Content validity of an instrument for motor assessment of youth with autism

Validação de conteúdo de instrumento para a avaliação motora de jovens com autismo

Taís Elena Heidrich *
Laura Bastianel
Grazielle Martins Gelain
Cláudia Tarragô Candotti

Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, RS, Brasil

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*** Correspondence:** tais_elena_@hotmail.com

Abstract

Introduction: Children and adolescents with autism spectrum disorder (ASD) present motor disorders that have been the focus of physical therapy interventions. However, the standardized motor assessments available in the literature have important gaps, among them the complexity of the tasks evaluated and the absence of qualitative information about the subjects' performance. **Objective:** To develop and evaluate the content validity of the Gross Motor Assessment of Children and Adolescents with ASD checklist (GMA-AUT checklist). **Methods:** The GMA-AUT checklist was sent to a committee of experts for content validation. The content validity index (CVI) was used to assess the degree of agreement between the experts. To verify the content validity of the checklist, the minimal acceptable CVI was 0.80. **Results:** Based on the suggestions made, the GMA-AUT was reformulated and submitted to the same panel of experts for reassessment. In the second and final draft of the checklist, only two items had a CVI of 0.88, while all others reached a CVI of 1.00. **Conclusion:** The GMA-AUT checklist presents adequate content validity for assessing gross motor in children and adolescents with ASD according to experts in the field.

Keywords: Autism spectrum disorder. Physical therapy. Validity.

Resumo

Introdução: *Crianças e adolescentes com transtorno do espectro autista (TEA) apresentam alterações motoras que têm sido foco de intervenções fisioterapêuticas. Contudo as avaliações motoras padronizadas disponíveis na literatura possuem lacunas importantes, entre elas a complexidade das tarefas avaliadas e a ausência de informação qualitativa sobre o desempenho dos sujeitos.* ***Objetivo:*** *Desenvolver e avaliar a validade de conteúdo do instrumento "Avaliação Motora Grossa de Crianças e Adolescentes com Transtorno do Espectro Autista" (GMA-AUT).* ***Métodos:*** *A versão inicial do instrumento GMA-AUT foi enviada a um comitê de especialistas no tema para a validação de conteúdo através de um questionário. Para avaliar o grau de concordância entre os especialistas, utilizou-se o índice de validade de conteúdo (IVC), sendo IVC de 0,80 o mínimo aceitável.* ***Resultados:*** *A partir das sugestões dos especialistas na primeira rodada de avaliação, o GMA-AUT foi reformulado e a partir da segunda, originou-se a versão final. Na versão final do instrumento apenas dois itens apresentaram IVC de 0.88, enquanto todos os demais apresentaram IVC de 1.00.* **Conclusão:** *O instrumento GMA-AUT apresenta validade de conteúdo adequada para a avaliação motora grossa em crianças e adolescentes com TEA segundo especialistas na área.*

Palavras-chave: *Transtorno do espectro autista. Fisioterapia. Validação.*

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder of heterogeneous presentation, which is characterized by difficulty in communication and social interaction and the presence of repetitive or restricted behaviors and/or interests.[1] Even in the first reports on autism, a variety of movement abnormalities were described, including atypicalities in postural control, gait, movements of the upper limbs and fine motor coordination. However, these signs have not been investigated over the years as deeply as social deficits.[2] Furthermore, recently, motor problems have been related to the central symptoms of ASD, being one of the limiting causes of social interactions.[3,4]

The underdevelopment of motor skills induces a vicious cycle, in which movement avoidance leads to reduced physical interaction and consequently an increased discrepancy in motor skills, when compared to typical children.[5] By promoting experimentation with a variety of movements, motor interventions can increase body awareness and help in the creation of social bonds between individuals.[6] Physiotherapeutic work with the autistic public is still a recent practice[7] and little described in the literature. However, there is evidence that physical therapeutic interventions not only improve motor skills but also improve social aspects in children with ASD, reducing aggression and repetitive behaviors.[8]

A recent systematic review showed that the available standardized motor assessments used to assess motor skills in children with ASD are effective for differentiate them from typical children, but do not provide accurate information about motor development in ASD. Furthermore, the authors reported assessments limitations, such as the absence of the autistic public in the study samples and insufficient detailing of the motor patterns performed, merely considering whether the child is able to complete the requested movement.[9]

In this context, the use of quantitative tools that provide qualitative information on the nature of motor patterns in the assessment of children and adolescents with ASD is considered essential. Many methods such as 3D analysis and plantar pressure analysis systems have been employed;[9] however, due to their high cost, they end up restricted to the research context, and the gap in the outpatient evaluation of these children and young people remains. On the other hand, an instrument such as a checklist can be used both in research and in clinical practice, due to its low cost and ease of accessibility.

Given this scenario, the objective of this study was to develop and assess the content validity of the Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT checklist). Since it has been developed specifically for the clinical practice of physical therapists of this field, our hypothesis is that the GMA-AUT checklist will be able to provide valid information about the motor patterns of children and adolescents with autism spectrum disorder.

Methods

This study consists of an applied research on the development and content validity of the GMA-AUT checklist. It was approved by the Ethics and Research Committee of the Universidade Federal do Rio Grande do Sul, Brazil (CAAE 32720020.2.0000.5334) where it was carried out.

The development of the GMA-AUT checklist followed the standards on content validity of the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN),[10] which consists in a checklist that can be used by researchers who are conducting studies to assess measurement properties.

Development of the checklist

The GMA-AUT checklist consists of an observational assessment of gross motor skills of children and adolescents with ASD from four to 18 years of age and was designed to minimize the interference from the evaluator as much as possible. The assessment setting must be previously prepared and equipped, based on the instructions from the checklist (Appendix 1).

The first draft of the GMA-AUT checklist was developed in three phases: (1) exploratory phase, which has provided information for the initial composition of the checklist, based both on informal conversations with physical therapists and the practical experience of the researchers; (2) literature review, which has confirmed the initial information from the previous phase; (3) literature review to identify instruments used for gross motor assessment of children and adolescents with ASD, as well as their strengths and weaknesses. Each GMA-AUT item assesses the execution of postural changes and maintenance, gait, balance and object exploration. Each item is divided in two sections (Figure 1).

The first section corresponds to the individual's ability to perform the activity ("performs" or "does not perform"). It contains a decreasing score that varies from 5 to 0 points and considers the need and graduation of prompts. Prompts are the stimuli done by the evaluator to help the individual to perform a desired behavior.[11] If the subject does not need the prompt to perform the activity ("no prompt"), a score of 5 points should be assigned. The verbal prompt is a command said by the evaluator (4 points). The gestural prompt is a gesture the evaluator does, for example, using the hands, tilting the head or looking at some direction, without touching the subject (3 points). The "modeling" consists in the evaluator performing the evaluated activity, giving a model of the action the subject should imitate (2 points). The "partial physical prompt" occurs when evaluator touches the individual to give sensory input on the direction of the movement that should be performed, promoting the beginning of the action for the individual, who completes the movement by oneself (1 point).[11] The assessment should be carried out using the less-to-more prompt hierarchy, in order to assess the individual's ability to perform the demand with the least intrusive prompt possible.[12] If the individual does not perform the activity, even with the maximum acceptable prompt (partial physical prompt), the respective check box in the column "does not perform" should be marked, that is, if the activity was not performed due to motor inability or due to "non-motor" reasons, which include inappropriate behaviors, such as tantrums and escapes. Both answers score 0 point in the assessment.

The second section of the items ("how he/she performs the activity") approaches the motor performance of the individual, when the evaluator should observe how the subject performs the action to rate it according to the answer options. The number of answer options in this section varies from item to item, being the highest score correspondent to the one found in typical development.

The sum of the scores of each section ("performs or does not perform" + "how") represents the item's score. To obtain the final GMA-AUT score, the scores of all items must be summed and then divided by the maximum score of the checklist. The final score of the individual is in percentage (Figure 2). The first draft of the checklist had 18 items, which are listed in Table 1.

Table 1 - Items in the first draft of the GMA-AUT checklist

Item	Name of the item
1	Seated on the floor to standing
2	Seated on a bench to standing
3	Standing to seated on the floor
4	Seated on the floor
5	Standing to seated on a bench
6	Standing on solid/stable surface
7	Standing on soft/semi-unstable surface
8	Standing, eyes closed
9	Standing, kicking a ball with the right foot
10	Standing, kicking a ball with the left foot
11	Standing, catching a ball thrown towards him/her
12	Walking for five meters
13	Transposing of obstacles
14	Going up stairs
15	Going downstairs
16	Going up a ramp with a minimal inclination of 45°
17	Going down a ramp with a minimal inclination of 45°
18	Motor stims

Note: GMA-AUT = Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder.

