

# The trouble with teething – misdiagnosis and misuse of a topical medicament

P. H. R. WILSON<sup>1</sup> & C. MASON<sup>2</sup>

<sup>1</sup>Guy's & St Thomas' Hospital Trust, and <sup>2</sup>Maxillofacial/Dental Department, Great Ormond Street Hospital for Children NHS Trust, London, UK

**Summary.** For many clinicians and parents 'teething' remains a convenient diagnosis to explain all manner of local and systemic upset in the young child. Many therapies are on the market to help alleviate the symptoms of primary tooth eruption. In this article we highlight the problems of 'teething' as a diagnosis by presenting a case where an initial misdiagnosis of teething compromised a patient's life. The same patient then suffered from topical analgesic misuse during the recovery period.

## Introduction

Dentitio difficilis or 'teething' as a diagnosis to explain vague childhood illness has been around for over 5000 years [1,2]. Manifestations of primary tooth eruption have ranged from the minor – drooling, sleep disturbance or coughing – to the more severe – convulsion or even death. In 1839, the Registrar General attributed 5016 infant deaths in England and Wales to teething, however, by 1910 this had reduced to 1600 [2]. The majority of these deaths occurred between the ages of six months and two years old, the period during which primary tooth eruption takes place.

Although these extreme sequelae have been discarded to the annals of history, much debate still exists as to the influence teething has on the developing child. Many mild symptoms are only temporarily associated with primary tooth eruption [3,4] and may be a consequence of the change from a passive to an active immune system [5]. This occurs during a period of development when a child is orally fixated. This said, labelling a systemically upset child as 'only teething' can misdiagnose a more serious gastrointestinal or upper respiratory tract infection.

Despite the inconsistencies, health care workers and parents persist in employing 'teething' to explain away childhood upsets and local oral distress. The vast array and brisk sales of teething remedies give an indication of this.

In this article, we highlight the problems of 'teething' as a diagnosis by presenting a case where an initial misdiagnosis of teething compromised a patient's life. The same patient then suffered from topical analgesic misuse during the recovery period.

## Case report

A 10-month-old boy was transferred from Malta to the Intensive Care Unit, Great Ormond Street Hospital for Children with a 2 week history of irritability, reduced feeding, shortness of breath and pyrexia. He had been diagnosed in Malta as 'teething' and prescribed a paediatric oral suspension of mefenamic acid (Ponstan®; 50 mg/5 ml) but his symptoms had steadily worsened.

The past medical history was uneventful. He had been delivered at full term weighing 2.8 kg and had a complete immunization record. There were no known allergies and he fed and gained weight normally from birth. His parents were both Maltese, unrelated and this was their only child.

An echocardiogram revealed a large secundum atrial septal defect (ASD) and mitral valve stenosis.

Correspondence: P.H.R. Wilson, Guy's & St Thomas' Hospital Trust, Floor 26, Guy's Tower, London SE1 9RT, UK. Tel.: 0207 9554333, Fax: 0207 9554452



Fig. 1. Yellow-white lesion on floor of mouth.

This was complicated by secondary congestive heart failure.

The ASD was surgically repaired and his condition improved significantly.

Three months after initial presentation at Great Ormond Street Hospital, while still an inpatient, the child developed a tender sublingual white patch. He was drooling, sleeping with his fingers in his mouth and his general health was deteriorating. His medical team diagnosed oral candidiasis and he was treated empirically with fluconazole. After 2 weeks of fluconazole treatment the patch appeared to be getting worse. The patient was then referred to the Maxillofacial/Dental Department of Great Ormond Street Hospital.

On examination, the floor of the mouth and ventral surface of the tongue were obliterated by an indurated, acutely tender yellow-white lesion which was fixed to the underlying mucosa (Fig. 1). It had a smooth surface and there were no signs of bleeding. The remainder of the oral mucosa appeared moist and healthy, as did the oropharynx. Upper and lower primary incisors, and upper first primary molars were erupting. The upper and lower primary canines were palpable.

Further discussion with the boy's parents and medical team revealed that Bonjela® (Reckitt and Colman, London, UK) (8.7% choline salicylate) was being used for 'teething' symptoms. The Bonjela® was smeared liberally on the digits of both hands four times daily, and the child then allowed to sleep with his fingers under his tongue. This regimen started 1 week before the appearance of the oral lesion and was still ongoing.

In the absence of any other obvious causes, a provisional diagnosis of chemical trauma secondary to inappropriate Bonjela® use was made. The medication was halted immediately and oral hygiene instruction given to the parents and nursing staff. Systemic analgesia and adequate hydration were ensured.

Review at 1 and 3 days revealed the lesion to be resolving and at 5 days the sublingual tissues were back to health. The child started to feed again, and 1 week later had recovered completely.

## Discussion

Teething has been blamed for protean manifestations in the developing child (Table 1).

