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Tony Perkins
President
Family Research Council

Fetal Pain
Can Unborn Children Feel Pain in the Womb?

BY ASHLEY MORROW FRAGOSO

Advancements in biological science have vastly increased our knowledge of life in the womb. We now know more than we ever have about the experiences of children before they are born. What is unborn life like? What can unborn children do? Modern embryology tells us that at the moment of conception, the new human being possesses all of the genetic material the baby will need to develop, and if the child will be a boy or a girl. Hereditary traits such as hair and eye color are determined at this very first instant of life. Approximately 22 days later, the child’s heart begins to circulate his own blood, often of a blood type different from that of his mother. At six weeks of life, electrical brain activity can be detected and the eyes, eyelids, nose, mouth, and tongue are formed. Babies this age can bend their hands at the wrist. This new skill is helpful, as children of seven weeks may be found sucking their fingers or thumbs. By eight weeks after conception, the little boy or girl is medically known as a “fetus” and contains all the organs and bodily structures, including 20 “baby” tooth buds, found in the newborn infant. Nine-week old babies are growing fingernails and toenails and are often seen swallowing, sucking their fingers or tongues, and yawning. By ten weeks

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of life, the child’s sex has become clearly visible, the vocal cords are forming, and he is likely quite active, making stretching, leaping, and kicking movements.¹

Two weeks later, at twelve weeks after conception, the unborn child has developed a habit of squirming when his mother prods her abdomen, and can perform an array of effortless movements. Unborn children at this stage of development often have well-shaped eyebrows and hair on their heads, along with softening “baby” cheeks. Babies of fourteen weeks are seen on ultrasound to be rather expressive, displaying a variety of facial expressions from wide smiles to grimaces and frowns, often in response to external stimuli. Over the next week, perceptive capacities increase and the baby becomes even better at coordinating movements in response to his place in his environment. Over the next several weeks, the child’s lungs grow stronger and more sophisticated, developing tiny air sacs called alveoli, and increasing in capacity as he practices breathing movements using amniotic fluid in place of air. The unborn child of fifteen to eighteen weeks continues to grow at a rapid pace and begins to acquire increasing amounts of the subcutaneous fat that will help him to regulate his body temperature after birth. This is a key period in brain and sensory development, during which the senses are heightened and neurological connections necessary to the formation of thought and memory increase in complexity. At approximately 20 weeks, the unborn baby’s hearing becomes much more clear as the bones of the inner ear continue to harden. Over the next week or so, the child takes an increasing interest in sounds outside the womb, often displaying preferences for particular voices or types of music (some will even move to a beat). By 22 to 23 weeks, more blood vessels take root in the lungs, and 32 permanent adult teeth wait in the gums as buds. Children born at this age can survive outside the womb.²

Can unborn children feel pain? Medical research, which defines pain as a perceptive response to potential or actual tissue damage, has greatly
enhanced our ability to answer this question, and has shown that children can feel pain while in the womb, with conservative estimates placing this faculty at 16 to 18 weeks after conception. This carries unsettling implications for countries with few restrictions on abortion.

During a 2004 federal court review of the Partial-Birth Abortion Ban Act of 2003, pediatric intensive care physician and fetal pain researcher, Dr. Kanwaljeet S. Anand, of the University of Arkansas for Medical Sciences and the Pain Neurobiology Laboratory at Arkansas Children’s Hospital Research Institute, testified before the District Court of Nebraska on the matter of fetal pain. He testified that reputable research and his own clinical experience indicate that unborn children are capable of feeling pain by 20 weeks of gestation, and that babies of this age suffer greatly during abortion:

It is my opinion that the human fetus possesses the ability to experience pain from 20 weeks of gestation, if not earlier, and the pain perceived by a fetus is possibly more intense than that perceived by term newborns or older children...³

The abortion process, he continued,

...will result in prolonged and intense pain experienced by the human fetus, if the fetus is at or beyond the neurological maturity associated with 20 weeks of gestation. Anesthetic agents that are routinely administered to the mother during this procedure would be insufficient to ensure that the fetus does not feel pain, and higher doses of anesthetic drugs, enough to produce fetal anesthesia, would seriously compromise the health of the mother. Thus, it is my opinion that the fetus would be subjected to intense pain, occurring prior to fetal demise, from the abortion procedures described in the Partial-Birth Abortion Ban Act of 2003.⁴