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** With free arms, he/she changes to kneeling, half-kneeling and stands up.	☐ **(3)** Supporting his/her weight on the arms against the body, he/she changes to kneeling, half-kneeling and stands up.	☐ **(2)** Supporting his/her weight on the arms against the floor, he/she moves into bear standing and then standing up.	☐ **(1)** With the arms against furniture, he/she pulls him/herself for standing up.				

Figure 1 - Example of answer options for item 1 in the Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT) checklist (seated on the floor to standing): sections *perform/does not perform* and *how* (he/she performs the activity), and their respective fields for scoring.

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	SUM	TOTAL
Item score																		___/190=_____%	

Figure 2 - Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT) checklist scoring table in the first draft of the GMA-AUT checklist.

Expert review

The group of experts included nine neuropediatric physiotherapists with experience in caring for children and adolescents with ASD, which were selected by convenience. According to Lynn,[13] the definition of the number of experts is somehow arbitrary when determining the content validity of an instrument. However, the author suggests that a minimum of five experts would provide a sufficient level of control for chance agreement, with a minimum number of three experts being acceptable if the content area is very restricted. Other researchers in the field of instrument development agree with the number of experts proposed by Lynn[13] and suggest five to ten professionals,[14,15] considering that a larger number of experts can provide more information about an instrument.[16]

The initial search for experts was performed in scientific articles of the area and in posts on social networks. Professionals working in public rehabilitation institutions, private physical therapy clinics and physical therapy school clinics were selected.

After the initial contact with the experts, we sent the informed consent form (ICF) for those who accepted the invitation so that they could manifest their assent to participate in the research.

Data collection

After assenting to participate in the research, the experts received two files by e-mail: (1) the first draft of the GMA-AUT checklist and (2) a specific questionnaire for content validation.

The content validation questionnaire, which was designed specifically for this research, aimed to evaluate two variables: (a) clarity (checking the instrument format and the wording of title and instructions); and (b) validity (checking the 18 items of the checklist).

Clarity in instrument format and in the wording of title and instructions were evaluated using a 4-point Likert scale as follows: not clear (1 point); less clear (2 points); clear (3 points); and very clear (4 points). Each of the 18 items of GMA-AUT checklist was scored for content validity as invalid (1 point); less valid, need for a major revision (2 points); valid, need for a minor revision (3 points); and completely valid (4 points).14 The experts were asked to justify their answers in all the items of the content validation questionnaire they rated as 1, 2 or 3 points and to state what they have considered inappropriate. Still, in the end of the questionnaire there was a 15-line space for the experts spontaneously evaluate the instrument, providing critics and/or observations.

From the first draft of the instrument, the content validation was developed in three phases: (1) content assessment of the GMA-AUT checklist's first draft, which was appraised by experts in the field of neuropediatric physical therapy, who are experienced in caring for children and adolescents with ASD; (2) development of GMA-AUT checklist's second draft, which was carried out by two researchers who considered the experts' suggestions; and (3) presentation of the revised checklist (second draft) to the experts for content reassessment, from which the final draft of the checklist was obtained.

The content validity index (CVI) was used to determine experts' agreement on GMA-AUT checklist's content validation, measuring the content validity of each item and the checklist as a whole. For this, the following indexes were used: (1) Item-level content validity index (I-CVI), which is the proportion of experts giving item a rating of 3 or 4; (2) Scale-level content validity index/ universal agreement calculation method (S-CVI/UA), which is the proportion of items rated as of 3 or 4 by all the experts; (3) Scale-level content validity index/ averaging calculation method (S-CVI/Ave), which is the average for all items' responses, obtained by summing the I-CVI and dividing it by the number of questions in the content validity questionnaire; (4) proportion of relevance given by each expert (PRE), which is the proportion of questions each expert rated as 3 or 4; and (5) mean expert proportion (MEP), which is the mean PRE.[15] The acceptable agreement rate among experts to verify the validity of a new instrument, in general, must be at least 0.80 and, preferably, higher than 0.90.[15,17]

Results

During the process of content validity, the GMA-AUT instrument underwent two rounds of evaluation with the experts. After round 1, one expert withdrew consent to participate in the study, so the answers from this person were unconsidered in all rounds of assessment of the instrument. Then, eight experts participated in the whole process of content validity.

In round 1, the I-CVI ranged from 0.50 to 1.00 (Table 2), the S-CVI/Ave was 0.92, the S-CVI/UA was 72%, the PRE ranged from 83% to 100%, and the MEP was 91% (Table 2).

Table 2 - Results for round 1 of the Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT) checklist's Assessment

ITEM	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Agreement	I -CVI
1	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
2	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
3	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
4	✓	✓	x	✓	✓	✓	✓	✓	7	0.88
5	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
6	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
7	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
8	✓	x	✓	x	x	✓	✓	x	4	0.50
9	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
10	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
11	✓	✓	✓	x	✓	✓	✓	✓	7	0.88
12	✓	✓	✓	✓	x	✓	✓	x	6	0.75
13	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
14	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
15	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
16	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
17	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
18	✓	✓	x	x	x	✓	✓	x	4	0.50
PRE (%)	100	94	89	83	83	100	100	83	S-CVI/Ave = 0.92	
	Mean PRE= 91%								S-CVI/UA = 72%	

Note: ✓= Item rated as 3 or 4 in the questionnaire of content validation of GMA-AUT checklist; x = item rated as invalid or less valid by the experts. Item 1 = seated on the floor to standing; Item 2 = seated on a bench to standing; Item 3 = standing to seated on the floor; Item 4 = seated on the floor; Item 5 = standing to seated on a bench; Item 6 = standing on solid/stable surface; Item 7 = standing on soft/semi-unstable surface; Item 8 = standing, eyes closed; Item 9 = standing, kicking a ball with the right foot; Item 10 = standing, kicking a ball with the left foot; Item 11 = standing, catching a ball thrown towards him/her; Item 12 = walking for five meters; Item 13 = transposing of obstacles; Item 14 = going up stairs; Item 15 = going downstairs; Item 16 = going up a ramp with a minimal inclination of 45°; Item 17 = going down a ramp with a minimal inclination of 45°; Item 18 = motor stims; I-CVI = Item-level content validity index; S-CVI/UA = Scale-level content validity index/universal agreement calculation method; S-CVI/Ave = scale-level content validity index/averaging calculation method; PRE = proportion of relevance of each expert.

Items with I-CVI of 0.50 were excluded from the second draft of the instrument and the remaining items were reformulated following the suggestions provided by the experts. One of the suggestions was the inclusion of a new item called "vertical jump". Also, the experts suggested altering the order of the items and dividing them into "static assessment", when the items refer to the maintenance of a posture, and "dynamic assessment", when the items refer to postural change, walking or controlling an object. In round 2, only two items presented I-CVI of 0.88 while all other items presented I-CVI of 1.00. The S-CVI/Ave was 0.99, the S-CVI/UA was 88%, the PRE ranged from 88% to 100%, and the MEP was 98% (Table 3). The results obtained in this round justified the ending of the process of content validity and the creation of the final draft of GMA-AUT checklist.

Table 3 - Results for round 2 of the Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT) checklist's Assessment

ITEM	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Agreement	I -CVI
1	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
2	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
3	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
4	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
5	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
6	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
7	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
8	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
9	✓	✓	x	✓	✓	✓	✓	✓	7	0.88
10	✓	✓	x	✓	✓	✓	✓	✓	7	0.88
11	✓	✓	✓	x	✓	✓	✓	✓	8	1.00
12	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
13	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
14	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
15	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
16	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
17	✓	✓	✓	✓	✓	✓	✓	✓	8	1.00
PRE (%)	100	100	88	100	100	100	100	100	S-CVI/Ave = 0.99	
	Mean PRE = 98%								S-CVI/UA = 88%	

Note: ✓= Item rated as 3 or 4 in the questionnaire of content validation of GMA-AUT checklist; x = item rated as invalid or less valid by the experts. Item 1 = seated on the floor to standing; Item 2 = seated on a bench to standing; Item 3 = standing to seated on the floor; Item 4 = seated on the floor; Item 5 = standing to seated on a bench; Item 6 = standing on solid/stable surface; Item 7 = standing on soft/semi-unstable surface; Item 8 = standing, eyes closed; Item 9 = standing, kicking a ball with the right foot; Item 10 = standing, kicking a ball with the left foot; Item 11 = standing, catching a ball thrown towards him/her; Item 12 = walking for five meters; Item 13 = transposing of obstacles; Item 14 = going up stairs; Item 15 = going downstairs; Item 16 = going up a ramp with a minimal inclination of 45°; Item 17 = going down a ramp with a minimal inclination of 45°; Item 18 = motor stims; I-CVI = Item-level content validity index; S-CVI/UA = Scale-level content validity index/universal agreement calculation method; S-CVI/Ave = scale-level content validity index/averaging calculation method; PRE = proportion of relevance of each expert.

