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# Effect of motor imagery on children with developmental disabilities

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## INTRODUCTION

Developmental disability (DD) is a category of long-term disabilities, both physical and/or intellectual, that occur in children before the age of 22.[7] Cerebral palsy, attention deficit disorder and intellectual disability are examples of conditions that fall under the DD category. These can occur as a result of genetic differences, perinatal and neonatal events including infection and maternal illness, environmental toxins, injury, poverty and trauma.[4] An estimated one in six children in the United States have a diagnosis of a condition that falls within the DD category.[7] Symptoms of DD vary amongst children in type, severity, and complexity.[4] Children with these diagnoses may have deficits and delays in several domains including behavior, cognition, vision, hearing, speech, and motor performance. [4] Upper extremity motor performance challenges can derive from a variety of causes such as spasticity, limb abnormalities, spinal cord injuries, and coordination or motor planning difficulties.[4] These motor performance challenges can therefore affect participation in activities of daily living, including dressing, toileting, bathing, social participation, and participation in school.

Occupational therapists (OT) commonly work with children with DD who have difficulties with activities of daily living using a variety of approaches. To address the motor performance challenges exhibited by children with DD, OTs and other rehabilitation professionals use interventions including process-oriented and task oriented approaches.[14] The process-oriented approach targets specific body functions needed to perform the motor aspect of an activity.[14] Conversely, rehabilitation professionals use task oriented approaches to target whole-body movements instead of specific body components. This is achieved by practice and repetition of physical movements, as well as integration of motor learning principles. [14]

### Terminology

*Spasticity*: motor disorder characterized by exaggerated jerks of the tendons. [8]

*Muscular dystrophy*: a group of diseases that result in muscle loss and weakness. [8]

*Motor learning:* practice and repetition leads to a person's ability to produce movements needed to complete a task.[8]

Motor imagery (MI) is considered a task-oriented approach that uses mental practice instead of physical practice to improve motor function.[6] Patients are prompted to visualize a movement before physically performing this movement, in hopes that the mental rehearsal will improve the physical performance of the movement.[6] MI is believed to be a useful tool when working with children with DD, as researchers theorize that difficulty with motor performance may be due to a lack of motor imagery processes occurring in the brain.[1] Researchers have found MI to be effective when used to improve motor performance in children without DD.[1] The body of research concerning the use of MI with children with DD is growing; however, no systematic review assessing the level and quality of this evidence of these studies has been published. This systematic review provides a comprehensive summary of current research evidence with the intent to help OTs working in pediatric settings understand the potential outcomes of using MI with children with DD.

## METHODS

This systematic review followed a strict methodology which was pre-determined and written in a protocol. The protocol is a plan for locating, appraising and synthesizing all relevant articles on a given topic.

*Locating:*

In accordance with the protocol, the following databases were searched in February 2019: PubMed, PsychInfo, CINAHL, Academic Search Premier, OTsearch, and TRIP. For each of the listed databases, a predetermined list of subject headings and keywords were used to generate a search sentence (Appendix A). The subject headings and keywords were identified by completing preliminary searches of these databases in consultation with a librarian.

Once the search was conducted, articles were included in this systematic review if they met the inclusion criteria: (1) included children between the ages of 5 and 21; (2) who had a developmental disability; (3) who were treated using MI; and (4) functional performance was measured (Appendix B). Furthermore, included articles were limited to those written in English, published in peer-reviewed journals, and used a quantitative article design, other than case report. A flow chart of the articles identified and included in this systematic review is provided in Figure 1. Two authors independently searched each database to find all articles that met the inclusion criteria. Both authors compared and then came to consensus with their searches to make a comprehensive list of articles that met the inclusion criteria. When disagreement arose over which articles to include, a third author was consulted.

