Teething revisited

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Adam and Eve had many advantages, but the principal one was that they escaped teething.

Mark Twain

To most parents, the sudden appearance of their child's first tooth is a momentous developmental milestone and the event is duly noted in a baby book. Historically, physicians and dentists have also attached great significance to primary tooth emergence and have duly committed their wisdom to manuscripts. Unfortunately, much of this wisdom has been characterized as "undocumented, unscientific, and contradictory."[1]

Hippocrates observed that "teething infants suffer from itching of the gums, fever, convulsions, diarrhea, especially when they cut their eye teeth." His opinion, offered in the 4th century B.C., was echoed through the ages by Pliny (1st century A.D.), Soranus and Galen (2nd century), Oreibasius (4th century), Aetius (6th century), and Avicenna (10th century). Skipping over many other endorsing notables, we arrive at the 16th century, when Ambrose Paré (1517–1592) trumped Hippocrates by convincing many contemporary professionals that death may occur directly from teething difficulty. Although there were occasional detractors, the concept of teething as a life-threatening event was essentially unchallenged and actually grew in popularity through the end of the 19th century.

Teething coincided with what used to be an especially vulnerable period of life and provided a convenient explanation for high infant morbidity and mortality rates. Guthrie[2] cited an 18th century English source that states that "...above one-tenth part of all children die in teething." The Registrar General's report of 1839 attributed 5,016 deaths in England and Wales to teething, and the 1842 report ascribed 12% of all deaths in children younger than 4 years old to the condition. In 1939 Witkin[3] stated, "A century ago the great majority of all infants' ailments were ascribed to teething. The mortality of this cause alone was placed as high as fifty percent." The disease was easily important enough to acquire a Latin sobriquet — *Dentitio Difficilis*, although it was usually referred to as teething, pathological dentition, or difficult dentition.

So deadly has (teething) become, that one third of the Human Family die before the twenty deciduous teeth have fully appeared.

***Dental Cosmos*, Thrasher, 1894**

Teething in the nineteenth century

In a paper presented at a meeting of the American Medical Association in 1896, Dr. S.W. Foster[4] stated that "The (teething) child becomes wakeful, restless, and fretful, refuses nourishment; the alimentary canal becomes more active, diarrhea follows, and if relief is not given, relaxation of the vital forces follows, and we have nausea, vomiting, convulsions, paralysis, and not infrequently, death." Dr. Foster went on to cite statistics indicating that more deaths occur during the period of teething (approximately 24 months) than in any similar period in the human life span. The inference was that teething may be the leading cause of death in the population. Far from being a shocking revelation to his audience, Dr. Foster's paper was in keeping with prevailing professional opinion. A respected medical reference of the time advised,"Children that have been strong and healthy up to the period of dentition often droop and die, while the delicate or sickly ones pass through it with apparent impunity."[5]

Fin de siècle voices of dissent were occasionally heard. Dr. W.C. Barrett spoke to the First District Dental Society of New York in 1894. His paper, "The Slaughter of the Innocents,"[6] recanted his earlier belief in "...the terrible mortality due to the advance of dentition." He also attacked the hypocrisy of his colleagues who used the teething diagnosis as an expedient to minimize symptoms and reassure worried mothers. With melodramatic prose appropriate to the era he stated:

> *"**The child is teething**, is the vague explanation given to many an anxious mother by practitioners who are either incompetent to form a complete diagnosis, or too indolent and careless to seek for the hidden springs of disease.... **Only teething**. To how many promising young existences in which were centered the hopes, the ambitions, the heart affections of a family circle, have these words sounded the knell. **Only teething**, and the fond parents*

looked with but little alarm upon symptoms of the gravest character. ***Only teething****, but when to their agonized ears came the sound of the clods of earth falling upon the little coffin, and they realized that with the words, earth to earth, dust to dust..."*

Nineteenth century believers in the essential pathogenicity of teething were not greatly concerned with proving how a developmental process could be so deadly. Belief amounted to an act of faith — a faith that required no great courage to profess since it affirmed established professional dogma. It also corroborated the wisdom of grandmothers. When etiological explanations were proposed, they were formulated without knowledge of the microbial basis of infectious disease. Medical thinking on teething pathology conformed to the theory of François Broussais, a French pathologist who held that all disease is a chemical reaction to excessive stimuli. Most frequently, the nervous system was indicted as the link between the noxious stimulus of tooth eruption and systemic disease.

