Community Dental Health (2006) **23,** 2-4

Editorial

Improving the oral health of young children through an evidence-based approach

Dental caries in young children remains a significant public health problem in the United Kingdom. Disease experience in 5-year-olds has remained largely unchanged over the last 20 years and large inequalities are evident between affluent and deprived areas (Pitts et al. 2005). For many years there have been concerns that the majority of disease in the population is untreated (Curzon and Pollard 1997). In 2003/4 only 12 percent of caries in 5-year-olds in England and Wales was treated by restoration (Pitts et al. 2005). What is less widely discussed is that this headline statistic masks large variation in the restorative index at Primary Care Trust level; in 2003/4 the restorative index ranged from 4 percent to 43 percent (Pitts et al. 2005). This large variation was also evident in NHS dental activity data collected by the Dental Practice Board (Dental Practice Board 2005) and cannot be fully explained by variations in disease and service supply at this crude geographical level. Therefore from a public health perspective we have two problems:

- large inequalities in dental disease, and
- large variation in the amount of restorative care provided to children.

To tackle the first problem, we know that fluoride-based interventions are effective in preventing caries (Marhino et al 2002 (a), Marhino et al 2002 (b), Marhino et al 2003). However, primary dental care-based interventions alone won't reduce whole population disease levels or tackle inequalities in caries levels. Indeed they are more likely to widen inequalities, as they can only reach children who attend the dentist on a regular basis and we know that children who attend sporadically harbour a disproportionately large share of population disease (Tickle et al. 1999, Tickle et al. 2000). Therefore to reduce population disease levels and tackle inequalities, resources for prevention should be focused on effective, fluoride-based, population-level interventions rather than those delivered in primary care. Water fluoridation, for example, reaches attenders and non-attenders alike reducing the disease burden (McDonagh et al. 2000) on primary care services making management of young children easier for General Dental Practitioners (GDPs) (Threlfall et al. *in press*).

We know far less about the second problem; which is why is there such a wide variation in the amount of restorative care provided and how to address this issue. In the UK the greater part of dental care for children is provided by GDPs working in the NHS. Although factors such as access to, and utilisation of dental services are important, it is crucial to understand how GDPs approach the care of young children. A retrospective cohort study reported the outcomes of care delivered by 50 GDPs in the North West of England. (Tickle et al. 2002). When the care provided by the dentists was compared large differences were apparent. At one end of the spectrum, four dentists filled all carious primary molars, at the other extreme one dentist restored only 25 percent of carious molars and there was a gradual change between these two extremes. Following this study, the Oral Health Unit (OHU) of the National Primary Care R&D Centre recently completed a large qualitative study to gain a clearer understanding of how GDPs approach the care of young children. Huge variation was apparent in GDPs' philosophy, beliefs and attitudes towards the management and care of young children (Threlfall et al. 2005, Threlfall et al. *in press*). In turn, this study promoted a national survey of GDPs and paediatric specialists in England. The survey clearly demonstrates large variation in opinion within and between GDPs and specialists on how to manage conditions that young children commonly present with. Widespread variation in opinion and delivery of care is therefore a consistent finding and cannot be accepted or ignored within a national health service. It cannot be right that a child would receive very different treatment for the same condition depending on which clinician they see.

Current UK guidance (Fayle et al. 2001) has advocated a vigorous restorative approach for children with carious primary teeth, but it is obvious that GDPs are not following this guidance (Tickle et al. 2002, Milsom et al. 2003a, Threlfall et al. 2005, Dental Practice Board 2005). This guidance is largely based on the traditional approach to care espoused for example by Curzon and Pollard (1997), which advocates that all carious primary teeth should be restored to the highest standards possible. Alternatively, the OHU questions this approach, pointing out that the evidence base for an enthusiastic restorative philosophy is weak (Milsom et al. 2003a). Two independently conducted studies both reported that approximately 80 percent of diseased primary teeth exfoliate without causing pain (Tickle et al. 2002, Levine et al. 2002). Also, no difference could be found in important outcomes for the patient (pain, extractions due to pain or sepsis or the prescription of antibiotics) irrespective of whether or not a carious molar was restored, after controlling for tooth type, size of the lesion and restorative material used (Tickle et al. 2002). These findings, although preliminary in nature, suggest that a less interventionist approach may be more fitting.

