

## Psychomotor Intervention to stimulate Motor Development in 8-10-year-old schoolchildren

### *Intervenção Psicomotora para estímulo do Desenvolvimento Motor de escolares de 8 a 10 anos*

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**Abstract** – The human being does not have static development throughout life. From conception to death, there are physical, psychological, social transformations and modifications, being vulnerable to restrictions. Interventions seek to reduce the effects of these restrictions, as children and adolescents are influenced by impoverished motor experiences in the family and school environment. The aim of this study was to evaluate the effects of an intervention program on 8-10-year-old schoolchildren in the public school system of Matinhos/PR, Brazil. Ninety-one 8-10-year-old schoolchildren from the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> grades were evaluated by the Motor Development Scale (MDS). Fifty-four of them presented risk of delay. Of these, 27 who performed weekly physical education classes were randomized into Control Group (CG), and 27 (Experimental Group - EG) to a psychomotor intervention program twice a week for four weeks. After interventions, EG and CG were reassessed. In the analysis of the General Motor Quotient (GMQ), it was verified that in all grades, EG presented a significant increase compared to the moment of evaluation, which was not observed among children in the CG. There was a significant increase in the averages in the reevaluation of CG and GE, however, EG presented significant differences in the Fine Motor and Balance dimensions. Intervention improved GMQ, Fine Motor and Balance compared to traditional Physical Education class.

**Key words:** Child; Child development; Motor skills; Physical education and training.

**Resumo** – O ser humano não tem um desenvolvimento estático ao longo da vida. Desde a concepção à morte, são conhecidas transformações e modificações físicas, psicológicas e sociais, estando vulneráveis a restrições. As intervenções buscam reduzir efeitos destas restrições, pois crianças e adolescentes sofrem influência de vivências motoras empobrecidas no meio familiar e ambiente escolar. Objetivou-se avaliar efeitos de um programa de intervenção em escolares de oito a dez anos da rede pública de ensino do município de Matinhos/PR, Brasil. Foram avaliados 91 escolares, de oito a dez anos, do 3<sup>o</sup>, 4<sup>o</sup> e 5<sup>o</sup> ano, foram avaliadas pela Escala de Desenvolvimento Motor (EDM). Destas, 54 apresentaram risco de atraso no desenvolvimento. Das 54 crianças, 27 que realizaram semanalmente aulas de Educação Física curriculares foram randomizadas no Grupo Controle (GC), e 27 (Grupo Experimental - GE) foram submetidas a uma intervenção psicomotora, duas vezes na semana, durante quatro semanas. Após as intervenções, o GE e GC foram reavaliadas. Na análise do Quociente Motor Geral (QMG), verificou-se que em todos os anos, o GE apresentou aumento significativo comparado ao momento de avaliação, fato não observado entre crianças do GC. Houve elevação significativa das médias na reavaliação no GC e no GE, contudo, o GE apresentou diferenças significativas em relação ao GC, nas dimensões Motricidade Fina e Equilíbrio. A intervenção melhorou o QMG, a Motricidade fina e Equilíbrio em comparação com a aula de Educação Física tradicional.

**Palavras-chave:** Criança; Desenvolvimento infantil; Destreza motora; Educação física e treinamento

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## INTRODUCTION

Childhood and adolescence are essential periods for learning, mainly due to the rapid neurodevelopment and greater neural plasticity, that is, experience in this period alters the architecture of neural circuits due to greater plasticity, strengthening synapses<sup>1</sup>. In these phases of human development, in addition to the physiological implications related to aspects of neurological maturation, the young organism is especially sensitive to the influence of environmental and behavioral factors of both positive and negative nature<sup>2</sup>. It is believed that motor coordination in childhood will exert influence in the later years of life, which results in greater abilities in sports practice in individuals physically active from childhood<sup>3</sup>.

