

EFFECTIVENESS OF FINE MOTOR INTERVENTION FOR YOUNG SCHOOL-AGED CHILDREN

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BRIEF EVIDENCE-
INFORMED ASSESSMENT
OF THE RESEARCH
(**BEAR**)



Evidence Centre

BEAR Rapid Clinical Query Worksheet

The Brief Evidence-Informed Assessment of the Research (BEAR*) process guides you in quickly integrating evidence into clinical decisions by:

1. Identifying and quickly answering clinical questions that arise in your daily practice
2. Reflecting on the clinical applicability of those answers

Note: A BEAR should take less than an hour to complete.

Name: Sarah, Stephanie and [] Program/Discipline: CDCB and School [] Date: March 2, 2017

Clinical Question: Among preschool and school-aged children aged 3 to 8, with developmental disabilities, does regular practice with fine motor activities result in improvement of []

Sources of Evidence to Search:

- TRIP Database
- Rehab Reference Center
- PubMed Clinical Queries
- McMaster Plus/Rehab+
- SUMSearch
- Discipline-specific synopsis database (e.g. PEDro, OTSeeker, SpeechBITE, PsycBITE): []
- Diagnostic-specific source: []
- Primary lit database(s): []
- Other: []

Number of resources (e.g. guidelines, articles, etc.) reviewed: []

Best Evidence (Top 3)	Type of Evidence (Pyramid Level)	Rapid Appraisal (include clinical applicability)		Key Message(s) for Action
		Strengths	Weaknesses	
Ohl, A. M., Graze, H., Weber, K. []	Single Study Primary research []	Statistically significant []	Neither group []	10-week FM/VM program for KG []
Bazyk, S., Michaud, P. []	Primary research, single study lev []	Evaluation measures []	Lacks control group. sma []	Measured changes in fine motor skills as well []
Ratzon, N. Z., Efraim, D., & Bar []	Single Study	- Small RCT - Group Level []	- The control group []	Short-term OT intervention provided in []

*Optional resources for Rapid Appraisal: [Step 3 Flowchart](#) & [Clinical Applicability Form](#)

Clinical bottom line:

Young students in kindergarten and grade 1 both with and without identified disabilities benefit from intensive fine motor and visual motor intervention that was either direct (small group) or indirect/consultative using a response to intervention framework or integrated occupational therapy approach. []

Based on these findings and on **current practice**, what degree of change is required?

- Significant
 Moderate
 Minimal
 None
 Unsure

Recommended actions for **practice change** (if warranted):

This supports our current practice in recommending the provision of fine motor and visual-motor activities to promote the development of skills needed for success in the school curriculum. This also supports the need for consultation from an occupational therapist to provide integrated services to support the fine motor []

CLINICAL QUESTION

- Among school-aged children aged 4 to 7, with developmental disabilities, does **regular practice with fine motor activities** result in improvement of classroom based skills such as printing readiness, pencil skills, and cutting?



SEARCH

SEARCH SOURCES:

- Trip Database
- CINAHL
- ERIC
- UpToDate



SEARCH TERMS:

In-hand manipulation, children, fine motor skills, therapy, hand and finger strengthening

BEST EVIDENCE

BEST EVIDENCE - TOP 3

TYPE OF EVIDENCE

Ohl et al., 2013

Single Study, Primary
Research

Bazyk et al., 2009

Single Study, Primary
Research

Ratzon et al., 2007

Small RCT, Group Level II

OHL ET AL., 2013

Purpose

- I. Examine the efficacy of a 10-wk Tier I Response to Intervention (RtI) Program* developed in collaboration with classroom teachers to improve FM and VM skills of general education KG students

**Response to Intervention Program = prevention programs designed to minimize learning and behavioural problems at individual, classroom and school wide levels; provides additional opportunities for OTs to contribute to the success of general education students.*

OHL ET AL., 2013

Participants & Method:

- 113 students in 6 elementary schools (*2 general education KG classrooms at each school*)
 - Ended with 75 students from 4 schools (that completed data in time for review)
- Classrooms randomly assigned to intervention & control groups
- FM, VMI and pencil grip measured at beginning of school year and after the 10wk program

RAPID APPRAISAL - OHL

Strengths

- Statistically significant improvements in FM & VM in Tx group
- Following the study, the control group also received Tx (for ethical/moral reasons)
- Therapist-teacher collaboration/coaching may work well in current school-OT consult model
- Use of a manualized program and clear plan/time-line allow this study to be potentially replicated
- Clinically applicable as study focused on target age group (younger school-age), the need for this type of intervention exists, intervention is ethical

RAPID APPRAISAL - OHL

Weaknesses

- Neither group improved pencil grip
- Unclear where to secure **Steps-K program**, thus difficult to replicate specific activities
- Study looked at **typical KG class** (versus those with prior FM/VM or other developmental challenges)

KEY MESSAGES FOR ACTION - OHL

- 10-week FM/VM program for KG classroom was shown to improve FM/VM skills
- Classroom FM stations can be referenced/used again throughout the year
- Empowering and enabling teachers with info/tools to support FM/VMI/pencil grip challenges (*passing the torch*)
- Prevention model to target general population will allow for greater range of children to receive early support

BAZYK ET AL., 2009

Purpose:

- Describe what a fully integrated occupational therapy service would look like in a kindergarten curriculum.
- Document the subsequent outcomes on fine motor and emergent literacy skills for kindergarten students with and without disabilities.

