It's only teething… A report of the myths and modern approaches to teething

M. P. Ashley[1]

Paediatric dentistry is not my usual field of work. I am now based almost entirely in restorative dentistry and it is five years since I worked in the dental department of a children's hospital. An essay on teething would appear to be an unusual choice of topic. With the current professional climate of 'general professional education' and 'lifelong learning' I can easily justify my time and effort studying a subject somewhat removed from my regular work. However, to be completely honest, I have reached that age when many of my friends, relatives and colleagues are enjoying the sleepless nights that accompany expanding families. Add to this the fact that I have recently married into a family of midwives, health visitors, nurses and new mothers. I was not sure that I was giving the best, most up to date advice when asked about teething. So some reading around was required. If only it were that simple. I now feel equipped to give a little more help than simply saying, "It's only teething…"

Historical teachings and old wives' tales

Throughout history, teething has been held responsible for a wide variety of childhood illnesses. There are references to teething difficulties in the Homeric hymns from around 1200BC and in the prayers of early Indian literature around 1000 BC. In the fourth century BC, Hippocrates wrote a short treatise, *On Dentition*, *'Teething children suffer from itching of the gums, fevers, convulsions and diarrhoea, especially when they cut their eye teeth and when they are very corpulent and costive'.* (25th Aphorism, 3rd book.)

He also observed that the more difficult the teething period was for the child, the better the child would come through it eventually. This may well have been a reference to the survival of the fittest since a child strong enough to survive the pain of teething and the change in diet occurring at that age, was more likely to overcome the normal traumas of childhood.

In 117AD, the physician Soranus of Ephesus was the first to suggest using hare's brain to ease teething. This remained a favoured remedy until the seventeenth century. There is a recorded cure from the fourth century AD, *'If they are in pain, smear the gums with dog's milk or hare's brain; this works also if eaten. But if a tooth is coming through with difficulty, smear Cyperas with butter and oil-of-lilies over the part where it is erupting'.*

In the sixth century AD, Aetios of Amida recommended that hare's brain be given in the food either boiled or roast and if no hare could be found, a lamb's brain would do just as well, *'for by its nature it assists'*. Aetios also encouraged the practice of wearing charms and amulets to make teething easier and keep death at bay. He recommended, *'Root of colocynth* [a wild, poisonous vine] *hung on the child in a gold or silver case, or bramble root, or the tooth of a viper, especially a male viper, set in gold or green jasper, suspended on the neck so as to hang over the stomach'.*

By the ninth century, physicians were concerned with which season was best for the teething child. *'They that teethe in winter, come off best'*. Gastrointestinal disorders and contamination of foodstuffs were more frequent in the summer.

In medieval times, animal substances were still being rubbed into the gums and teething infants were encouraged to chew on hard objects such as roots. In 1429, Von Louffenberg, a German priest, summarised the care of a teething baby.

'Now when your baby's teeth appear, you must of these take prudent care.
For teething comes with grievous pain, so to my word take heed again.
When now the teeth are pushing through, to rub the gums thou thus shall do.
Take fat from chicken, brain from hare, and these full oft on gums shall smear.
If ulcers sore thereon should come, then thou shalt rub upon the gum.
Honey and salt and oil thereto. But one thing more I counsel you,
A salve of oil of violet, for neck and throat and gums to get.
And also bathe his head a while, with water boiled with camomile.'

In 1545, Thomas Phaire, an English physician, advised an ointment containing oil of roses and juice of nightshade. His recommended charm was, '*The fyrst cast tooth of a colt set in silver and bone, or red coralle in lyke manner hanged about the neck, whereupon the chylde should oftentimes labour his gums*'.

