

# Teething: Myths and Facts

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*From grandmothers to medical professionals, everyone seems to have a list of symptoms they believe are linked to teething. During this time period of an infant's life, passive immunity due to maternal antibodies wanes and exposure to a wide variety of childhood illnesses occurs. Parental false beliefs associated with teething may interfere with the prompt diagnosis and management of a range of serious illnesses. Strong parental beliefs which are not borne out by evidence will unlikely change until professionals (most of whom are also parents) change theirs. Therefore, there is a need to know the facts and the false beliefs attributed to teething. Medical professionals need to be educated about teething to provide reasonable explanations to concerned caregivers. This article examines the signs and symptoms frequently attributed to teething and their possible alternative causes. The contemporary principles of the management of teething are discussed, including supportive care.*

**Keywords:** Childhood illnesses; Management; Teething.

J Clin Pediatr Dent 35(1): 9–14, 2010

## INTRODUCTION

Teething continues to be an ill-defined non evidence-based, inappropriate diagnosis proffered by both healthcare professionals and lay people for a number of childhood diseases. Often, this diagnosis seems to help alleviate parental anxiety. Fever, pain, irritability, sleep problems, mouthing/biting, drooling, red cheeks, decreased oral intake, gum inflammation, runny nose, and diarrhoea have been attributed to teething worldwide, across all education levels, and for both first-time and experienced parents.<sup>1,2</sup> The treatment modalities for teething have been diverse throughout the ages, frequently depending on the tenets of the medical profession and lay people. Restlessness and sleeplessness attributed to teething may well prevent parents from implementing behavioral and sleep management strategies, in addition to the more serious consequences of chemical burn, overdose and toxicity due to possible excessive and long term use of various medications.

## Tooth Eruption

Teeth form embryologically from neuroectoderm, which is the portion of embryonic ectoderm that develops into the

central and peripheral nervous systems. Tooth development begins in the fetus around 28 days, but mineralization does not occur until 11 weeks in utero. Tooth eruption is the developmental process responsible for moving a tooth from its crypt position through the alveolar process into the oral cavity to its final position of occlusion with its antagonist. Prior to erupting, the crown of the tooth is covered by enamel epithelium and as the tooth moves upward in the jaw, this area of fused epithelium breaks down, and the tooth erupts. The dental follicle (sac containing the developing tooth and its odontogenic organ) is a source of eicosanoids, cytokines, and growth factors and, thus, contributes to pain, tenderness and inflammation by sensitizing afferents carrying pain impulses. Thus teething lead to local symptoms which are inflammatory or irritative in nature.<sup>3, 4, 5</sup>

The timing of tooth eruption varies widely, although most children get their first primary tooth around 6 months of age and their last between 24 and 30 months of age. The lower central incisors usually erupt first and the molars last. Teeth tend to emerge in pairs, and girls often get their teeth earlier than do boys. The average number of teeth a child should have is roughly his or her age in months minus 6 until 24 months of age.<sup>6</sup> Preterm infants acquire their teeth at a later chronological age but the same post conceptual age as term infants.<sup>7</sup>

Most parents regard the appearance of an infant's first tooth as one of a series of significant developmental landmarks. Communities hold a number of beliefs in relation to tooth eruption such as misfortunate to family if their child is born with teeth in the mouth, a child getting epilepsy/seizure or delayed tooth eruption if a child visualizes oneself into the mirror before the first tooth has erupted, an arrogant child in case maxillary teeth erupts before the mandibular

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teeth. Precocious eruption of teeth is considered a sign of great intelligence.<sup>8,9</sup>

A number of pathologic conditions are associated with a delay in tooth eruption, a few are mentioned in Table 1.<sup>10</sup>

**Table 1.** Causes of Delayed Tooth Eruption

- Impacted Teeth
- Down Syndrome
- Impedance of tooth eruption by adjacent or overlying tooth or bone.
- Cleidocranial Dysplasia
- Congenital Hypothyroidism
- Gaucher Disease
- Osteopetrosis
- Rickets