Some authors<sup>4-5</sup> state that the biological characteristics and social and cultural factors result in the child's development. Thus, it is important that interventions involve several factors and tasks so that skills are properly acquired. It is in this way that these characteristics and factors are integrated, forming the motor development of the human being<sup>6</sup>.

There is no question of the influence of the environment on development and how it occurs; however, the number of schools with adequate spaces for physical activity practices is currently scarce, which may compromise the development of the motor skills of students due to precarious infrastructure<sup>7</sup>.

A study<sup>8</sup> has shown that motor performance is correlated to school performance, and that the use of the MDS evaluation tool enables the teacher to identify the specific needs of students, as well as the elaboration of educational goals and psychomotor interventions.

A research<sup>9</sup> has compared the motor performance of children in sports schools with children who only performed Physical Education classes and verified that children who participated only in Physical Education classes had lower levels of motor performance. These findings confirm the need for the diversity of interventions and activities complementary to Physical Education classes with children in the study age group.

Since the reality of the research site is restricted to a public school with low-income population and without conditions of activities outside the school environment, it is necessary to analyze the effects of interventions applied in the school context and of easy reproducibility.

The great majority of studies that perform psychomotor interventions are aimed at students with special needs or with some specific pathology<sup>10</sup>. There is, therefore, a shortage of studies that propose psychomotor intervention for students with typical development. The acquisition of motor skills is related to school performance and learning process, as well as to prevention for future life<sup>11</sup>, which justifies the need to implement psychomotor activities for this population.

Considering these perspectives, the aim of this study was to evaluate the effects of a psychomotor intervention on the Motor Development of schoolchildren from 3<sup>rd</sup> to 5<sup>th</sup> grades of a city in southern Brazil.

## METHODOLOGICAL PROCEDURES

This experimental research was approved by the Ethics Research Committee of the Health Sciences sector, Federal University of Paraná (UFPR), CAAE No. 16964513.9.0000.0102, respecting the specific resolution of the National Health Council (No. 466/12) that involves research with beings humans.

The sample consisted of 91 children enrolled in a public school in Matinhos / PR, Brazil, who had no physical disabilities or neurological diseases diagnosed and authorized by their parents and / or guardians by signing the Informed Consent Form (TCLE), according to the Helsinki Declaration. Children of the 3<sup>rd</sup> (n = 25), 4<sup>th</sup> (n = 34) and 5<sup>th</sup> (n = 32) grades were evaluated for the convenience of researchers and availability of class schedules.

The Motor Development Scale (MDS)<sup>13</sup> was used for data collection in the pre- and post-intervention moments. This instrument determines, among other items, the General Motor Quotient (GMQ) and the motor development dimensions: Fine Motor (Motor Age 1 - IM1), Global Motor (Motor Age 2 - IM2), Balance, Body Scheme (Motor Age 4 - IM4), Spatial Organization (Motor Age 5 - IM5) and Temporal Organization (Motor Age 6 - IM6)<sup>11</sup>.

These values are quantified (in points) and categorized, allowing classifying the skills analyzed into standards: Very High (130 or more), High (120-129), High Normal (110-119), Average Normal (90-109), Low Normal (80-89), Low (70-79), Very Low (69 or less)<sup>11</sup>.

After evaluation, children with performance above “Low Normal” did not fall into any group. Individuals with performance equal to or below “Low Normal” were randomized into Experimental Group (EG) and Control Group (CG):

- CG: Children with low normal, low, very low result, who did not receive intervention and performed traditional physical education class in school;
- GE: Children with low normal, low, very low result, who received the intervention program. For the intervention, three different intervention strategies were created (one for 8-year-olds, one for 9-year-olds and one for 10-year-olds), with the same psychomotor goal for all. If some was late or advanced in relation to the school grade, it would enter into the age-appropriate group.

The intervention had average duration of 40 minutes, twice a week, totaling 8 interventions, with total duration of 4 weeks.