The infant nervous system was regarded as exquisitely sensitive and "the nervous perturbation occasioned by the eruption of teeth increases the susceptibility and lessens the resistive power of the child."[7] The putative difficulty experienced by erupting teeth in penetrating gingival tissue affected trigeminal nerve endings. A "reflex stimulation" of other cranial and spinal nerves ensued, producing "functional derangements" and disease in other organs.[7,8] This theory of reflex stimulation was reiterated as late as 1939[3] and again in 1954.[9]

Morbid conditions and diseases attributed to teething included fever, convulsions, diarrhea, vomiting, bronchitis, infantile paralysis, cholera, tetanus, meningitis, and insanity.[2,7,10] It is likely that dehydration figured prominently in much of the morbidity/mortality associated with teething since fever, diarrhea, and vomiting were among the more common sequelae. Although many imaginative treatment measures were recommended, the importance of fluid intake *per se* was not appreciated.

The first dentition is a physiological and anatomical crisis of infancy — it is rare for a child to pass through the period of dentition without more or less manifestation of suffering, and frequently there are serious and alarming disturbances of its health.

***The American System of Dentistry,* JW White, 1887**

The 19th century teething infant endured therapeutic measures that ranged from innocuous to life threatening. Topical application of emollients was not as widely favored as it was in previous centuries or in the present one. Dietary changes were frequently prescribed and various arcane medications were administered according to the prejudices of the attending physician or dentist. One text on children's diseases favored dosing the teething infant with calomel (a mercurial), opiates, or a solution in which lead acetate(!) was the principal ingredient.[11] Purgatives and emetics were recommended, even when the patient was experiencing diarrhea or vomiting beforehand.[7,12] Leeches were applied to the mastoid area or directly on the gingiva.[2,11] (How the affected infant was dissuaded from consuming the leech is not revealed). As a local measure, however, leeching was much less popular than lancing.

Lancing the gingiva over an erupting tooth was strongly advocated, mostly to relieve "pathological tissue tension" but also because of the presumed therapeutic benefits of bleeding.[2,13,14] Although lancing was not universally practiced, anyone who openly questioned its efficacy risked professional ridicule. After all, "The publication and dissemination of such (antilancing) views by a practitioner of standing cannot fail to be productive of incalculable harm,"[15] and, "Hundreds of lives have been lost by abandoning the practice of lancing the gums."[13] The logic behind lancing was thought unassailable. By incising the ischemic tissue over an erupting tooth, pressure was relieved and reflex stimulation of the trigeminal nerve to the rest of the central nervous system ceased. Usually, any infant between the age of 5 to 30 months was apt to have at least one tooth whose imminent eruption was surely responsible for the current illness. If no telltale gingival bulge could be identified in a sick infant, one authority advised lancing the gingiva anyway; a deep tooth bud was probably responsible.[7]

The Power of the Lancet

A curious case is related by M. Robert, in his Treatise on the Principal Objects of Medicine, illustrative as well, of one of the effects of difficult dentition, as of the division of the gum.... A child, after having suffered greatly from difficult dentition, apparently died, and was laid out for interment. M. Lemonnier was desirous of ascertaining the condition of the alveola. He accordingly made a free incision through the gums; but, on preparing to pursue further his examination, he perceived the child to open his eyes, and give other indications of life. He immediately called for assistance; the shroud was removed from the body, and by careful and persevering attention, the child's life was saved; the teeth in due time made their appearance, and (the child's) health was fully restored.

***Diseases of Children,* Condie, 1850**

The use of mercury-based teething powders (calomel) only ended in the United States and Great Britain in the mid-1950s when the association between mercury administration and conditions such as acrodynia (pink disease) and nephrosis was established.[16,17] It became embarrassingly obvious that deaths and permanent disabilities that had been attributed to teething were, in fact, due only to the remedy applied.[16-18]

Teething in the twentieth century

Controversy surrounding teething has greatly subsided in recent decades as morbid conditions affecting the teething infant have been found to have other causes. Nevertheless, there is evidence that many health professionals continue to believe that erupting primary teeth may cause significant local discomfort as well as systemic symptoms. Most of these advocates are content to let sleeping dogmas lie, but some continue to press their views openly and argumentatively.[19] Teething pathology, like the Loch Ness monster, illustrates how difficult it is to prove something doesn't exist.