The title and instructions of GMA-AUT checklist obtained I-CVI of 1.00 in round 1 and the agreement rate remained still in round 2. Visual layout of the instrument obtained I-CVI of 0.88 in round 1, and 1.00 in round 2, being then considered clear by all the experts. The final draft of the GMA-AUT checklist is available in Appendix 1 and Appendix 2 (Portuguese version).

Discussion

Content validity

In this study, we evaluated the content validity of the GMA-AUT checklist, developed for gross motor assessment in children and adolescents with ASD. The committee of experts considered valid the content of GMA-AUT for gross motor ability assessment in children and adolescents with ASD, between four and 18 years old, with excellent I-CVIs.

A recent review on motor competences assessments for children with ASD or intellectual disabilities (ID) included ten instruments.[18] The Bruininks–Oseretsky Test of Motor Proficiency-2 (BOT-2), followed by the Test of Gross Motor Development-2 (TGDM-2), were the most psychometrically appropriate motor competency assessments for children with ID. Although current literature defends content validation of instruments,[13,19] the instruments for gross motor assessment included in the systematic review did not present content validation in their process of validation.[18]

Valentini[20] translated and investigated the content, criteria, and construct validity and reliability of the TGMD-2 for Brazilian children with atypical development. The result of agreement for language clarity of motor items was 0.96 and 0.89 for pertinence. In the present study, validity of motor items was 0.99.

In a systematic review on validity and reliability of motor assessments in children and adolescents, content validity was the less investigated measurement property.[19] The authors reiterate that in batteries of abilities which are well stablished in the field as the TGDM, it is possibly assumed that content validity has already been tested. However, this supposition could not be made because this test, for example, evaluates abilities that have limited relevance in individuals from other countries.[21,22] Still, they suggest that experts might provide their evaluation regarding the applicability of an instrument in population of interest before this instrument be used in a population.[19]

Adjustments

After round 1, item 8 (standing, eyes closed) and item 18 (motor stims) from the first draft were considered invalid by half of the experts. They justified that few children would accept to keep the eyes closed because of the sensorial alterations that it causes. The dependence on vision in the static balance of children with ASD has been confirmed in previous studies in which moderate severity ASD children were asked to close their eyes or wear a blindfold during balance assessments.[23,24] However, this kind of assessment (with eyes closed) can be difficult for children with more severe ASD, since static assessments of postural control are influenced by patient's motivation, focus, cooperation and effort[25] and may be a problem when applied in a population that often presents communication, learning, attention and behavioral problems.

In this way, with the intention of using a methodology that would allow the assessment of balance in minimally cooperative patients[23] and could be performed even by subjects with limited cognitive capacity without the need for a direct command, we kept item 2 (standing on a solid/stable surface) and item 3 (standing on a soft/semi-unstable/soft surface), as these items are subject to observation and can be performed spontaneously by the patient. We believe that these items are relevant as children with ASD have greater postural sway on unstable surfaces compared to children with typical development.[26]

Regarding motor stims/stereotypies, there was divergence among experts. Three professionals justified that such item should be excluded, as it did not concern motor skills directly. This disagreement also occurs in literature because there is controversy on the causes of this behavior. Although no model got major support between specialists, Applied Behavior Analysis, which is the predominant behavioral theory currently, suggests that motor stims are maintained by automatic reinforcement or social interactions.[27] A second view, which is postulated by homeostatic theories, suggests that there is an optimal level of stimulus for each individual and motor stimming have a compensatory regulatory function in both less stimulating and overstimulating environments.[28,29] Lastly, another approach says that

motor stims are seen as a motor disorder which does not depend on functional interpretation, but it reflects involuntary actions of a deregulated motor control system.[30,31] Thus, due to the lack of consensus among experts and in the literature, and since the influence of motor stims on development is not fully elucidated, the item about motor stims was removed from the instrument.

In addition to the removal of those items, two experts suggested the inclusion of jump assessments, with item 13 being added in the second draft (vertical jump). Children with ASD have several deficits in gross motor skills, such as running, jumping and sliding.[32-34] The decreased motor function in skills involving lower limbs mimics motor patterns commonly found in hypotonia,[35] what can affect dorsiflexion and plantar flexion control and function.[36] Apparently, these changes continue into adulthood, once young adults with ASD have lower angles of flexion of the hips and knees and greater angles of dorsiflexion of the ankle when compared to participants without ASD in long jump assessment, showing the existence of a pattern of inefficiency in the use of lower limbs' distal joints.[36]

In round 2, only one expert presented PRE of 88%, while all others presented PRE of 100%, considering all valid items. Expert 3 considered less valid items 9 and 10 (standing, kicking a ball with the right foot/left foot). The expert sustained the same suggestion from round 1 that the nomenclature "dominant foot" and "non-dominant foot" should be used. However, we understand that the determination of foot dominance involves a prior assessment, which we cannot assume will be carried out prior to the application of the GMA-AUT. So, we chose to keep the nomenclature referring to laterality. Moreover, other study[37] indicates that the process of lateralization and dominance of lower limbs is completed around the sixth year of life, then if this item was modified following the expert's suggestion, it could not be applied to the age group for which the assessment is intended (from four to 18 years old).

Differentials

Motor abnormalities in ASD manifest early in childhood and often precede the emerging of primary deficits, besides presenting intrinsic relationship with central characteristics of ASD as they affect the learning of perceptual motor skills and limit social interactions.[3,4]

Wilson et al.[9] systematically reviewed the literature to describe standardized motor assessments that are most commonly used in children with ASD. They indicated that the main global limitation of these assessments is the absence of children with ASD in the sample of the included studies, which affects validity and reliability of these measures when assessing this population. Similar review concluded that assessments developed specifically for this population showed greater feasibility, what corroborates with the importance of using population-specific tools.[18]

Another limitation of the assessments was in scoring only motor skills, without describing motor patterns.[9] This was a major concern in the development of the GMA-AUT, which aims to provide qualitative information about how the individual performs the motor task (through a quantitative scale) and not just informing whether the individual was able to perform it or not.

In this way, it is important to note that about 70 to 75% of children with ASD demonstrate a co-occurrence of moderate to severe ID,[38] and these children obtain lower values on tests of motor skills when compared to typical children of the same age.[39] For this reason, Wilson et al.[9] suggest that motor assessments in this population should not use methods which require cognitively complex tasks, but should approach different levels of intellectual and behavioral functions. These topics guided the development of an instrument which has an observational nature. Also, the division of the checklist items into two sections aimed to appraise both motor and social-behavioral issues.

In this context, the development of a specific standardized assessment for children with ASD is important both in the outpatient setting, to direct motor intervention and to measure treatment results, and in the context of scientific production, to allow the determination of motor patterns for ASD, which enables further studies on the relationship of these patterns with the concepts of motor cognition and its role in the social skills of individuals with ASD.[9,40]

Limitations

We understand that an observational assessment of the spontaneous motion of children and adolescents with ASD, which aims to embrace all levels of cognitive and behavioral function, may have limited the assessment of other skills that might be important such

as the unipodal balance assessment and the horizontal jump, for example. However, we believe that these skills are indirectly included in the evaluation of items such as kicking a ball (which requires unipodal support while the contralateral foot performs the kick) and vertical jump (which assesses the ability to provide impulse).

Content validation, according to the COSMIN criteria,[10] can also be performed on the target population. However, we considered that this requirement would not be applicable as the target population in this study are children and adolescents with ASD. Another COSMIN's requirement that was not applied refers to recordings and transcripts of meetings and interviews, which did not occur since the questionnaire for content validity was closed-ended (but with empty space for writing suggestions), and it was replied by e-mail.

