHPERD that reported results similar to those obtained in the present investigation.

However, these studies did not investigate older adults living in nursing homes. Most of these studies involved women aged 60 years or older. Only the study of Mazo et al.¹⁸ investigated older men. Furthermore, all participants in those studies performed physical activity. Four of the studies reported reference values of the battery tests for older adults and two were descriptive studies.

Although involving different populations, these studies reported similar results. However, comparison with the findings of the present study analyzing older adults living in nursing homes revealed divergent

results. Older adults living in nursing homes are more debilitated and do not achieve the same time, distance or repetitions in the tests. The present study therefore highlights the importance to develop normative values that classify older adults based on the reality of nursing homes. This is the first step to establish reference values for nursing homes that would permit the comparison of different nursing homes in Brazil, even with limitations. We believe that it is better to compare the results between Brazilian nursing homes than to compare data of older adults from other countries.

Table 5. Results of studies using the original version of the AAHPERD test battery.

Study	Gender	Age (years)	Coordination (s)	Agility/balance (s)	Flexibility (cm)	Strength (repetitions)	Endurance (s)
Bravo et al., 1994 ¹¹	Women	50-70	13 ± 2	27 ± 3	59 ± 10	22 ± 5	450 ± 49
Zago and Gobbi, 2003 ⁵	Women	60-70	11 ± 2,7	20 ± 2,5	58 ± 10,4	29 ± 6	493 ± 51
Benedetti et al. 2007 ¹²	Women	70-79	13,3	22	60	25,8	528
Cipriani et al., 2010 ¹³	Women	≥ 60	11,32	21,2	60,7	25	543
Pauli et al. 2009 ¹⁴	Women	≥ 60	9,2	28,2	71	19	460
Capranica et al., 2001 ¹⁵	Italian women	60-79	13 ± 3	23 ± 4	63 ± 12	24 ± 5	527 ± 69
Hoefelmann et al., 2011 ¹⁶	Women	≥ 80	15 ± 4	31 ± 9	56 ± 13	19 ± 4	627 ± 98
Mazo et al., 2010 ¹⁷	Men	60-69	13 ± 4	25 ± 7	51 ± 14	23 ± 5	494 ± 103
Capranica et al., 2001 ¹⁵	American men	≥ 60	11 ± 3	23 ± 6	55 ± 16	25 ± 6	416 ± 88
Capranica et al., 2001 ¹⁵	Italian men	61-78	12 ± 3	19 ± 5	45 ± 12	22 ± 4	426 ± 62

There are no studies applying the original version of the AAHPERD test battery to institutionalized older adults or residents of nursing homes. The present study represents a progress in this respect by adapting and testing this battery in institutionalized older adults and defining normative or reference values of functional fitness for this population.

Physical inactivity is an important factor in nursing homes and most older adults present low functional fitness due to diseases combined with their routine in the facility²⁰. With few exceptions, older adults do not perform occupational activities and prefer activities that require less effort, leading to rapid debilitation²⁰ and consequent physical and functional limitations.

The AAHPERD functional fitness test battery adapted for and tested in institutionalized older adults can be used to evaluate functional fitness in this population living in nursing homes since it is an easily applied, fast (about 20 minutes) and low-cost instrument. This test battery was adapted in the present study because of the low physical and functional condition of the residents of nursing homes, testing a battery that can be used for this population. However, it is important to note that all variables analyzed are of the utmost importance for older people living in nursing homes since

the evaluation of their physical condition permits to identify risks for the occurrence of dependency.

A study conducted in the United States on 64 institutionalized older adults (45 women and 19 men) with a mean age of 84 years demonstrated the usefulness of the AAHPERD functional fitness test battery to evaluate a physical activity program (strength training or walking twice a week for 4 months). The authors observed improvement in strength (33%), coordination (18%), balance and agility (14%), flexibility (10%), and aerobic endurance (7%). At the same time, 61% of the subjects presented a decline in the number of falls¹¹.