*Appraising:*

Two authors independently appraised each article included to determine the level and quality of evidence. A set of predetermined

### Terminology

*Level of Evidence:* study design; studies that are least vulnerable to bias, more generalizable, and more likely to have outcomes caused by the intervention have the highest levels of evidence.[5]

*Quality of Evidence:* measures the degree of rigor within the study's methodology.[5]

*Clinical significance:* change from intervention makes a perceptible difference in the lives of the participants.[5]

*Statistical significance:* change can be attributable to the intervention and not chance.[5]

questions was used to discern the quality of evidence of each article, based on the design of the study. The two reviewers then compared their independent appraisals of each article, discussed, and resolved any discrepancies through a consensus process. A third reviewer assisted in resolving discrepancies when necessary. The summary of information regarding the level and quality of evidence is found in Table 1.

*Synthesizing:*

Summarization of the included articles was performed following the same process of independent work completed by two reviewers, then consensus. This summary of information is available in the *Overview of Included Articles* table (Table 2). The table includes information about the study design, sample, intervention, outcomes, measures, and the statistical and clinical evidence. From the available evidence, practice recommendations were determined using a modified version of the GRADE system.

## RESULTS

### *Study Identification*

The flowchart, *Studies Identification Steps* (Figure 1), represents the process involved in excluding and including articles and summarizes each stage of the process. Through the search of the literature, 387 articles were identified; nine met the inclusion criteria to be included in this systematic review. These nine articles included seven Level 1 articles (i.e., RCT), one Level 2 article (i.e., pretest/posttest study), and one Level 3 article (i.e., single case design without repeated measures), as listed in Table 1. The articles ranged in terms of quality of evidence with two articles of high quality, two of moderate quality, and five of low quality (Table 1).

Developmental disability is an umbrella term that encompasses many different conditions. One of the articles included subjects whose primary disability was attention deficit disorder, three articles included subjects with a physical disability and four articles included individuals with intellectual disabilities. In two of the nine articles, MI was used in conjunction with physical practice whereas in the other seven articles, MI alone was provided to children with DD. Researchers studied the effect of MI on three specific outcomes: improvement in performance measured through the use of standardized assessments, improvement in functional motor performance, and improvement in executive functioning.

*Motor performance (standardized assessments)*: Motor performance in this context can be described as specific motor movements needed to complete a task involved in a standardized assessment[1]. Four articles in this review used motor performance during standardized assessments as an outcome measure to determine the efficacy of MI. [1,11,16,17] This included three RCTs and a Single Case Design (SCD). The assessments used for these outcomes are listed in Table 2. Both assessments are valid and reliable. Of these four articles, one article[1] was clinically significant but not statistically significant. This means the clinical significance could have occurred by chance. The results of another article were statistically significant but not clinically significant[11], and two were both clinically and statistically significant. [16,17] While the results of these articles are likely attributable to the intervention, they did not necessarily measure functional performance.

*Functional motor performance:* Functional motor performance is described as motor actions that are task specific.[13] Two articles used a functional activity to measure the effect of MI on motor performance. [3,12] This included one RCT and one quasi-experimental study. One study was of moderate quality [3], while the other was of low quality.[12] Measurement tools utilized included basketball free throws and dart throwing. Both articles were statistically significant but not clinically significant. [3,12] While the change can be attributed to the intervention, it was not significant enough to make a difference in the lives of the participants.

*Executive functioning*: Executive functioning in this context incorporates the cognitive processes needed to perform motor tasks, including planning the task, envisioning a mental image of the task, and executing the task.[9] Three articles in this review used executive functioning during motor activities as an outcome measure.[2,10,15] Variables of executive functioning being tested included executive control, alerting, orienting, timing accuracy, and reaction time. All of these articles were of low quality evidence. Measurement tools that were utilized included the Stroop Test and the Bassin Anticipation Timer. Two of these studies established statistical significance.[8,13] Statistical significance could not be calculated for one study due to lack of pertinent data.[2] None of these studies established clinical significance. While the change can attributable to the intervention, it was not found to be significant enough to make a difference in the lives of the participants.

## PRACTICE RECOMMENDATIONS

There is Grade B evidence supporting the use of motor imagery to improve motor performance, functional motor performance, and executive functioning. The included articles received a moderate quality score based on the modified GRADES criteria. While the evidence found was positive, it was not consistently clinically nor statistically significant. For all three of the included outcomes, the costs and burdens closely balance the potential benefits that can be gained. Alternative treatment options may be equally reasonable. It is suggested that future studies use larger sample sizes and more rigorous methodologies to increase the level of evidence as highlighted by the GRADES criteria. Further research is very likely to have an impact on the estimate of effect and validity of the results.