Conclusion

The content proposed by the GMA-AUT checklist was considered valid from the perspective of experts in the field. Nevertheless, it is noteworthy that it is still necessary to assess the reliability of the GMA-AUT to be used both in clinical practice and in research. Currently, the GMA-AUT checklist is available as a support material in the teaching-learning process in the academic context of physical therapy.

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Authors' contribution

All authors were responsible for conceptualization, and resources were provided by GMG and CTC. TEH, LB and CTC were responsible for the methodology; TEH, LB and GMG, for validation and analysis; TEH, for investigation, data curation, write of the original draft and project administration. All authors reviewed and edited the original draft, and CTC supervised it.

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Appendix 1 - Gross Motor Assessment of Children and Adolescents with Autism Spectrum Disorder (GMA-AUT)

Name:_____ D.B.:___/___/___ Final Score:_____ Evaluator:_____ Assessment Date: ___/___/___

MATERIALS AND ENVIRONMENT:

1. Reinforcers (toys or objects of great interest to the subject).
2. Bench on which the subject sits, with feet touching the ground, hips and knees flexed at 90°.
3. Foam block, Airex® type.
4. Ball with a diameter between 25 and 30 centimeters (slightly larger than a soccer ball), preferably inflatable.
5. Step (solid block; bench) with a minimum height of 12 centimeters and a minimum width equivalent to the approximate width of the subject's pelvis.
6. Stairs with handrails and at least 04 steps.
7. Ramp with standardized slope of therapeutic equipment and sufficient length to change at least 3 steps;
8. Photographic camera.
9. Tripod or stable camera holder.

GENERAL INSTRUCTIONS:

1. This instrument is intended for the gross motor assessment of children and adolescents with Autism Spectrum Disorder, aged 4 to 18 years.
2. The assessment should take place in a quiet environment, in a room as neutral as possible, with as few resources as possible, aiming not to distract the person who is being assessed. The environment must be previously organized to minimize discontinuity and interruption of the evaluation.
3. The assessment must be filmed from start to finish and then scored on the assessment sheet (which at the time of assessment will only serve as a guide of what should be assessed). The items completion may occur in a different order from the order in the evaluation sheet.
4. The evaluator should avoid giving commands about the tasks to be performed (except in the case of a verbal prompt - see below), letting the evaluated move as naturally as possible. Prompts only need to be provided if the subject does not perform the item independently (spontaneously or provoked through the use of reinforcers). For example: placing the reinforcer on the floor so that the subject sits on the floor or moving it to the opposite side of the room so the subject can walk.
5. The evaluator can use any resource or strategy that he/she considers valid to encourage the evaluated person to perform the task, as long as he/she does not give the direct command (because if he/she does, the use of a verbal prompt should be considered). For example: singing a song, using a video on a tablet or asking the subject to look at a fixed point while maintaining the standing posture.
6. The items are divided into two sections: static assessment – items that assess the ability to maintain postures; and dynamic assessment – items that assess postural changes, movements and displacements.
7. It is suggested that the evaluation be carried out completely in two moments, with a maximum interval of 7 days, in order to record the best performance.

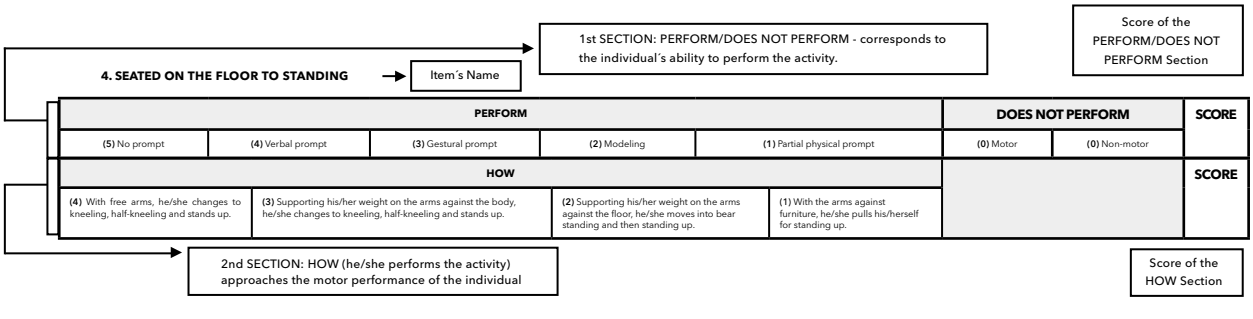
SPECIFIC INSTRUCTIONS:

ITEM 2. STANDING ON STABLE/SOLID SURFACE (ground) and ITEM 3. STANDING ON SEMI-UNSTABLE/SOFT SURFACE (foam block) - For the assessment of these items, it is suggested that the assessed be asked to look at a fixed point (for example: image on the wall, television, tablet positioned in front of the eyes, but out of reach), in order to promote greater concentration and time spent in the posture.

ITEM 11. WALKING FOR 2 METERS - For gait assessment, the height of the tripod/camera support must be set at approximately half the height of the subject and so that the entire subject can be seen in the visual field. The filming must be done in two different ways: in the sagittal plane, filming the subject in the lateral view, at a distance that is possible to evaluate at least four steps; and in the frontal plane, filming the subject in the posterior view. A minimum distance of 2 meters is suggested, taking into account the phases of acceleration and deceleration, thus allowing the assessment of the person's usual gait. If the evaluated person does not walk in a straight line and continuously for at least 2 meters, the evaluator must check in the filming if there was a record of the gait in which it is possible to evaluate the sub-items of the "HOW" section.

ITEM 13. VERTICAL JUMP – For this item assessment, it is suggested that a reinforcing object be held in the air by the evaluator, at a height greater than the subject's height, promoting the jump in an attempt to catch the object.

ITEM 14. GOING UP STAIRS and ITEM 15. GOING DOWN STAIRS – It is necessary that the subject go up or down in at least 3 steps for these items' assessments.



SCORING INSTRUCTIONS:

Each item has two sections, the first of which corresponds to the subject's ability to perform the activity evaluated (PERFORM/DOES NOT PERFORM), also considering the need and grading of prompts to do.

"No prompt" corresponds to carrying out the activity without any interference from the evaluator. For example, in item 1. SITTING ON THE FLOOR TO STANDING, the subject must do it in the search for a toy or object of interest, without the evaluator speaking, gesticulating, modeling or touching the individual. This answer is worth 5 points.

"Verbal prompt", considering the same example, the evaluated would only make the postural change at the command of the evaluator "get up" or "stand up", with a value of 4 points in the evaluation.

"Gestural prompt" is a gesture the evaluator does, for example, using the hands, tilting the head or looking at some direction, without touching the subject. This answer is equivalent to 3 points.

"Modeling" consists of the evaluator performing the evaluated activity, in the case of the example, getting up from the floor and standing up so that the evaluated person imitates the action that was modeled, thus receiving a score of 2 points.

"Partial physical prompt" allows the evaluator to touch the subject, providing sensory input on the movement direction that must be performed and promoting an initiation of action, but without performing the movement completely by the individual. This answer is worth 1 point.

The assessment should be performed using less-to-more prompt hierarchy, in order to assess the ability of the subject to perform the demand with the least intrusive prompt possible. If the individual does not perform the activity, even with the maximum acceptable prompt (partial physical prompt), the respective check box in the column "does not perform" should be marked, that is, if the activity was not performed due to motor inability or due to "non-motor" reasons, which include inappropriate behaviors, such as tantrums and escapes. Both answers score 0 point in the assessment. It is suggested that the evaluator uses the gray field to record the "non-motor" motive if he is able to identify it (ie behavior, sensory alteration, etc.), in order to compare with future evaluations.

After assessing the child's ability to perform the action and verifying that the child is capable, regardless of the level of cues needed, the evaluator must proceed to the second section of the item, which concerns the individual's motor performance (HOW). To score this section, the evaluator must observe how the subject performs the action and score according to the response options. The highest score corresponds to what would be ideal, found in typical development. The number of response options may vary from item to item. The best motor performance should be considered, regardless of the prompts needed, that is, the score in the HOW section should prevail over the score in the PERFORM/DOES NOT PERFORM section.

