

# AN EXAMINATION OF THE CHILDREN WITH DEVELOPMENTAL COORDINATION PROBLEM AND PHYSIOTHERAPY

Inderpreet Kaur<sup>1</sup>, Sikander Singh<sup>2</sup>  
<sup>1,2</sup>Guru Kashi University, Talwandi Sabo

## **ABSTRACT**

*It is the goal of this systematic literature review and meta-analysis to identify the kinds of physical therapy therapies that have been studied in children with developmental coordination deficit, the most prevalent factors being addressed, and if these interventions are beneficial. It was found that the PEDro and NIH quality evaluation measures were used to assess the quality of the studies that were screened using the MEDLINE, PEDro, CINAHL, SPORTDiscus, PsycINFO, or Cochrane Library databases. In order to assess systematic reviews, researchers employed AMSTAR and then performed a meta-analysis. From the articles that were analysed, 29 articles of moderate to high quality made it into the qualitative analysis. Children with DCD benefit from both task-oriented and motor skill training-based therapies when it comes to enhancing their motor function. The meta-analysis included data from 14 studies, all of which supported the efficacy of physical therapy treatments in the fight against inactivity. Physical treatment for children with DCD should include both task-oriented and conventional approaches, according to the findings. Individual children's needs must be well defined in interventions in physical therapy settings.*

**Keywords:** *developmental coordination disorder, child, adolescent, physical therapy, interventions, systematic reviews, meta-analysis, motor skill disorders*

## **I. Introduction**

*The goal of this study was to perform a systematic evaluation of all currently available information on therapies for children with DCD in physical therapy settings. Further, we sought out the sorts of physical therapy interventions used on children with DCD, as well as the most often addressed characteristics (such as balance, motor coordination and timing) in order to determine the efficacy of such treatments (Bhat, 2020). A total of 29 primary studies*

were found after reviewing 3,570 abstracts and 109 full-text publications, and 13 of these studies were included in the meta-analysis. There are three types of PT interventions: task-oriented, traditional, and contemporary.

## **II. Literature Review**

*Task-oriented approaches and classic and current physical therapy therapies have been found to be beneficial in the treatment of children with DCD, according to this comprehensive literature review. Compared to control groups, the meta-analysis found that treatments in physical therapy settings were more successful, and children's post-test scores were considerably higher than those of the protest group. Due to the small number of participants in these research, occupational therapy and physical therapy did not have statistically different outcomes (only two studies being compared). As a consequence of the 29 papers, it is feasible to conclude that PT therapies for children with DCD are successful.*

## **III. Limiting Factors**

*In some (clinical) circles, the phrase "physical therapy" has a specific meaning, which may impact whether therapists choose to utilise a conventional theoretical approach or an empirically-driven paradigm (Sujatha, et al. 2020). In spite of the fact that the meta-analysis revealed a significant difference between intervention and control groups, there is a substantial risk of bias because the majority of papers included were not homogeneous and many did not include random allocation into groups. Some of the discrepancies in the data might be explained by additional potential limiting variables. Sample size, participant motivation, study duration, and intervention design are all part of this equation.*

## **IV. Sample Size**

*Many of the studies had a problem with sample size. Despite finding an increase in motor proficiency following the core stability and task-oriented training, the authors of one research said that no strong conclusions could be drawn due to the small sample size. A study's error rate can be reduced by increasing the number of participants (Dannemiller, et al. 2020). For some variables (confounding variables), a limited sample size may have contributed to inconsistencies in conclusions, whereas bigger sample sizes would have yielded more definitive results. The ability to identify causality, magnify acute consequences, and reduce bias can be improved by using bigger sample sizes in future research.*

## **Quality Assessment and Selection of Studies**

*Studies that did not meet the inclusion criteria were subjected to a quality assessment in order to determine which ones should be included. Controlled trials were evaluated using the Physiotherapy Evidence Database; systematic reviews were evaluated using AMSTAR and other papers were evaluated using NIH quality evaluation measures. For research that earned a low rating from one of the experts, a third expert assessed the results (Sankar, & Monisha, 2019). When a third reviewer gave a study a low grade, it was omitted from the systematic review.*