Dentistry and medicine are presently at a point where the signs and symptoms attributed to teething are reduced to an obstinate few. But these few survive in the minds of professionals and parents alike. In a 1975 survey of 64 primary care pediatricians, Honig[1] found that only five believed that teething was not responsible for symptoms such as irritability, eating problems, wakefulness, and rashes. Eighteen felt teething could be responsible for temperature elevation up to 39°C. Dentists are equally reluctant to completely discard the teething diagnosis. Most general dentists do not routinely treat infants of teething age, and their opinions on the subject are likely to reflect dental folklore. Many parents (and probably all grandmothers) believe in, at least, the local distress of teething. The brisk sales of proprietary teething anodynes are an indication of this.

Herpes — the teething virus?

Several contemporary authors have suggested that tooth eruption in infants may be blamed for symptoms actually caused by an undiagnosed primary herpetic infection.[20–22] The few remaining symptoms left to teething such as fever, irritability, and eating difficulties are quite consistent with primary herpetic gingivostomatitis. Coincidentally, primary tooth eruption begins when infants are losing maternal antibody protection against the herpes virus and the newly pierced gingiva around an erupting tooth offers a convenient viral inoculation site.

In response to the untested teething-herpes hypothesis, this author and coworkers recently examined 20 infants who, according to parental report, were experiencing teething distress.[23] Oral swab samples were taken and sent to a virology laboratory. Cultures were positive for HSV1 in nine of the 20 subjects. All of the nine infants positive for HSV showed signs of oral infection and general symptoms consistent with primary herpetic gingivostomatitis. None of the 11 HSV-negative subjects showed signs of oral infection but five had elevated temperatures. All symptomatic HSV-negative subjects were referred to physicians for further evaluation. No rigorous followup of the HSV-negative subjects was attempted but it was learned incidentally that two had otitis media and one developed varicella soon after our examination.

Recent elucidation of the clinical features of human herpesvirus 6 (HHV-6) infection[24, 25] suggests it also may be responsible for the misdiagnosis of teething. This infection is ubiquitous, occurs mainly in teething-age infants and produces the elevated temperature and facial rash frequently attributed to teething distress.

Summary

Teething as a disease entity has been diminished from its 19th century status as the major cause of infant mortality to its modest position today as a "waste basket" diagnosis. If past proves to be prologue, it will diminish further as more credible causes for undifferentiated fevers and other complaints are found. The 21st century may find teething consigned to the shelf along with miasma, humoral theory, mesmerism, and other archival curiosities.

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Genetic technology making inroads against cancers

Advances in diagnosis, prognosis, and risk assessment seen

Imagine a future where the agonizing uncertainties of cancer diagnosis and prognosis can be resolved quickly and easily. Using genetic technology, this future is being developed — and in some cases being practiced, according to an article in a recent *Journal of the American Medical Association*.

"The transformation of medicine from art to science, which is one of the consequences of the remarkable advances in our understanding of the genetic changes in tumor cells, will lead to major benefits for patients," write Jeffrey Sklar, MD, PhD, from the Department of Pathology, Brigham and Women's Hospital, Boston, and Professor of Pathology, Harvard University Medical School, and Janet Rowley, MD, Department of Medicine, University of Chicago Medical Center, with colleagues.

Sklar presented the findings at an AMA media briefing on genetics. More than 150 scientific articles on genetics and molecular medicine from JAMA and the AMA's 10 specialty journals were published and released today.

The authors list 24 types and subtypes of malignant cancer where advances in diagnosis, prognosis and/or cancer management due to genetic technology are in practice or under study.

These include several forms of leukemia, (e.g., chronic myelogenous leukemia, chronic lymphocytic leukemia, acute myeloid leukemia, acute lymphoblastic leukemia, and lymphomas). Solid tumors discussed include breast cancer, colorectal cancer, lung cancer, ovarian cancer, and neuroblastoma (a childhood tumor of the peripheral nervous system).

"At present, we know much more about the hematologic disorders, especially leukemia and lymphoma," they write. "This is rapidly changing as many laboratories are actively investigating the genetic aberrations in carcinomas and sarcomas."

For acute myelogenous leukemia, for example, researchers have identified a genetic diagnostic marker, a prognostic marker and one that helps physicians determine the course for therapy. For breast cancer, however, only a prognostic marker has been identified; researchers are still uncertain about the specific diagnostic marker and authors say genetic information necessary to manage therapy is still somewhere in the future.

"The notion that cancer is an essentially genetic disorder has been further strengthened by the identification of familial forms of cancer," they write. "More than 50 different tumors have shown a propensity to aggregate in certain families."

The authors write: "This revolution in tumor biology has resulted in a major challenge for physicians to keep pace with the dramatic changes that are occurring in our understanding of cancer. It is incumbent upon physicians to help translate these insights from the bench to the bedside as effectively as possible."