The use of coral was considered protective in other ways. *'By consent of all authors, it resisteth the force of lightening, helpeth the chyldren of the falling evil [epilepsy] and is very good to be made in powder and dronken against all manner of bleeding of the nose or fundament'.*

About the same time, Flemish physicians advised, *'Make use, in this affliction, of the canine tooth of a wolf chiefly; and that of the she wolf has a greater reputation than that of the male wolf'.*

Ambriose Pare (1517–1592), the French army surgeon, began to advocate a new solution to the age old problem of 'breeding

[1]*Specialist Registrar in Restorative Dentistry, Department of Restorative Dentistry, Charles Clifford Dental Hospital, Wellesley Road, Sheffield S10 2SZ*
**Correspondence to above address.*
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teeth': cutting the gums with a lancet. In 1575, he described how he developed the method, from the examination of a dead child. *'When we diligently sought for the cause of his death, we could impute it to nothing else than the contumacious hardness of the gums…when we cut the gums with a knife we found all the teeth appearing…if it had been done when he lived, doubtless he would have been preserved.'*

And later, *'…of which kind remedy I have with prosperous and happy success made trial in some of mine own children…which is much better and more safe to do as some nurses do, who taught only by instinct of Nature, with their nails and scratching, break and tear and rent the gums'.*

In 1668, Francois Mauriceau, a French male midwife, recommended that the procedure, *'Be done with a lancet rather than a knife, although a thin groat* [a small coin] *is as good or better than either'.*

Mauriceau challenged the effectiveness of charms, although he believed that the silver coral stick was helpful only because its hard smoothness soothed the child's gums. *'There are many remedies which diverse persons assert have a peculiar property to help the cutting of teeth, as rubbing them with Bitches' milk, hare's or pig's brains and hanging a viper's tooth about the neck of the child and suchlike trifles: but since they are founded more on superstition, than any reason, I will not trouble myself to enlarge on what is so useless'.*

Eighteenth and nineteenth century therapies were varied and depended on local superstition and the beliefs of the attending physician. Doses of mercury salts, opiates, purgatives and emetics were recommended, even if the child was experiencing diarrhoea or vomiting beforehand. With modern understanding of diseases it is likely that dehydration was largely responsible for many of the signs, symptoms and deaths associated with teething.

Leeches were applied to the mastoid area or directly to the gums. However, leeching was not as popular as lancing.

John Hunter and Joseph Hurlock both wrote works on teeth. In 1742, Hurlock wrote his treatise *Upon Dentition*. He was convinced that many more children died from teething than was generally believed. In his view, many of the deaths from convulsions were also a result of teething. Both Hunter and Hurlock tried to encourage the lancing of gums to prevent these deaths. Hunter 'would lance a baby's gums up to ten times'. Hurlock advocated gum lancing for every childhood disease or ailment, irrespective of whether the tooth was evident. There do not appear to be any records of problems caused by lancing. John Hunter's view was that lancing was never attended by dangerous consequences.

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Marshall Hall, (1790–1857) a physician, stated that he 'would rather lance a child's gums 199 times unnecessarily than omit it once if necessary' and instructed his students to do it, before, during and after the teeth appeared, sometimes twice a day.

By 1839, 5016 deaths in England and Wales were attributed to teething. The English Registrar-General report on teething of 1842 discussed infant mortality: 4.8% of all infants who died in London under the age of 1, 7.3% of those between the ages of 1 and 3 and 12% of all deaths under four years were directly attributed to teething.

The belief in lancing the gums was widely and firmly held by both the medical profession and the public. In 1850, Condie, in his book *Diseases of Children*, reported:

'A curious case is related by M. Robert, in his treatise on the Principal Objects of Medicine, of one of the effects of difficult dentition, as of the division of the gum. A child, 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 persue 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. In due time the teeth made their appearance and the child's health was fully restored.'

In 1884, the Medical Society of London held a meeting on the subject of teething. Edmund Owen, Surgeon to the Hospital for Sick Children, stated that the lancet and the leech now *'lie together in the same dark tomb'*. Most colleagues at the meeting disagreed. Many believed that childhood ailments were caused by teething and had anecdotal evidence to support this. It was considered by most that failing to lance contributed to the high rate of infant mortality. The American physician Samuel Gross complained that young doctors were not using their lancets.