Though subject to contentious debate, these views are supported by substantial clinical research and reflect accepted medical practice by neurologists, perinatologists, pediatricians and anesthetists, for many of whom the idea of withholding anesthesia from their youngest patients undergoing invasive procedures is unthinkable.⁵

Fetal Development

Systematic study of fetal development with relation to the experience of pain by unborn children has existed for the better part of a century. In 1941, neuroanatomy researcher Davenport Hooker of the University of Pittsburgh found in tests on live unborn children that humans respond to touch around the mouth at five-and-a-half weeks after conception. The entire face becomes sensitive over the following week. By
nine weeks after conception, the baby responds to stimulation of his or her hands, and by three months, the entire body is sensitive.6

Subsequent research has shown that nerves form and connect with one another and that brain structures begin to take shape during the sixth week of life in the womb. A Working Party of England’s Council for Science and Society concluded that pain perception may begin as early as the sixth week after conception, and the British Commission of Inquiry into Foetal Sentience reported that, “Most scientists currently agree that this marks the earliest possible point at which sensation might occur.”7 Electrical brain activity can be confirmed in babies of six or seven weeks of age.8

Between seven and twelve weeks gestation (five and ten weeks after conception), the unborn child also begins to move and becomes increasingly sensitive to tactile and noxious stimulation. The baby will partially close his hands when his palms are touched. In the brain, the thalamus and cortex have begun development, but nerve pathways do not yet connect the cortex with the lower part of the brain. The lower brain stem is active at this point.9

Along with the beginning of the second trimester comes further neurological development. Sensory receptors cover the body surface and the hippocampus becomes functional. As a result, early second trimester babies often respond to invasive procedures with elevated heart rate and secretion of stress hormones.10 This response is nearly universal by sixteen weeks after conception.11

At 23 weeks, the nerves that transport pain signals to the cortex are connected to the rest of the brain, and signals received through the thalamus can be processed in the cortex, allowing for a form of conscious perception similar to that found in older fetuses and infants. While researchers maintain varying opinions about the precise nature of unpleasant sensations experienced early in human development, it is generally accepted that “the capacity for an experience of pain comparable to that in a newborn baby is certainly present by 24 weeks after conception.”12 A distinct key to discussions of fetal pain, however, was made during expert testimony before the Nebraska District Court: it is at 20 to 30 weeks gestation that the human being has the highest number of pain receptors per square inch of skin, more than at any other period in development, and that the thin, tender skin of a 20 to 30 week unborn child places his or her nerve fibers closer to the surface of the skin than older babies and adults.13
Scientific consensus seems to be that unborn children feel pain by five to six months gestation, and possibly earlier. Though most assessments of the possibility of fetal pain emphasize the need for active connections between the cortex and the lower brain, thus moving the timeline for the ability of the fetus to feel pain well into the second trimester, several noted researchers assert that pain may in fact be present earlier.

In her expert testimony to the British Commission of Inquiry into Foetal Sentience, perinatal psychobiologist Dr. Vivette Glover of Imperial College London reflected on responsiveness in children with hydranencephaly. Children with this condition are born with a functioning or partially-functioning brain stem, but lack cerebral hemispheres. The space where the middle and upper brains would be is instead filled with fluid. When exposed to noxious stimuli, hydranencephalic infants with intact hypothalamo-hypophyseal systems have been found to react, despite their very limited cortical function. As a result, Swedish neuroscientist Bjorn Merker, who tracks hydranencephalic children showing signs of consciousness, recorded his observations in the journal *Behavioral and Brain Sciences*, writing that, “[t]he tacit consensus concerning the cerebral cortex as the ‘organ of consciousness’ may have been reached prematurely, and may in fact be seriously in error.” Dr. Glover shares this view, concluding that if hydranencephalic children can respond to stimuli in the absence of a functioning cortex, the human fetus may be aware, conscious, and capable of pain once the brain’s lower structures have taken shape at approximately eleven weeks.

Much of the uncertainty regarding fetal pain concerns the very nature of pain itself, currently viewed as both a physiological and a psychological experience. The International Association for the Study of Pain defines pain as, “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”

For this reason, an influential 2005 review of fetal pain research published in the *Journal of the American Medical Association* framed the question of pain before birth as one of “the presence of consciousness” that would “permit recognition of a stimulus as unpleasant.” If pain is “a psychological construct,” the belief that an unborn child can experience pain must be borne out by evidence of consciousness sophisticated enough to allow for the interpretation of subjective experience.