All activities were carried out within the school premises, during the period when the children attended school, and aimed at stimulating the participants' motor skills. The intervention was developed and applied by three academic Physiotherapy researchers with teacher supervision and follow-up of teacher of each classroom. The materials used for the pro-

gram were simple materials available at the school itself, so the program is easy to apply and reproducible. All activities were based on the proposed objectives that covered the pillars of psychomotricity: Balance, Spatial / temporal organization, Body scheme, Fine Mobility, Global Mobility and Laterality. The proposed activities are described below:

### Intervention 1

- **Activity:** Balance the little ball (Balance, fine and global mobility, Spatial and temporal organization).  
**Materials:** 2 rubber balls and 2 spoons.  
**Description:** The child should hold the spoon performing tweezers and balancing the ball that will be on the tip of the spoon, traveling determined distance.
- **Activity:** Gather the grains (fine and global mobility).  
**Materials:** Table and bean grains.  
**Description:** Several bean grains will be spread on a table, each team will aim to obtain these grains, and the team with the largest number of beans will win.
- **Activity:** Goal to goal (Balance, global mobility, spatial organization, laterality).  
**Materials:** Chairs and ball.  
**Description:** Students divided into two teams, on the side of each team there will be a chair, which will be used as a goal.
- **Activity:** Basketball in the chair (Balance, global mobility, spatial / temporal organization).  
**Materials:** Chair and ball.  
**Description:** Divide participants into two teams. Each team must choose a person to stay on top of a chair, which will stay in the opponent's defense field. The goal is to get the ball to the teammate on the chair.

### Intervention 2

- **Activity:** Chain catch (Spatial organization, balance, global mobility, body scheme).  
**Materials:** None.  
**Description:** Participant spread throughout space and one will be named the catcher. At the signal, he will go after other participants. When he picks up someone, this person happens to be helping the catcher, holding hands, forming a chain. When everyone is caught, another participant will start picking up.
- **Activity:** Crazy Race (Spatial / temporal organization, balance, body scheme, global mobility).  
**Materials:** 02 sock-filled balls, 02 cones.  
**Description:** Students divided into two groups. The 1<sup>st</sup> of each group must have a sock-filled ball balanced on the head and will have to make a course to a cone, betting the race without letting the ball fall.

If dropped, the student must stop and replace it, returning to the end of the row, the last that completes the course wins.

- **Activity:** Ball in the hula hoop (Global mobility, body scheme, laterality).

**Materials:** Ball and hula hoop.

**Description:** Distribute hula hoops in a vertical line, form two rows of students, who must bounce the ball inside the hula hoop, the team that finishes first wins.

- **Activity:** Which side do I go to? (Laterality, Spatial / temporal organization).

**Materials:** None.

**Description:** Form two teams in a vertical row, the first one in the row will receive the command to go left or right, after the command, he must go to the requested side, returning to the end of the row, the team that completes first wins.

### Intervention 3

- **Activity:** Zigzag (global mobility, balance, spatial / temporal organization).

**Materials:** Hula hoops.

**Description:** Spread the hula hoops on the ground and form two teams in a row, the students must perform zigzag between hula hoops, the team that finish first wins.

- - **Activity:** Spread the hula hoops on the ground and form two teams in a row, the students must perform zigzag between hula hoops, the team that finish first wins.

**Materials:** Hula hoops.

**Description:** Spread the hula hoops on the ground and form a row of students, one by one they should jump feet together from one hula hoop to the other.

- **Activity:** Ball pass (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Ball.

**Description:** Participants form a wheel, whoever is with the ball should say the name of a participant and throw the ball at him. If he cannot catch the ball, he is eliminated. If he can get the ball, he will say the name of another person who will follow the game, from where a winner will emerge.

- **Activity:** Change of place (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** None.

**Description:** Participants form a gigantic wheel and choose a fool, who will be in the center of it. With each round, the fool will order two people to change places. Example: FOOL: - Maria and Beto. Immediately, Maria should go to Beto's place and Beto should go to Maria's place. Meanwhile, the fool tries to get into one of the empty

places. If you cannot do it, do another round. If you can, whoever lost the place is the new fool.