Explanations of the relationship between teething and childhood illnesses were made without recognition of many diseases and understanding of the action of organisms causing infection. Most frequently, the nervous system was indicated as a link between tooth eruption and systemic disease. In 1887, J. W. White wrote, *'The nervous perturbation occasioned by the eruption of teeth increases the susceptibility and lessens the resistive power of the child'.*

It was believed that the difficulty experienced by an erupting tooth whilst penetrating gingival tissue affected trigeminal nerve endings. A 'reflex stimulation' of other cranial and spinal nerves ensued, producing 'functional derangements' and diseases in other organs. Lancing over an erupting tooth was recommended to allow bleeding and to release tissue pressure that was causing reflex stimulation of the trigeminal nerve. Any sick infant could be found to have an erupting tooth, even if the 'tooth bud' was deeply buried. This theory of reflex stimulation was reiterated as late as 1954.

There remained a widespread fear of the role of teething in infant illness and mortality. In 1894 Dr M. Thrasher, writing in *Dental Cosmos*, stated his belief that, *'So deadly has teething become, that one third of the Human family die before the twenty deciduous teeth have fully appeared'*.

Soon after this, in 1896, Dr S. W. Foster, also in *Dental Cosmos*, explained, *'The teething child becomes wakeful, restless and fretful, refuses nourishment; the alimentary canal becomes more active, diarrhoea follows and if relief is not given, relaxation of the vital forces follows and we have nausea, vomiting, convulsions, paralysis and not infrequently, death'*.

He stated that more deaths occur in the teething period than in any similar period during the human lifespan and inferred that teething may be the leading cause of death in the population.

Over the centuries, an extensive folklore had built up around teething. The condition even acquired a Latin name, *Dentitio Difficilis*. However, not everyone agreed with the belief of the majority. In 1771, George Armstrong, a paediatrician, wrote, *'Teething in the manner as was observed in convulsions is said to carry off a much greater number of children than it actually does, for almost all children that die whilst they are about teeth are said to die of teething'*.

At the time that Drs Thrasher and Foster were writing in *Dental Cosmos*, Dr W. C. Barrett addressed the First District Dental Society of New York. His paper was called *The Slaughter of the Innocents* and attacked the hypocrisy of his colleagues.

'"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 the symptoms of the gravest character.'

It is easy to imagine that he was not only a dentist with views ahead of his time, but a theatrical orator also.

A rough rule of thumb is that the age in months minus six gives the average number of teeth, up to age 2 years.

With increasing understanding of medicine and diseases came a gradual but recognisable change in the belief and practice of the dental profession. In 1910, 1600 deaths in England and Wales were attributed to teething, compared with 5016 in 1839.

The process of teething

Normally a deciduous tooth begins its upward movement about the time of crown completion. Until the tooth emerges through the gingivae, its crown is covered by the reduced enamel epithelium. Gradually the connective tissue between the enamel epithelium and the oral epithelium disappears, with the two layers of epithelium fusing together over the advancing cusp or incisal edge. This area of fused epithelium breaks down to allow the tooth to emerge into the mouth. The eruptive force is believed to come from the growth of pulp tissue at the end of the developing root.

Deciduous tooth eruption is sometimes preceded by an eruption cyst of the overlying gum or by a smooth bluish swelling due to haematoma formation. They occur most commonly over deciduous molars but are also seen occasionally over deciduous incisors. Some eruption cysts originate from remnants of the reduced enamel epithelium and are true dentigerous cysts, located in the soft tissue rather than bone. Others are simply an accumulation of blood or fluid from the connective tissue between the two layers of epithelium.

Timing of tooth eruption

The timing of tooth eruption varies widely. One per cent of infants acquire their first tooth before the age of four months, whereas one per cent have not had their first tooth erupt by the age of twelve months. Parents should be reassured that many months delay in tooth eruption in an otherwise normally developing child is of no concern. A rough rule of thumb is that the age in months minus six gives the average number of teeth, up to age 2 years. Environmental factors such as climate or illness have not been found to have a significant effect on the rate of dental development; nor is a gender relationship evident. Premature infants get their first teeth at a later chronological age, but at the same post-conceptual age as full-term infants.

