

## **SOMATOTOPIC PROCESSING OF PAIN IN THE NEWBORN'S CEREBRAL CORTEX**

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Considerable research has been made on newborn's pain perception. It has been proposed that it is not sufficient that a painful stimulus activates the newborn's cerebral cortex because it could be inferred that pain is experienced consciously; pain cortical processing has to show also an adequate level of functioning. Recently, a pain associated cortical activation of newborn's cerebral cortex has been found by near-infrared spectroscopy (NIRS), a safe and non-invasive functional neuroimaging technique. In this study we used optical topography, a multichannel NIRS system, to assess if cortical regions processing pain in the newborn are the same found in the adult (somatosensory, motor and frontal cortices), and if pain generically activates such cortical areas or if it early emerges a more complex functional organization. In a sample of 35 newborns, 17 full term and 18 preterm (mean gestational age = 32.12 weeks), cortical activity was detected during a heel prick procedure for blood sampling. Oxy-haemoglobin increase and deoxy-haemoglobin decrease were used to identify cortical activation. We observed a very localized, bilateral and symmetrical significant activation in the most superior portion of both sensorimotor cortices, but not in the frontal or in the most posterior parietal cortices. Distinctly considering the subsamples of full term and preterm newborns, they have been observed analogous results. These findings are compatible with the presence, already in preterm newborns, of a somatotopic organization in pain cortical processing, at least in sensorimotor regions; such a complex functional organization further support the hypothesis that newborns perceive pain consciously.