## CLINICAL IMPLICATIONS

Motor imagery has been found to have a positive impact on motor performance during standardized assessments, functional motor performance, and executive functioning in some but not all the studies. The few included studies of high-quality evidence found more positive change; however, these results were minimized by the moderate quality of evidence of most of the included articles. Furthermore, clinicians using MI with children with DD should consider using it simultaneously with another intervention (e.g., physical practice), as some studies found neither positive nor negative results unless it was performed in conjunction with another intervention. Given this, a caution recommendation has been made in favor of using MI with children with DD. Based on the limited evidence available on MI, clinicians should take data and monitor progress closely. Clinicians should discontinue the intervention if the data indicates that it is ineffective. Moreover, considering this practice recommendation, it is important for clinicians to help patients explore other interventions that may be more effective in helping them achieve their goals. Based on the results of this review, MI may be most appropriate for typically developing children as young as five years old with an IQ ≥ 70 and the ability to visualize movement. [1]

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## Appendix A. "A Priori" Protocol

| **PICO question** | | | |
|---|---|---|---|
| **P - Children with developmental disabilities** | **I -Motor imagery** | **C -Usual care** | **O –Functional performance** |

**SEARCH STRATEGY**

**List of the Databases to be Search:**

| **Databases Included in SR Search** | **Planned the Search** | | **Will conduct the Search** | |
|---|---|---|---|---|
| | **Person 1** | **Person 2** | **Person 1** | **Person 2** |
| **PubMed** | **All** | **All** | **Lindsay Finnegan** | **Jackie Bonner** |
| **PsychInfo** | **Valerie Leonard** | **Ashley Shacklett** | **Jackie Bonner** | **Julie Thiel** |
| **CINAHL** | **Maddy Scuderi** | **Julie Thiel** | **Valerie Leonard** | **Lindsay Finnegan** |
| **Academic Search Premier** | **Lindsay Finnegan** | **Jackie Bonner** | **Maddy Scuderi** | **Ashley Shacklett** |
| **OTsearch** | **Lindsay Finnegan** | **Valerie Leonard** | **Ashley Shacklett** | **Julie Thiel** |
| **TRIP** | **Ashley Shacklett** | **Jackie Bonner** | **Maddy Scuderi** | **Valerie Leonard** |

**List of Search Terms:**

| | **Construct 1 Motor Imagery** | | **Construct 2 Developmental Disability** | |
|---|---|---|---|---|
| **Database** | **Subject Headings** | **Keywords** | **Subject Headings** | **Keywords** |

| | | | | |
|---|---|---|---|---|
| PubMed | N/A | motor | developmental | Developmental |

| | | | | |
|---|---|---|---|---|
| | | imagery | disabilities | disabilities |

neurodevelopmental

| | | | | |
|---|---|---|---|---|
| | | | disorders | Developmental |

| MSOT Program |  |  |  | disability |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | | Disabled children | |

| | | | | |
|---|---|---|---|---|
| | | | | developmental |

delay

developmental

| | | | | |
|---|---|---|---|---|
| | | | | disorder* |

| | | | | |
|---|---|---|---|---|
| | | | | motor skills disorder |

developmental

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  |  | coordination |

| | | | | |
|---|---|---|---|---|
| | | | | Dyspraxia |

| | | | | |
|---|---|---|---|---|
| | | | | Disabled, children |

| | | | | |
|---|---|---|---|---|
| | | | | Disabled child |

| | | | | |
|---|---|---|---|---|
| | | | | Child disabled |

| | | | | |
|---|---|---|---|---|
| PsychInfo | Motor Imagery | mental | Developmental | developmental |