For example: if, from sitting on the floor to standing, the subject does it without support from the upper limbs, moving to kneeling, semi-kneeling and standing (score 4) with a verbal prompt (score 4), it is preferable to assign this score from the which he does with the support of the upper limbs, moving to kneeling, semi-kneeling and standing (score 3) and without any prompt (score 5).

After defining the answers in the two sections, the scores must be noted in the space provided (SCORE). The scores for each section must also be added (PERFORM/DOES NOT PERFORM + HOW) and recorded in the score table on the last assessment sheet. The score of all items must also be added and divided by the maximum score of the assessment, resulting in a percentage number, corresponding to the final score obtained.

STATIC EVALUATION

1. SEATED ON THE FLOOR

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
TRUNK CONTROL	☐ **(3)** Maintains sitting posture, without upper limbs support.	☐ **(2)** Maintains sitting posture with an upper limb support.	☐ **(1)** Maintains sitting posture with both upper limbs support.				
LOWER LIMBS	☐ **(4)** Sits with lower limbs forward or sideways.	☐ **(3)** Sit on the heels (low kneelisng) or cross-legged (criss-cross).	☐ **(2)** Sits with excessive lower limb abduction.	☐ **(1)** "W"sitting (between the heels).			
TRUNK POSTURE	☐ **(2)** When seated, maintains the torso upright, with proper alignment.	☐ **(1)** When seated, presents kyphotic posture.	☐ **(1)** When sitting, has hyperlordosis.				

2. STANDING ON SOLID/STABLE SURFACE (FLOOR)

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(2)** Maintains unsupported standing posture for more than 20 seconds without becoming unbalanced.		☐ **(1)** Maintains standing posture without support, but loses balance before 20 seconds, taking small steps in the same place. TIME: ____					

3. STANDING ON SOFT/SEMI-UNSTABLE (FROM BLOCK)

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(2)** Maintains unsupported standing posture for 5 seconds or more, making necessary postural adjustments, without performing compensatory steps.		☐ **(1)** Maintains standing posture without support, but loses balance before 5 seconds, taking compensatory steps to regain balance.					

DYNAMIC EVALUATION

4. SEATED ON THE FLOOR TO STANDING

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** With free arms, he/she changes to kneeling, half-kneeling and stands up.	☐ **(3)** Supporting his/her weight on the arms against the body, he/she changes to kneeling, half-kneeling and stands up.	☐ **(2)** Supporting his/her weight on the arms against the floor, he/she moves into bear standing and then standing up.	☐ **(1)** With the arms against furniture, he/she pulls his/herself for standing up.				

5. SEATED ON A BENCH TO STANDING

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** Without upper limb support and without excessive trunk flexion (< 60° approx.).	☐ **(3)** Without upper limb support, but presenting excessive trunk flexion (> 60° approx.).	☐ **(2)** With upper limb support on the bench.	☐ **(1)** With upper limb support on furniture in front or with physical help from another person to pull oneself.				

6. STANDING TO SEATED ON THE FLOOR

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(5)** Moving to half-kneeling and kneeling/squatting, sitting with movement control, without upper limb support.	☐ **(4)** Moving to half-kneeling and kneeling/squatting, sitting with control of the movment, with upper limb support in only half of the transition.	☐ **(3)** Moving to semi-kneeling and kneeling/squatting, sitting with movement control, with upper limb throughout the transition.	☐ **(2)** Moving to semi-kneeling and kneeling/squatting with upper limb support throughout the transition, and no movement control.	☐ **(1)** With upper limb support on furniture in front or with physical help from another person to pull oneself.			

7. STANDING TO SEATED ON A BENCH

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(3)** Without upper limb support, without excessive trunk flexion (<60° approx.), controlling movement speed.	☐ **(2)** Without upper limb support and controlling movement speed but presenting excessive trunk flexion (< 60° approx.).	☐ **(1)** With upper limb support on the bench with excessive trunk flexion (< 60° approx.) and no control of the movement speed.					

8. STANDING, CATCHING A BALL THROWN TOWARDS HIM/HER

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(3)** Maintains standing posture, and catches ball thrown towards he/she with both hands, without letting it fall.	☐ **(2)** Maintains standing posture, and touches with one or both hands a ball thrown towards him/her, but is unable to catch it.	☐ **(1)** Maintains standing posture and initiates movement with upper limbs to catch a ball thrown towards him/her, but with delay.					

9. STANDING, KICKING A BALL WITH THE RIGHT FOOT

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** Maintains standing posture without support, transfers weight to the left leg and lifts the right lower limb off the ground to kick ball slowly displaced towards him/her.	☐ **(3)** Maintains standing posture without support, transfers weight to the left leg and lifts the right lower limb off the ground to kick a stationary ball in front of him/her.	☐ **(2)** Maintains standing posture without support, transfers weight to the left leg, lifts the right lower limb from the ground to kick a stationary ball in front of him/her, but becomes unbalanced.	☐ **(1)** Maintains standing posture with the upper limbs support on furniture or wall, removes the right lower limb from the ground to kick a stationary ball in front of him/her.				

10. STANDING, KICKING A BALL WITH THE LEFT FOOT

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** Maintains standing posture without support, transfers weight to the right leg and lifts the left lower limb off the ground to kick ball slowly displaced towards him/her.	☐ **(3)** Maintains standing posture without support, transfers weight to the right leg and lifts the left lower limb off the ground to kick a stationary ball in front of him/her.	☐ **(2)** Maintains standing posture without support, transfers weight to the right leg, lifts the left lower limb from the ground to kick a stationary ball in front of him/her, but becomes unbalanced.	☐ **(1)** Maintains standing posture with the upper limbs support on furniture or wall, removes the left lower limb from the ground to kick a stationary ball in front of him/her.				

11. WALKING FOR TWO METERS

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
ASSISTANCE	☐ **(3)** Walks 2 meters independently.	☐ **(2)** Walks for 2 meters with support on one hand.	☐ **(1)** Walks for 2 meters with support in both hands.				
BASE OF SUPPORT	☐ **(3)** Feet hip-width apart.	☐ **(2)** Feet slightly wider than hips.	☐ **(1)** Feet exaggeratedly wider than hips.				
EXT. ROTATION RIGHT LL	☐ **(3)** Forefoot aligned with hindfoot.	☐ **(2)** Forefoot slightly more abducted than hindfoot.	☐ **(1)** Forefoot exaggeratedly more abducted than hindfoot.				
EXT. ROTATION LEFT LL	☐ **(3)** Forefoot aligned with hindfoot.	☐ **(2)** Forefoot slightly more abducted than hindfoot.	☐ **(1)** Forefoot exaggeratedly more abducted than hindfoot.				
KNEES	☐ **(2)** No apparent changes.	☐ **(1)** Tendency to hyperextension in stance phase.	☐ **(1)** Tendency to knee flexion in stance phase.				
FOOT CONTACT	☐ **(3)** Support in all plantar regions on both feet.	☐ **(2)** Altered support on one foot.	☐ **(1)** Altered support on both feet.				

12. TRANSPOSING OF OBSTACLES (STEP/SOLID EVA BLOCK)

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** Looks at the obstacle and crosses it with both feet.	☐ **(3)** Looks at the obstacle, passes it with the front foot, but trips with the back foot.	☐ **(2)** Looks at the obstacle and starts the transposition, but trips with the front foot.	☐ **(1)** Does not look at the obstacle and does not consider crossing it, walking normally.				

13. VERTICAL JUMP

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(4)** Squats and extends lower limbs to jump, taking feet off the ground.	☐ **(3)** Squats and extends lower limbs to jump, but takes feet partially off the ground (forefoot remains on ground).	☐ **(2)** Squats and extends legs to jump, but does not take feet off the ground.	☐ **(1)** Does not initiate squat to jump.				

14. GOING UPSTAIRS

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(6)** Goes upstairs without upper limbs support, alternating lower limbs.	☐ **(5)** Goes upstairs without upper limbs support, without alternating lower limbs.	☐ **(4)** Goes upstairs with an upper limb support, alternating lower limbs.	☐ **(3)** Goes upstairs with an upper limb support, without alternating lower limbs.	☐ **(2)** Goes upstairs with both upper limbs support, alternating lower limbs.	☐ **(1)** Goes upstairs with both upper limbs support, without alternating lower limbs.		
☐ **(4)** Goes upstairs without performing any postural compensation.	☐ **(3)** Goes up the steps performing <u>one</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(2)** Goes up the steps performing <u>two</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(1)** Goes up the steps performing <u>all</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.				