## **V. Data Extraction and Synthesis**

*The data for the meta-analysis, which included research types, participant characteristics, group size, intervention features, and outcome variables, was retrieved by one author and verified by another reviewer. In this approach, we considered materials that offered motor proficiency composite score means and standard deviations or mean difference and effect size. The standardised mean difference (SMD) with 95 percent confidence intervals (CI) was presented since motor proficiency was measured using a variety of devices (Bolk, et al. (2018). The Cochrane Collaboration's Review Manager Software was utilised for the meta-analysis. The inverse variance outcome assessment was used to obtain an overall impact estimate since many studies included groups that were not randomly assigned to the intervention or control. MD (95 percent confidence interval) results are presented, and the random effects model was adopted because of the variety of treatments. The Movement Assessment Battery for Children's data was used in a variety of research that used varied outcome measures. The mean change was reversed for trials in which lower outcome scores were seen as an improvement.*

## **VI. Motivation**

*Research with children need a high level of participant motivation. Children in the DCD group were largely in school, and studies have shown that motivated students do better in school. For example, findings decided to use a portable dynamometer instead of manual muscle testing in order to inspire their five-year-old participant (HHD). When the subject was less upset with the HHD, he was more motivated to keep going, and he performed better with more consistency (Moore, Rand, & Simmonds, 2019). Children's motivation can only be boosted if the intervention is enjoyable for them. It was shown that the subjects' enjoyment of the rebound therapy intervention was a major factor in their willingness to participate, as was the case with the Wii Fit trial, where participants also claimed that they were driven by the program's*

*enjoyment to attend sessions. Participants' lack of motivation was evident in the findings study when the activity was not pleasurable, on the other hand.*

## **VII. Duration**

*The length of the intervention ranged from one to 36 weeks, and the amount of time each session lasted from 20 minutes to two hours, according to the publications examined. Results might be improved if the experiment is allowed to run for a long enough time. According to the findings study, neither the Wii Fit group nor the NTT group improved in terms of motor performance. Researchers ascribe this in part to the shorter programme length for the Wii group (6 weeks) than for the NTT group (9 weeks). The researchers questioned if extra time would have resulted in bigger gains for the Wii group (Jane, et al. 2018). According to Findings, the study was conducted pragmatically owing to a lack of resources, time, and participants, and this pragmatic approach resulted in a higher chance of bias or inconclusive findings. In order to retain information and store it in the long-term memory, it is necessary to practise for longer periods of time. The long-term memory is capable of storing information for an extended length of time. Children with DCD benefit from this because they strengthen their motor abilities and keep them for a long time.*

## **VIII. Intervention Design**

*A study's success hinges on the intervention's design. The optimal experimental research design is a randomised controlled trial (RCT) with blind evaluation, although the design is depending on the goal of the research. However, the authors indicated that an RCT would have been superior and would have allowed for more reliable findings on the efficacy of the experimental design in the findings trial, which utilised a matched-pair experimental design. Having an experimental and a control group is always the best approach to determine the success of a programme in a research (Dana, et al. 2019). However, Findings said that the "no change" findings in their two control groups may have been influenced by the application of an intention-to-treat premise. While one assessor was blinded to the participants in the findings trial, the patients and their therapists were not, which may have added bias, according to the authors of the study.*

## **IX. Implications for Future Research**

*For future investigations, it is clear that activities that are therapeutic yet pleasant for greater motivation, higher sample sizes, appropriate duration and the correct study design are*

*necessary. A follow-up is also advised for additional studies on PT therapies for children with DCD. Assessing the intervention's long-term impact necessitates a follow-up (Aertssen, W., Jelsma, & Smits-Engelsman, 2020). Only three of the 29 included studies tracked down their individuals again. Findings' follow-up found that the individuals continued to participate in the activities for at least one to four years after the first study. In order to notice a difference, it is necessary to wait a significant amount of time between the intervention and the follow-up. If you'd want to see how well your motor skills have held up over time, you may want to conduct a follow-up.*

