

The effectiveness of cognitive Strategies as an intervention for children with Developmental Co-ordination Disorder

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CLINICAL SCENARIO

Developmental Co-ordination Disorder (DCD) is thought to affect 6-13% of school aged children, however diagnosis of DCD is difficult as it relies on the observations of parents and teachers (Hillier, 2007). A child is identified as having DCD when they display difficulties in motor co-ordination that have a negative effect of their functional performance, despite the absence of any obvious impairment to motor function (Mandich, Polatajko, Missiuna & Miller, 2001). In New Zealand DCD is referred to as Developmental Dyspraxia (The Dyspraxia Support Group of New Zealand Inc., 2006). There are a number of different interventions that aim to improve motor performance in children who have DCD, these include Sensory Integration and Perceptual Motor Therapy; the use of cognitive strategies for this purpose is relatively new (Mandich, Polatajko, Missiuna & Miller, 2001).

FOCUSSED CLINICAL QUESTION

For Children with Developmental Co-ordination Disorder, are cognitive strategies more effective than other commonly used interventions, for improving motor performance?

SUMMARY OF SEARCH, 'BEST' EVIDENCE' APPRAISED, AND KEY FINDINGS

There was a lot of evidence available on this topic, the majority of studies were qualitative and a number of studies were based on the same video footage from a previous study. The key findings were that intervention in general, is effective for children with DCD, but there is insufficient evidence to compare the effectiveness of different interventions (Mandich, Polatajko, Missiuna & Miller, 2001, Polatajko, Mandich, Miller & Macnab, 2001, Hillier, 2007). Perceptual Motor Therapy and Sensory Integration are identified as having strong evidence of their effectiveness (Hillier, 2007). There is limited evidence for cognitive strategies and more research is needed in this area.

CLINICAL BOTTOM LINE

There is limited evidence to suggest that cognitive strategies are effective in improving motor performance for children with DCD, however there is no evidence to suggest that it is more effective than any other intervention, therefore more research is required to establish the effectiveness of this intervention.

LIMITATION OF THIS CAT:

This critical appraisal has been peer reviewed by one lecturer as part of an assignment.

SEARCH STRATEGY:

In order to identify relevant articles, a search of CINAHL, PubMed, and OT Seeker databases was conducted. The search terms used were “Developmental Co-ordination Disorder” AND “intervention” AND “cognit*”. This produced a manageable number of results without the possibility of limiting any relevant articles. It was not necessary to identify an age group, as all articles related to children. A manual search of the reference lists of all relevant articles found was also conducted.

INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria

Published in English language

Diagnosis of participants was DCD

Age of participants was 5-18 (school aged)

Included cognitive strategies as an intervention

Aim of intervention was to improve motor performance

Exclusion Criteria

Focused on a specific motor skill rather than general motor performance

RESULTS OF THE SEARCH:

Study Design/ Methodology of Articles Retrieved	Level	Author (Year)
Systematic review	N/A	Hillier (2007)
Qualitative – Grounded Theory	5	Mandich, Polatajko, Missiuna & Miller (2001)
Qualitative – Case Study	4	Taylor, Fayed & Mandich (2007)
Qualitative – Descriptive	5	Bernie & Rodger (2004)
Review (not systematic)	N/A	Polatajko, Mandich, Miller & Macnab (2001)
Qualitative - descriptive	5	Mandich, Polatajko, Macnab & Miller (2001)

BEST EVIDENCE

1. Mandich, Polatajko, Missiuna & Miller (2001)

This article was allocated as part of the assignment.

2. Hillier (2007)

This article was considered best evidence as it presents a summary of evidence pertaining to a range of occupational therapy interventions, including cognitive strategies. In addition to this, the requirements of this assignment state that two different types of evidence must be reviewed. This meant that a second qualitative article could not be chosen.

SUMMARY OF BEST EVIDENCE

1. Mandich, Polatajko, Missiuna & Miller (2001).

Aim

The aim of this study was to explore the use of cognitive strategies in occupational therapy intervention for improving motor performance in functional tasks for children with DCD. The study does not aim to evaluate the effectiveness of the intervention but rather aims to identify and classify aspects of the intervention.

Study Design

Qualitative - Grounded theory.

Setting

This study took place in the Occupational Therapy Department of the University of Western Ontario. The study consisted of analysing video footage; the article does not state the setting where the videos were originally filmed.