| | | | | |
|---|---|---|---|---|
| | | practice | Disabilities | disabilit* |

| | | | | |
|---|---|---|---|---|
| | | mental | Dyspraxia | developmental |

| | | | | |
|---|---|---|---|---|
| | | rehearsal | | delay |

| | | | | |
|---|---|---|---|---|
| | | mental | | developmental |

| | | | | |
|---|---|---|---|---|
| | | imagery | | disorder* |

| | | | | |
|---|---|---|---|---|
| | | motor | | motor skills disorder |

|  |  |  |  |  |
|---|---|---|---|---|
| MSOT Program |  | imagery |  |  |

disorder

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  |  | dyspraxia |

| | | | | |
|---|---|---|---|---|
| CINAHL | N/A | mental | developmental | developmental |

| | | | | |
|---|---|---|---|---|
| | | practice | disabilities | disabilit* |

| | | | | |
|---|---|---|---|---|
| | | mental | | |

| | | | | |
|---|---|---|---|---|
| | | rehearsal | Child disabled | developmental |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  | mental |  |  |

| | | | | |
|---|---|---|---|---|
| MSOT Program | | imagery | | developmental |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  |  | disorder* |

| | | | | |
|---|---|---|---|---|
| MSOT Program | | motor | | Jefferson – East Falls Campus |

| | | | | |
|---|---|---|---|---|
| | | imagery | | motor skills disorder |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  |  | developmental |

| | | | | |
|---|---|---|---|---|
| | | | | coordination |

| | | | | |
|---|---|---|---|---|
| | | | | disorder |

dyspraxia

| | | | | |
|---|---|---|---|---|
| Academic | motor imagery | mental | children with disabilities | developmental |

|  |  |  |  |  |
|---|---|---|---|---|
| Search | (cognition), | practice | developmentally | disabilit* |

| | | | | |
|---|---|---|---|---|
| Premier | | | disabled children | |

| | | | | |
|---|---|---|---|---|
| | | mental | | developmental |

| | | | | |
|---|---|---|---|---|
| | | rehearsal | | delay |

| | | | | |
|---|---|---|---|---|
| | | mental | | developmental |

| | | | | |
|---|---|---|---|---|
| | | imagery | | disorder* |

| | | | | |
|---|---|---|---|---|
| | | motor | | motor skills disorder |

| | | | | |
|---|---|---|---|---|
| MSOT Program | | imagery | | Jefferson – East Falls Campus |

| | | | | |
|---|---|---|---|---|
| | | graded imagery | | developmental coordination disorder<br>dyspraxia |
| OT Search | N/A | mental practice<br>mental rehearsal<br>mental imagery<br>motor imagery | developmental disabilities<br>Disabled children<br>Motor skills disorders | developmental disabilit$<br>developmental delay<br>developmental disorder$<br>motor skills disorder<br>developmental coordination disorder<br>DCD<br>dyspraxia |
| TRIP | N/A | mental practice<br>mental rehearsal<br>mental imagery<br>motor imagery | N/A | developmental disabilities<br>developmental delay<br>developmental disorder*<br>motor skills disorder<br>developmental coordination disorder<br>dyspraxia |