#### Intervention 4

- **Activity:** Who remembers more Organization (spatial / temporal).  
**Materials:** Sheets of paper, pencil.  
**Description:** Two teams are composed and one student writes down for each team. The master will show the same drawn paper (various figures, animals, objects ...) for each team for 30 seconds. After 30 seconds another countdown is started, now 2 minutes, which is the time it takes for each team member to write down on paper the highest number of things he can remember in the landscape. There are several rounds (several drawings). The team that hits more things wins the round and the team that wins more rounds wins the game.
- **Activity:** Jump rope (global mobility, balance, spatial / temporal organization, laterality, body scheme).  
**Materials:** 3m rope.  
**Description:** Children should jump rope with one foot, when they are asked, they should change foot.
- **Activity:** Follow the master (Global mobility, balance, spatial / temporal organization, laterality, body scheme).  
**Materials:** None.  
**Description:** The children will form a row, the first directs the queue for a walk; however, they will walk counting steps, heel on the tip of the foot and vice versa.
- **Activity:** Mirror (global mobility, balance, spatial / temporal organization, laterality, body scheme).  
**Materials:** None.  
**Description:** One student facing the other, one student should make some movement and another should repeat, be aware that if the student moves the right arm the other should also move the right arm.

#### Intervention 5

- **Activity:** Bounce the ball (global mobility, balance, spatial / temporal organization, laterality, body scheme).  
**Materials:** Ball.  
**Description:** The student should bounce the ball on the floor with his right hand and then left, while walking, on the return delivery it to the friend who should do the same.
- **Activity:** Balance in the bench: (Global mobility, balance, spatial / temporal organization, laterality, body scheme).  
**Materials:** Two benches and one ball.  
**Description:** Place two benches in front of each other, the children should stand on top of the benches playing ball to each other; who loses balance returns to the game.
- **Activity:** Do what I do: (Global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** None

**Description:** Form a row and choose a leader who should be the first in line, the same should move to any side, and whoever is behind has to follow him.

- **Activity:** Fut zigzag: (Global mobility, balance, spatial / temporal organization, laterality).

**Materials:** Ball and hula hoop.

**Description:** Place the hula hoops in a vertical line apart, the student should lead the ball with his feet between the hula hoops and in return deliver the ball to the next.

## Intervention 6

- **Activity:** Take the ball (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Ball.

**Description:** Form a vertical row, the first child must throw the ball up and run to the end of the queue while the next in the row takes the ball before it falls on the ground.

**Activity:** Handclap (Global mobility, spatial / temporal organization).

**Materials:** None.

**Description:** Gather the students, they must clap their hands together and ask them to repeat the sequence of clapping. Ask some of them to “command” the activity.

- **Activity:** Jumping with rope (Global mobility, balance, spatial / temporal organization, laterality, corporal scheme).

**Materials:** Ball and hula hoops.

**Description:** Distribute hula hoops on the ground and at the end put a 45cm rope, the students will have to go through the hula hoops and then jump the rope.

- **Activity:** Bouncing ball (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Ball.

**Description:** Students must bounce the ball for 5 meters with both hands, and on the back return to the next on the line.

## Intervention 7

- **Activity:** Pet bottle bowling (Global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Ball and pet bottles.

**Description:** Place the pet bottles 10m apart, the students one by one, will throw the ball in order to knock down the largest number of bottles.

- **Activity:** Paper war (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Paper balls.

**Description:** Divide two teams into one field or adequate space, two teams play in two distinct fields, separated by a space. Each team will

have dozens of paper balls. They will start throwing these paper balls into the opponent's field, which should do the same. The goal is to get the balls out of your field and play on the opponent. The team that has less paper in their field is the winner.

- **Activity:** Tunnel ball (Global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Hula hoops.