Participants

The sample for this study was taken from videotaped sessions sourced from two previous studies. There were eight participants included in this study, this consisted of all four participants from one of the previous studies, and four randomly selected from the other study, which had a total of ten participants. Although not stated, it appears that the eligibility criterion was that the participants had been part of one of the two previous studies. The participants were all children with DCD; three girls, five boys, their ages and other demographic information were not stated. The sample was then further refined by randomly selecting a number of ten minute segments of videotape to analyse.

Method

The intervention that this study focuses on was carried out as part of two previous studies; specific information about the intervention, such as where it was carried out and by whom, is not stated in this article. The article describes the method used to analyse the data gathered from the previous studies.

Observational coding was used to collate data from the video footage. First, criteria were set for what would be accepted as the use of a strategy. The researcher then viewed ten, ten minute segments of video and recorded each time a strategy was used. The researcher then categorised the strategies that had been identified. These categories were then verified by an independent observer, multiple times, using different segments of video footage. Inter-observer agreement ranged from 92-96% and the categories were determined to be "exhaustive and mutually exclusive" (p. 130).

Findings

This study showed that the global strategy *Goal-Plan-Do-Check (GPDC)* was used as an overall framework to guide the use of other domain specific strategies, as identified in the *Good Strategy User* model. There were eight domain specific strategies identified these were task specification/modification, motor mnemonic, body position, feeling the movement, attention to doing, verbal guidance, verbal self guidance and verbal rote script. Supplementation of task knowledge by the therapist was also identified as being used alongside GPDC. This is where the therapist would give the child information that would help them to perform the task.

Original Authors' Conclusions

The author's conclusions were that cognitive strategies are an important part of intervention for children with DCD in order to improve motor performance in functional tasks. Current use of cognitive strategies used in occupational therapy practice include the use of the GPDC strategy as an overall framework, which is used alongside the domain specific strategies identified in the *Good Strategy User* model and supplementation of task knowledge. The authors believe it is necessary to conduct further research to evaluate the efficacy of the intervention, but that it was first necessary to fully identify and understand the different aspects of the intervention. The authors believe that the findings of this study can be used as a starting point for further research regarding the intervention's efficacy.

Critical Appraisal:

Trustworthiness of the results

Taylor (2007) suggests that in order for results to be trustworthy, they should be credible, transferable, dependable and confirmable. The following is a discussion relating to the criteria set out by Taylor, in relation to this study.

Credibility – The qualifications and previous publication of articles of the authors suggest that they are well informed on both the topic and research procedures. However, information about the original videotaping of the sessions is not included in this article; therefore it is not possible to judge the credibility of that aspect of the research.

Transferability - This article does not present information such as the participant's ages or other demographic information, this will make it difficult for readers to establish its transferability to their own setting. This study sampled children with DCD, and could not be transferred to other populations, but it is unclear whether it can be transferred to children of all ages or of different cultures.

Dependability –The method used to analyse the data was clearly explained, which would allow review of the process and findings, however the method used in the original videotaped intervention is not stated.

Confirmability –The data analysed in the study came from video footage which means it can be easily audited. The research process included secondary analysis of the data by an independent researcher, who confirmed the findings with high rates of inter-observer agreement.

Interpretation of Results

The results of this study do show that the GPDC strategy is used successfully in occupational therapy intervention to improve motor skills for children with DCD. However the extent of the intervention's effectiveness can not be drawn from this study, due to its design, nor can judgements be made about the intervention's superiority over any other intervention. The results of this study provide a good foundation for further research that may aim to find this information.

Summary/Conclusion

This study shows limited evidence of the successful use of cognitive strategies with children with DCD. This evidence however is not considered trustworthy due to limited credibility and dependability. More importantly, the aim of the study was not to evaluate the effectiveness of such an intervention and therefore the results should not be used for this purpose.

2. **Mandich, Polatajko, Missiuna & Miller (2001).**

Aim

To summarise and evaluate the evidence that shows the effectiveness of a range of interventions used with children who have DCD.

Study Design

Systematic review

Search strategy

The author identified 18 databases that were searched. The titles and abstracts of the search results were reviewed by two people in order to identify relevant articles. The author also conducted a manual search of the reference lists of all articles that were collected from the databases.

Setting

The author is a lecturer at the University of South Australia.

Articles Reviewed

In total 47 studies were included in this systematic review. Only 31 studies are reported in this article however; these are the studies that were considered to be level III-3 evidence or higher.

