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Analysis of the implication of different sports modalities on children's motor coordination: An integrative review

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ABSTRACT
The childhood phase is a period of extreme importance for the child's motor development, since it is at this stage that motor skills become fundamental for carrying out daily tasks. Development is a process that is characterized by changes in biological aspects so that human beings can adapt to these factors in order to provide motor skills.

Keywords: Motor skills, Sports practice, Physical growth.

INTRODUCTION

The childhood phase is a period of extreme importance for the motor development of the child, since it is at this stage that motor skills become fundamental for the performance of daily tasks (GALLAHUE; OZMUN; GOODWAY, 2013). Development is a process that is characterized by changes in biological aspects so that human beings can adapt to these factors in order to provide motor skills (SILVA *et al*., 2018).

For Gallahue, Ozmun and Goodway (2013), motor development is the constant change in motor behavior throughout life, promoted by the relationship between the need for tasks, the individual in his biological aspect and environmental aspects. For Silva *et al*. (2021), movement changes due to motor development can be perceived from motor skills, which evolve from simple and disordered movements to more organized and complex movements. Motor development allows the individual to have the ability to coordinate movements involving the nervous, muscular, sensory, and skeletal systems. Thus, sports practice cannot be seen only as a practice that involves techniques, but rather as the experience of directed

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motor activities, enabling various gestures and actions that are outside the daily patterns as a way to develop motor coordination (CARLOS; FIELD; BRENDA, 2018).

Developing motor coordination always requires a planned process with imposed objectives, because when one wants to develop one of the skills, consequently the others end up being influenced and this ends up leading to improvement and diversity of movements (SILVA; GIANNICHI, 1995). From the perspective of Chaves *et al*. (2013) the construction of a rich and diversified motor repertoire allows the expression of adequate levels of motor coordination and ensures the homogeneity, integration and structural unity of the different movements present in children's daily routines, influencing psychomotor development and aspects related to their health.

The practice of sports activities allows the child to experience movements that are associated with fundamental aspects for motor development and consequently good motor coordination. Over the last few years, children's sports practice has become the target of research in the area of human motor sciences, contributing significantly to the studies of physical growth, development and motor learning. Investigations in systematized sports activities focus on environmental factors, referring to the nature of the task, biological individuality and with regard to explanations for possible changes in children's development and level of motor behavior (WROTNIAK et al., 2006; ROSA NETO, 2020).

OBJECTIVE

The objective of this study was to identify, through an integrative review, studies that provide information on the influence of sports practice on motor development during childhood.

METHODOLOGY

The present study is an integrative review in which it consists of a broad analysis based on studies with different methodologies focusing on a given theme (LAKATOS; MARCONI, 2021). For the construction of this work, surveys of articles were carried out in the ADOLEC, BIREME, LILACS, MEDLINE and SCIELO databases with the following descriptors from DeCS: "child development" and "motor skills" and "physical exercise" and "children".

The inclusion criteria were articles published in the last 10 years, in Portuguese or English, original articles, duplicates available in full and focusing on children. Thus, the search began to identify and capture the maximum of available studies related to the objective of this article and that met the previously established inclusion and exclusion criteria. For the exclusion criteria, incomplete articles, literature reviews, focusing on children with compromised neurological development, duplicates and articles unrelated to the theme were used.

DEVELOPMENT

From the searches carried out, 6 articles were found on the Adolec platform, 96 on the Bireme platform, 22 on Lilacs, 111 on Medline and 2 on the Scielo platform, resulting in a total of 237 selected works. After applying the exclusion criteria, 6 articles from Adolec, 93 from Bireme, 21 from Lilacs, 108 from Medline, and 2 from Scielo were discarded. Thus, only 7 articles met all the research parameters.

After selecting the articles, a table was created to compare the information of each article containing the necessary information such as author (year), objectives, methodology and results.

Table 1:

AUTHOR (YEAR)	OBJECTIVES	METTODOLOGY	RESULTS
(FARIAS *et al.*, 2021)	To analyze the impact of the level of physical activity on the motor development of schoolchildren	A total of 90 students of both sexes participated in the study. The level of physical activity was assessed using the PAQ-C, and the level of motor development using the motor development scale (MDS)	Regarding the level of physical activity, 44.4% were classified as insufficiently active and 55.6% as sufficiently active. The data showed that the Insufficiently Active (AI) students presented in their predominance a classification of motor performance in two levels, much lower and lower, while the Students Sufficiently Active (SA) were predominantly classified as inferior, normal, low and medium normal. The results indicate that the level of physical activity AI promotes motor impairment in schoolchildren
(QI *et al.*, 2018)	To evaluate the effects of supervised training, combining whole-body exercise and hand-eye coordination activities to improve fine motor skills in a group of ordinary five-year-old children	Fifty-two children were selected and randomized into exercise and control groups. The exercise group participated in three 30-minute training sessions per week for 24 weeks	The fine motor skills and handgrip strength of the exercise group increased significantly, while there was no significant change in the control group during the experimental period. The results indicate that the current training program is effective and can be applied to ordinary five-year-olds to improve their fine motor skills. In addition, this program has simple physical activities that are suitable for the physical and mental level of child development