**Description:** Two teams play. Participants stand one behind the other with their legs spread apart, forming two tunnels (one for each team). The first one in the queue passes the ball under the tunnel (through everyone's hand) and the one at the end of the tunnel must pick it up, run and take it to the front of the tunnel, where he will do the same. Everyone will have their turn. The team whose first player returns to the starting position wins.

- **Activity:** Relay in reverse (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** 30 cm stick.

**Description:** Identical to the athletics mode. There are two teams, each with 4 runners, who are expected to run and deliver a stick to the back mate. But this race will be done on the back. The team that completes the relay first wins.

## Intervention 8

- **Activity:** Grab and throw the ball (global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** Ball.

**Description:** Form two vertical rows, the first of the row must throw the ball to the first of the other row and return to the end of it, the game ends when the ball reaches the first player who threw it.

- **Activity:** One foot only: (Global mobility, balance, spatial / temporal organization, body scheme).

**Materials:** None.

**Description:** At the signal, students should jump on one foot only, alternating of feet when requested, or to make difficult, ask them to close their eyes.

- **Activity:** Jump the bench (Global mobility, balance, spatial / temporal organization, laterality, body scheme)

**Materials:** 45 cm bench.

**Description:** After forming a row, place the bench at a certain distance from students, who should jump over it until it reaches the last student.

- **Activity:** Race to the mirror: (Global mobility, balance, spatial / temporal organization, laterality, body scheme).

**Materials:** None.

**Description:** Divide two teams into a field or appropriate space, one by one the students must run against, at a certain time, there will be command of which side they should go (right or left).

After intervention, both groups were reassessed by MDS to analyze the program effectiveness. After reevaluation, after the end of the work, children from CG and those who presented an initial performance above “low normal”, participation in the intervention was offered.

The difference between MDS (GMQ) variables and Motor Age (IM1 to IM6) was evaluated for data distribution pattern using the Kolmogorov-Smirnov & Lilliefors test. The homogeneity of variances was evaluated by the Levene test. Once the assumptions of normality and homoscedasticity were checked, variables were compared using the ANOVA test for Repeated Measures to compare CG and EG in the pre- and post-test moments, considering groups and school grades (3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> grades). Means were evaluated between pairs by Tukey’s test for unequal n’s. All analyses were performed in the Statistica 7.0 software, assuming significance level of 0.05.

## RESULTS

A total of 91 students participated in the study, of which 25 were students of the 3<sup>rd</sup> grade, 34 of the 4<sup>th</sup> grade and 32 students of the 5<sup>th</sup> grade, with mean age of  $105.96 \pm 6.73$ ,  $113.23 \pm 7.94$  and  $124.06 \pm 4.64$  months, respectively. Forty-three (47.25%) were female and 48 (52.74%) were male. Of these, 54 presented risk of developmental delay, which were randomized into CG and EG.

Of the 25 3<sup>rd</sup> grade students, 84% (n = 21) presented “low normal” performance, while only 16% (n = 4) presented “Average Normal” performance. Of the 34 4<sup>th</sup> grade students, 55.88% (n = 19) presented “Low Normal” performance, and 44.11% (n = 15) presented “Average Normal” performance. In the 5<sup>th</sup> grade, 46.87% (n = 15) presented “Average Normal” performance, 40.62% (n = 13) presented “Low Normal” performance and 12.5% (n = 4) “Low” performance (Table 1).