## Teething: Historical Prospective

Teething or “dentition difficilis,” derived from Latin for pathologic dentition or difficult dentition, was considered a deadly disease until the late 19th century. Hippocrates, Homer, Celsus and Aristotle are known to have associated teething with significant morbidity.<sup>11</sup> The disease “teeth” was hallowed by Hippocratic genius in one of the Aphorisms: “At the time of dentition there is pruritus of the gums, fever, convulsions, diarrhoea, especially when cutting the canine teeth and in those who are particularly fat and have constipated bowels.” In 1894, Dr Thrasher, a well-known dentist, wrote in *Dental Cosmos*, “So deadly has teething become that one third of the human family die before 20 deciduous teeth have fully appeared.”<sup>12</sup> Infant mortality was extremely high in previous centuries, typically at 6 months to 4 years of age, a time period temporally corresponding to tooth eruption. Thus, it is not surprising that teething was also believed to be the cause of death. The *London Bills of Mortality* regularly listed teeth (sometimes grouped with worms) as the second most common cause of childhood death, after the deaths within the first month of life.<sup>13</sup> Until the early 20th century, most paediatric textbooks continued to discuss mortality around the time of first dentition as a consequence of it.<sup>11</sup>

Systemic medicaments have through the ages been used for managing teething, many containing opiates, lead acetate, mercurials and bromide. Ironically, most of these compounds were poisonous and contributed directly to the high morbidity and mortality of teething infants and children. (Table 2) Topical medicaments included animal milk, butter and a honey/salt mixture.<sup>14</sup> Purgatives and emetics were given even if the child presented with vomiting and diarrhoea.<sup>11</sup> In the 18th and 19th centuries, treatment for teething was violent and included blistering, bleeding, placing leeches on the gums, and applying cautery to the back of the head.<sup>15</sup> Treatment also involved removal of teeth, hot nails pressed into the gums, and lancing of the gum tissue.<sup>16</sup> Lancing was introduced as a more professional treatment by French surgeon Ambroise Paré (1510–90) and consisted of two incisions given crossing at 90° overlying the ‘difficult’ tooth. It was supposed to relieve the pressure in

ischemic mucous membrane overlying an incipiently erupting tooth in the absence of any anaesthesia.<sup>17</sup> These remedies were believed to cure diarrhoea, vomiting as well as other ills associated with teething.<sup>15</sup>

Few medical men like William Cadogan (1711–97) and the pioneer of child health Michael Underwood (1736–1820) who regarded teething as natural and inflammatory process were much criticised.<sup>18,19</sup> By the mid-19th century it was becoming clear to some practitioners that teething did not cause serious disease in infants. Charles West (1816–98), founder of the Hospital for Sick Children, Great Ormond Street, London, wrote that dentition was “a perfectly natural process.”<sup>20</sup>

**Table 2.** Historical Teething Remedies no longer used now

Teething Treatment	Adverse Effects
Emetics, purgatives, and salts	Dehydration
Honey	Botulism
Opiates	Somnolence, respiratory depression
Lead	Paralysis, encephalopathy, seizures
Mercury	Vomiting, diarrhoea, renal failure
Bromide	Seizures, hallucinations

## Teething: Today

RS Illingworth statement, “Teething produces nothing but teeth.” is a straightforward summation of the actual process of teething.<sup>3</sup> Many diseases are now accurately diagnosed after significant diagnostic and therapeutic medical advancement.

Historical teething remedies are no longer recommended. The complications are disfiguring and deadly. Traditional healers or village elders often use unsterilized equipment, leading to localized and systemic infections. Lancing or tooth removal can cause enamel defects, malformed teeth, and altered mandible size.<sup>21</sup> But many of the historical misconceptions about teething and the related dangerous remedies persist. The enigma of teething continues to endure as a wastebasket diagnosis, when no cause can be found for a particular sign or symptom. Continued worldwide education about teething and diarrhoea is needed to ensure that infants and children are treated appropriately and safely.

The period associated with the eruption of the deciduous teeth in infants can be difficult and distressing for both the child and their respective parents and accompanied by a number of relatively minor symptoms. Parents hold a spectrum of opinions regarding the teething-associated symptoms like pain, inflammation of the mucous membrane overlying the tooth (possibly with small haemorrhages), general irritability, disturbed sleep/wakefulness, drooling/ sialorrhea, diarrhoea, circumoral rash, intra-oral ulcers, mild temperature elevation, increased biting, gum-rubbing, sucking, wakefulness, ear-rubbing on the same side as the erupting tooth and loss of appetite/alteration in volume of fluid intake as identified in different studies.<sup>1,24-34</sup>

