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Classification of motor function and functional performance in children with cerebral palsy

Classificação da função motora e do desempenho funcional de crianças com paralisia cerebral

Chagas PSC[1], Defilipo EC[2], Lemos RA[2], Mancini MC[3], Frônio JS[1], Carvalho RM[1]

Abstract

Objective: To classify children with cerebral palsy (CP) using classification systems for mobility and manual function; to compare groups of children with CP regarding gross motor function and functional performance outcomes; and to evaluate associations between the functional classifications and the scores obtained in the outcomes that were investigated. **Methods:** Thirty children with CP were classified using the Gross Motor Function Classification System (GMFCS) and the Manual Abilities Classification System (MACS), and were divided into three groups, based on their classification (mild, moderate or severe) in each of these systems. Gross motor function was documented using the Gross Motor Function Measure (GMFM-66) test, while functional abilities and the caregiver's assistance regarding self-care and mobility were documented using the Pediatric Evaluation of Disability Inventory (PEDI). **Results:** One-way ANOVA showed that the groups were significantly different regarding the GMFM-66 and PEDI results. Post-hoc comparison tests (Scheffé) revealed that the children with moderate impairment (GMFCS) had functional abilities and caregiver support that were similar to those of the mildly impaired children. However, the moderate children (MACS) were not different from the severe children. Spearman rank correlations showed strong and significant inverse associations between the functional classifications and the results from the PEDI and GMFM-66 tests. **Conclusions:** The results suggest that the MACS and GMFCS functional classifications are good indicators of the manual function and mobility of children with CP. These classifications may be useful in the processes of evaluation and intervention planning.

Key words: cerebral palsy; classification; child development.

Resumo

Objetivos: Classificar crianças com paralisia cerebral (PC) utilizando sistemas de classificação de mobilidade e de função manual; comparar os grupos de crianças com PC nos desfechos de função motora grossa e de desempenho funcional; avaliar a associação entre as classificações funcionais e os escores obtidos nos desfechos investigados. **Materiais e métodos:** Trinta crianças com PC foram classificadas pelos sistemas Gross Motor Function Classification System (GMFCS) e Manual Abilities Classification System (MACS) e divididas em três grupos, de acordo com a sua classificação em cada um destes sistemas em leve, moderado e grave. A função motora grossa foi documentada pelo teste Gross Motor Function Measure (GMFM-66), e as habilidades funcionais e assistência do cuidador em autocuidado e em mobilidade, pelo teste Pediatric Evaluation of Disability Inventory (PEDI). **Resultados:** O teste one-way ANOVA demonstrou diferenças significativas entre os grupos nos resultados do GMFM-66 e do teste PEDI. Testes de comparação *post-hoc* (Scheffé) revelaram que crianças com comprometimento moderado (GMFCS) apresentaram habilidades funcionais e receberam assistência do cuidador semelhantes às crianças leves. Entretanto, crianças moderadas (MACS) assemelharam-se às graves. Índices de correlação de Spearman rank demonstraram associação inversa, significativa e de magnitude forte entre as classificações funcionais e os resultados dos testes PEDI e GMFM-66. **Conclusões:** Os resultados sugerem que as classificações funcionais MACS e GMFCS são bons indicadores da função manual e da mobilidade de crianças com PC, podendo ser úteis nos processos de avaliação e planejamento de intervenção.

Palavras-chave: paralisia cerebral; classificação; desenvolvimento infantil.

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[1] Department of Physical Therapy, School of Medicine, Universidade Federal de Juiz de Fora (UFJF) – Juiz de Fora (MG), Brazil

[2] Physical therapist

[3] Department of Occupational Therapy, School of Physical Education, Physical Therapy and Occupational Therapy (EEFFTO), Universidade Federal de Minas Gerais (UFMG) – Belo Horizonte (MG), Brazil

Correspondence to: Paula Silva de Carvalho Chagas, Rua Tom Fagundes 80/402, Cascatinha, CEP 36033-300, Juiz de Fora (MG), Brazil, e-mail: pscchagas@gmail.com / paula.chagas@ufjf.edu.br

Introduction

The term cerebral palsy (CP) designates a non-progressive sequela which results in an impairment to the immature and developing central nervous system, generating deficits in posture, tonus and movement[1-3]. The most up-to-date definition for CP suggests that the disorders of the motor development originating from a primary cerebral lesion are permanent and mutable, causing secondary musculoskeletal changes and limiting activities[4].

