



### R<sup>3</sup>: Research, Read & Review

Literature dissemination by the NIDCAP and Science Sub-Committee

January 2023

<b>Title</b>	Effectiveness of interventions on early neurodevelopment of preterm infants: a systematic review and meta-analysis
<b>Reference</b>	Aita M, De Clifford Faugere G, Lavallee A, Feeley N, Stremier R, Rioux E, & Proulx M. H. (2021). BMC Pediatrics, 21(1), 210. <a href="https://doi.org/10.1186/s12887-021-02559-6">https://doi.org/10.1186/s12887-021-02559-6</a>
<b>What is known about this topic?</b>	<ul style="list-style-type: none"> <li>• Premature infants are likely to have early neurodevelopmental problems that may persist over the long term (beyond school age, adolescence and into adulthood).</li> <li>• Many factors in the NICU environment (including environmental stimulation by light and noise, quality of social interactions with parents, and caregiving experiences) may or may not be compatible with and may influence the development of the preterm infant's brain during a critical period of development.</li> <li>• Systematic reviews have analyzed the effectiveness of interventions targeting these NICU-related factors on the neurodevelopment of preterm infants at 12 or 24 months of age. However, because of the relatively long period spanning from NICU discharge to the time of these neurodevelopmental assessments, confounding factors may have been present.</li> <li>• Since NICU-related factors might shape neurodevelopment as soon as preterm infants are hospitalized, and since early neurodevelopment is an important predictor of future development, it is important to assess which interventions are beneficial for neurodevelopment specifically during hospitalization and close to term age.</li> </ul>
<b>What does this paper add?</b>	<ul style="list-style-type: none"> <li>• Provides a first systematic review and a closer look at the effectiveness of interventions <i>specifically provided during the very first weeks of the preterm infant's life</i>: hospitalization in the NICU and close to term age.</li> <li>• The review includes interventions and neurodevelopment measurements done soon after discharge (two weeks CA).</li> <li>• The combination of 3 studies in a meta-analysis showed positive effects for the NIDCAP intervention, thus reinforcing previous publications that emphasized its beneficial effects across the first months of life.</li> </ul>

	<ul style="list-style-type: none"> <li>• In light of the low to very-low overall quality of evidence found in the reviewed studies (attributed to high to unclear risk of bias, heterogeneity and small sample sizes), the authors suggest that future studies use interventions that allow for comparison with previous ones, as well as a combination of different assessment instruments to provide a more global evaluation of preterm infants' neurodevelopment.</li> </ul>
<p><b>A summary</b></p>	<p>This systematic review and meta-analysis evaluated the effectiveness of interventions initiated during NICU hospitalization on preterm infants' early neurodevelopment during their hospitalization, and up to two weeks corrected age (CA). The data search included randomized controlled/clinical trials conducted with preterm infants born between 24 and 36 <sup>6/7</sup> weeks of gestation. All types of interventions implemented during the NICU stay were included.</p> <p>Findings of 12 studies involving 901 preterm infants were synthesized. Eleven studies were RCTs and one was a pilot RCT with published results. Three studies that included a total of 229 infants were combined in a meta-analysis targeting the NIDCAP intervention, and two other studies totaling 137 infants were included in a meta-analysis for the effects of parental participation.</p> <p>Compared to standard care, NIDCAP was found effective in improving preterm infant's neurobehavioral (assessed with APIB) and neurological development (assessed with the Prechtl Neurological Examination) at two weeks corrected age.</p> <p>Parental participation alone did not significantly improve preterm infants' neurobehavioral development during NICU hospitalization.</p> <p>For all other interventions reviewed (i.e., developmental care, sensory stimulation, music and physical therapy), the synthesis of results shows that compared to standard care, the effectiveness was either controversial or partially effective.</p>
<p><b>What is the relevance to NIDCAP?</b></p>	<ul style="list-style-type: none"> <li>• This systematic review adds to the efforts of previously published research, by bringing in a new systematic review that reinforces NIDCAP as an intervention that favors early neurodevelopment of preterm infants, in a crucial time period for brain development and maturation.</li> <li>• The authors advocate for the implementation of NIDCAP principles to guide the developmental care that should be encouraged in every NICU.</li> <li>• In its discussion section, the article emphasizes the extensive training and time investment needed for acquiring NIDCAP knowledge and expertise. However, other aspects of the NIDCAP approach, such as its comprehensive and multi-layered nature, seems to be a less known aspect of NIDCAP-based care, and remains more loosely discussed in some of the literature addressing NIDCAP.</li> </ul>

**Questions suggested for reflection**

- How can we keep contributing to a professional dialogue that showcases NIDCAP as a holistic model of care that brings in more than its components alone ?
- Can interventions that do not clearly involve the dimension of being attuned with the infant (and therefore with his/her behavioral signs, however subtle) work well for infants and families ?
- Can genuine parental involvement take place in the NICU without parents being knowledgeable, sensitive co-regulators of their infants ?