15. GOING DOWNSTAIRS

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(6)** Goes downstairs without upper limbs support, alternating lower limbs.	☐ **(5)** Goes downstairs without upper limbs support, without alternating lower limbs.	☐ **(4)** Goes downstairs with an upper limb support, alternating lower limbs.	☐ **(3)** Goes downstairs with an upper limb support, without alternating lower limbs.	☐ **(2)** Goes downstairs with both upper limbs support, alternating lower limbs.	☐ **(1)** Goes downstairs with both upper limbs support, without alternating lower limbs.		
☐ **(4)** Goes downstairs without performing any postural compensation.	☐ **(3)** Goes down the steps performing <u>one</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(2)** Goes down the steps performing <u>two</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(1)** Goes down the steps performing <u>all</u> of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.				

16. GOING UP A RAMP WITH A MINIMAL INCLINATION OF 45º

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(3)** Goes up a ramp without support from the upper limbs.		☐ **(2)** Goes up a ramp with an upper limb support.		☐ **(1)** Goes up a ramp with support from both upper limbs.			
☐ **(3)** Does not increase support base.		☐ **(2)** Slightly increases support base.		☐ **(1)** Excessively increases support base.			
☐ **(4)** Goes up a ramp without performing any postural compensation.	☐ **(3)** Goes up a ramp performing one of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(2)** Goes up a ramp performing two of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.		☐ **(1)** Goes up a ramp performing all of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.			

17. GOING DOWN A RAMP WITH A MINIMAL INCLINATION OF 45º

PERFORM					DOES NOT PERFORM		SCORE
☐ **(5)** No prompt	☐ **(4)** Verbal prompt	☐ **(3)** Gestural prompt	☐ **(2)** Modeling	☐ **(1)** Partial physical prompt	☐ **(0)** Motor	☐ **(0)** Non-motor	
HOW							**SCORE**
☐ **(3)** Goes down a ramp without support from the upper limbs.		☐ **(2)** Goes down a ramp with the support of an upper limb.		☐ **(1)** Goes down a ramp with support from both upper limbs.			
☐ **(3)** Goes down in a controlled manner.		☐ **(2)** Goes down with little control.		☐ **(1)** Goes down without movement control (unable to control movement speed).			
☐ **(4)** Goes down a ramp without performing any postural compensation.	☐ **(3)** Goes down a ramp performing one of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.	☐ **(2)** Goes down a ramp performing two of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.		☐ **(1)** Goes down a ramp performing all of the following compensations: trunk inclination, external rotation of lower limbs, altered plantar support.			

SCORE TABLE

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	SUM	TOTAL
Item score																		___/190=	_____%

Appendix 2 - Avaliação Motora Grossa de Crianças e Adolescentes com Transtorno do Espectro Autista (GMA-AUT)

Nome:_____ D.N.:___/___/___ Pontuação Final:_____ Avaliado:_____ Data da Avaliação: ___/___/___

EQUIPAMENTOS E AMBIENTE:

1. Reforçadores (brinquedos ou objetos de grande interesse do avaliado).
2. Banco no qual o avaliado sente e fique com os pés apoiados no solo e quadris e joelhos flexionados a 90°.
3. Bloco de espuma, do tipo Airex®.
4. Bola com diâmetro entre 25 e 30 centímetros (pouco maior que uma bola de futebol), preferencialmente inflável.
5. Degrau (bloco sólido de EVA; banco) com altura mínima de 12 centímetros e largura mínima equivalente à largura aproximada da pelve do avaliado.
6. Escada com corrimãos e pelo menos 04 degraus.
7. Rampa com inclinação padronizada de equipamentos terapêuticos e comprimento suficiente para a troca de pelo menos 3 passos.
8. Câmera fotográfica.
9. Tripé ou suporte estável para câmera.

INSTRUÇÕES GERAIS:

1. Esse instrumento é destinado à avaliação motora grossa de crianças e adolescentes com Transtorno do Espectro Autista, de 4 a 18 anos.
2. A avaliação deve ocorrer em um ambiente tranquilo, em uma sala o mais neutra possível, com o mínimo de recursos que possam ser distratores para o avaliado. O ambiente deve ser previamente organizado para minimizar descontinuidade e interrupção da avaliação.
3. A avaliação deve ser filmada do início ao fim e posteriormente pontuada na folha de avaliação (que no momento da avaliação servirá apenas como um roteiro do que deve ser avaliado). A realização dos itens pode ocorrer em ordem diferente da ordem da folha de avaliação.
4. O avaliador deve evitar dar comandos sobre as tarefas a serem realizadas (exceto no caso de ser necessária uma dica verbal - veja a seguir), deixando que o avaliado se movimente de forma mais natural possível. As dicas só precisam ser fornecidas caso o avaliado não realize o item de forma independente (de maneira espontânea ou provocada a partir do uso de reforçadores). Por exemplo: colocar o reforçador no solo para que o avaliado sente no solo ou movê-lo para o lado oposto da sala para que o avaliado caminhe.
5. O avaliador pode utilizar qualquer recurso ou estratégia que considere válida para estimular o avaliado a realizar a tarefa, desde que não dê o comando direto (pois caso dê, deve ser considerado o uso de dica verbal). Por exemplo: cantar uma música, utilizar um vídeo em tablet ou pedir para que o avaliado olhe para um ponto fixo durante a manutenção da postura em pé.
6. Os itens estão divididos em duas seções: avaliação estática – itens que avaliam a capacidade de manter posturas; e avaliação dinâmica – itens que avaliam trocas posturais, movimentos e deslocamentos.
7. Sugere-se que a avaliação seja realizada por completo em dois momentos, com um intervalo máximo de 7 dias, visando registrar o melhor desempenho.

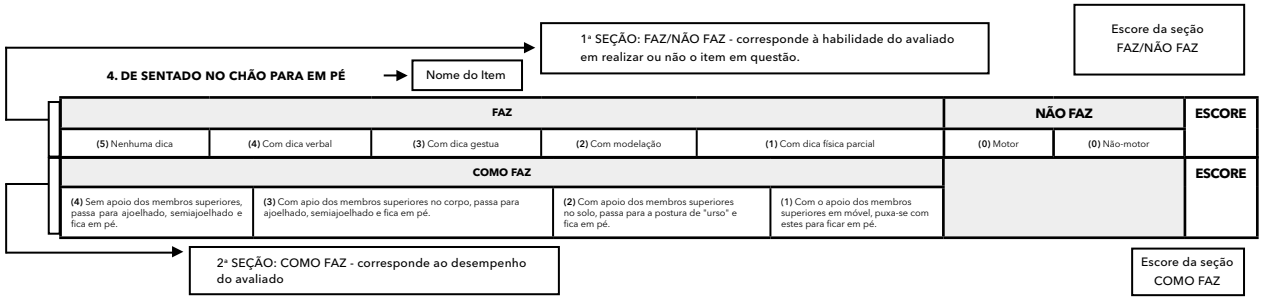
INSTRUÇÕES ESPECÍFICAS:

ITEM 2. EM PÉ SOBRE SUPERFÍCIE ESTÁVEL/SÓLIDA (solo) e ITEM 3. EM PÉ SOBRE SUPERFÍCIE SEMI-INSTÁVEL/MACIA (bloco de espuma) - Para a avaliação destes itens, sugere-se que o avaliado seja solicitado a olhar para um ponto fixo (por exemplo: imagem na parede, televisão, tablet posicionado a frente na altura dos olhos, mas fora de seu alcance), a fim de promover maior concentração e tempo de permanência na postura.

ITEM 11. CAMINHA POR 2 METROS - Para a avaliação da marcha, a altura do tripé/suporte da câmera deve ser regulada em aproximadamente a metade da estatura do avaliado e de maneira que o campo visual abranja todo o avaliado. A filmagem deve ser feita de duas maneiras distintas: no plano sagital, filmando o avaliado na vista lateral, a uma distância que seja possível avaliar pelo menos quatro passos; e no plano frontal, filmando o avaliado na vista posterior. É sugerida a distância mínima de 2 metros levando em consideração as fases de aceleração e desaceleração, permitindo assim que seja avaliada a marcha habitual do avaliado. Caso o avaliado não caminhe em linha reta e de maneira contínua por pelo menos 2 metros, o avaliador deve consultar na filmagem se houve registro da marcha no qual seja possível avaliar os subitens da seção "COMO FAZ".