There are several classifications for CP[5-7], which are distinguishable according to the information they provide, including the type of tonus, the distribution of the impairment in the body, and the level of independence[4-6]. Among the changes in tonus, the most common is spasticity. Seventy-five percent of children with CP have elevated tonus[1,8], exacerbation of the tendinous reflexes and resistance to rapid, passive movement[6,9,10]. According to the topographical classification, spastic children may be quadriplegic, diplegic, or hemiplegic[6,7].

Currently, the literature favors the classification of CP children according to their functional independence with regard to gross motor function[3,11-13] and the fine motor function[14-17]. There are two systems of functional classification which follow this trend. The Motor Function Classification System (GMFCS) and the Manual Abilities Classification System (MACS) were developed to categorize, respectively, the mobility and the manual function of children with CP[12,14-16]. The GMFCS classification is according to child age, and the studies defend the notion that a child's classification according to this system has a good degree of stability over the years, that is, a child usually stays within the same level of classification[18-20].

In addition to the systems of functional classification, there are standardized and validated tests, generally used to evaluate the gross motor function and the functional performance of children with CP, such as the Gross Motor Function Measure – version 66 (GMFM-66) and the Pediatric Evaluation of Disability Inventory (PEDI)[11,21-29]. Although the GMFM and the PEDI tests are well-known in the national and international literature, the classification of Brazilian children with the GMFCS and the MACS is still under developed. It is common knowledge that the information made available by these classification systems serve different purposes compared to the information derived from tests. However, the GMFCS and the MACS systems as well as the previously outlined functional tests deal with the construct of functionality. Thus, it is necessary to identify and compare the information made available by the classification systems and by the functional tests in order to adapt the use of this instrument to clinical practice.

The objectives of the present study were: (1) to classify the mobility and the manual function of a group of children with spastic-type CP using the GMFCS and the MACS; (2) to divide the children into three groups, according to their classification within each of the systems, namely mild, moderate, and severe; (3) to compare the scores obtained by the children within these groups in gross motor function (by means of the GMFM-66 test), and in functional performance (by means of the PEDI test), according to each level of classification; and (4) to verify the association between the gross motor function and the functional development of the children with CP and their classification categories according to the GMFCS and the MACS.

Methods

Participants

The present cross-sectional study consisted of 30 children with CP, divided non-randomly into groups depending on the level of functionality as demonstrated by the GMFCS and MACS. The calculation of the sample for this study indicated that each group should have at least six children to demonstrate statistically significant changes, at a level of significance of α=0.05, statistical power of 0.80 and expected effect (*r* index of correlation) of 0.8, based upon the magnitude of similar effects indicated in the literature[3].

The children in this convenience sample received physical therapy at two major physical therapy centers. The criteria for inclusion in the study were identified by the physical therapists of these institutions and confirmed by two researchers of the study who examined the children's charts. The criteria were as follows: children aged one to 14, with a medical diagnosis and/or clinical profile of spastic-type CP and able to understand simple instructions. We also included children who were making use of anticonvulsants and who had not had any episodes in the previous three months. Exclusion criteria were congenital malformations not related to CP, chromosomal diseases and tonus oscillations that would influence movement. Children who underwent surgeries of the musculoskeletal system or treatments with botulinum toxin type-A within a six-month period were also excluded.

Instruments

The groups were defined according to the children's functional classifications. For the classification at the gross motor function level, the participants were classified according to the GMFCS[12], and for the classification of the level of fine motor function or manual ability, the MACS[14-16] was used.

Both the GMFCS and the MACS feature a five-level ordinal scale which reflects, in a decreasing order, the level of independence and functionality of children with CP[12,14-16]. For a six year-old child, a level I GMFCS classification indicates the ability to move without any restrictions; level II indicates limitations in gait in outdoor settings; and level III is reserved for those who need assistance in order to move about. At level IV, the patient needs assistive technology equipment to move, and at level V, the child demonstrates severe movement restrictions, even with the aid of state of the art techonogy[12]. In the MACS, regardless of age, children who are able to easily manipulate objects are classified as level I, and those who handle objects poorly belong in group II. Level III children, in turn, manipulate objects with difficulty, requiring help or adaptation of the activity, whereas those in level IV perform manual activities with limited success, and under constant supervision. Finally, level V includes children with severely compromised manual abilities who need complete assistance[14-16].