**Boolean Sentence for each database:**

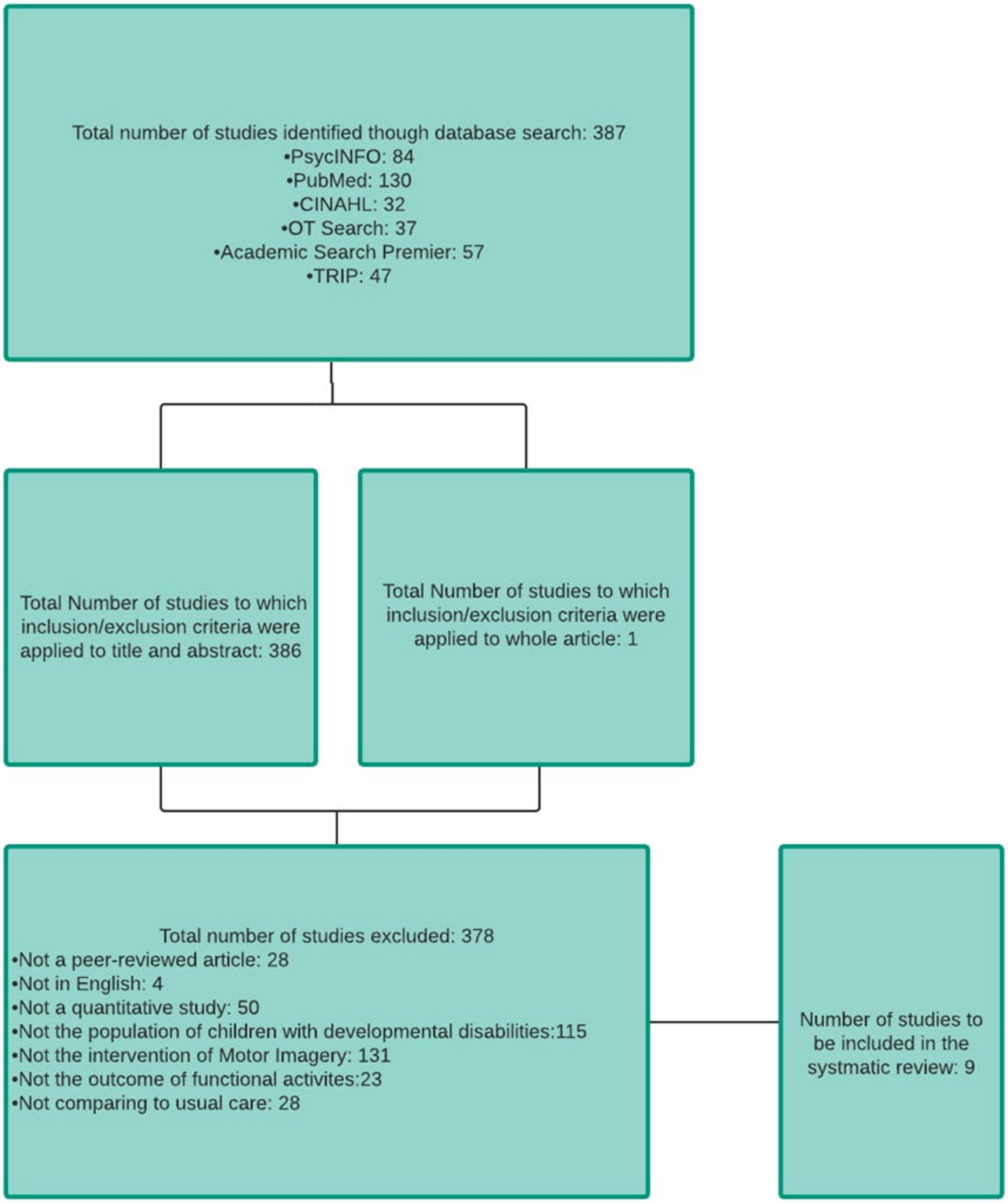
| **Database Name** | **Boolean Sentence** |
|---|---|
| PubMed | (Imagery OR _mental practice”_ OR _“mental rehearsal”_ OR _“mental imagery”_ OR _“motor imagery”_) AND (“developmental disabilities” OR  “neurodevelopmental disorders” OR “child disabled” OR “_developmental disabilit*”_ OR _“developmental delay”_ OR _“developmental disorder*”_ OR _“motor skills disorder”_ OR _“developmental coordination disorder”_ OR _dyspraxia_) |
| PsychInfo | (“_mental practice”_ OR _“mental rehearsal”_ OR _“mental imagery”_ OR _“motor imagery”_) AND  (“developmental disabilities” OR<br><br>dyspraxia OR “_developmental disabilit*”_ OR _“developmental delay”_ OR _“developmental disorder*”_ OR<br><br>_“motor skills disorder”_ OR _“developmental coordination disorder”_ OR _dyspraxia_) |
| CINAHL | (“_mental practice”_ OR “_mental rehearsal”_ OR “_mental imagery”_ OR “_motor imagery”_) AND (“_developmental disabilit*”_ OR “_developmental delay”_ OR “_developmental disorder*”_ OR _“motor skills disorder”_ OR “_developmental coordination disorde_r” OR _DCD_ OR _dyspraxia_ OR children with disabilities OR developmentally disabled children) |
| Academic Search Premier | (“DE motor imagery (cognition)” OR “_motor imagery_” OR “_graded imagery_” OR “_mental imagery_" OR "_mental rehearsal_” OR "_mental practice_”) AND (“DE developmental disabilities” OR “DE children with disabilities” OR “ DE developmentally disabled children ” OR "_developmental disabilit_*" OR “_developmental delay_” OR “_developmental disorder_*” OR “_motor skills disorder_” OR "_developmental coordination disorder_” OR _dyspraxia_) |
| OT Search | (_“mental practice”_ OR _“mental rehearsal”_ OR _“mental imagery”_ OR _“motor imagery”_) AND (“developmental disabilities” OR “disabled children” OR “Motor Skills Disorders” OR _“developmental disability$”_ OR _“developmental delay”_ OR _“developmental disorder$”_ OR _“motor skills disorder”_ OR _“developmental coordination disorder”_ OR _DCD_ OR _dyspraxia_) |
| TRIP | _(“mental practice”_ OR _“mental rehearsal”_ OR _“mental imagery”_ OR*“motor imagery”*) AND (“_developmental disabilit*”_ OR “_developmental delay”_ OR _“developmental disorder*”_ OR “_motor skills disorder”_ OR “_developmental coordination disorder”_ OR _dyspraxia_) |