Dental caries can lead to an increased threat to general health and well-being (Petersen et al. 2005) and this perhaps has led to some disquiet about leaving caries untreated. Associations have been found between caries

experience in children and asthma (Reddy et al 2003), and obesity (Willershausen et al. 2004). There have been fears that chronic oral infection (largely through chronic periodontal disease rather than untreated caries, and in adults rather than children) has also been linked with systemic infections, cardiovascular disease, adverse pregnancy outcomes, respiratory diseases, and increased all-cause mortality rate (Joshipura et al. 2000). Importantly, cause and effect relationships have not been demonstrated and any associations found might be due to confounding, because of common risks for oral diseases and these conditions. For healthy children, there is no evidence of a causal link between untreated caries in the primary dentition and development of systemic conditions. There is, however, a strong association between traumatic dental treatment and emotional and psychological problems in young children. Theoretical links have been proposed for a direct causal link between traumatic dental events and dental anxiety (Rachman 1990), which can be a refractory condition (Lindsay et al. 1987). A recent cross-sectional study (Milsom et al. 2003b) demonstrated that 5-year-old children with a history of extraction were three and a half times more likely to be fearful or anxious of dental procedures than those with no history of extraction. Although we have no proof of a causal link between traumatic dental events and dental fear and anxiety, it seems that many GDPs believe that this is the case, and this belief influences their approach to the management of young children (Threlfall et al. *in press*). This balance between the impact of the disease and the impact of treatment on children is crucially important to understand. Researchers need to provide clinicians with a clear understanding of the risk and benefits of different approaches to dental care if they are to strike a balance between providing effective treatment whilst minimising any harm to the patient, whether from the disease process or iatrogenically induced.

Therefore two schools of thought are current on this issue; the traditional restorative approach and a group questioning whether a less interventionist approach is more appropriate. This lack of consensus on how care should be provided is symptomatic of the lack of a strong evidence base for the management of caries in the primary dentition (SIGN 2005). To improve the evidence base a more strategic approach is needed than in the past, to look at the fundamental components of this issue. There are significant problems with the current research base, which has influenced current guidance. For example, studies in the literature show little consideration for the importance of the natural history of disease in the primary dentition; a crucial issue when considering outcomes in anatomical structures which are designed to be temporary. Previous studies have almost universally involved interventions delivered by specialists in specialist centres and one wonders how relevant the outcomes of these studies are to understanding what works best in the hands of GDPs, who provide the majority of care in the UK. Studies have also focused on the comparative survival rates of restorations rather than looking at outcomes, which are more important to the patient such as pain, and the patient experience of treatment.

It is appropriate to take stock of the current debate in the UK on the management of young children with caries. Dental Public Health needs to show leadership on this and other issues and start using high quality research and an evidence-based approach as a tool for change integral to the commissioning process. The OHU has recently completed two large prospective cohort studies, which will report in 2006; one looking at the natural history of dental anxiety in children and its association with dental treatment, and a second looking at the outcomes of care provided in general dental practice. These studies will provide further useful information but will not be definitive, as they are observational in nature. The debate in the UK has reached an impasse and is now somewhat sterile. Various experts can offer their opinion but we have too much opinion, we now need evidence and this means delivering multiple, high quality randomised controlled trials, preferably in a primary care setting. I believe that we have demonstrated that the profession in the UK is in equipoise on how best to manage the care of young children with caries and that trials are not only ethical, but imperative.

Professor Martin Tickle
Research Director Oral Health Unit, National Primary Care R&D Centre
Manchester University

References

Curzon MEJ and Pollard MA. (1997) Do we still care about children's teeth? *British Dental Journal*, 182, 242-244.

Dental Practice Board http://www.dpb.nhs.uk/gds/index.shtml

Fayle SA, Welbury RR, Roberts JF. (2001) British Society of Paediatric Dentistry: a policy document on management of caries in the primary dentition. *International Journal of Paediatric Dentistry,* **11**, 153-157.