Based on the information gathered from the administration of the classification systems, the children were grouped into three levels of impairment, following the suggestions of studies which used the same systems[3,12,14,20]. The children classified into levels I and II, for both scales, were considered mild; level III were moderate, and levels IV and V were severe[3,12,14]. According to the study by Eliasson et al.[14], there is a 0.79 correlation between the two scales, with 49% of the classification with total agreement of children at the same functional level for both the GMFCS and the MACS.

For the evaluation of gross motor function and functional performance, the standardized GMFM-66 and PEDI tests were used, respectively. GMFM-66 provides a quantitative log of the gross motor performance of children with CP, by observing their functional capacity[22,23]. This protocol consists of 66 items grouped into five dimensions or sub-scales: a) lying and rolling; b) sitting; c) crawling and on their knees; d) standing; and e) walking, running, and leaping. The items for each dimension are scored on a four-point scale, ranging from zero to three[22]. This summarized version of the GMFM-88 test only allows the calculation of the estimated total score by means of the Gross Motor Ability Estimator (GMAE) software which comes with the manual[22]. Studies have shown that the GMFM is valid and reliable when applied to children with CP[11,21,23,24,29]. The present study used all of the GMFM-66 dimensions.

The PEDI is a standardized instrument that consists of a structured interview of the caretaker, who is able to document the functional performance of children in their activities of daily living[27]. This test encompasses three dimensions: self-care, mobility, and social interaction. The self-care scale includes eating, grooming, toileting, dressing, and sphincter control. The functional items for mobility provide information on transfers, indoor and outdoor locomotion, and use of stairs. The social interaction dimension reflects issues related to communication, problem-solving, interaction with friends, etc. All of these dimensions are structured in three parts. The first part refers to the functional performance of daily activities; the second covers the level of assistance that the caretaker gives to the child to accomplish daily activities; and the third part evaluates how often the child requires adaptations[27]. Studies have shown that the PEDI test is valid and reliable in applications for CP children in Brazil[1,3,25,26,28,30]. The present study focused only on the dimensions of self-care and mobility in functional abilities and caregiver assistance.

The sample was characterized according to gender, age, weight, height, and CP topographical type (i.e. quadriplegy, diplegy, and hemiplegy). We also used the Brazilian Economic Classification Criterion[31], a socioeconomic level (SES) questionnaire developed by the Brazilian Association of Media Research Companies (Associação Brasileira de Empresas de Pesquisa - ABEP), for the socioeconomic characterization of the participants' families.

The present study was approved by the Ethics in Research Committee of Universidade Federal de Juiz de Fora (Approval report number 186/2007). The parents or caregivers of all of the children signed a free and informed consent agreement.

Procedures

The children included in the present study were evaluated at the physical therapy out-patient clinics of two participating centers in August and September of 2007. Each participant was evaluated only once by two previously trained researchers (ICC>0.94). An examiner administered the PEDI instrument, and then collected demographic information (gender, age in months, height and weight) and administered the NSE questionnaire. Meanwhile, another examiner first gave the GMFM-66 and then did the functional classification of the CP, according to the GMFCS and to the MACS. The entire data collection procedure lasted approximately 50 minutes.

After defining the children's functional classification, they were divided into two blocks for easier comparison: one block of three groups (mild, moderate, and severe), according to the GMFCS classification, and another of three groups (mild, moderate, and severe) according to the MACS classification.

Statistical Analyses

The description of the sample was carried out for the following variables: gender, age, anthropometric characteristics, SES, CP topographical type, degree of functionality (GMFCS and MACS) and motor impairment

(mild, moderate, severe). One-way ANOVA was used to test numeric variable differences between the groups, and the chi-square test was used to evaluate the association between the categorical variables.

One-way ANOVA test was used to compare the children who were classified in the three GMFCS groups, as well as in the three MACS groups, according to the results obtained in the GMFM-66 and in the PEDI. Once a statistical significance was identified, the Scheffé *post-hoc* comparative test was used to locate the bivariate difference. Spearman rank correlation coefficients tested the association among the GMFCS and MACS functional classification categories, the PEDI gross score (self-care and mobility for both part s of the test) and the total scores (percentages) obtained for the GMFM-66. For all statistical analyses, a significance index of α=0.05 was adopted. The statistical package used was the SPSS 15.0 (SPSS Inc., 2006®).

Results

The descriptive characteristics of the sample, according to the GMFCS and MACS, are shown in Table 1. There was no relevant difference between the groups as to age, SES, weight, and height. All children whose parents had signed the consent agreement were evaluated; therefore there were no sample losses in the present study.

