"On the Influence of Abnormal Parturition, Difficult Labors, Premature Birth, and Asphyxia Neonatorum, on the Mental and Physical Condition of the Child, Especially in Relation to Deformities" (1861), by William John Little [1]

By: Ellis, Brianna Keywords: fetal deformities [2] Cerebral Palsy [3] birth trauma [4]

In 1861, William John Little [5] published, "On The Influence of Abnormal Parturition, Difficult Labors, Premature Birth, and Asphyxia Neonatorum, on the Mental and Physical Condition of the Child, Especially in Relation to Deformities," hereafter "Abnormal Parturition," in the *Transactions of the Obstetrical Society of London* In the article, Little discussed the causes and types of what he refers to as abnormal births, and theorized how those births affect an infant's likelihood of exhibiting a deformity. Little defined abnormal births as those involving an atypical maternal or fetal presentation, such as a slow birthing process or a fetus [6] exiting the birth canal feet first rather than head first. In his article, Little published one of the first definitional frameworks to describe a condition causing rigidity and stiffness in the limbs that is often associated with birth-related trauma, which was then called Little's disease, but is modernly known as spastic Cerebral Palsy.

Little worked as an orthopedic surgeon throughout England during the mid- to late-nineteenth century. An orthopedic surgeon is a surgeon who specializes in injuries or diseases dealing with the bones and muscles of the body. Little researched congenital malformations, otherwise known in the twenty-first century as birth defects [7]. Congenital malformations are deformities to the structure or function of the body that occur before birth or while the fetus [6] is developing in the womb [8]. Little's research on congenital malformations led him to explore abnormal births and the effects that they have on the mental and physical aspects of the neonate subjected to those conditions. The term abnormal parturition, or abnormal birth, means a process of childbirth that presents atypically. Some examples of abnormal births include an unnatural position of the neonate at the time of delivery, a very slow labor, or a premature birth. Little said that prior to his research, physicians were doubtful that common deformities and disorders were a result of abnormal birth. He also stated that he had previously seen over 200 cases of deformities that resulted from abnormal labors.

Little divides his article into six different broad themes. He starts the article by discussing the different types of deformities infants may develop and the previous background on the topic prior to publication. In the second section, Little explains the requirements needed for the healthy development of the fetus [6] in the womb [8] and what happens if those requirements are not met. In the third section of his article, he analyzes the different types of abnormal births that can occur. In the fourth section of the article, he explores the theories generated from scientists' dissections of neonates that had died from an abnormal birthing process. Little goes on to talk about his theories on paralysis in neonates in the fifth section. In the last section, Little discusses forty-seven case studies and the common patterns between them.

In the first section, Little asserts there is a difference in neonatal health problems depending on whether the neonate sustains injuries prior to birth, during birth, or after birth. He acknowledges that diseases that arise after birth can often result in disorders specific to the nervous system. For example, reduced infant nutrition can result in deficiencies that can lead to degeneration of the muscles. He then goes on to discuss the purpose of his narrative, which is to show how the birthing process occasionally affects the muscular and skeletal structures of the fetus [6]. Little states that prior to the publication of his paper in 1861, the science of studying the causes and effects of disease was much different. At that time in the 1820s, deformities were obscure to physicians and researchers since they did not have generally recognized causes.

In the second section, Little describes the usual birthing process. He states that while in the womb [8], the fetus [6] is subjected to what Little calls a deep sleep, with evidence of limb movement and a heartbeat at certain developmental stages [9]. Little describes how the fetus [6] needs oxygen, which it receives through the pregnant woman's blood that is exchanged through the placenta [10]. The placenta [10] is an organ present in the female uterus [11] during pregnancy [12] that provides oxygen and nutrients to the fetus [6]. He discusses the growth of the fetus [6], including the development of the medulla oblongata, a part of the brain which enables involuntary functions like the admission of air into the lungs. Little uses the information about the birth process to later discuss how abnormal births, like premature births, can cause underdevelopment in organs.