**Table 1.** Quantity (n) and percentage (%) of individuals by gender, mean age and result of the evaluation

	3 <sup>rd</sup> grade		4 <sup>th</sup> grade		5 <sup>th</sup> grade	
	n	%	n	%	n	%
Male	15	60.0	19	55.9	14	43.8
Female	10	40.0	15	44.1	18	56.2
Total	25	100.0	34	100.00	32	100.00
Age (months) ± Standard Deviation	105.96±6.73	-	113.23±7.94	-	124.06±4.24	-
Average Normal	04	16.0	15	44.1	16	48.3
Low Normal	21	84.0	19	55.9	12	38.7
Low	00	0.0	00	0.0	04	12.9

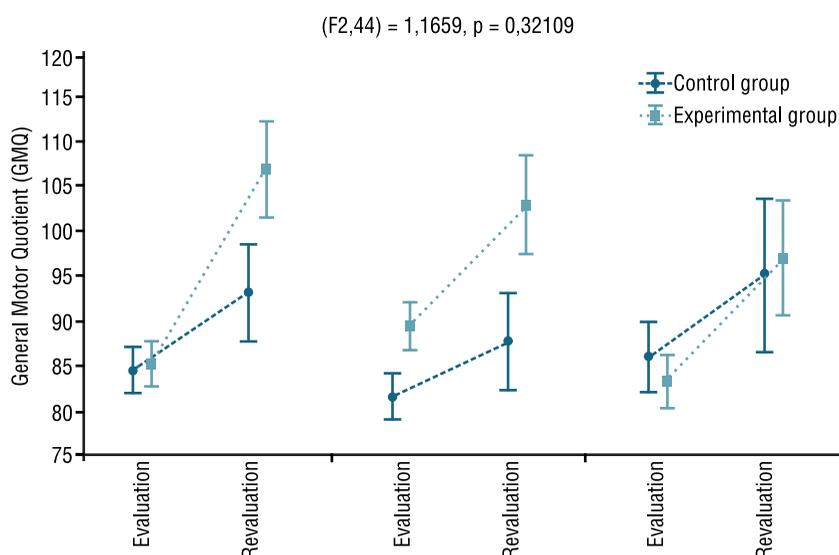
Table 2 describes the mean values of EG and CG for GMQ, IM1 (Fine Mobility) and IM3 (Balance), at baseline (Evaluation) and post intervention (Reevaluation).

**Table 2.** GMQ, IM1 and IM3 values pre- and post-intervention

	Grade	Group	n	Evaluation	Re-evaluation
				Mean ± SD	Mean ± SD
GMQ	3 <sup>rd</sup>	Control	10	84.60±3.77	93.2±9.47
	3 <sup>rd</sup>	Experimental	11	85.30±4.27	106.9±9.48
	4 <sup>th</sup>	Control	10	85.60±4.19	87.8±9.16
	4 <sup>th</sup>	Experimental	09	86.44±4.53	103.0±6.98
	5 <sup>th</sup>	Control	08	86.00±2.94	95.3±5.85
	5 <sup>th</sup>	Experimental	08	85.43±2.29	97.1±5.93
IM1	3 <sup>rd</sup>	Control	10	85.20±4.73	101.40±15.34
	3 <sup>rd</sup>	Experimental	11	88.20±8.02	124.20±8.50
	4 <sup>th</sup>	Control	10	106.80±15.44	113.40±10.75
	4 <sup>th</sup>	Experimental	09	101.33±10.58	128.00±6.70
	5 <sup>th</sup>	Control	08	116.50±3.00	124.50±9.00
	5 <sup>th</sup>	Experimental	08	109.86±11.71	130.29±2.92
IM3	3 <sup>rd</sup>	Control	10	94.80±13.20	102.60±18.42
	3 <sup>rd</sup>	Experimental	11	96.60±9.98	124.20±8.02
	4 <sup>th</sup>	Control	10	112.20±8.02	114.00±11.66
	4 <sup>th</sup>	Experimental	09	108.00±14.69	122.00±15.87
	5 <sup>th</sup>	Control	08	111.00±6.00	126.00±6.92
	5 <sup>th</sup>	Experimental	08	108.86±8.78	126.86±6.41

GMQ = General Motor Quotient; IM1 = Motor Age 1 (Fine Mobility); IM3 = Motor Age 3 (Balance); N = Number of students per group; SD = Standard Deviation

In the analysis of variable GMQ, it was possible to verify that in all school grades, EG presented increase of averages at the moment of reevaluation when compared to the moment of evaluation, a fact not observed among children from the CG, a result that indicates an improvement in performance of the children participating in the intervention. However, the significant difference between groups was observed at the moment of reevaluation only in the 3<sup>rd</sup> and 4<sup>th</sup> grades (Figure 1).