Method of review

Each article was read by two independent reviewers. The articles were summarised in a table showing; the level of evidence as established by the PEDro scale, the diagnosis of participants, which intervention had been evaluated, the outcome measures used and whether the intervention had been shown to be effective or not.

Results

The results show that there is strong evidence to suggest that intervention for children with DCD is more effective in improving motor performance than no intervention. The evidence surrounding whether one intervention is more effective than another is less clear. There is strong evidence to suggest that Perceptual Motor Therapy and Sensory Integration are effective, despite the fact that some outcome measures showed them to be inferior to the comparative intervention. Physiotherapy and the incorporation of mastery concepts also had strong evidence to support their effectiveness. For kinaesthetic training there is only moderate evidence to suggest that the intervention is effective. There is limited evidence supporting weight bearing exercises, writing, CO-OP, contemporary treatment approach, process orientated treatment, traditional treatment, individual tutoring and motor imagery.

Original Authors' Conclusions

The author concluded that intervention for children with DCD is effective for improving motor performance, when compared with having no intervention. However there is not enough evidence to conclude that one intervention is better than another. It is suggested that it may be the attributes of therapy that are consistent across interventions, such as positive attention and feedback that contribute to improvement in function. The author suggests that further research into DCD itself is required, along with an investigation into the specific factors of intervention that are beneficial.

Critical Appraisal:

Are the results Valid?

In order for a systematic review to be considered valid, Taylor (2007) suggests that a number of criteria should be met. This review meets those criteria, which are as follows; the focus of the systematic review was clearly defined, a thorough search of databases was conducted, along with a manual search of reference lists, a good range of relevant studies were chosen to be reviewed, with clear inclusion and exclusion criteria identified. A level of evidence for each study was established using the PEDro scale and any concerns about the quality of the methodology of a study were identified.

What are the results?

Taylor (2007) also suggests criteria for appraising the results of a systematic review. This review rates well against the criteria. The results of this review clearly address the research question. A meta-analysis was deemed to inappropriate for this review; the results were instead presented in a table as a best- evidence synthesis of findings. This seems to be the most appropriate way to collate the data, as it provides the reader with a clear overview of each study and allows comparisons to be made. As the results of the studies were not combined and analysed, it would be inappropriate to comment on statistical significance or identify confidence intervals. The clinical significance of the results has been discussed. The author has accurately interpreted the results, and has not made any unsupported claims.

How will these results help me work with my clients?

Taylor (2007) suggests that there are a number of issues to consider when deciding if a systematic review will be of benefit in practice. This review relates to a very specific client group, and will therefore only be relevant for a select number of therapists. The studies included in this review use a vast number of outcome measures, as these outcome measures are listed with study, it is possible for the reader to identify the studies that will be relevant to their intervention goals by selecting studies that used a

corresponding outcome measure. The cost- benefit relationship of the interventions has not been discussed in this review.

Summary/Conclusion:

The results of this systematic review are considered valid, and the way the results have been analysed and presented is deemed to be appropriate. The relevance to therapists in practice is limited, but for those working with this client group the results would be valuable.

IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

The level of evidence found by this review is insufficient to use as a basis for making decisions about the use of cognitive strategies in practice. However, the information contained in the articles would be valuable for therapists working with this client group to use alongside their clinical judgement. There is limited low level evidence that supports the use of cognitive strategies as an intervention for children with DCD therefore, therapists using cognitive strategies in practice need to use their own clinical judgement to evaluate its effectiveness with their clients. As there is no evidence to refute the use of cognitive strategies, there is no reason to discontinue their use in practice if clients are showing improvements as a result of intervention. Therapists who are not currently using cognitive strategies in practice need not change their approach as a result of the evidence found by this review, although they may wish to consider the use of cognitive strategies as part of intervention, on a case by case basis.

Mandich, Polatajko, Missiuna and Miller's (2001) article offers valuable information for educating therapists about the use of cognitive strategies with children who have DCD. It provides a clear description of the key components used within the intervention, and examples of how they may be used in practice.

Hillier's (2007) article makes it clear that further research about the efficacy of the use of cognitive strategies with children with DCD is required, as only one study, out of a total of 31 studies reviewed, focused on the use of cognitive strategies. Mandich, Polatajko, Missiuna and Miller's (2001) article is also useful as a foundation for further research on this topic, as Mandich, Polatajko, Missiuna and Miller suggest that it is first necessary to fully understand the key aspects of an intervention before research can be conducted to evaluate its efficacy.

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