



R³: Research, Read & Review

Literature dissemination by the NIDCAP and Science Sub-Committee

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Title	Neuroscience meets nurture: challenges of prematurity and the critical role of family-centered and developmental care as a key part of the neuroprotection care bundle
Reference	Soni R, Tscherning Wel-Wel C, Robertson NJ. Arch Dis Child Fetal Neonatal Ed. 2021;0: F1–F8.
What is known about this topic?	The third trimester is a critical period of brain development. Prematurity and its related experiences can push the trajectory of the developing brain to an atypical path during this most vulnerable period, which is spent largely in the NICU, in the absence of positive maternal influences.
What does this paper add?	This an up-to- date review that summarizes the latest studies on preterm infants' neurodevelopmental outcomes, the pathophysiology of encephalopathy of prematurity, and possible medical and non-medical neuroprotective strategies.
A summary	<p>Although the incidence of intraventricular hemorrhage and cystic periventricular leukomalacia is decreasing, a new phenotype of preterm brain injury has emerged and consists of a combination of destructive and dysmaturational effects. Consequently, while severe neurological disability is reported at lower rates than previously done, the overall morbidity associated with premature birth continues to increase.</p> <p>In this review article, the authors examine the developmental milestones of fetal brain development and discuss how preterm birth may disrupt that trajectory. They review common morbidities associated with premature birth today including motor, cognitive, behavioral, speech/language, and academic difficulties.</p> <p>The authors depict a new pathological entity, encephalopathy of prematurity, and highlight the occurrence of a "signature</p>

	<p>pattern" on MRI studies, which characterizes the preterm infant brain. The structural changes in that pattern include alterations in white and grey matter microstructure, impaired cortical folding, and disturbances in regional brain growth, reflecting dysconnectivity of neural networks and atypical development.</p> <p>The article relates to current drug-based neuroprotective therapies including antenatal administration of steroids and magnesium, delayed cord clamping and caffeine treatment after delivery, as well as interventions like erythropoietin and stem cell treatments which are still under intense research. However, the goal of this review is to outline and emphasize basic, sustainable, and effective non-medical, family-centered, and developmental care strategies (e.g., NIDCAP, skin to skin care, breastfeeding, parental presence) which have the potential to improve neurodevelopmental outcomes for preterm infants. Indeed, the authors advocate for these practices to be an integral part of any neuroprotection care bundle, and to be considered in future clinical trials of pharmacological therapies for brain protection in preterm infants.</p>
What is the relevance to NIDCAP?	<p>The review by Soni et al. relates to essential components of good neonatal care, shared also by the NIDCAP model, and emphasizes the neuroprotective nature of the reviewed strategies and interventions.</p> <p>The review is an excellent source that can be used by NIDCAP trainers and suggested as complementary reading to NIDCAP professionals in-training.</p>