Among medical professionals, paediatricians attribute the fewest symptoms to teething and paramedic staff the most.<sup>22,23,35-37</sup> Dentists also are more likely to attribute a

greater variety of symptoms, including diarrhoea, to teething, likely due to a lack of exposure to young children and because diarrhoea is not part of dental training.<sup>24,25</sup> In a survey among paediatricians, Honig found that only 5 of 64 paediatricians believed that irritability, eating problems, wakefulness and rashes were not consequent to teething, and 18 paediatricians thought that fevers of up to 39°C could be caused by teething.<sup>38</sup> British Medical Journal<sup>39</sup>editorial (1975) stated that conditions like uncontrolled vomiting, weight loss, rashes, septicaemia, tonsillitis, infantile paralysis, cholera, meningitis, fits, and tetanus should not be attributed to teething. Swann examined the records of 50 children admitted to hospital with symptoms attributed to teething by either parents or doctors.<sup>31</sup> In 48 of these children, organic causes like upper respiratory tract infections, bronchopneumonia, febrile convulsions, eczema, gastroenteritis, urinary tract infections and meningitis were identified. Pediatricians that diagnose these signs and symptoms as teething were delaying the diagnosis and treatment of serious disorders.

### Does teething cause systemic upset?

The timing of eruption of the primary incisors (6–12 months) coincides with the diminution of the circulating maternal humoral immunity conferred via the placenta, and the establishment of the child's own humoral immunity.<sup>32</sup> Most children of this age are susceptible to a myriad of relatively minor infections.

An undiagnosed primary herpetic infection (primary herpetic gingivo-stomatitis) could be responsible for the symptoms of fever, irritability and appetite loss. The study by King *et al*<sup>40</sup> found that 9 out of 20 infants reported to be 'teething' by one of their parents produced an oral swab positive for herpes simplex virus (HSV). The formation of a gingival crevice around a newly erupting tooth could act as a portal of entry for herpes viruses. The symptoms of elevated temperature and facial rash could also be due to infection with the Human Herpes Virus 6 (HHV-6), which is ubiquitous among infants of teething age.<sup>41</sup>

It is believed by the parents and some health professionals that the gum swelling that precedes tooth eruption may also be one of the causes of diarrhoea.<sup>25, 27</sup> The timing of eruption of the primary teeth (6 months onwards) coincides with age when the baby starts to crawl and explore his environment. During this phase babies put various objects and also their dirty hands into their mouth which may lead to diarrhoea or vomiting which has been wrongly attributed to teething. Since diarrhoea with dehydration continues to be the leading cause of childhood mortality in developing countries, other possible causes of diarrhoea should be ruled out and it should be managed accordingly rather than attributing it to teething.

Pain is reported as a common feature of teething by parents.<sup>25, 26</sup> It is not the tooth which is the cause, but the dental follicle which is a rich source of eicosanoids, cytokines and growth factors resulting in a localised inflammatory response and pain.<sup>5</sup>

The fact is that various studies<sup>40-44</sup> could not identify sys-

temic manifestations such as decreased appetite for liquids, congestion, sleep disturbances, daytime restlessness, diarrhoea, vomiting, cough, body rash, fever greater than 38.9°C, an increase in finger sucking, and gum rubbing to be associated with teething in children but still many parents will testify that their children are teething.

### Treatment

Both pharmacological as well as non pharmacological methods of the management of teething are presented in Table 3. Infants with severe systemic signs should be promptly referred to a physician for an accurate diagnosis and appropriate treatment.

**Table 3.** Management of teething

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- Teething rings (chilled)
  - Hard sugar-free teething rusks/bread-sticks/oven-hardened bread
  - Cucumber (peeled)
  - Frozen items (anything from ice cubes to frozen bagels, frozen banana, sliced fruit)
  - Pacifier (even frozen)
  - Rub gums with clean finger, cool spoon, wet gauze
  - Reassurance
  - Analgesic/antipyretics
  - Topical anesthetic agents
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### Non-pharmacological management

The expression "born with a silver spoon in his mouth" has its origin as a teething remedy. This expression referred to wealthy 19th century parents who would give their teething children a silver spoon to bite on to relieve discomfort. Unlike many historical teething remedies, the "silver spoon" treatment was effective and still is used but has been replaced by more affordable textured or cold teething rings. The cold temperature of the object causes localized vasoconstriction, which decreases the inflammation, and biting on the object gives further relief by applying pressure to the gums.<sup>45</sup> A wide range of teething rings are commercially available for infants to 'gnaw'. Liquid-filled teething rings should be chilled in the refrigerator, not in the freezer, and should not be sterilized in boiling water or in the dishwasher (unless specified by the manufacturer). These should be attached to the infants clothing, and not tied around the neck, as strangulation could result. Many teething children are comforted by a pacifier, and will chew the teat to provide temporary pain relief.<sup>12</sup>