Most health care workers agree that primary tooth eruption does not cause life-threatening illness but there are still difficulties regarding local and systemic symptoms.

Swan [6], in a study of 50 infants hospitalized for symptoms attributed to 'teething', found that 48 had another organic cause for their upset. The symptoms leading to admission ranged from pyrexia, disturbed sleep and feeding, irritability, dribbling, diarrhoea, respiratory problems, ear pulling and convulsions. The actual diagnoses included upper respiratory tract infection, herpetic encephalitis, and bacterial meningitis. Recently a 0.6 °C rise in temperature has been demonstrated during the teething process [7], however, the point at which teething occurred was not defined.

The eruption of primary teeth has been investigated in a recent prospective descriptive study [10]. Many primary teeth demonstrated an 'oscillating' pattern of eruption and this is accompanied by gingival erythema but not swelling.

A prospective look at 18 local and systemic symptoms attributed to primary tooth eruption has been carried out on 125 healthy, non-institutionalized infants [3]. It was found that fever, daytime restlessness,

Table 1. Symptoms ascribed to 'teething' in infants.

Appetite for liquids decreases	Appetite for solids decreases
Biting/Chewing	Congestion/Running nose
Cough	Drooling
Ear rubbing/pulling	Gingival rubbing
Irritability	Facial rash
Nappy/Body rash	Sleep disturbance
Vomiting	Stool looseness/number
Sucking	Constipation
Colic	Fever
Convulsions	Malodourous urine

**Table 2.** Treatments for the symptoms of teething.

<b>Pressure based</b>	Teething rings/rattles (chilled)		
	Blanket/cold flannel		
	Hard vegetables (chilled carrots, celery)		
	Hard sugar free rusks (Bickiepegs®)		
<b>Drug based</b>	Systemic – paracetamol, ibuprofen		
	Local	Gels –	8.7% choline salicylate
			0.3% lidocaine HCl
			0.6% lidocaine HCl
		Powders –	benzocaine, paracetamol

thumb sucking, gingival rubbing, drooling and loss of appetite were associated with the four days before and three days after tooth eruption. Symptoms appearing on the day of eruption, or less than two days before, included decreased appetite for solids, wakefulness, ear rubbing, facial rash and slight temperature elevation. The remaining symptoms in the study, for example diarrhoea, cough, nasal congestion, nappy rash, and vomiting were not significant.

It has been postulated that unrecognized or misdiagnosed primary herpetic gingivostomatitis may be the cause of some children's teething difficulties [5].

Parental attitudes to 'teething' reflect those of most health care workers [8]. In an Australian population, 70–85% of parents believed 'teething' to produce mild, self limiting symptoms. Alarming, the remainder ascribed more serious symptoms to 'teething'. Most of the parental diagnoses were made on symptoms alone, rather than inspection and palpation.

In our case, both the parents and Maltese health care workers perceived the child's initial symptoms to be the result of teething problems. He was at the appropriate age and had well known signs thought to be caused by primary tooth eruption. Although possible, the duration with which these symptoms persisted and worsened merited rapid reassessment. Further delay may have proved fatal.

The child's condition deteriorated for a second time because of iatrogenic oral mucosal trauma. Although a correct diagnosis of teething was possibly made on this occasion, the uncontrolled application of topical choline salicylate had both local and systemic consequences. The child could not eat or drink, and therefore his general well-being declined. On removing the teething treatment he improved very rapidly.

Whether primary tooth eruption and its associated symptoms require treatment is open to question. There are a variety of remedies for the teething child (Table 2). Pressure based treatments enable the child

to soothe localized tender areas of gingivae, probably by the gate theory of pain control. They must be non-toxic, sugar free, and not easily broken into small pieces, which could constitute an airway risk. Chilled objects offer greater relief. Recently, manufacturers have stopped using the carcinogen diisononyl phthalate as a softening agent in teething rings and rattles as it was found to leach out and could have been ingested [11].

Drug based treatments have an analgesic effect. In our case Bonjela® was employed. This contains 8.7% choline salicylate in a flavoured gel base. It is indicated for mild oral and perioral lesions and 1/4 – 1/2 inch of gel is applied topically 3-hourly, up to a maximum of six applications per day. It has a local analgesic effect although the pressure of application may be the true mechanism of action. Choline salicylate is a synthetic non-steroidal anti-inflammatory based on aspirin. It has less adverse effects when compared to aspirin, however, it has been reported to have caused salicylate intoxication when applied topically in a child [9]. It is not thought to be implicated in Reye's Syndrome. If topical therapy is required, it must be applied sparingly to localized areas of dry mucosa. The patient must be reviewed regularly and reassessed.