Lindsay S J, Humphris G, Barnby G J. (1987) Expectations and preferences for routine dentistry in anxious adult patients. *British Dental Journal,* **163**, 120-124.

Joshipura K, Ritchie C, Douglass C. (2000) Strength of evidence linking oral conditions and systemic disease. *Compendium of Continuing Education in Dentistry* Suppl, **30**, 12-23.

Levine RS, Pitts NB, Nugent ZJ. (2002) The fate of 1,587 unrestored carious deciduous teeth: a retrospective general dental practice based study from northern England. *British Dental Journal*. **193**, 99-103.

Marinho VC, Higgins JP, Logan S, Sheiham A. (2002a) Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database* Systematic Review (3), CD002279.

Marinho VC, Higgins JP, Logan S, Sheiham A. (2002b) Fluoride gels for preventing dental caries in children and adolescents. *Cochrane Database* Systematic Review (2), CD002280.

Marinho VC, Higgins JP, Sheiham A, Logan S. (2003) Fluoride toothpastes for preventing dental caries in children and adolescents. *Cochrane Database* Systematic Review. (1), CD002278.

McDonagh MS, Whiting PF, Wilson PM, Sutton AJ, Chestnutt I, Cooper J, Misso K, Bradley M, Treasure E, Kleijnen J. (2000) Systematic review of water fluoridation. *British Medical Journal*, **321**, 855-9.

Milsom KM, Tickle M, King DK. (2003 a) Does the dental profession know how to care for the primary dentition? *British Dental Journal*, **195**, 301-303

Milsom K, Tickle M, Humphris GM, Blinkhorn AS. (2003 b) The relationship between anxiety and dental treatment experience in 5-year-old children *British Dental Journal* **194**, 503–6.

Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. (2005) The global burden of oral diseases and risks to oral health. *Bulletin World Health Organisation* **83**, 661-9.

Pitts NB, Boyles J, Nugent ZJ, Thomas N, Pine CM. (2005) The dental caries experience of 5-year-old children in England and Wales (2003/4) and in Scotland (2002/3). Surveys co-ordinated by the British Association for the Study of Community Dentistry in 2001/2002. *Community Dental Health*, **22**, 46-56.

Rachman S. (1990) *Fear and courage*. 2nd ed. New York: Freeman.

Reddy DK, Hegde AM, Munshi AK J (2003) Dental caries status of children with bronchial asthma. *Clinical Pediatric Dentistry* **27**, 293-295.

Scottish Intercollegiate Guidelines Network (2005) Guideline 83 Prevention and management of dental decay in the pre-school child: a national clinical guideline Scottish Intercollegiate Guidelines Network, Edinburgh 2005. www.sign.ac.uk

Threlfall AG, Pilkington L, Milsom K, Blinkhorn AS, Tickle M. General Dental Practitioners' views on the use of stainless steel crowns to restore primary molars. (2005) *British Dental Journal*.**199**, 453-5

Threlfall AG, Milsom KM, Blinkhorn AS, Tickle M. General Dental Practitioner's views on dental general anaesthetic services. *in press Community Dental Health.*

Tickle M, Williams MJ, Jenner AM, Blinkhorn AS. (1999) The effects of dental attendance and socio-economic status on dental caries experience and treatment patterns in 5-year-old children *British Dental Journal*, **186**, 135-137.

Tickle M, Moulding G, Milsom KM Blinkhorn AS. (2000) Dental caries, contact with dental services and deprivation in young children: their relationship at a small area level. *British Dental Journal,* **189**, 376-9.

Tickle M, Milsom K, King D, Kearney-Mitchell P, Blinkhorn A. (2002) The fate of the carious primary teeth of children who regularly attend the general dental service. *British Dental Journal* **192**, 219-23.

Willershausen B, Haas G, Krummenauer F, Hohenfellner K. (2004) Relationship between high weight and caries frequency in German elementary school children. *European Journal of Medical Research*, **9**, 400-4.

Editor's Note: An alternative point of view on the above topics will be presented in a future issue of the Journal.