Most of the physical abilities evaluated by the test battery adapted here are based on scientific evidence as reported in a review article by the American College of Sports Medicine which analyzed more than 250 studies¹⁹. An overview of this study is given below.

Coordination was not studied by the group and there seems to be no strong evidence of health benefits, although coordination is known to be affected by aging and reduces the occurrence of falls¹⁹. In contrast, agility and dynamic balance are directly related to falls. Despite the medium evidence reported in that study, these physical abilities should be developed mainly to prevent falls¹⁹. Flexibility is a physical ability with low evidence of health benefits. Individuals who perform stretching exercises usually try to improve flexibility and report to feel better. Muscle strength was the most important physical ability during aging in the studies analyzed and there is strong evidence that improvement of muscle strength permits the maintenance of an independent life¹⁹. It is therefore necessary to preserve this physical ability. Aerobic endurance is another physical ability with strong evidence of preserving independence for a longer period of time¹⁹.

As reported in another study by our group, physical inactivity is a major factor in nursing homes whose residents show low functional fitness because of their routine in the facility²⁰. With few exceptions, older adults living in nursing homes do not perform occupational activities and prefer activities that require less effort, leading to rapid debilitation²⁰.

The evaluation of functional fitness in older adults is an essential requisite for the implementation of physical activity intervention programs in nursing homes. This assessment permits to determine the degree of physical function in older adults and which components of functional fitness need to be exercised and/or improved in order to preserve an autonomous and independent life in the nursing home. Therefore, the adoption of the adapted AAHPERD test battery by nursing homes will permit the regular evaluation of functional fitness in their residents and provide technical data to design and implement geriatric programs that promote an active life.

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and the scientific initiation students of the participating universities who helped with the data collection.

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APPENDIX 1

The American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) protocol developed by Osness et al. (1990) and adapted for institutionalized older adults.

Agility and dynamic balance test

- **Equipment required:** a chair with armrests, a measuring tape, two marker cones, and a stopwatch.
- **Organization of the test:** the chair is placed at a marked position, permitting the feet to touch the floor. Two cones positioned 1.50 m behind the chair and 1.80 m on each side (Figure 2).
- **Position of the subject:** the subject sits on the chair with the feet (heels) touching the floor.
- **Position of the examiner:** the examiner stands close to the subject.
- **Procedure:** on the signal “Go”, the subject rises from the chair, walks around the cone to the right, returns to the chair, and sits down, slightly lifting the feet. The subject then immediately rises from the chair, walks around the cone to the left, returns to the chair, and sits down. This corresponds to one circuit. The subject should complete a course of two complete circuits.
- **Observation:** demonstrating the test and the subject should repeat it without counting the time (walking as fast as possible). Two attempts are made and the best (lowest) time is recorded in seconds as the final result.

Adaptation of the test with assistance

- **Procedure:** the examiner assists with the execution of the test, holding the subject’s arm and allowing the subject to perform the test at his/her own pace. During the test, the examiner verbally informs the steps of the test: walk around the cone, sit in the chair, and lift your feet.

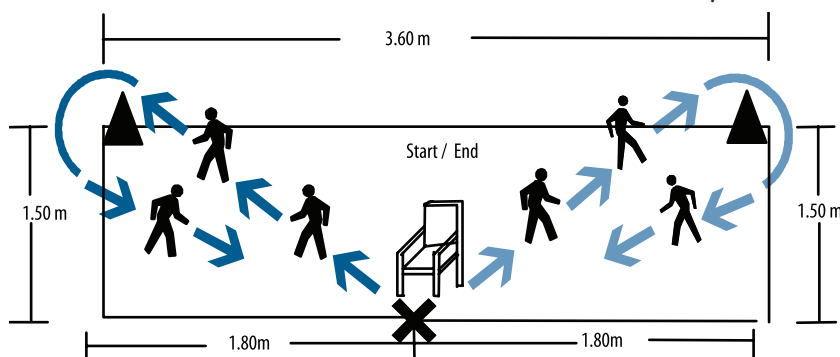


Figure 2. Schematic drawing of the agility and dynamic balance test (Zago and Gobbi, 2003).