Chi-square tests revealed a significant association (p<0.05) between the classifications provided by the GMFCS and the MACS in regard to gender and topographic type of the children who took part in the study. Regarding gender, the direction of this effect showed that only male children were classified as severe, both by the GMFCS and by the MACS. Boys were also more frequently classified as mild by the GMFCS and moderate by the MACS. With regard to the topographical type, it was observed that in the GMFCS classification, the hemiplegic children were only in the mild category; the diplegic children were more commonly mild and moderate, and most of the quadriplegic children were classified as severe. The moderate category included all topographic types.

The first block included 13 mild, six moderate, and 11 severe children, according to the GMFCS classification. The second block included 16 mild, six moderate, and eight severe children, according to the MACS. Some children considered mild, moderate, or severe in the GMFCS had the same classification in the MACS, but there were also varied classifications so that the blocks included children placed in different groups.

One-way ANOVA tests showed statistically significant differences among the groups classified by the GMFCS and MACS systems, in the performance of the GMFM and PEDI tests (p<0.001). Significant differences among the three groups classified by the GMFCS were evident in the gross motor abilities (GMFM-66) ($F_{(2,27)}$=36,621, p<0.001). The PEDI test results showed significant differences between the severe group and the mild and moderate groups in regard to functional abilities in self-care ($F_{(2,27)}$=13,450, p<0.001) and mobility ($F_{(2,27)}$=26,324, p<0.001), as well as in caregiver assistance for both self-care ($F_{(2,27)}$=14,236, p<0.001) and mobility ($F_{(2,27)}$=24,298, p<0.001). Nevertheless, there were no significant differences between the mild and moderate groups in the same functional areas (Table 2).

Statistically significant differences were also found in the three groups classified by the MACS in regard to gross motor abilities (GMFM-66) ($F_{(2,27)}$=49,290, p<0.001). In the PEDI test, the mild group showed better functional abilities in self-care

Table 1. Descriptive characteristics of the sample, according to group classifications into mild (MI), moderate (MO) and severe (SE) based on the Gross Motor Function Classification (GMFCS) and Manual Abilities Classification System (MACS).

Descriptive variables		Groups					
		GMFCS			MACS		
		MI	MO	SE	MI	MO	SE
Number		13	6	11	16	6	8
Age	(Months)	92.23 (39.62)	103.33 (51.69)	88.63 (38.28)	106.25 (35.86)	72.16 (44.51)	82.62 (41.80)
Gender	F	6	4	0	9	1	0
	M	7	2	11	7	5	8
Height	(meters)	1.17 (0.18)	1.19 (0.23)	1.13 (0.20)	1.23 (0.14)	1.08 (0.26)	1.08 (0.20)
Weight	(kg)	23.45 (9.18)	25.50 (13.41)	20.54 (11.53)	25.52 (10.20)	20.33 (7.56)	19.27 (13.82)
SES	A	0	1	1	1	0	1
	B	1	0	0	1	0	0
	C	7	2	6	7	4	4
	D	5	3	4	7	2	3
Topographical distribution	Quadri	0	1	10	0	3	8
	Di	6	5	1	10	2	0
	Hemi	7	0	0	6	1	0

Legend: F=female; M=male; kg=kilograms; SES=socio-economical status; quadri=quadriplegia; di=diplegia; hemi=hemiplegia.
Age, height and weight are reported in means, and standard deviation (in parentheses). Number of children, sex, SES and topographical distribution of CP are informed as frequency.

($F_{(2,27)}$=33,187, p<0.001) and mobility ($F_{(2,27)}$=39,352, p<0.001) when compared with the moderate and severe groups. These results were also observed in the scores for caregiver assistance in self-care ($F_{(2,27)}$=29,295, p<0.001) and mobility (F(2,27)=45,508, p<0.001). Differences between the moderate and severe groups were not found in the functional variables of the PEDI test (Table 2).

Spearman rank correlation coefficient revealed negative and statistically significant association between the GMFCS levels and the GMFM-66 gross scores (r=-0.849, p<0.001), and between the GMFCS categories and the gross scores of the PEDI test in areas such as functional abilities in self-care (r=-0.634, p<0.001) and mobility (r=-0.826, p<0.001), and in caregiver assistance in self-care (r=-0.683, p<0.001) and mobility (r=-0.786, p<0.001). Similar results were found between the MACS levels and the GMFM-66 gross scores (r=-0.885, p<0.001) and with the PEDI gross score in the functional abilities and caregiver assistance in self-care (r=-0.843, p<0.001; r=-0.839, p<0.001, respectively) and mobility (r=-0.885, p<0.001; r=-0.886, p<0.001, respectively).