## **X. Recommendations for Practice**

*Leeds Consensus Statement was created in 2019 by D.A. Sugden and included suggestions for the use of diagnostic criteria for developmental coordination problem. For physical therapy interventions, the Consensus recommendations for intervention techniques are as follows: intervention must "include activities that are functional and based on the relevance of daily living and meaningful to the child, parents or teachers and others," as well as take into account the wishes of children, important people in their lives and their family contexts while being based on theory and evidence (Sulaiman, et al. 2022). If an intervention is to be effective, it must focus on improving a person's ability to practise the skills they are lacking in order to help them change their motor behaviour. In order to allow for the child's ability to adapt to the abilities they are taught, physical therapists should use the principle of repetition in their treatment plans. In addition to the intervention, further practise involves prescribing home exercises to the youngster.*

*"Interventions for children with DCD should focus on sensorimotor organisation and involve activities organising the sensory system by giving visual, proprioceptive, auditory, and tactile inputs," said findings.*

## **XI. Conclusion**

*There is still a need for additional study into how physical therapy might help children with DCD, but the current data demonstrates that physical therapy is an effective treatment for increasing balance, motor coordination and timing, muscular strength and function and performance. Children with DCD benefit from task-oriented approaches (NTT) and motor training based therapies in both conventional as well as modern PT contexts, according to the publications included in this study. For gross motor difficulties, NTT and motor skills training are the most effective interventions. Fine motor skills may be improved by using NTT, too.*

*Accordingly, further research on the effectiveness of various treatment options and their particular results in children with DCD should be conducted in the future.*

## **XII. References**

*Aertssen, W., Jelsma, D., & Smits-Engelsman, B. (2020). Field-based tests of strength and anaerobic capacity used in children with developmental coordination disorder: a systematic review. Physical Therapy, 100(10), 1825-1851.*

*Bhat, A. N. (2020). Is motor impairment in autism spectrum disorder distinct from developmental coordination disorder? A report from the SPARK study. Physical therapy, 100(4), 633-644.*

*Bolk, J., Farooqi, A., Hafström, M., Åden, U., & Serenius, F. (2018). Developmental coordination disorder and its association with developmental comorbidities at 6.5 years in apparently healthy children born extremely preterm. JAMA pediatrics, 172(8), 765-774.*

*Dana, A., Hamzeh Sabzi, A., & Christodoulides, E. (2019). The effect of virtual reality exercises on dynamic balance of children with developmental coordination disorder. Journal of Humanities Insights, 3(03), 123-128.*

*Dannemiller, L., Mueller, M., Leitner, A., Iverson, E., & Kaplan, S. L. (2020). Physical therapy management of children with developmental coordination disorder: An evidence-based clinical practice guideline from the academy of pediatric physical therapy of the American physical therapy association. Pediatric physical therapy, 32(4), 278-313.*

*Jane, J. Y., Burnett, A. F., & Sit, C. H. (2018). Motor skill interventions in children with developmental coordination disorder: a systematic review and meta-analysis. Archives of physical medicine and rehabilitation, 99(10), 2076-2099.*

*Moore, N., Rand, S., & Simmonds, J. (2019). Hypermobility, developmental coordination disorder and physical activity in an Irish paediatric population. Musculoskeletal Care, 17(2), 261-269.*

*Sankar, U. G., & Monisha, R. (2019). Life impact of developmental coordination disorder: Qualitative analysis of patient and therapist experiences. Biomedical & Pharmacology Journal, 12(1), 491.*

*Sujatha, B., Alagesan, J., Akahaya, R., Rajameena, R., & Rayna, A. B. S. (2020). Effect of aerobic exercise training on anxiety in children with developmental coordination disorder. Biomedicine, 40(4), 535-538.*

*Sulaiman, M., Baig, M. O., Memon, S. I., Ashraf, N., Butt, P., Afzal, K., & Iqbal, R. (2022). Effects of Trampoline Exercises in Children with Developmental Coordination Disorder: A Randomized Controlled Trial. Physikalische Medizin, Rehabilitationsmedizin, Kurortmedizin.*