

Critical Review

The Infancy of Infant Pain Research: The Experimental Origins of Infant Pain Denial

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Abstract: Skepticism toward infant pain characterized much of 20th century research and clinical practice, with infant surgery routinely conducted with minimal or no anesthesia into the 1980s. This paper offers a historical exploration of how this view became common by reviewing and analyzing the experimental infant pain research of the 19th and early 20th centuries that contributed to the development of infant pain denial. These experiments used pinprick and electric shock, and the results were generally interpreted as evidence of infants' underdeveloped pain perception, attributed to their lack of brain maturation. Even clear responses to noxious stimuli were often dismissed as reflex responding. Later these experimental findings were used by anesthesiologists to support the lessened use of anesthesia for infants. Based on the reviewed literature, this paper suggests that 4 interrelated causes contributed to the denial of infant pain: the Darwinian view of the child as a lower being, extreme experimental caution, the mechanistic behaviorist perspective, and an increasing emphasis on brain and nervous system development. Ultimately this history can be read as a caution to modern researchers to be aware of their own biases, the risks of null hypothesis testing, and a purely mechanistic view of infants.

Perspective: This article reviews the history of 19th and early 20th century infant pain research, tracing how the widely accepted belief that infants could not feel pain developed in the period prior to the growing acceptance of infant pain. Four interrelated causes are posited to help explain the tolerance of infant pain denial until recent times.

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Pain research's most famous infant, Jeffrey Lawson, was born prematurely February 1985 and underwent open heart surgery shortly thereafter.²⁶ What made this particular surgery noteworthy was the fact that Jeffrey was awake and conscious throughout the entire procedure. The anesthesiologist had administered only Pavulon, a paralytic that has no effect on pain. Only after Jeffrey died 5 weeks later did his mother, Jill, learn the truth about his surgery. Jeffrey had been too young to tolerate anesthesia, the anesthesiologist said, and anyway, "It had never been demonstrated to her

that premature babies feel pain."^{26(p.125)} This was not the case of a rogue anesthesiologist; textbooks at the time taught that the surgery Jeffrey underwent "could be safely accomplished with only oxygen and a paralytic"^{69(p.580)} when performed on infants. In her advocacy work Lawson questioned how such a belief developed: "If I had been told by a physician, no matter how senior, that infants don't feel pain, I would never have believed it. What constitutes the difference between my reaction and that of the thousands of physicians who did believe it?"^{27(p.1198)} Decades later, the question of how such medical practice could evolve still plagues us. This paper offers a historical response to this question by analyzing the early infant pain research that contributed to the development of infant pain denial.

Skepticism toward infant pain characterized much of 20th century research and clinical practice, with infant surgery routinely conducted with no or minimal anesthesia well into the 1980s.⁵¹ It was not until the emergence of parent activism and the rapid growth of pediatric pain

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research in the 1980s^{3,21} that the denial of infant pain began to be challenged. Anand and Hickey's seminal article¹ was particularly important in refuting many of the earlier beliefs about infant pain perception, such as the claim that the lack of myelination of the nervous system prevented infant pain perception.

Historical Methods

A historical review of the infant pain literature of 19th and early 20th centuries can reveal the particular attitudes, assumptions, and research findings that played a causal role in establishing the later erroneous scientific consensus that newborns do not experience pain. Establishing the original causes of infant pain denial through the historical record is critical because vestiges of this skeptical attitude persist to the present day and bias modern research. Discovering how these views arose requires a thorough review of the historical experimental work on infant pain. Unfortunately, published works that review the history of infant pain research are limited to the following: Chamberlain⁹ reviews 20th century infant pain research from an antircircumcision perspective, McGrath³⁰ reviews the history of infant pain research in the 1980s, and Pabis et al³⁷ and Unruh⁶⁴ review the ancient and medieval views of infant pain. While these publications offer useful literature reviews, they do not evaluate infant pain experiments in any depth. In contrast, this paper gives careful attention to the assumptions and design of the historical infant pain experiments, gleaned from their language and structure evidence of the views and motivations of early infant pain researchers. Additionally, given that these experiments were conducted across nearly 2 centuries and arose in diverse contexts and theoretical systems, we interpret these experiments in light of their social and scientific contexts.

This project involved an extensive literature search for historical publications on infant pain, which began with database searches of PsycINFO, Pubmed, and ProQuest. However, because most historical experimental articles are not indexed in modern databases, these initial searches uncovered only a handful of relevant sources: a historical review of infant pain experimentation,⁹ a 1954 review of literature on the neonate,⁴⁴ a history of pain,⁴⁸ and a history of anesthesia.⁴² The reference sections of these sources formed the basis for further snowball searching, which resulted in 24 articles or books dealing with infant pain published from 1848 to 1974 (see Table 1).

Because this paper expands the number of historical experiments beyond the scope of previous reviews, we decided to focus only on experiments that clearly test infant pain and to exclude borderline cases of experiments on infant reactions to other "noxious stimuli," such as temperature, unpleasant tastes, or tactile pressure, even though such experiments may well have been conducted with the same motivations.^{10,23,37,45} These exclusions resulted in a total of 20 articles for analysis. Taken together, these articles provide a rough chronology for the development of infant pain denial.

In what follows we review those experiments that were important in establishing views of infant pain, as judged by their influence on successive researchers, or that demonstrate the experimental design typical of a particular time period. In addition, based on these articles and what is known about their historical contexts, we have identified 4 factors that appear to have played a causal role in the development of infant pain skepticism. These are 1) the Darwinian view of the child as a lower being; 2) extreme experimental caution; 3) the mechanistic behaviorist perspective; and 4) an increasing emphasis on brain and nervous system development. To some degree these factors implicate the modern scientific method, as we show in the discussion. But first, we turn to the context in which experimentation on infant pain began: the 19th century.

Nineteenth Century Developments in Pain

The modern view that pain is negative and that alleviating it is the goal of medical intervention was not shared by earlier periods. Although by the time of the Enlightenment the general trend was toward a more secular, physiological understanding of pain, pain was still often seen as beneficial.⁴⁸ Since pain often occurred in the natural course of illness, it was seen to be useful not only in diagnosis but also in treatment. Well into the 19th century doctors might induce pain in order to bring on the crisis of the illness, since pain was associated with the body's healthy, healing reaction to illness or surgery, whereas loss of sensation often indicated a nearness to death. For example in 1826, American doctor Felix Pascalis wrote in his treatise on pain, "Painful...sensations all require sound and healthy organs. It is therefore our axiom, that the greater the pain, the greater must be our confidence in the power and energy of life."^{48(p.43)}

The reality that medical options for alleviating pain at the time were limited doubtless contributed to this more positive evaluation of pain. Nevertheless, the view of pain as beneficial was sufficiently powerful that it inspired some resistance to ether and chloroform when they were pioneered around 1846.⁴² Traditional religious attitudes of pain as divinely ordained and natural (particularly for childbirth), in combination with the very real risks of early forms of anesthesia, gave some reason to question whether anesthesia was actually a medical advance.⁴²

This ambivalence toward pain and the relatively recent invention of anesthesia helps to explain why infant pain sensitivity was not explored earlier than the 19th century. If preventing pain was not seen as an unqualified good and if there were few medical means of alleviating pain available, the question of whether infants felt pain was largely irrelevant. In addition, infants' lack of agency and limited self-expression meant the concerns about infant pain were largely drowned out in discussions of maternal pain driven by their more vocal mothers.⁴²

This concern over maternal pain was also the result of the common view that different demographics differed

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