Coordination test

- **Equipment required:** adhesive tape, a table, a chair, and three full soda cans.
- **Organization of the test:** a 76.2-cm strip of adhesive tape is fixed to a table. Six marks spaced 12.7 cm apart are made on the tape, with the first and last mark at a distance of 6.35 cm from the ends of the tape.

Perpendicularly to the tape, another strip of adhesive tape (7.6 cm long) is fixed to each mark (Figure 3). If the right hand is the dominant hand, the first soda can is placed at position 1, the second can at position 3, and the third can at position 5. The right hand is then placed on can 1, thumb up, and the elbow is bent at an angle of 100 to 120 degrees.

- **Position of the subject:** the subject is seated at the table and uses the dominant hand for the test.
- **Position of the examiner:** the examiner is standing close to the subject holding the stopwatch.
- **Procedure:** on the signal “Go”, the stopwatch is started and the participant turns the can upside down, placing can 1 at position 2, can 2 at position 4, and can 3 at position 6. The participant, with thumb down, then returns immediately to the first can, turning it upside down and replacing it in the original position, and proceeds the same way placing can 2 at position 3 and can 3 at position 5, thus completing one circuit. This procedure is repeated twice without interruptions, corresponding to one trial. If the participant is left-handed, the same procedure is adopted, except that the position of the soda cans is inverted, starting from the left side. Each participant performs two practice trials, followed by two valid trials for evaluation. The time of the last two trials is recorded to the nearest tenth of a second and the lowest time is used as the final result.
- **Observation:** the position of the cans is inverted if the subject is left-handed.

Adaptation of the test

- **Procedure:** the examiner indicates with the finger where the cans should be turned.

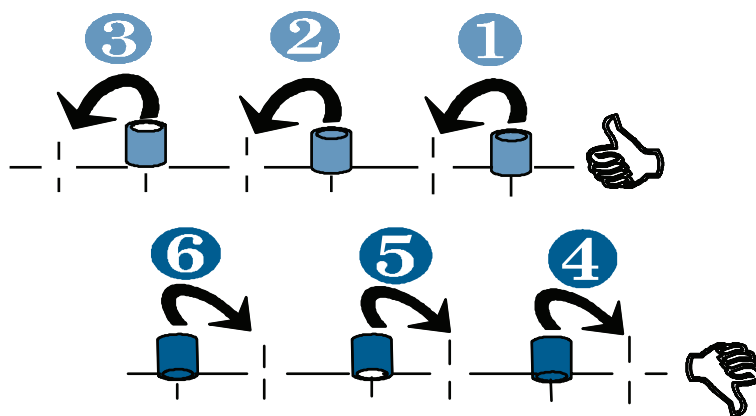


Figure 3. Schematic drawing of the coordination test (Zago and Gobbi, 2003).

Flexibility test

- **Equipment required:** adhesive tape and a metal ruler longer than 63 cm.
- **Organization of the test:** a 50.8-cm long tape is fixed on the floor and a metal measuring tape is fixed perpendicularly on the floor, with the 63.5-cm mark being placed directly on the adhesive tape. Two equidistant points are marked 15.2 cm from the center of the measuring tape (Figure 4).

- **Position of the subject:** The participant sits without shoes on the floor, with the legs stretched out, the feet spaced 30.4 cm apart, the toes pointing up, and the heels centered on the marks made on the adhesive tape. The zero of the measuring tape points to the participant.
- **Position of the examiner:** The examiner sits on the side, holding down the subject's knees.
- **Procedure:** With the hands on top of each other, the participant slowly slides the hands along the measuring tape as far as possible and holds the final position for at least 2 seconds. Two practice trials are allowed, followed by two test trials. The best distance of the two trials is recorded as the final result.

Adaptation of the test with assistance:

A wooden plank for support is fit between two chairs so that the participant could perform the flexibility test sitting on a chair.