Discussion

The present study pioneered the use, in Brazil, of the new functional classifications recently published in the literature about children with CP. We compared the functional information obtained from these classifications (MACS e GMFCS) and from the administration of the two functional tests (PEDI and GMFM-66) to a group of CP children. The two blocks of groups divided according to the functional classifications were equivalent in terms of age, SES, weight, and height, which allowed the comparison of the groups as to functional outcomes.

In general, the results reinforced the coherence of functional information given by these classifications and tests. In fact, children classified in the upper MACS and GMFCS levels, which indicated greater severity, showed a lower gross motor function capacity compared to children belonging to the lower levels, who had mild to moderate CP. However, differences in the functional profiles of the groups suggested that this relationship was not uniform, but specific to each classification.

In the present study, there were variations in the children's classifications according to each system. For example, according to the GMFCS, the severe group consisted mainly of quadriplegic children; the mild group included an equivalent number of hemiplegic and diplegic children; and in the moderate group there was a predominance of diplegics. When the participants were classified according to the MACS, the moderate group became more heterogeneous than the same category as classified by the other system, and included both quadriplegic and diplegic children, as well as one hemiplegic child. This discrepancy suggests that the information about the topographical impairment of CP are not necessarily interpreted in the same way by both functional classification systems. Indeed, the GMFCS and the MACS must be taken as complementary classification systems of the mobility and manual function of children with CP. Topographical profiles such as hemiplegia might have a smaller impact on the gross motor activity than on manual function. The results of the present study confirmed that claim. The relationship between the topographical impairment and the functional classification of children with CP has been documented in the literature, particularly with regard to the use of the GMFCS[32,33].

The relationship between the information obtained from both classification systems and from the functional tests

Table 2. Means and Standard Deviations obtained in the GMFM and PEDI tests by children classified as mild (MI), moderate (MO) and severe (SE), according to the GMFCS and MACS Functional Classifications.

Inferential variables	Groups					
	GMFCS			MACS		
	MI	MO	SE	MI	MO	SE
GMFM	64.65* (14.17)	48.22* (8.05)	21.98* (11.32)	63.06* (12.33)	37.43* (7.87)	17.26* (9.35)
PEDI						
FPSC	50.00[a] (18.06)	48.67[a] (23.95)	15.18[b] (23.41)	54.62[a] (15.71)	26.83[b] (11.89)	9.25[b] (7.29)
FPM	43.46[a] (17.06)	31.33[a] (16.46)	3.36[b] (4.03)	44.00[a] (14.85)	11.50[b] (9.01)	2.13[b] (2.85)
CASC	24.23[a] (11.55)	22.83[a] (15.11)	2.90[b] (3.81)	26.94[a] (10.31)	6.17[b] (6.15)	2.00[b] (3.55)
CAM	25.08[a] (10.07)	19.17[a] (10.98)	1.55[b] (2.77)	26.06[a] (8.33)	6.00[b] (5.66)	0.62[b] (1.41)

Legend: GMFCS=Gross Motor Function Classification System; MACS=Manual Abilities Classification System; GMFM=Gross Motor Function Measure; PEDI=Pediatric Evaluation of Disability Inventory; FPSC=functional performance in self-care, FPM=functional performance in mobility, CASC=caregiver's assistance in self-care, CAM=caregiver's assistance in mobility.

Values in means and standard deviations (SD) in parentheses; *p<0.05; same letters (a,b) and numbers in bold, illustrate similarity between groups, and different letters inform significant differences between groups.

demands attention. Concerning the gross motor function documented by the GMFM-66, children belonging to the three functional levels of the GMFCS and the MACS showed significantly different functionality, i.e. children classified as moderate had superior gross motor function compared to those classified as severe, and inferior to those classified as mild; and. the best results in the GMFM-66 test were obtained by children classified as mild, having independent gait and, therefore, greater ability in all of the dimensions.

These results corroborate other findings in the literature. Gorter et al.[32] also found a relationship between the gross motor function classification by the GMFCS and the GMFM-66 scores. The results of the present study supplement the existing literature and show that the groups divided according to the MACS classification had differences in gross motor function because the GMFM-66 test took upper limbs into account in gross motor activities. For example, item 2 of dimension A, in the supine position, evaluates the activity of raising both hands to the midline of the body; item 64 of dimension D, in the standing position, refers to the activity of bending down, picking up an object and standing up again[22]. Thus, when comparing the GMFM-66 scores of children classified in the different MACS levels, we identified differences between the groups. Children with greater impairment in manual function also had greater impairment in gross motor function, but when the functional outcome was documented by the PEDI test, the results did not match.

