



Canadian Physicians
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Canadian Physicians for Life's members on

Fetal Pain: The Current Evidence

In Canada, the controversy surrounding abortion rarely includes a discussion involving fetal pain. This is in contrast to the U.S., where as of the writing of this paper, 12 states have outlawed abortions past 20 weeks¹, based on the assertion that a fetus likely experiences pain once past 20 weeks gestation, and thus abortion would be inhumane. While in Canada there is absolutely no legislation regarding abortion, there is clearly a need to understand the neurodevelopmental processes behind the formation of the ability to experience pain, as this will inevitably inform one's perception of the value of the unborn child. This article will outline the current state of research regarding how and when an unborn child starts feeling pain. While the results of research on fetal pain will likely strike an additional conversation regarding its implications for abortion legislation, it is not the goal of this article to delve into such a complex topic.

Pain is, as defined by International Association for the Study of Pain, "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage²." Thus, it is important to note that there is both a physical, sensory aspect to pain, as well as a cognitive, emotional component of it as well. Even before the completion of development of connections to the cortex, fetuses already display physical behaviours in response to painful stimuli. By 6 weeks post-fertilization, the unborn child will exhibit reflex withdrawal from invasive surgical procedures, likely through the spinal reflex

pathway³. At 16 weeks post-fertilization, in response to painful stimuli, the unborn child will also increase cortisol and B-endorphin production and increase their respiratory rate⁴. Thus, there are clear behavioural and endocrine responses to stress very early in fetal development. However, many contend that such physical responses do not necessarily indicate the ability to perceive pain, as pain is defined by many as a cognitive response, involving higher order functions.

The cerebral cortex is understood by many academics as the center for higher level cognitive processes such as intelligence, memory, and emotion⁵. Thus, it is pertinent that one understands the timing of the development of connections from the peripheral sensory receptors to the cortex. From very early in development, foetuses already appear to have nociceptors throughout most of their body. Starting at 5 weeks post-fertilization, nociceptors appear periorally, and by 12 weeks, are present throughout the body⁶. By 18 weeks, afferent nerves connecting the spinal cord and the thalamus are complete⁷, and by 24-28 weeks, connections from the thalamus to the cortex are complete⁸. Thus, it is possible for information from noxious stimuli to travel from peripheral receptors to the cortex of the unborn child by 24 weeks.

Despite the prevailing view that the cerebral cortex is a mandatory component of the pain experience, there is increasing evidence that suggests that the thalamus and lower brainstem may be adequate for pain perception.



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Observations of hydranencephalic children (whose cerebral hemispheres are absent and replaced by fluid) reveal that these children nonetheless are able to respond to noxious stimuli in a purposeful and coordinated fashion, in a manner comparable to children with cortices^{9,10,11}. These children demonstrate pain aversion by "fussing", arching of the back, crying (in many gradations), their faces being animated by these emotional states¹². Thus, one must challenge the notion that a functional cortex is a prerequisite for the pain experience.

So in an attempt to answer the question of when an unborn child begins to experience pain, one arrives at several possible conclusions. It is clear that nociception can be detected by 8 weeks post-fertilization, evidenced by reflex movements away from painful stimuli. However, when pain is defined as a higher-order process, it is conceivable that a fetus experiences pain at 20 weeks, which is when thalamic connections are completed, based on observations of anencephalic children with intact brainstem and thalamus. By 24-28 weeks, it is even more certain that pain experience is possible, as this is when the cortical connections are complete. The scientific evidence behind fetal pain, regardless of its legal implications, is important as it informs our view of the unborn child as one who is capable of experiencing pain, an integral part of the human emotional experience that all of us can identify with. In fact, evidence suggests that a fetus experiences *more* pain than an older infant does, as descending pain inhibitory pathways, such as the dorsolateral funiculus,

develop postnatally¹³. Far from simply being a clump of cells, the unborn child is one who interacts with sensory stimuli in a real, palpable way. Thus, regardless of its impact on legislation, this knowledge must necessarily inform our perception of the unborn.

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