Little claims that if the neonate does not quickly breathe on its own after delivery, there may be effects like stillbirth or suspended animation, the latter of which can lead to long-term deformities. While most definitions of suspended animation describe it as chemically-induced, Little's definition of suspended animation is a temporary discontinuation in most vital functions, which generally does not always lead to death. However, Little indicates that just a few moments with no respiration can cause a lasting injury for the infant, so medical intervention may be necessary. Little then goes on to state that he has recorded the connection between suspended animation at birth and physical and mental impairments that come later in the infant's life. If there is no correction to the lack of respiration, the physical condition of the infant will deteriorate, and the infant will ultimately suffocate and die.

In the third section, Little goes on to discuss the forms of abnormal birth he identifies as causing mental and physical disorders. Little writes that, if a neonate experiences an abnormal birth, physicians must provide immediate attention following the birth. He states that care is especially important due to the fact that in every pregnancy [12], the neonate is already subject to what he calls partial suffocation. Little states that immediate attention to infants birthed abnormally may enable the physicians to fix the complications sooner, resulting in a decreased neonatal mortality rate.

In the fourth section, Little notes that previous physicians had dissected infants who were dead at birth. The dissections enabled researchers to note abnormalities in the body after an abnormal birth that resulted in neonatal death. Little notes there were many instances in which those researchers found spots and bruises appeared on the neonates' lungs and skin. Little went on to explain that blood filled the vessels and sinuses of the brain in stillborn neonates, due to insufficient respiration through umbilical cord [13] pressure, uterine hemorrhage, or premature separation of the placenta [10]. In the spinal cord of neonates that were stillborn, the researchers noted a leakage of blood and brain matter around the spine. Little notes that the findings of the researchers Hecker and Weber supported his theory that a neonate does not have to sustain significant injury to die, and many of the neonates included in Hecker and Weber's studies had not sustained particularly traumatic births.

In the fifth section, Little describes the symptoms exhibited by forty-seven neonates who were born through abnormal births. Little mentioned adverse neonatal effects affecting the limbs, including paralysis, or the loss of the ability to move, and what he calls spasticity, or a condition where the muscles in certain parts of the body continuously contract. He used the results found by Hecker and Weber to conclude that both a traumatic or non-traumatic birth can affect the surfaces of the neonate's chest, brain, and spinal cord, which can in turn cause paralysis and spasticity. For spasticity specifically, he notes that the contractions usually occurred in the lower extremities, especially the hips, knees, and ankles. Little records that the neonates born from abnormal births often had a hard time standing and walking, and often could not walk alone until ages three and four, while some never walked at all.

In the last section of the article, Little summarizes the forty-seven case studies that he examined on neonates born from abnormal births. While observing cases, he documented spastic rigidity in each one. Little states that the spastic movements, or convulsions, were often caused by excessive pressure on the neonate's head during a very long labor, leading to a form of suffocation. The pressure on the neonate's head during the birthing process could have affected its blood pressure and, in turn, resulted in convulsions, Little explains. He then presents a theory that most of the deformities that resulted from abnormal birth resulted from head trauma, specifically that which affects the neonate's brain. The head trauma can be caused from pressure as previously discussed, violence, oxygen deprivation, and umbilical cord [13] trauma, among other reasons. He finishes the article by stating that he hoped that the article unraveled information regarding the relationship between abnormal birth with deformities and disorders, and he anticipates the use of the knowledge provided to promote treatment for people with those disorders.

In the article, Little uses information from forty-seven case studies to support his stance that abnormal births oftentimes cause deformities. One of the conditions Little described throughout the article involved adverse neurological symptoms as a result of partial suffocation during delivery. Shortly after the publication of “Abnormal Parturition,” that condition became known as Little’s disease, and was one of the first documented descriptions of what is modernly known as spastic Cerebral Palsy. As of 2021, spastic Cerebral Palsy affects nearly eighty percent of people with a diagnosis of Cerebral Palsy according to the Centers for Disease Control and Prevention. That specific form of Cerebral Palsy can exhibit a wide range of symptoms, but generally involve muscle stiffness, difficulties maintaining balance, decreased reflexes, and jerky, repeated movements.

