

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Early Diagnosis for Children with Cerebral Palsy: Clinical Effectiveness and Guidelines

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Research Questions

1. What is the clinical effectiveness of early diagnosis in children with cerebral palsy?
2. What are the evidence-based guidelines addressing early diagnosis in children with cerebral palsy?

Key Findings

Five systematic reviews, one with meta-analysis, one randomized controlled trial, and one non-randomized study were identified regarding the clinical effectiveness of early diagnosis in children with cerebral palsy.

Methods

A limited literature search was conducted on key resources including Ovid Medline, PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases and a focused Internet search. No methodological filters were applied to limit retrieval by publication type. The search was limited to English language documents published between January 1, 2016 and January 2, 2018. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Children with cerebral palsy
Intervention	Early diagnosis
Comparator	Q1: Standard care; no comparator Q2: No comparator
Outcomes	Q1: Clinical evidence of health benefits and/or harms e.g., earlier intervention; improved health, physical/cognitive function, neuroplasticity, etc. Q2: Guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Five systematic reviews, one with meta-analysis, one randomized controlled trial, and one non-randomized study were identified regarding the clinical effectiveness of early diagnosis or intervention in children with cerebral palsy. No evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Five systematic reviews,¹⁻⁵ one with meta-analysis,² were identified regarding the clinical effectiveness of early diagnosis in children with cerebral palsy (CP). One systematic review (SR)¹ evaluated the level of evidence of vision interventions and assessments for infants 0-2 years of age at high risk or with a CP diagnosis. It found strong levels of evidence for neuroprotective interventions such as caffeine and hypothermia, but weak levels of evidence for surgery, visual training, or developmental programs. Another SR² examined the diagnostic ability of early magnetic resonance imaging (MRI) to examine motor outcomes or CP in infants. The study reported that early MRI has reasonable sensitivity and specificity to detect adverse motor outcomes or CP, but further studies are needed to determine the clinical utility of early MRI. One SR³ evaluated the evidence on interventions applied during the first postnatal year in infants with, or at very high risk of CP; it also examined whether the type and dosing of intervention modifies the effect of intervention. The study reported that sufficient quality literature on early intervention is limited and provides weak evidence on the effect of the intervention. Another SR⁴ examined early, accurate diagnosis of CP. It reported that before 5 months of age, term-age MRI, Prechtl Qualitative Assessments of General Movements, and the Hammersmith Infant Neurological Examination are the most predictive tools for detecting risk of CP. After 5 months of age, MRI, the Hammersmith Infant Neurological Examination, and the Developmental Assessment of Young Children are the most predictive tools. Another SR⁵ reviewed the evidence on the effectiveness of motor interventions for infants (up to 2 years old) with a high risk or diagnosis of CP. The study reported there is some evidence that early intervention incorporating child-imitated movement, parental education, and environment modification have a positive effect on motor development, but published studies are limited and lack high-quality.

One randomized controlled trial⁶ and one non-randomized study⁷ were identified regarding the clinical effectiveness of early diagnosis in children with CP. The randomized controlled trial (RCT)⁶ randomly assigned infants with CP younger than 12 months to receive either baby constraint-induced movement therapy (CIMT) or baby massage. It was reported that baby CIMT appeared to improve the unimanual ability of young children with CP more than massage. The non-randomized study (NRS)⁷ evaluated the ability of Structured Observation of Motor Performance in Infants (SOMP-I) to detect CP in infants. The study reported that SOMP-I was sensitive for detecting CP early in infants, but the chosen cut-off can lead to false positives for CP.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Chorna OD, Guzzetta A, Maitre NL. Vision assessments and interventions for infants 0-2 years at high risk for cerebral palsy: a systematic review. *Pediatr Neurol*. 2017 Nov;76:3-13.
[PubMed: PM28918222](#)
2. George JM, Pannek K, Rose SE, Ware RS, Colditz PB, Boyd RN. Diagnostic accuracy of early magnetic resonance imaging to determine motor outcomes in infants born preterm: a systematic review and meta-analysis. *Dev Med Child Neurol*. 2017 Nov 29.
[PubMed: PM29193032](#)
3. Hadders-Algra M, Boxum AG, Hielkema T, Hamer EG. Effect of early intervention in infants at very high risk of cerebral palsy: a systematic review. *Dev Med Child Neurol*. 2017 Mar;59(3):246-58.
[PubMed: PM27925172](#)
4. Novak I, Morgan C, Adde L, Blackman J, Boyd RN, Brunstrom-Hernandez J, et al. Early, accurate diagnosis and early intervention in cerebral palsy: advances in diagnosis and treatment. *Jama, Pediatr*. 2017 Sep 1;171(9):897-907.
[PubMed: PM28715518](#)
5. Morgan C, Darrah J, Gordon AM, Harbourne R, Spittle A, Johnson R, et al. Effectiveness of motor interventions in infants with cerebral palsy: a systematic review. *Dev Med Child Neurol*. 2016 Sep;58(9):900-9.
[PubMed: PM27027732](#)

Randomized Controlled Trials

6. Eliasson AC, Nordstrand L, Ek L, Lennartsson F, Sjostrand L, Tedroff K, et al. The effectiveness of Baby-CIMT in infants younger than 12 months with clinical signs of unilateral-cerebral palsy; an explorative study with randomized design. *Res Dev Disabil*. 2018 Jan;72:191-201.
[PubMed: PM29175749](#)

Non-Randomized Studies

7. Montgomery C, Johansen K, Lucas S, Stromberg B, Persson K. The structured observation of motor performance in infants can detect cerebral palsy early in neonatal intensive care recipients. *Early Hum Dev*. 2017 Oct;113:31-39.
[PubMed: PM28728014](#)

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Previous CADTH Reports

8. Early diagnosis in children with cerebral palsy: clinical evidence and guidelines [Internet]. Ottawa: CADTH; 2017 Jan 25. [cited 2018 Jan 9]. (CADTH Rapid response report: summary of abstracts). Available from: <https://www.cadth.ca/early-diagnosis-children-cerebral-palsy-clinical-evidence-and-guidelines-0>

Systematic Reviews – Alternative Interventions

9. Ward R, Reynolds JE, Bear N, Elliott C, Valentine J. What is the evidence for managing tone in young children with, or at risk of developing, cerebral palsy: a systematic review. *Disabil Rehabil.* 2017 Apr;39(7):619-30.
[PubMed: PM27027325](#)

Non-Randomized Studies – Alternative Outcome

10. Zhao W, Song S, Zhang B. Clinical analysis of 52 cases of neuromuscular examination for early screening of cerebral palsy in high risk premature infants. *Adv Gen Pract Med* [Internet]. 2017 [cited 2018 Jan 9];1(1) 9–12. Available from <http://journals.syncsci.com/index.php/AGPM/article/view/51>

Additional References

11. Byrne R, Noritz G, Maitre NL, NCH Early Developmental Group. Implementation of early diagnosis and intervention guidelines for cerebral palsy in a high-risk infant follow-up clinic. *Pediatr Neurol.* 2017 Nov;76:66-71.
[PubMed: PM28982529](#)