Chemically traumatized mucosa ranges from a yellow-white lesion to severe tissue coagulation. The surface can be hard, smooth or with fissures, or can be coagulated with an erythematous, haemorrhagic area underneath. Treatment is usually supportive to facilitate healing and prevent secondary infection. It is imperative to review patients early. In an infant, mucosal turnover is extremely rapid and healing can be observed within 24 h. If the tissues do not appear to be regenerating then the diagnosis must be reconsidered. Causes that should be included in a differential diagnosis are thermal or physical trauma, candidiasis, hypersensitivity, leukoplakia or neoplasia.

## Conclusions

A diagnosis of 'teething' should only be made once other systemic or local causes of upset have been excluded.

'Teething' must be treated in the first instance with an appropriate device which applies local pressure to the gingivae.

Only in certain cases should a pharmacological treatment be sought, and even then its use must be limited and carefully monitored.

Parents and healthcare workers should be warned against the uncontrolled use of topical teething medicaments.

The general dental practitioner is in an ideal position to advise parents and healthcare workers in all aspects of paediatric oral health and should be involved at an early stage in a child's development.

## Acknowledgements

We would like to thank the parents of the child for their permission to report this case, Miss S. Dewhurst, Specialist Registrar in Paediatric Dentistry, Eastman Dental Hospital, London, and also the Medical Illustration Department, Great Ormond Street Hospital for Children, London, UK.

**Résumé.** Pour de nombreux cliniciens et parents, l'émergence des dents est un diagnostic facile pour expliquer toute manifestation locale et systémique affectant le jeune enfant. De nombreux traitements sont sur le marché pour aider à soulager le patient des manifestations de l'émergence des dents temporaires. Dans cet article, nous étudions les problèmes d'émergence comme diagnostic à l'aide d'un cas où un mauvais diagnostic initial de problème d'émergence a mis en péril la vie du patient. Le patient souffrait d'une mauvaise utilisation d'un analgésique topique durant la même période.

**Zusammenfassung.** Für viele Kliniker und Eltern stellt "Zahnen" nach wie vor eine bequeme Diagnose dar, welche alle möglichen Befindlichkeitsstörungen lokaler und systemische Art erklärt.

Es existieren die verschiedensten Therapeutika zur Behandlung des Zahnens. In diesem Artikel wird das Problem des Zahnens anhand eines Falles beleuchtet, in welchem die anfängliche Fehldiagnose des Zahnens zu lebensbedrohlichen Komplikationen führte. Der gleiche Patient litt in der Rekonvaleszenz unter einer Fehlbehandlung mit einem topischen Analgetikum.

**Resumen.** Para muchos clínicos y padres el comienzo de la dentición continúa siendo el diagnóstico adecuado que explica todo tipo de trastornos locales y sistémicos en el niño pequeño. Muchos tratamientos están en el mercado para ayudar a aliviar los síntomas de la erupción de los dientes temporales. En este artículo resaltamos los problemas del comienzo de la dentición como diagnóstico, presentando un caso donde un diagnóstico incorrecto inicial comprometió la vida de un paciente. El mismo paciente luego sufrió el mal uso del analgésico tópico durante el período de recuperación.

## References

- 1 King DL. Teething revisited. *Pediatric Dentistry* 1994; **16**: 179–182.
- 2 Dally A. The lancet and the gum lancet: 400 years of teething babies. *Lancet* 1996; **348**: 1710–1711.
- 3 Macknin ML, Piedmonte M, Jacobs J, Skibinski C. Symptoms associated with infant teething: a prospective study. *Pediatrics* 2000; **105**: 747–752.
- 4 Tasanen A. General and local effects of the eruption of deciduous teeth. *Annals Paediatric Fennicae* 1968; **14**: 1–3.
- 5 King DL, Steinhauer W, Garcia-Godoy F, Elkins CJ. Herpetic gingivostomatitis and teething difficulties in infants. *Pediatric Dentistry* 1992; **14**: 82–85.
- 6 Swan IL. Teething complications: a persisting misconception. *Postgraduate Medical Journal* 1979; **55**: 24–26.
- 7 Jaber L, Cohen IJ, Mor A. Fever associated with teething. *Archives of Diseases of Children* 1992; **67**: 233–234.
- 8 Wake M, Hesketh K, Allen M. Parental beliefs about infant teething: a survey of Australian parents. *Journal of Paediatric Child Health* 1999; **35**: 446–449.
- 9 Sarll DW, Duxbury AJ. Choline salicylates and Reye's syndrome. *British Dental Journal* 1986; **161**: 317–318.
- 10 Hulland SA, Lucas JO, Wake MA, Hesketh KD. Eruption of the primary dentition in human infants: a prospective descriptive study. *Pediatric Dentistry* 2000; **22**: 415–421.
- 11 Ashley MP. It's only teething ... A report of the myths and modern approaches to teething. *British Dental Journal* 2001; **191**: 4–8.