## Appendix B. Inclusion Criteria

**ARTICLE INCLUSION and EXCLUSION CRITERIA**

| **Inclusion Criteria** | | | |
|---|---|---|---|
| Population | Intervention and Comparison | Outcome | Other |
| Children (7 to 21) | Motor Imagery (intervention that guides individual to visualize completing a movement/activity in their mind in order to actually perform the physical activity/movement). | Functional Activities | English Language |
| Developmental Disability (an onset of the condition was before the age of 8; regardless of when the individual was diagnosed). | | | Peer Reviewed Journals |
| | | | Quantitative Studies |
| **Exclusion Criteria** | | | |
| Population | Intervention and Comparison | Outcome | Other |
| N/A | N/A | N/A | N/A |

Figure 1. *Studies Identification Steps*



Total number of studies identified though database search: 387
- PsycINFO: 84
- PubMed: 130
- CINAHL: 32
- OT Search: 37
- Academic Search Premier: 57
- TRIP: 47

Total Number of studies to which inclusion/exclusion criteria were applied to title and abstract: 386

Total Number of studies to which inclusion/exclusion criteria were applied to whole article: 1

Total number of studies excluded: 378
- Not a peer-reviewed article: 28
- Not in English: 4
- Not a quantitative study: 50
- Not the population of children with developmental disabilities:115
- Not the intervention of Motor Imagery: 131
- Not the outcome of functional activites:23
- Not comparing to usual care: 28

Number of studies to be included in the systmatic review: 9

Table 1. Quality of Evidence Table

| | | Quality Criteria | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Citation** | **Type of design** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Quality Level** | **Evidence Level** |
| Adams, Smits-Engelsman, Lust, Wilson, & Steenbergen (2017) | SCD: AB with no repeated measures | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | High | Level 3 |
| Chevalier, Parent, Rouillard, Simard, Guay, & Verret (2017) | RCT | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | Low | Level 1 |
| Hemayattalab & Movahedi (2009) | RCT | 0 | 0 | 1 | 1 | 0 | 1 | N/A | 1 | 0 | 0 | Moderate | Level 1 |
| Poretta & Surburg (1995) | RCT (3) | 0 | 0 | 1 | 1 | 0 | 0 | N/A | 0 | 0 | 0 | Low | Level 1 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Screws & Surburg (1997) | RCT | 0 | 0 | 1 | 1 | 0 | 0 | N/A | 0 | 1 | 0 | Low | Level 1 |
| Sharif, Hemayattalab, Sayyah, Hemayattalab, & Bazazan (2015) | Nonequivalent pretest-posttest control group design (5) | 0 | 1 | 1 | 0 | 0 | N/A | 0 | 1 | 0 | 1 | Low | Level 2 |
| Surburg (1991) | RCT | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | Low | Level 2 |
| Wilson, Thomas, & Maruff (2002) | RCT | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | High | Level 1 |
| Wilson et al. (2016) | RCT | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | Moderate | Level 1 |