Sources

1. Centers for Disease Control and Prevention. “Cerebral Palsy (CP).” CDC. https://www.cdc.gov/ncbddd/cp/index.html [14] (Accessed September 14, 2020).
2. Lankford, Janice C., Peggy Mancuso, and Roberta Appel. "Congenital Reproductive Abnormalities."*Journal of Midwifery & Women's Health*58 (2013): 546–51.
3. Little, William John. *A Treatise on the Nature of Club-Foot and Analogous Distortions: Including Their Treatment Both With and Without Surgical Operation, Illustrated by a Series of Cases and Numerous Practical Instructions*. London: W. Jeffs, 1839. https://archive.org/details/treatiseonnature00litt/page/n6 [15] (Accessed January 12, 2020).
4. Little, William John. "On the Influence of Abnormal Parturition, Difficult Labors, Premature Birth, and Asphyxia Neonatorum, on the Mental and Physical Condition of the Child, Especially in Relation to Deformities." *Clinical Orthopedics and Related Research* 46 (1861): 7–22. http://www.neonatology.org/classics/little.html [16] (Accessed January 12, 2020).
5. National Institute of Neurological Disorders and Stroke. “Cerebral Palsy: Hope Through Research.”National Institutes of Health [17]. https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Hope-Through-Research/Cerebral-Palsy-Hope-Through-Research [18] (Accessed September 14, 2020).
6. Pietrzak, Krzysztof, Andrzej Grzybowski, and Jacek Kaczmarczyk. “William John Little (1810–1894).”*Journal of Neurology* 263 (2015): 1047–9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4859855/ [19] (Accessed January 12, 2020).
7. Ruhräh John. “William John Little 1810–1894: A Note On The History Of Spastic Diplegia.”*Am J Dis Child* 49 (1935): 1299–305. https://jamanetwork.com/journals/jamapediatrics/article-abstract/1176913 [20]
8. Tonti-Filippini, Nicholas. "The embryo rescue [21] debate: Impregnating women, ectogenesis, and restoration from suspended animation."*The national Catholic bioethics quarterly* 3 (2003): 111–37. https://www.researchgate.net/publication/10666564_The_embryo_rescue_debate_impregnating_women_ectogenesis_and_restoration_from_suspended_animation [22] (Accessed January 12, 2020).

In 1861, William John Little published, “On The Influence of Abnormal Parturition, Difficult Labors, Premature Birth, and Asphyxia Neonatorum, on the Mental and Physical Condition of the Child, Especially in Relation to Deformities,” hereafter “Abnormal Parturition,” in the Transactions of the Obstetrical Society of London. In the article, Little discussed the causes and types of what he refers to as abnormal births, and theorized how those births affect an infant’s likelihood of exhibiting a deformity. Little defined abnormal births as those involving an atypical maternal or fetal presentation, such as a slow birthing process or a fetus exiting the birth canal feet first rather than head first. In his article, Little published one of the first definitional frameworks to describe a condition causing rigidity and stiffness in the limbs that is often associated with birth-related trauma, which was then called Little’s disease, but is modernly known as spastic Cerebral Palsy.

Subject
Birth injuries--Complications [23] Birth injuries--Complications and sequelae [24] Little's disease [25] Paralysis, Cerebral [26] Cerebral palsy--Patients [27] Cerebral paralysis [28] Muscle spasticity [29] Spasticity [30] Spasticity--Diagnosis [31] Abnormalities, Human [32] Congenital abnormalities [33] Birth defects [34] Anomalies, Congenital [35] Nervous system--Abnormalities [36] Brain--Abnormalities [37] Cerebral Palsy [38] CP (Cerebral Palsy) [39] Cerebral Palsy, Mixed [40] Spastic diplegia cerebral palsy [41] Cerebral palsy, spastic, diplegic [42] Cerebral Palsy, Spastic Quadriplegic, 1 [43] Cerebral Palsy, Ataxic, Autosomal Recessive [44] Ataxic Cerebral Palsy [45] Microphthalmia and mental deficiency [46] Cerebral Palsy, Athetoid [47] Congenital Defects [48] Parturition [49] Hypoxia [50]

Topic
Disorders [51] Publications [52]

Publisher
Arizona State University. School of Life Sciences. Center for Biology and Society. Embryo Project Encyclopedia.