The analysis of the information obtained from both classification systems and the PEDI test showed that the impact of the classifications on the functionality of children with CP does not manifest itself directly and may include other factors such as contextual influence, as suggested by Mancini et al.[3]. In fact, the results revealed that the children classified as mild by the GMFCS and the MACS performed better than those classified as severe. This occurred because severe children generally have greater impairment in both upper and lower limbs, resulting in poorer performance in the PEDI scales and the need for more caregiver assistance. This evidence is supported by the literature. Ostensjo, Carlberg and Vollestad[34] found that the greater the functional limitation in daily activities, usually requiring more caregiver assistance, the greater the severity of the gross motor function. Similarly, Mancini et al.[3] found superior functionality in children classified as mild, according to the GMFCS, when compared with the severe group in all areas assessed by the PEDI test.

The functionality profiles of mild and severe children appeared to be different, while the profiles of moderate children showed peculiarities in the functional performance of their daily routine. In fact, there were similarities between the moderate and mild groups, which differed from the severe group according to the GMFCS method, for all scales of the PEDI test. However, when classified by the MACS, the moderate children resembled the severe children, and both were different from the mild children in the same scales of the PEDI test. Part of these results may be explained by the fact that the GMFCS classifies children with CP according to mobility. Because the moderate group, according to the GMFCS, performs the mobility activities with the aid of adaptive equipment[12], in the present study, part of their functionality content became comparable to that of the mild children. Furthermore, moderate children generally need less assistance from their caregivers in the dimensions of mobility. Thus, contextual factors such as mobility aids seem to influence the relationship between the functional classification of CP and functional performance.

Mancini et al[3] used the GMFCS to divide the groups according to severity, and also found that the mild group resembled the moderate group and that the moderate children resembled the severe children in the PEDI functionality scales. In the present study, however, the similarities between moderate and severe children and between moderate and mild children were marked by the type of functional classification used to define the groups (GMFCS or MACS), and not by the content of functionality, as in Mancini et al[3].

The results obtained by the groups in the GMFM-66 and PEDI tests, according to each functional classification, were not similar. This can be explained by the fact that these two tests measure constructs with distinct peculiarities. In fact, the GMFM evaluates gross motor function and the PEDI test describes the child's performance and independence in daily tasks and activities. The functionality information given by both tests may be complementary, rather than redundant, thus the division into groups according to the GMFCS or the MACS resulted in different functional profiles so both should be used to classify children with CP.

Some of the limitations of the present study must be pointed out. Firstly, the division of the sample group according to the two classification systems resulted in very small groups, e.g. the groups containing moderate children in both classification systems, which included six children. This occurred because the moderate group consisted solely of level III children, both by the GMFCS and by the MACS, whereas the remaining groups (mild and severe) included two levels of functional classifications. It is worth noting that the sample was recruited from two of the city's largest rehabilitation centers, which may have given the sample a local characteristic of relatively low numbers of moderate severity children. For the present study, a prior sample estimate was calculated and, based on that, the number of participating children was considered suitable. Moreover, given that the results showed significant effects, a

type-I error for the inference of the sample cannot be attributed to the size of the sample. Secondly, there was a statistically significant difference between genders in the sample, as characterized by a greater number of boys compared to girls. Yet, the epidemiological data do not determine the effect of gender in the prevalence of CP[7]. Although there are studies on gender differences in the motor performance of normal children[35], the impact of gender on motor activities of children with CP has yet to be investigated and remains a hypothesis to be tested in the future.

In short, the results of the present study showed a relationship between the type of classification and the characterization of functionality in children with CP. These results may guide the clinical practice of pediatric neurology professionals and help them choose the most appropriate systems of classification and functional tests according to severity. Finally, although they not replace traditional evaluation methods, the GMFCS and MACS classification systems are easy to use, as are the GMFM-66 and PEDI tests, and require minimal training to be used and applied to everyday practice.

Conclusions

The present study revealed that the GMFCS and MACS functional classifications are good instruments for the evaluation of the motor function and manual abilities of children with CP, respectively. These data may be useful in the functional characterization of this clinical group, in the selection of evaluations, and in planning clinical interventions.

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