As University of Birmingham (UK) psychologist Stuart Derbyshire, who denies the possibility of fetal pain, suggests, The undisputed discovery that the neonate and fetus launch a hormonal and neural response to invasive practice cannot be
considered proof that there is an experience of pain. An experience implies sensations have been interpreted in a conscious manner. Even when combined with the observations of behavior and improved clinical outcome when using anesthetics, there is still no proof there is an experience of pain.9

Derbyshire and his colleagues suggest that “true” psychological pain, as experienced by adults, should thus be distinguished from nociception, the brain’s physiological response to invasive stimuli, which is generally present by 18 weeks of gestation.

Where Should We Go From Here?

Where certainty is lacking, we would do well to err on the side of caution. If there is a good but not universally accepted possibility that a fetus of a particular age may experience pain during an invasive procedure, justice and compassion compel us to act as if that capacity is present. This position is affirmed by noted academics and practitioners such as fetal medicine professor Kypros Nicolaides of Kings College School of Medicine and the Harris Birthright Research Centre for Fetal Medicine (London), who told the British Commission of Inquiry into Foetal Sentience that because science does not definitively indicate the exact moment at which a fetus becomes able to feel pain, fetuses should be treated as capable of experiencing pain well before the end of the first trimester. Dr. C.J. Hull, former Vice President of Britain’s Royal College of Anaesthetists, has also stated that “the fetus should be given the benefit of the doubt.”20 Preference for minimizing the pain the unborn may suffer is further maintained in informational materials produced by centers for fetal surgery, which emphasize the importance of anesthesia, often mentioning a meeting with the fetal anesthesia team as one of the earliest steps in planning a prenatal operation.21

Scientific uncertainty neither compels nor precludes medical practice. Decisions made concerning fetal anesthesia should operate around a principle expressed by Dr. Vivette Glover:

I think I would like to make a distinction between scientific and medical caution. As a scientist, one always has to be very careful not to overstate one’s case, but in this area, I am a bit concerned that if we just say we
don't know, we may be causing quite a lot of suffering. I would rather err on the safe side and say, ‘Well the fetus may be suffering and so we ought to do something about it.’

Legislative Action
In the United States, the issue of fetal pain has been addressed legislatively at both the federal and state levels. In recent years, the legislatures of 26 states and the U.S. Senate have debated the matter. Arkansas, Georgia, Louisiana, Minnesota and Oklahoma have been sufficiently persuaded of the unborn child’s capacity to feel pain such that they have passed laws requiring doctors to inform mothers requesting abortions at 20 weeks gestation or more that their child is able to feel pain, and to offer anesthesia administered directly to the unborn child. Since September 2004, parallel legislation - the Unborn Child Pain Awareness Act - has been introduced in the U.S. Senate nearly every year. In a similar vein, Alaska, South Dakota and Texas discuss fetal pain in their state-issued abortion counseling materials, and Nebraska has passed the Pain-Capable Unborn Child Protection Act of 2010, prohibiting most abortions after 20 weeks post-conception due to the ability of a child of that age to suffer pain. This most recent law, which provides exception when a mother’s pregnancy “so complicates her medical condition as to necessitate the abortion of her pregnancy to avert her death or to avert serious risk of substantial and irreversible physical impairment of a major bodily function,” challenges decades of legal precedent that accepts the unborn child’s viability as the primary justification for laws significantly restricting abortion.

The question of fetal pain has also been treated in the United Kingdom, where a 2008 review of the 1967 liberalization bill, The Abortion Act, along with the Human Fertilisation and Embryology Act of 1990, brought the unborn child’s capacity to feel pain to the fore. As the British House of Commons debated whether the upper limit for legal abortion should be reduced from 24 weeks of pregnancy to an earlier gestational age, University of Arkansas pediatrician and fetal pain researcher Dr. Kanwaljeet Anand testified that the pain an unborn child of 20 or more weeks experiences when being dismembered by an abortion is certain to be “excruciating.” As such, he urged that abortion in England should be restricted to that gestational age or earlier. Despite this testimony and public support for a revision of the law, the 24-week limit remains unchanged. The matter of fetal pain has rarely factored into the abortion laws of other nations, as few provide for unrestricted abortion at gestational ages at which pain perception is medically verifiable.
Conclusion