BAZYK ET AL., 2009

Participants/Method:

- Convenience sample of 37 kindergarten students (aged 60 to 83 months)
- Students were enrolled in an inner city urban school in the USA
- 12 students had identified disabilities (eg: Down Syndrome, CP, DD), the rest were considered typical
- Assessments were administered pre and post treatment

BAZYK ET AL., 2009

Participants/Method:

- **Treatment:**

- An experienced OT provided service 2 days/week in the classrooms over 7 months during the school year
- Therapy services involved a mix of consultation and direct intervention in group or individualized format
- Group-based activities were planned to coincide with classroom curriculum, including emergent literacy goals
- Fine motor materials were also left in the classroom for use by the teacher

RAPID APPRAISAL- BAZYK

Strengths

- Provided a comprehensive evaluation of several pre-academic skill areas (fine motor skills, visual-motor integration, in-hand manipulation, pencil grip, and emergent literacy)
- Evaluation measures were standardized and most were reported to have high reliability
- The study measured statistically significant changes in fine motor and emergent literacy skills, even when taking into account maturation

RAPID APPRAISAL- BAZYK

Weaknesses

- Lacked control group
- Small sample size (37 children)
- Convenience sample
- Lack of controls or consideration for confounding variables or biases (ex. blinding of assessors)
- Difficult to determine significance of findings due to lack of power calculations
- Intervention was poorly described and would not be replicable

KEY MESSAGES FOR ACTION- BAZYK

- The use of occupational therapy guided activities (even when not provided directly by the therapist) can lead to improved literacy and fine motor skills in typical and developmentally delayed children.
- Changes were seen across children with and without disabilities, demonstrating the added value of intervention for children not identified with a disability, but were at-risk due to their socioeconomic status

RATZON ET AL., 2007

Purpose:

- To assess the efficacy of a short-term fine motor intervention on visual-motor skills in first grade students from low socioeconomic backgrounds

RATZON ET AL., 2007

Participants & Method:

- 52 1st graders in 4 elementary schools in Israel
- Low socioeconomic mixed Arab and Jewish population
- Scored below the 21st %ile on the Beery VMI
- Randomly divided into tx and control groups
- Tested before and after 12 - once a week - 45 minute small group OT sessions (2 students/group)
- Fine Motor Activities included: threading beads, inserting pegs, guided play with coins, screws/nuts etc as well as paper and pencil worksheets (mazes, coloring, connecting dots etc)

RAPID APPRAISAL- RATZON

Strengths

- Small RCT - Group Level II evidence
- Moderate quality (4/7 AACPDm) ie:
 - Inclusion/exclusion criteria of the study population well described
 - Measures used were clearly described, valid and reliable for measuring the outcomes of interest
 - Dropout/loss to follow-up reported and less than 20%
 - Appropriate methods for controlling confounding variables and limiting potential biases were used (blinded scorer)

RAPID APPRAISAL- RATZON

Strengths

Positive Results:

Students in the intervention group made significant gains both in:

- Total score on the graphomotor test (Developmental Test of Visual Perception)
- Fine-motor test (Bruininks–Oseretsky Motor Development Scale)

RAPID APPRAISAL- RATZON

Strengths

This study is very clinically applicable:

- Area of interest to parents and teachers
- The intervention is feasible & with in OT scope of practice
- Equipment and resources are accessible and affordable

RAPID APPRAISAL- RATZON

Weaknesses

- The assessor was not masked
- Power calculations were not reported
- Generalizability is limited:
 - Limited to only students with mild challenges (not well described ie ? DCD or ADHD or ?)
 - Due to demographics of the setting (Israel)

KEY MESSAGES FOR ACTION- RATZON

- Short-term OT intervention provided in a very small group format (2 students) to improve fine and visual–motor skills in first graders from low socioeconomic backgrounds is feasible and shows promise

CLINICAL BOTTOM LINE

Research suggests that:

- In students in kindergarten and grade 1, both short and long term intervention in fine-motor and visual-motor activities support improvements in those areas
- Improvements can be seen even when activities are not directly practiced with a therapist (Integrated OT classroom-based learning is also beneficial)
- Benefits of intervention extend to children with and without identified disabilities

RECOMMENDATIONS FOR OT & EDUCATION PRACTICE

OTs need to:

- Advocate for use of structured fine-motor activity centers or fine motor programs in the classroom setting, particularly in at-risk schools
- Continue to recommend fine-motor and visual-motor activities to support children who demonstrate challenges in those areas

RECOMMENDATIONS FOR THE FUTURE

- Development of classroom-friendly fine motor resources and materials that are evidence-based & openly available online

REFERENCES

- Ohl, A. M., Graze, H., Weber, K., Kenny, S., Salvatore, C., & Wagreich, S. (2013). Effectiveness of a 10-week Tier-I Response to Intervention program in improving fine motor and visual-motor skills in general education kindergarten students. *American Journal of Occupational Therapy*, 67(5), 507-514.
- Bazyk, S., Michaud, P., Goodman, G., Papp, P., Hawkins, E., & Welch, M.A. (2009). Integrating occupational therapy services in a kindergarten curriculum: A look at the outcomes. *American Journal of Occupational Therapy*, 63, 160-171.
- Ratzon, N. Z., Efraim, D., & Bart, O. (2007). A short-term graphomotor program for improving writing readiness skills of first-grade students. *American Journal of Occupational Therapy*, 61(4), 399-405.