**Figure 1.** General motor quotient analysis in the pre- and post-intervention moments.

When evaluating the Fine Motor Age (IM1), it was possible to verify that in the 3<sup>rd</sup> grade, there was an increase in the averages at the time of re-evaluation in both CG and EG, but EG presented significant differences in relation to CG, which evidences an improvement in the motor performance in the fine motor item for children participating in the intervention program (Figure 2).

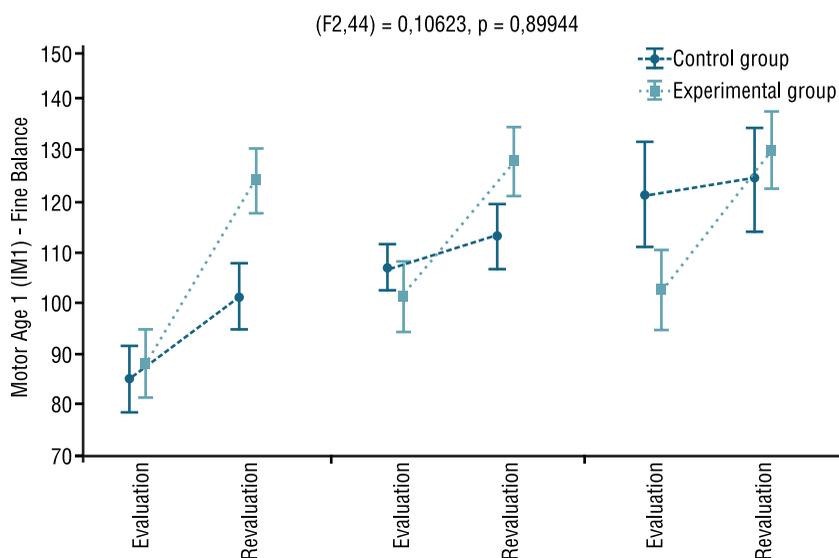


Figure 2. Fine Motor Analysis in pre- and post-intervention moments.

In relation to the Motor Age of Balance (IM3), it was possible to verify that the EG in the 3<sup>rd</sup> grade presented a high mean at the time of reevaluation, presenting significant differences in relation to CG, which shows an improvement in the balance for these participants (Figure 3).

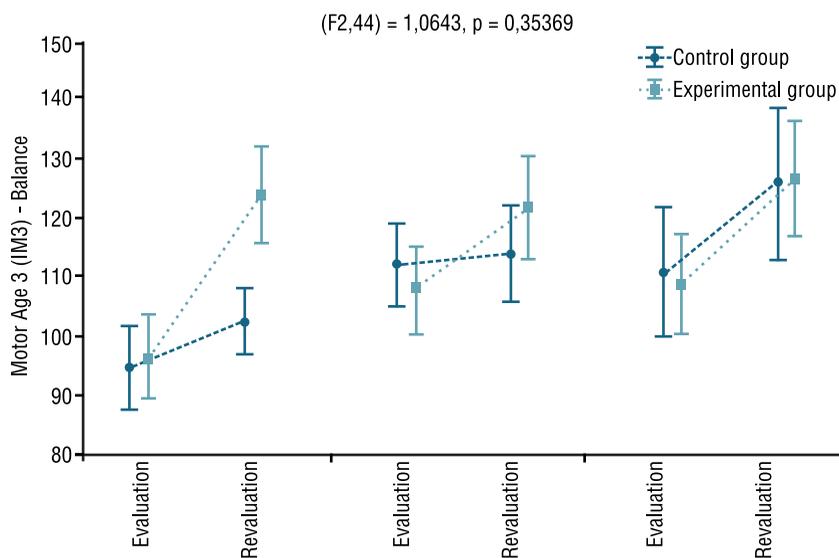


Figure 3. Equilibrium analysis in pre- and post-intervention moments.