Advances in the medical sciences tell us a great deal about the development of the unborn child. We now know that babies respond strongly to noxious stimulation by sixteen weeks after conception, and that many academics and physicians who specialize in fetal pain believe that the capacity for physical suffering sets in between eleven and eighteen weeks of life. In view of this range of opinion, we are compelled to err on the side of caution in our treatment of the unborn child, be it in the provision of invasive medical procedures or with regard to the unjust circumstance of abortion. While it is encouraging to see that some states have taken legislative measures to protect the unborn against pain, and while provisions of this sort should be expanded, there is a long way to go in pursuit of justice and compassion for the unborn, whose very lives deserve full protection, regardless of their gestational age.

Glossary of Terms

Brain stem - The lower extension of the brain that is connected to the spinal cord and is the source of most cranial nerves. Neurological functions needed for breathing, digestion, maintenance of heart rate and blood pressure, and arousal to alertness are located in the brain stem.

Conception - The moment of fertilization, at which the male sperm cell unites with the female ovum, creating a brand new human being who is genetically distinct from his or her parents.

Cortex or cerebral cortex - The sheet of neural tissue overlaying the cerebrum or forebrain. It plays a key role in attention, memory, language, and perceptual awareness.

Fetus - The medical term for an unborn child from eight weeks after conception to birth. A child in this developmental stage has acquired the organs and basic structures he or she will possess as a newborn.

Gestation - Pregnancy, counted from the start of the mother’s last menstrual period. Because conception typically occurs approximately two weeks after the mother’s last menstruation, a baby’s “gestational age” is generally two weeks greater than his or her post-conception age or number of weeks of life.
**Hippocampus** - A horseshoe-shaped sheet of neurons located in the medial temporal lobe of the brain. Involved in memory, emotion, and spatial perception.

**Hydranencephaly** - A rare condition in which the brain’s cerebral hemispheres are absent and the remaining space is filled with sacs of cerebrospinal fluid.

**Hypothalamo-hypophyseal system** - The network of blood vessels that link the hypothalamus to the anterior lobe of the pituitary gland.

**Nociception** - The brain’s physiological response to invasive stimuli, generally present by 16 weeks after conception.

**Noxious stimulation** - An actual or potential tissue damaging event, such as prodding with a needle.

**Pain** - Defined by the International Association for the Study of Pain and many clinicians as, “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”

**Thalamus** - A large mass of brain tissue seated deep within the forebrain. It coordinates sensory information and communicates messages from other parts of the brain to the cortex. It is thought that conscious awareness of sensations begins in this region.

**Trimester** - A unit devised by the U.S. Supreme Court in *Roe v. Wade* to divide the full-term pregnancy into three roughly three-month parts. It is now widely accepted in medical use. The American College of Obstetricians and Gynecologists includes weeks 0 to 13 from the last menstrual period in the first trimester, weeks 14 to 27 in the second trimester, and weeks 28 to 40 in the third. The Society of Obstetricians and Gynaecologists of Canada ends the first trimester at 12 weeks and the second at 27 weeks, while England’s Royal College of Obstetricians and Gynaecologists defines the first trimester as 0 to 12 weeks, the second as 12 to 24 weeks, and the third as 24 to 40 weeks.
For an accessible account of life in the womb provided by the founder of London's Harris Birthright Research Centre for Fetal Medicine, see Professor Stuart Campbell, MD's *Watch Me Grow!* (New York: St. Martin's Griffin, 2004).

Ibid.


Ibid.


Ibid.

Ibid.


*Human Sentience Before Birth*, 23.

Anand, Expert Report to the United States District Court, 8.


*Human Sentience Before Birth*, 18.


*Human Sentience Before Birth*, 37.

The Fetal Care Center of Cincinnati, http://www.fetalcarecenter.org/surgery/fetal-surgery-anesthesia.htm; The Children's Hospital of Philadelphia's Center for Fetal Diagnosis and Treatment, http://www.chop.edu/service/fetal-diagnosis-and-treatment/home.html?team=true; the Fetal Diagnosis and Therapy program of the Vanderbilt University Medical Center, and the University of California at San Francisco’s
Fetal Treatment Center, http://fetus.ucsfmedicalcenter.org/our_team/anesthesiologists.asp; involve pediatric anesthesiologists in all plans for fetal surgery.

22 Human Sentence Before Birth, 37.


29 Ibid.


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