ITEM 13. SALTO VERTICAL – Para avaliação deste item, sugere-se que um objeto reforçador seja segurado no ar pelo avaliador, em altura superior ao alcance do avaliado, promovendo o salto na tentativa de pegar o objeto.

ITEM 14. SOBE ESCADAS e ITEM 15. DESCE ESCADAS – É preciso que o avaliado realize a subida ou descida de no mínimo 3 degraus para a avaliação destes itens.



INSTRUÇÕES PARA PONTUAÇÃO:

Cada item apresenta duas seções, sendo a primeira delas correspondente a capacidade do sujeito em realizar a atividade avaliada (FAZ/NÃO FAZ), considerando também a necessidade e graduação de dicas para tanto.

"Nenhuma dica" corresponde a realização da atividade sem nenhuma interferência do avaliador. Por exemplo, no item 1. DE SENTADO NO CHÃO PARA EM PÉ, o avaliado deve fazê-lo na busca por algum brinquedo ou objeto de seu interesse, sem que o avaliador fale, gesticule, modele ou toque no indivíduo. Essa resposta vale 5 pontos.

"Dica verbal", levando em consideração o mesmo exemplo, o avaliado somente faria a troca postural ao comando do avaliador "levante-se" ou "fique em pé", tendo o valor de 4 pontos na avaliação.

"Dica gestual" consiste em algum sinal que o avaliador faça com as mãos, inclinações de cabeça ou olhar em um sentido, sinalizando a direção do movimento que deve ser executado, sem tocar no sujeito. Essa resposta equivale a 3 pontos.

"Modelação" consiste no avaliador executar a atividade avaliada, no caso do exemplo, levantando-se do chão e colocando-se em pé para que o avaliado imite a ação que foi modelada, recebendo assim o escore de 2 pontos.

"Dica física parcial" permite que o avaliador toque o avaliado, fornecendo um input sensorial da direção do movimento que deve ser executado e promovendo uma iniciação da ação, porém sem realizar o movimento completamente pelo indivíduo. Essa resposta vale 1 ponto.

Deve-se realizar a avaliação utilizando o sistema de esvanecimento de dicas de menos para mais, a fim de avaliar a capacidade do avaliado em realizar a demanda com a dica menos intrusiva possível. Se o sujeito não executar a atividade, mesmo com a dica máxima aceitável (dica física parcial), deve ser pontuada na coluna "NÃO FAZ", respondendo se a não realização se deu por inabilidade motora ou por motivos "não-motores", que incluem comportamentos inadequados, como birras e fuga da demanda. Ambas as respostas pontuam 0 pontos na avaliação. Sugere-se que o avaliador utilize o campo em cinza para registrar o motivo "não-motor" caso seja capaz de identificá-lo (ex: comportamento, alteração sensorial etc), a fim de comparar com avaliações futuras.

Avaliada a capacidade da criança em executar a ação e constatado que a criança é capaz, independentemente do nível de dicas necessário, o avaliador deve seguir para a segunda seção do item, que diz respeito ao desempenho motor do avaliado (COMO FAZ). Para pontuação dessa seção, o avaliador deve observar como o avaliado executa a ação e pontuar conforme as opções de resposta. A pontuação mais alta corresponde ao que seria o ideal, encontrado no desenvolvimento típico. A quantidade de opções de respostas pode variar de item para item. Deve ser considerado o melhor desempenho motor, independentemente da quantidade de dicas, ou seja, a pontuação da seção COMO FAZ deve prevalecer sobre a pontuação da seção FAZ. Por exemplo: se, de sentado no chão para em pé, o avaliado faz sem apoio dos membros superiores, passando para ajoelhado, semi-ajoelhado e em pé (pontuação 4) com dica verbal (pontuação 4), é preferível atribuir essa pontuação do que se ele faz com apoio dos membros superiores, passando para ajoelhado, semi-ajoelhado e em pé (pontuação 3) e sem nenhuma dica (pontuação 5).

Após a definição das respostas das duas seções, os escores devem ser anotados no espaço destinado (ESCORE). Os escores de cada seção devem também ser somados (FAZ + COMO FAZ) e registrados na tabela de pontuação na última folha de avaliação. A pontuação de todos os itens deve também ser somada e dividida pela pontuação máxima da avaliação, resultando em um número percentual, correspondendo ao escore final obtido.

AVALIAÇÃO ESTÁTICA

1. SENTADO NO SOLO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
CONTROLE DE TRONCO	☐ **(3)** Mantém a postura sentada, sem apoio dos membros superiores.		☐ **(2)** Mantém a postura sentada com apoio de um membro superior.	☐ **(1)** Mantém a postura sentada com apoio dos dois membros superiores.			
MEMBROS INFERIORES	☐ **(4)** Senta com os membros inferiores à frente ou de lado.	☐ **(3)** Senta sobre os calcanhares (ajoelhado abaixo)ou com as pernas cruzadas (em "índio")	☐ **(2)** Senta com abdução excessiva dos membros inferiores.	☐ **(1)** Senta em "W"(entre os calcanhares).			
POSTURA DO TRONCO	☐ **(2)** Quando sentado, mantém o tronco ereto, com adequado alinhamento.		☐ **(1)** Quando sentado, apresenta postura cifótica.	☐ **(1)** Quando sentado, apresenta hiperlordose.			

2. EM PÉ SOBRE SUPERFÍCIE ESTÁVEL/SÓLIDA (solo)

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(2)** Mantém a postura em pé sem apoio por mais de 20 segundos sem desiquilibrar-se,		☐ **(1)** Mantém a postura em pé sem apoio, mas desiquilibra-se antes de 20 segundos, dando pequenos passos no mesmo lugar. TEMPO: _____					

3. EM PÉ SOBRE SUPERFÍCIE SEMI-INSTÁVEL/MACIA (bloco de espuma)

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(2)** Mantém a postura em pé sem apoio por 5 segundos ou mais, realizando os ajustes posturais necessários, sem realizar passos comensatórios.		☐ **(1)** Mantém a postura em pé sem apoio, mas desiqulibra-se antes de 5 segundos, realizando passos comensatórios para recuperar o equilíbrio.					

AVALIAÇÃO DINÂMICA

4. DE SENTADO NO CHÃO PARA EM PÉ

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(4)** Sem apoio dos membros superiores, passa para ajoelhado, semiajoelhado e fica em pé.	☐ **(3)** Com apoio dos membros superiores, passa para ajoelhado, semiajoelhado e fica em pé.	☐ **(2)** Com apoio dos membros superiores no solo, passa para a postura de "urso" e fica em pé.	☐ (1) Com apoio dos membros superiores em móvel, puxa-se com estes para ficar em pé.				

5. DE SENTADO EM BANCO PARA EM PÉ

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(4)** Sem apoio dos membros superiores e sem flexão excessiva do tronco (< 60° aproximadamente).	☐ **(3)** Sem apoio dos membros superiores e com flexão excessiva do tronco (> 60° aproximadamente).	☐ **(2)** Com apoio dos membros superiores no banco.	☐ (1) Com apoio dos membros superiores em móvel à frente ou com ajuda física de outra pessoa para puxar-se.				

6. DE PÉ PARA SENTADO NO SOLO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(5)** Passando para semiajoelhado e ajoelhado ou para cócoras, sentando-se com controle do movimento, sem apoio dos membros superiores.	☐ **(4)** Passando para semiajoelhado e ajoelhado ou para cócoras, sentando-se com controle do movimento, com apoio dos membros superiores em apenas metade da transição.	☐ **(3)** Passando para semiajoelhado e ajoelhado ou para cócoras, sentando-se com controle do movimento, com apoio dos membros superiores durante toda a transição.	☐ **(2)** Passando para semiajoelhado e ajoelhado ou para cócoras, com apoio dos membros superiores durante toda a transição, e sem controle do movimento.	☐ (1) Com apoio dos membros superiores em móvel à frente ou com ajuda física de outra pessoa, deixando-se cair.			

7. DE PÉ PARA SENTADO EM BANCO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(3)** Sem apoio dos membros superiores, sem flexão excessiva do tronco (< 60° aproximadamente), controlando a velocidade do movimento.	☐ **(2)** Sem apoio dos membros superiores e com flexão excessiva do tronco (< 60° aproximadamente), controlando a velocidade do movimento.	☐ (1) Com apoio dos membros superiores no banco com flexão excessiva do tronco (< 60° aproximadamente) e sem controle da velocidade do movimento.					