- **Equipment required:** wooden plank with a drawn measuring line. Two chairs of the same height without armrests.
- **Organization of the equipment:** one chair is placed in front of the other and the wooden plank is fit on the two chairs.
- **Position of the subject:** the participant sits without shoes on one of the chairs, with the legs stretched out at an angle of 180 degrees, the feet spaced 30.4 cm apart, the toes pointing up, and the heels centered on the marks made on the plank. The zero of the measuring line points to the participant.
- **Position of the examiner:** the examiner places the wooden plank on the chair seat under the thighs of the subjects and on the seat of the other chair. The examiner assists the participant in extending the legs on the plank in the adequate position, holding down the subject's knees.
- **Procedure:** with the hands on top of each other, the participant slowly slides the hands along the measuring line drawn on the wooden plank as far as possible and holds the final position for at least 2 seconds. Two practice trials are performed, followed by two test trials. The best distance of the two trials is recorded as the final result.

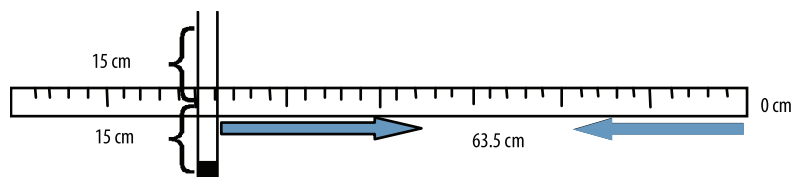


Figure 4. Schematic drawing of the flexibility test (Zago and Gobbi, 2003).

Upper limb strength and endurance test

- **Equipment required:** 1.8-kg weight for women and 3.6-kg weight for men, a chair without armrests.
- **Organization of the test:** the chair is placed in a comfortable room and the weights close to the chair.
- **Position of the subject:** the subject sits on the chair, leaning on the back

of the chair with the trunk erect and looking straight ahead, with the sole of the feet completely touching the floor. The dominant arm should remain relaxed and extended along the body (hand turned towards the body), whereas the non-dominant hand lies on the thigh. The weight should be parallel to the ground, with one end facing forward.

- **Position of the examiner:** two examiners. The first examiner stands on the side of the subjects and puts one hand on the biceps and the other on the triceps. The other examiner holds the weight placed in the dominant hand of the participant and a stopwatch.
- **Procedure:** the second examiner responsible for the stopwatch starts the test and the subject contracts the biceps, flexing the elbow until the forearm touches the hand of the first examiner placed on the subject's biceps. When the trial is completed, the weight is placed on the floor and the subject is allowed to rest for 1 minute. After this period, the test is repeated, but this time the subject performs the maximum number of repetitions over a period of 30 seconds, which is recorded as the final result of the test.

Adaptation of the test

- **Procedure:** there was no adaptation of the test. Weights of 2 kg for women and of 4 kg for men were used.

Overall aerobic endurance and walking ability test

- **Equipment required:** marked athletic track and a stopwatch.
- **Organization of the test:** performed on a running track.
- **Position of the subject:** the participant stands at the start line.
- **Position of the examiner:** the examiner stands close to the subject holding the stopwatch.
- **Procedure:** on the signal "Go", the subject starts walking as fast as possible (not running) 804.67 m on the 400-m track. The time spent for this task is recorded in minutes and seconds and then transformed into seconds.

Adaptation of the test

This test was changed to a 6-minute walk test to be more specific for fragile older adults.

- **Objective:** To evaluate aerobic endurance.
- **Equipment required:** a stopwatch, a measuring tape, cones, sticks, a piece of chalk, and a marker. For safety reasons, chairs should be placed at various points outside the circuit. 50 m, at intervals of 5 m.
- **Position of the subject:** the subject stands at the start line.
- **Position of the examiner:** the examiner stands at the start line holding the stopwatch.
- **Procedure:** the examiner assists with the execution of the test, holding the subject's arm and allowing the subject to perform the test at his/her own pace. The distance covered of a period of 6 minutes is recorded.