## DISCUSSION

Motor development in schoolchildren has been a frequent target of research, considering the repercussions in the lives of these children and adolescents. Studies have found that most participants had motor development below normal levels, a result similar to that of this study<sup>12</sup>. Another study<sup>13</sup>, which used the same instrument, evaluated the motor skills of schoolchildren participating in social educational projects, sports projects and non-participants in extra-class structured activities, and its result evidenced the vast difference in motor skills that children participating in activities have compared to those who did not participate, especially those that are focused on specific sports. Other studies have used MDS to evaluate the development of schoolchildren, most of them indicating low motor performance scores of participants<sup>14,15,16,17,18</sup>. It is clear that the practice of physical activities in childhood and adolescence promotes the improvement in motor skills and the acquisition of new skills and experiences.

When analyzing the total number of participants (91 children) of the present study, it was observed that this is a larger sample when compared with other studies on the same subject<sup>19,20</sup>. Only one study with a related theme was found with a larger number of participants; however, it involved 40 public schools (1 federal, 25 state, 14 municipal schools) from 24 neighborhoods of the city of Florianópolis, Santa Catarina, Brazil<sup>13</sup>.

In our sample, 59.34% (n = 54) of children presented risk of developmental delay. A study<sup>8</sup> using the same instrument showing different results was developed with 6-10-year-old students from two public schools and verified that the majority of schoolchildren (96%) presented motor development within normal parameters, which justifies the creation of an intervention program for the sample with developmental risks.

In spite of the high risk in all sampled school grades, the fifth grade is notable because it presents a high rate of students with low motor performance, mainly due to the number of children classified as "Low". Another study, which also used MDS, also found similar results, in which older schoolchildren (approximately 10 years of age) presented lower performance compared to younger ones<sup>13</sup>. Other studies with different methods also showed a decrease in motor performance and physical activity index as the age increased<sup>21,22,23</sup>.

These findings can be explained by the fact that with school progress, children are increasingly involved in curricular activities, which restricts activities (plays and games), which stimulate the exploration of one's own body and the environment, consequently leading to motor difficulties<sup>19</sup>. Based on this principle, it is important to emphasize that the earlier the evaluations and intervention proposals, the better the chances of preventing neuropsychomotor disturbances and deficits affecting children's development (personal, professional and academic)<sup>22</sup>.

One of the main positive results of the intervention in the present study was the improvement in fine motor skills in EG that, despite being directly

associated with academic performance, is little mentioned in literature when it comes to sports performance, but several sports require such skills<sup>21-23</sup>.

A research carried out<sup>9</sup> with children aged 8-10 years verified that children who were inserted in the sporting context presented better performance in motor skills than children that only performed physical education classes, which also occurred in the present study, since children who performed the intervention program presented better motor performance. These findings can be justified by the influence of the environment and context on children's motor acquisition, which can also be justified by the results of another study<sup>19</sup>.

A study<sup>24</sup> compared the motor performance of practitioners and non-practitioners of systematic physical activity, and although both groups presented motor performance lower than expected, the group that practiced systematic physical activity presented better performance in motor skills and control of objects than the group of non-practitioners. These results are in agreement with the findings of the present study, which justifies the implementation of a specific and structured intervention program in the school environment.

The limitations of the study include the fact that activities were carried out in a single city, with specific reality, being necessary the replication in other locations, as well as the absence of a CG without activities, because the CG of this study participated in physical education classes, which limits the perception of the benefits of traditional Physical Education classes.

## CONCLUSION

The program proposed to schoolchildren provided an increase in Motor Development (through the General Motor Quotient), especially in Fine Motor and Balance, indicating that psychomotor interventions are promising for this purpose.

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