8. EM PÉ, PEGA COM AS MÃOS BOLA ARREMESSADA EM SUA DIREÇÃO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(3)** Mantém a postura em pé e pega com as duas mãos bola arremessada em sua direção, sem deixá-la cair.	☐ **(2)** Mantém a postura em pé e toca com uma ou ambas as mãos bola arremessada em sua direção, porém não é capaz de pegá-la.	☐ (1) Mantém a postura em pé e inicia movimento com os membros superiores para pegar bola arremessada em sua direção, porém com atraso.					

9. EM PÉ, CHUTA BOLA COM O PÉ DIREITO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(4)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior esquerdo e retira o membro inferior direito do solo para chutar bola lentamente deslocada em sua direção.	☐ **(3)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior esquerdo e retira o membro inferior direito do solo para chutar bola parada a sua frente.	☐ **(2)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior esquerdo, retira o membro inferior direito do solo para chutar bola parada a sua frente, porém desiquilibra-se.	☐ (1) Mantém a postura em pé com aopio dos membros superiores sobre móvel ou parede, retira o membro inferior direito do solo para chutar bola parada a sua frente.				

10. EM PÉ, CHUTA BOLA COM O PÉ ESQUERDO

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(4)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior direito e retira o membro inferior esquerdo do solo para chutar bola lentamente deslocada em sua direção.	☐ **(3)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior direito e retira o membro inferior esquerdo do solo para chutar bola parada a sua frente.	☐ **(2)** Mantém a postura em pé sem apoio, transfere o peso para o membro inferior direito, retira o membro inferior esquerdo do solo para chutar bola parada a sua frente, porém desiquilibra-se.	☐ (1) Mantém a postura em pé com aopio dos membros superiores sobre móvel ou parede, retira o membro inferior esquerdo do solo para chutar bola parada a sua frente.				

11. CAMINHA POR DOIS METROS

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	

COMO FAZ				ESCORE
APOIO	☐ **(3)** Caminha por 2m de maneira independente.	☐ **(2)** Caminha por 2m com apoio em duas mãos.	☐ **(1)** Caminha por 2m com apoio em ambas as mãos.	
BASE DE SUPORTE	☐ **(3)** Pés na largura dos quadris.	☐ **(2)** Pés discretamente mais largos que os quadris.	☐ **(1)** Pés exageradamente mais largos que os quadris.	
ROTAÇÃO EXT. MID	☐ **(3)** Antepé alinhado com retropé.	☐ **(2)** Antepé discretamente mais abduzido que retropé.	☐ **(1)** Antepé exageradamente mais abduzido que retropé.	
ROTAÇÃO EXT. MIE	☐ **(3)** Antepé alinhado com retropé.	☐ **(2)** Antepé discretamente mais abduzido que retropé.	☐ **(1)** Antepé exageradamente mais abduzido que retropé.	
JOELHOS	☐ **(2)** Sem alterações aparentes.	☐ **(1)** Tendência à hiperextensão na fase de apoio.	☐ **(1)** Tendência à flexão de joelhos na fase de apoio.	
APOIO DO PÉ	☐ **(3)** Apoio em todas as regiões plantares nos dois pés.	☐ **(2)** Apoio alterado em um dos pés.	☐ (1) Apoio alterado nos dois pés.	

12. TRANSPOSIÇÃO DE OBSTÁCULOS (degrau/bloco de EVA sólido)

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	

COMO FAZ				ESCORE
☐ **(4)** Olha para o obstáculo e o transpõe com ambos os pés.	☐ **(3)** Olha para o obstáculo e o transpõe com o pé da frente, mas tropeça com o pé de trás.	☐ **(2)** Olha para o obstáculo e inicia a transposição, mas tropeça com o pé da frente.	☐ **(1)** Não olha para o obstáculo e não considera transpô-lo, caminhando normalmente.	

13. SALTO VERTICAL

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	

COMO FAZ				ESCORE
☐ **(4)** Agacha e estende os membros inferiores para pular, retirando os pés do contato com o solo.	☐ **(3)** Agacha e estende os membros inferiores para pular, mas retira parcialmente os pés do contato com o solo (antepés permanecem no solo).	☐ **(2)** Agacha e estende os membros inferiores para pular, mas não retira os pés do contato com o solo.	☐ **(1)** Não inicia agachar para pular.	

14. SOBE ESCADAS

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	

COMO FAZ						ESCORE
☐ **(6)** Sobe degraus sem apoio dos membros superiores, alternando membros inferiores.	☐ **(5)** Sobe degraus sem apoio dos membros superiores, sem alternar membros inferiores.	☐ **(4)** Sobe degraus com apoio de um membro superior, alternando membros inferiores.	☐ **(3)** Sobe degraus com apoio de um membro superior, sem alternar membros inferiores.	☐ **(2)** Sobe degraus com apoio de ambos os membros superiores, alternando membros inferiores.	☐ **(1)** Sobe degraus com apoio de ambos os membros superiores, sem alternar membros inferiores.	

☐ **(4)** Sobe os degraus sem realizar nenhuma compensação postural.	☐ **(3)** Sobe os degraus realizando uma das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	☐ **(2)** Sobe os degraus realizando duas das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	☐ **(1)** Sobe os degraus realizando todas as seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	

15. DESCE ESCADAS

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	

COMO FAZ						ESCORE
☐ **(6)** Desce degraus sem apoio dos membros superiores, alternando membros inferiores.	☐ **(5)** Desce degraus sem apoio dos membros superiores, sem alternar membros inferiores.	☐ **(4)** Desce degraus com apoio de um membro superior, alternando membros inferiores.	☐ **(3)** Desce degraus com apoio de um membro superior, sem alternar membros inferiores.	☐ **(2)** Desce degraus com apoio de ambos os membros superiores, alternando membros inferiores.	☐ **(1)** Desce degraus com apoio de ambos os membros superiores, sem alternar membros inferiores.	

☐ **(4)** Desce os degraus sem realizar nenhuma compensação postural.	☐ **(3)** Desce os degraus realizando uma das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	☐ **(2)** Desce os degraus realizando duas das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	☐ **(1)** Desce os degraus realizando todas as seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio planar alterado.	

16. SOBE RAMPA COM INCLINAÇÃO MÍNIMA DE 45º

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(3)** Sobe rampa sem apoio dos membros superiores.		☐ **(2)** Sobe rampa com apoio de um membro superior.		☐ **(1)** Sobe rampa com apoio de ambos os membros superiores.			
☐ **(3)** Não aumenta base de suporter.		☐ **(2)** Aumenta discretamente base de suporte.		☐ **(1)** Aumenta exageradamente base de suporte.			
☐ **(4)** Sobe rampa sem realizar nenhuma compensação postural.	☐ **(3)** Sobe rampa realizando uma das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.	☐ **(2)** Sobe rampa realizando duas das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.		☐ **(1)** Sobe rampa realizando todas as seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.			

17. DESCE RAMPA COM INCLINAÇÃO MÍNIMA DE 45º

FAZ					NÃO FAZ		ESCORE
☐ **(5)** Nenhuma dica	☐ **(4)** Com dica verbal	☐ **(3)** Com dica gestual	☐ **(2)** Com modelação	☐ **(1)** Com dica física parcial	☐ **(0)** Motor	☐ **(0)** Não motor	
COMO FAZ							**ESCORE**
☐ **(3)** Desce rampa sem apoio dos membros superiores.		☐ **(2)** Desce rampa com apoio de um membro superior.		☐ **(1)** Desce rampa com apoio de ambos os membros superiores.			
☐ **(3)** Desce controladamente.		☐ **(2)** Desce com pouco controle.	☐ **(1)** Desce sem controle do movimento (incapaz de controlar a velocidade do movimento).				
☐ **(4)** Desce rampa sem realizar nenhuma compensação postural.	☐ **(3)** Desce rampa realizando uma das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.	☐ **(2)** Desce rampa realizando duas das seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.		☐ **(1)** Desce rampa realizando todas as seguintes compensações: inclinação de tronco, rotação externa de membros inferiores, apoio plantar alterado.			

TABELA DE PONTUAÇÃO

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	SOMA	TOTAL
Pontuação																		___/190=_____%	