(SILVA *et al*., 2019)	To verify the amount and intensity of physical activity practiced by children of low socioeconomic status during weekdays and weekends, to evaluate motor competence indicators and to verify the associations between these variables	A total of 176 children between 3 and 6 years of age participated in the study. The children wore an accelerometer for seven consecutive days to measure physical activity, and motor competence was measured using the *Test of Gross Motor Development* (TGMD-2).	Boys spent more time on total physical activity than girls (222.5 min vs. 204 min; $p<0.01$) on weekdays. In both sexes, the average daily time of total physical activity was above the international guidelines for physical activity (≥ 3 hours of physical activity per day), but there are indicators of delay in the development of motor competence, especially in object control skills. We conclude that boys have higher rates of physical activity than girls and have greater motor competence, however, reduced values of association between physical activity and motor competence suggest that the amount of physical activity does not necessarily imply the development of motor competence
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(HU *et al.*, 2020)	Verify the effectiveness of new rhythmic activities in improving fundamental movement skills	289 children aged 3 to 5 years were randomly divided into an experimental group and a control group. To assess motor development, the TGMD-2 was used as a collection instrument	The practice of new rhythmic activities improves the performance of fundamental motor skills of movement better than traditional rhythmic activities

(TORTELLA *et al*., 2016)	to examine the effects and specificity of structured and unstructured activities played in the Primo Sporte 0246 playground in Northern Italy on motor competence in 5-year-olds	The study included 71 children from kindergartens who attended the space once a week for ten consecutive weeks and were exposed to 30 minutes of free play and 30 minutes of structured activities. The control group included 39 children who did not attend the park	The results show that the experimental group that practiced gross motor activities observed in the park improved significantly in 4 of the 6 gross motor tasks and in none of the fine motor tasks.
(RABELO *et al*., 2023)	to check if there are differences in the development of motor skills in children aged 48 months	A total of 400 children of both sexes (28.14 + 7.23 months) participated in this study. Two groups were created (the group that performed guided physical activity (30 min duration and 2 times a week) and the group that did not perform guided physical activity). For a better understanding, they were divided into 3 age groups (12-23, 24-35 and 36-48 months). Motor skills were assessed using the PDMS-2 scales for 6 months after the application of the standard instrument.	The practice of guided physical activity in the first 48 months is essential for the development of motor skills. It is in the first months (up to 36) that there are greater differences

DISCUSSION OF THE RESULTS

In view of the results achieved, we sought to discuss similarities and divergences between the findings of the studies and to confront with the literature how sports practices help in the development of motor coordination, minimizing delays in the child's development. Pedro and Florindo (2014) state that for good motor development in childhood, it is necessary to offer the child a varied space with a diversity of stimuli so that this individual can interact in different ways in order to experience new learning in which they will enhance movements. For Gallahue, Ozmun and Goodway (2013), sport promotes the improvement of motor skills.

In the study conducted by Hu*et al.* (2020) with children aged 3 to 5 years, with the aim of to verify the effectiveness of new rhythmic activities in improving fundamental movement skills. The result was that the practice of new rhythmic activities improves the performance of fundamental motor skills of movement better than traditional rhythmic activities.

Within this context of early childhood, Qi *et al.* (2018) Evaluated the effects of supervised training, combining full-body exercise and hand-eye coordination activities to improve fine motor skills in a group of ordinary five-year-old children. The fine motor skills and handgrip strength of the exercise group increased significantly, while there was no significant change in the control group during the experimental period. The results indicate that the current training program is effective and can be applied to ordinary

five-year-olds to improve their fine motor skills. In addition, this program has simple physical activities that are suitable for the physical and mental level of child development.

In view of this, the different sports modalities can be seen as responsible tools for the diversity of movements during childhood, favoring motor development, because, as Gallahue, Ozmun and Goodway (2013) explains, individuals who receive motor stimuli and opportunities from diversified environments from an early age have the possibility of better developing motor skills in general.

FINAL CONSIDERATIONS

The present integrative review allowed the construction of a synthesis of scientific knowledge about the practice of sports in various modalities in childhood to improve motor coordination. It was noticed that stimuli in early childhood significantly improve the motor development of individuals.

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