Table 2. Study Description Table

| Study | Population | N | Outcome(s) | Measurement |
|---|---|---|---|---|
| Adams, Smits-Engelsman, Lust, Wilson, & Steenbergen (2017) | 7-12 | MI: n=4<br>Alt Tx: n=4 | Motor performance (standardized assessment) | MABC-2 = +<br>MC=+<br>No SS<br>CS |
| Chevalier, Parent, Rouillard, Simard, Guay, & Verret (2017) | 5-7 | MI: n=7<br>CT: n=8 | 1. Executive function (executive control)<br>2.Executive function (alerting)<br>3.Executive function (orienting) | Animal Stroop test + (Executive functioning) NS<br>K-CPT + (alerting) NS<br>NEPSY + (orienting) NS |
| Hemayattalab & Movahedi (2009) | 12-15 | MI: n=8<br>Alt tx: n=8<br>Alt tx & MI: n=8<br>MI & Alt tx: n=8<br>CT: n=8 | Functional motor performance (basketball free throws) | -2 points awarded for each basket and -1 point for unsuccessful shot that hit rim initially or after rebound.<br>-10 total trials<br>SS<br>No CS |
| Poretta & Surburg (1995) | 13-17 | MI: n=16<br>Alt Tx: n=16 | 1.Executive functioning (Absolute constant error of timing accuracy)<br>2.Executive functioning (variable error | Bassin Anticipation Timer (msec.) (< = better)<br>Bassin Anticipation Timer (msec.) (< = better)<br>SS<br>No CS |

| | | | | |
|---|---|---|---|---|
| | | | of timing accuracy) | |
| Screws & Surburg (1997) | 11-13 | MI: n=10<br>Alt Tx: n=10<br>CT: n=10 | Motor performance (standardized assessment) | Peg board<br>Pursuit Rotor Task<br>SS<br>No CS |
| Sharif, Hemayattalab, Sayyah, Hemayattalab, & Bazazan (2015) | 13-21 | MI: n=10<br>Alt. Tx: n=10<br>CT: n=9 | Functional motor performance | Reported as mean scores of points scored by each group during each dart throwing session<br>SS<br>No CS |
| Surburg (1991) | 14-18 | MI: n= 32<br>CT: n=32 | Executive function (reaction time) | Timed motor task<br>SS<br>No CS |
| Wilson, Thomas, & Maruff (2002) | 7-12 | MI: n= 17<br>Alt Tx: n=17<br>CT: n= 17 | Motor performance (standardized assessment) | MABC scores (0-67+)<br>SS<br>CS |
| Wilson et al. (2016) | 7-12 | MI: n= 12<br>Alt Tx: n= 13<br>CT: n= 11 | Motor performance (standardized assessment) | MABC scores (0-67+)<br>SS<br>CS |

Key: Alt tx: alternative treatment; *No actual numbers given, approximate number taken from line graph chart; CO-OP = Cognitive Orientation to Occupational Performance; CS = Clinically significant; MABC= Movement Assessment Battery for Children; MABC-2 = Movement Assessment Battery for Children (2nd edition); MCQ = Motor Control Questionnaire; MCRP = The Motor-Cognitive Remediation Program; MI = Motor Imagery; MMD = Mild Mental Disabilities; MP = Mental Practice; MPO = Mental Practice Only; MP&PP = Mental Practice followed by Physical Practice; $n^2$ = Effect size; NEPSY = Visual Attention subtest of the Developmental Neuropsychological Assessment Battery; NP = No Practice

NS-Not significant; PMT- Perceptual Motor Therapy; PP- Physical Practice; PPO- Physical Practice Only; PP+MI; PP&MP- Physical Practice followed by Mental Practice; r- Correlation Coefficient; RCT- Randomized Controlled Trial; SCD- Single Case Design; SS-Statistically significant.