Generalized delay in eruption has been noted in hypopituitarism, hypothyroidism, infantile rickets, Down's Syndrome, cleidocranial dysostosis, osteopetrosis, Gardener's syndrome and achondroplastic dwarfism.

Sometimes children are born with teeth (natal teeth) or they erupt in the first month of life (neonatal teeth). The reported incidence of natal teeth is between 1 in 2000 live births and 1 in 6000 live births. Some cases of natal teeth have been associated with cleft lip and palate cases, Pierre–Robin syndrome and other syndromes with a head and neck involvement.

Most natal and neonatal teeth are mandibular incisors and are usually part of the normal deciduous dentition and not supernumery teeth. Frequently there is a family history of natal or neonatal teeth. These teeth may appear normal or may appear as simple shell like structures, with little or no root. Root growth progresses normally and the tooth gradually becomes firmer (usually within four weeks), but the enamel is always hypomineralized and tends to break away. Natal and neonatal teeth should be retained if possible, as they are part of the normal dentition. They should only be extracted if they cause trauma to the infant, to the mother's nipple or if there is a danger of them being swallowed or inhaled.

Variations in the normal sequence of eruption may occur with dental infections, additional teeth in the path of eruption, insufficient space in the arch and ectopic development of teeth.

Behavioural changes

Throughout the early stages of an infant's life, their behaviour changes. Parents understandably become concerned by some of these changes and wonder how to stop the problem. Between the ages of four months and three years, parents attribute a variety of their child's behaviour to teething. The use of a simple diagnosis of teething helps to reduce their anxiety. Parents often find that attributing problems associated with changes in sleeping and eating patterns to teething is reasonable and effective.

Opinions about the local and systemic disturbances in the teething infant vary. Much of the information gathered about teething is based on subjective parental opinion that is influenced by the desire to explain behavioral changes with an anxiety-reducing diagnosis. It is also difficult to separate the signs and symptoms of teething from the normal psychological and physiological changes, such as drooling and wakefulness.

Teething is almost certainly a little uncomfortable for the child. The gums swell and are tender to palpation just prior to tooth eruption. Children will chew their fingers and can drool excessively. Other observations are lip and object biting, irritability, restlessness and night crying. These observations parallel those reported by authorities in veterinary medicine. Dogs have increased salivation, loss of appetite and irritability when their teeth erupt. Monkeys become irritable and hyperactive and exhibit increased biting activity. Other signs commonly attributed to teething such as diarrhoea, cough, ear rubbing, rashes, fever and convulsions, have not been found to have any relationship to teething. These signs are much more likely to have another cause.

Seward studied the association of 18 disturbances with the eruption of the deciduous teeth in 224 normal children.[1] Irritability, night crying, drooling, poor appetite, circumoral rash and inflammation of the gums were common findings.

Tasanen studied teething infants in North Finland, with daily recording of temperature, appearance of gums, presence of infections and disturbances of behaviour.[2] He showed that tooth eruption bore no relation at all to infection, diarrhoea, fever, rash, convulsions, sleep disturbance, cough or ear rubbing. Teething was associated with daytime restlessness, loss of appetite, hand sucking, drooling and some appetite loss.

Average deciduous teething dates

lower central incisors	5–7 months
upper central incisors	6–8 months
upper lateral incisors	9–11 months
lower central incisors	10–12 months
canines	16–20 months
first molars	12–16 months
second molars	20–30 months

Illingworth suggested that in 6–12-month-old infants, much of the evening and nighttime crying that is attributed to teething may be due to bad habit formation and mismanagement.[3] Infants of this age have discovered that if they cry at night, they will be picked up, taken downstairs, played with and given a thoroughly enjoyable time

In a 1975 study of 64 primary care paediatricians in Philadelphia, Honig found that only five believed that teething was not responsible for symptoms such as irritability, eating problems, wakefulness and rashes.[4] Eighteen felt that teething could be responsible for temperatures up to 39.4°C.