Rights

Format
Articles [53]

Last Modified
Monday, May 3, 2021 - 09:18

DC Date Accessioned
Sunday, May 2, 2021 - 19:37

DC Date Available
Sunday, May 2, 2021 - 19:37

DC Date Created
2021-05-02

- Contact Us

- The Embryo Project at Arizona State University, 1711 South Rural Road, Tempe Arizona 85287, United States

---

Links
[1] https://embryo.asu.edu/pages/influence-abnormal-parturition-difficult-labors-premature-birth-and-asphyxia-neonatorum-mental
[2] https://embryo.asu.edu/keywords/fetal-deformities

[3] https://embryo.asu.edu/keywords/cerebral-palsy
[4] https://embryo.asu.edu/keywords/birth-trauma
[5] https://embryo.asu.edu/pages/william-john-little-1810-1894
[6] https://embryo.asu.edu/search?text=fetus
[7] https://embryo.asu.edu/search?text=birth%20defects
[8] https://embryo.asu.edu/search?text=womb
[9] https://embryo.asu.edu/search?text=developmental%20stages
[10] https://embryo.asu.edu/search?text=placenta
[11] https://embryo.asu.edu/search?text=uterus
[12] https://embryo.asu.edu/search?text=pregnancy
[13] https://embryo.asu.edu/search?text=umbilical%20cord
[14] https://www.cdc.gov/ncbddd/cp/index.html
[15] https://archive.org/details/treatiseonnature00litt/page/n6
[16] http://www.neonatology.org/classics/little.html
[17] https://embryo.asu.edu/search?text=National%20Institutes%20of%20Health
[18] https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Hope-Through-Research/Cerebral-Palsy-Hope-Through-Research
[19] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4859855/
[20] https://jamanetwork.com/journals/jamapediatrics/article-abstract/1176913
[21] https://embryo.asu.edu/search?text=rescue
[22] https://www.researchgate.net/publication/10666564_The_embryo_rescue_debate_impregnating_women_ectogenesis_and_restoration_from_suspended_animation
[23] https://embryo.asu.edu/library-congress-subject-headings/birth-injuries-complications
[24] https://embryo.asu.edu/library-congress-subject-headings/birth-injuries-complications-and-sequelae
[25] https://embryo.asu.edu/library-congress-subject-headings/littles-disease
[26] https://embryo.asu.edu/library-congress-subject-headings/paralysis-cerebral
[27] https://embryo.asu.edu/library-congress-subject-headings/cerebral-palsy-patients
[28] https://embryo.asu.edu/library-congress-subject-headings/cerebral-paralysis
[29] https://embryo.asu.edu/library-congress-subject-headings/muscle-spasticity
[30] https://embryo.asu.edu/library-congress-subject-headings/spasticity
[31] https://embryo.asu.edu/library-congress-subject-headings/spasticity-diagnosis
[32] https://embryo.asu.edu/library-congress-subject-headings/abnormalities-human
[33] https://embryo.asu.edu/library-congress-subject-headings/congenital-abnormalities
[34] https://embryo.asu.edu/library-congress-subject-headings/birth-defects
[35] https://embryo.asu.edu/library-congress-subject-headings/anomalies-congenital
[36] https://embryo.asu.edu/library-congress-subject-headings/nervous-system-abnormalities
[37] https://embryo.asu.edu/library-congress-subject-headings/brain-abnormalities
[38] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy
[39] https://embryo.asu.edu/medical-subject-headings/cp-cerebral-palsy
[40] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy-mixed
[41] https://embryo.asu.edu/medical-subject-headings/spastic-diplegia-cerebral-palsy
[42] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy-spastic-diplegic
[43] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy-spastic-quadriplegic-1
[44] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy-ataxic-autosomal-recessive
[45] https://embryo.asu.edu/medical-subject-headings/ataxic-cerebral-palsy
[46] https://embryo.asu.edu/medical-subject-headings/microphthalmia-and-mental-deficiency
[47] https://embryo.asu.edu/medical-subject-headings/cerebral-palsy-athetoid
[48] https://embryo.asu.edu/medical-subject-headings/congenital-defects
[49] https://embryo.asu.edu/medical-subject-headings/parturition
[50] https://embryo.asu.edu/medical-subject-headings/hypoxia
[51] https://embryo.asu.edu/topics/disorders
[52] https://embryo.asu.edu/topics/publications
[53] https://embryo.asu.edu/formats/articles