Hard, non-sweetened rusks and oven-hardened bread made from flour and wheat with no sugar or sweetener can also be attached onto the infant's clothing. A variety of fresh and frozen fruit and vegetables e.g., peeled cucumber, frozen bananas can be used by teething infants. Such remedies should not be used in children who are not yet taking solid foods, and foods that have high sucrose content are not recommended. Supervision is needed to ensure that small pieces of food do not break off and pose a choking hazard.

The application of pressure to the painful area of mucous

membrane with a clean finger (possibly with wet gauze) or a cold spoon can also be applied.<sup>4</sup> Excessive salivation commonly runs onto the infant's skin, and should be wiped away regularly otherwise, a rash (which may be considered pathognomic of teething) may develop.

### Pharmacological management

A wide range of effective topical and systemic preparations are available when local measures fail to provide relief.<sup>12</sup>

- **Topical local anesthetics**  
Lignocaine based preparations and topical Benzocaine gel are rapidly absorbed through mucous membrane giving prompt relief from pain. These should be placed on a clean finger or cotton bud, and rubbed onto the painful area. Parents should be advised to wash their hands thoroughly before applying topical agents directly to the painful area of mucous membrane. Some of their reported relief may be due to the pressure of application.
- **Topical choline salicylate-based products**  
Salicylates are regarded as minor analgesics and penetrate mucous membrane readily to give prompt pain relief. Their anti-inflammatory and antipyretic effect reduces swelling which is an additional advantage. The link between aspirin and Reyes syndrome is not relevant for non-aspirin salicylates. Frequent applications to the oral mucosa may result in a chemical burn.
- **Systemic analgesics**  
The conservative use of acetaminophen and ibuprofen can reduce pain and pyrexia caused by teething. Parents must know the correct dosage for their children to prevent overdose. A sugar-free paracetamol elixir is the drug of choice. It acts by inhibiting prostaglandin production. The recommended paracetamol dosage is: 3–12 months = 60–120 mg; 1–5 years = 120–250 mg which can be repeated 6 hrly. Underdoses of paracetamol for teething children are ineffective, whilst overdosing may lead to severe hepatocellular necrosis and renal tubular necrosis. Ibuprofen suspension can be given to children over one year.

Parents should be advised that a number of outdated practices are potentially harmful. Adding sugar, honey or jam to feeding bottles, or dipping a pacifier in honey or jam has absolutely no pain relieving effect. Only sugar-free objects and medication should be prescribed during teething. Medicines should never be added to food or feeding bottles, as parents (or carers) cannot accurately control the dosage ingested. Alcohols are not recommended for infants, and specifically the application directly to mucous membrane should be avoided as it may lead to hypoglycaemia.

Teething remedies should be kept well out of reach of all

children, as even 'childproof' containers can be opened by small children, and because of added flavourings, children can unwittingly overdose themselves.

### CONCLUSIONS

Historically almost any potentially serious illness as well as normal childhood behaviour during the period of teeth eruption has been attributed to it.

- Parents need to be educated that even though teething may lead to local symptoms which are inflammatory or irritative in nature, systemic symptoms are not caused by teething. Before attributing any signs or symptoms of a potentially serious illness to teething, primary health care providers and parents must rule out other possible causes.
- Young children are exposed to a wide variety of situations, environments, and illnesses and can have multiple episodes of fever, congestion, and diarrhoea. Physicians and caregivers should be aware of the temporal relationship between teething, exposure to infection, and normal childhood illnesses.
- The currently accepted methods of pain relief for teething infants have progressed considerably since the historic days of gum-lancing and dangerous remedies which contributed to the high morbidity and mortality.
- Teething treatments range from topical and systemic pharmacological preparations, teething rings and cold washcloths to topical benzocaine.
- Most of these treatments are benign, but some have the potential to cause serious disease or pose a choking risk. Vigilance and caution should be used when physicians prescribe treatment and when parents choose to use non-traditional remedies.

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