Dentists are equally reluctant to discard the teething diagnosis. Most dentists do not routinely treat children of this age and their opinions often reflect dental folklore. Most parents (and grandmothers!) believe in the distress of teething.

Teething complaints are confined almost exclusively to the eruption of the deciduous dentition. Other than impacted third molars, the eruption of permanent teeth is free from the symptoms frequently ascribed to the eruption of the deciduous teeth. In 1990, Wray commented that the current understanding was that teething coincides with the stage of development when active immunity is struggling to take over from the waning passive immunity of the mother.[5] This often results in ENT or gastrointestinal infection in a child with an obvious oral fixation who will naturally suck or chew their fingers.

More recently, the possibility of the signs and symptoms related to teething being due to viral infection has been proposed and investigated. King studied 20 infants presenting with a parental diagnosis of teething difficulty, compared with 20 infants with no distress acting as a control.[6] Almost half of the studied group had oral swabs positive for herpes simplex virus (HSV). None of the control group had positive oral swabs. King concluded that oral HSV infection should be included in the differential diagnosis of infants presenting with teething difficulties.

The few remaining signs and symptoms left to teething, eg fever, irritability and eating difficulties, are quite consistent with primary herpetic gingivostomatitis.

Treatment

Various treatments are now advocated for the relief of the discomfort or pain associated with teething. Many of these have their origins in methods used for centuries. Rubbing substances into the gums and chewing on hard objects are still extremely common, although the use of animal brains is no longer recommended! The action of gum lancing is now confined to history, although surgical removal of eruption cysts overlying a deciduous tooth may still be carried out when indicated.[1]

Chewing on clean, hard, cool objects will give relief from soreness and there seems to be a limitless number of items recommended for this purpose. Chilled teething rings and rattles, cold wet flannels, chilled hard vegetables such as carrots and celery and an icecube tied in a cloth are all recommended and probably entirely safe. Teething biscuits and rusks are not suitable as they can promote tooth decay.

In 1998, Government Safety Regulators in the United States asked manufacturers to stop using a chemical known to be a carcinogen in baby rattles and teething toys. The chemical, disononyl phthalate, is used as a softening agent. The child is likely to ingest small amounts of the chemical as it leeches out of the product. Although there have been no reported cases of phthalate-related cancer in infants using teething

products, manufacturers worldwide have ceased using these chemicals in their products.

The use of chilled topical preparations in gel form remains popular. Lignocaine-containing products have been shown to be more effective than similar, control preparations without lignocaine. However, many authorities advise that these gels are largely insufficient to treat the condition when used alone, due to the rapid washing away from the site of discomfort.

A sugar-free elixir of paracetamol is the basis for some commercially available products. It is effective particularly due to its analgesic and antipyretic effects. The use of aspirin in either topical or systemic form is contraindicated in children and teenagers due to the association with the brain and liver disorder, Reye's syndrome.

Steward recommended this approach to the treatment of teething.[7]

- First, give the child teething objects to bite. Cold objects bring greatest relief, so teething rings can be kept in the fridge. All teething rings should be safe and easy to clean. Carbohydrate containing foods should be avoided.
- If pain is troublesome, use the appropriate dose of a paracetamol elixir, preferably sugar-free. This may be given regularly, every 4–6 hours.
- If additional analgesia is required, lignocaine-based teething gels should be used.

Conclusion

The beliefs and superstitions associated with teething throughout history appear amusing and it may cause concern that the profession was so willing to go along with practices so incorrect. Yet it is sobering to appreciate that our historic colleagues were acting on their existing knowledge and their professional and personal standing relied heavily on their reputation amongst their peers and patients. Maybe things have not changed so much after all. Will our colleagues of the future be smirking at our misguided ways?

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