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Parental perspectives on preterm children's oral health behaviour and experience of dental care during preschool and early school years

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Background. Children born preterm (PT) have medical conditions and impairments that may affect their oral health.

Hypothesis. Our hypothesis for the study was that PT children display more dental behaviour management problems (BMPs) and less favourable oral health behaviour than controls (C).

Methods. Parents of 153 PT children and 153 C children were interviewed regarding the children's oral health behaviour and experience of dental care on two occasions, 2 years apart. The interviews concerned the preschool period and the early school years, respectively.

Results. BMPs were more common in PT children of preschool age, but not during the early school years. Regarding oral health behaviour, there were no differences between the groups, except that PT children had more problems with toothbrushing than C children in the preschool period, in spite of the fact that the PT group reported more medical health problems and more anxious behaviour and indications of cognitive problems than the C group.

Conclusions. Children born PT exhibit several risk factors for both BMP and impaired oral health. It is essential that this group of patients is identified early and receives special attention from the dental services.

Introduction

A *preterm* (PT) *infant* is defined as an infant born before gestational week 37 or with birth weight less than 2500 g[1]. In Sweden, 5.6% of infants are born before 37 weeks gestation, and 4.8% have a birth weight less than 2500 g[2]; 0.8% of the infants are born between 29 weeks and 32 weeks of gestation [*very preterm* (VPT)][1], and 0.4% between 23 weeks and 28 weeks of gestation [*extremely preterm* (EPT)][1,2].

Advances in medical care in recent decades have resulted in increasing numbers of PT survivals, and today the survival rate of Swedish PT infants born at 23–36 weeks gestation varies between 80% and 98%[2]. The improved survival rates have, however, been accompanied by an increased incidence of neurodevelopmental impairments[3,4]. The risk of impairments increases with decreasing gestational age and birth weight[5], leading to disabilities in multiple developmental domains[3].

Several follow-up studies focus on the cognitive outcome of prematurity, including early school problems, and it has been shown that cognitive impairment and general behavioural problems at early ages are more common than neuromotor, neurosensory, hearing, or vision problems in children born before 26 weeks of gestation[6]. In a review, Johnson[7] reported lower intelligence quotient (IQ) scores for VPT children than for full-term controls (C), which may affect later cognitive outcome in middle childhood. As an example, Stjernqvist and Svenningsen[8] found in a 10-year follow-up study of Swedish EPT children that almost half of the EPT children had poor school results. Further, EPT children were more anxious and shy, or troublesome and aggressive than full-term Cs. These findings were supported in a recent 10- to 12-year follow-up on EPT children also from Sweden[9]. Further, school-aged VPT children have been reported to continue

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to display cognitive, educational, and behavioural impairments[10,11].

The various effects of PT birth on developmental outcomes, cognitive profiles, IQ scores, and perceptual abilities may also have an impact on the child's behaviour and cooperation in the dental situation. Dental examinations and treatments are demanding experiences for all young children, and Swedish prevalence figures on dental behaviour management problems (BMPs) vary between 8% and 18% for preschool children[12,13]. Regarding PT children, a previous study reported 32% of a preschool population of PT children presenting with BMP, and that BMP at dental examination was more common in 3-year-olds than in 6-year-olds[14]. The findings supported the idea of PT children's cooperation during dental treatment possibly being affected by their cognitive and perceptual abilities. The study was, however, limited to the preschool period and was based on dental records, thus only giving the dentists' assessments of the children's behaviour. Therefore, the aims of this study were to investigate PT children and compare with full-term matched Cs regarding BMP, oral health behaviours and experiences from dental care at preschool age, and school age using the parents as informants.

The hypotheses for this study were: (i) that PT children display more dental BMPs and have less favourable oral health behaviour than full-term children as reported by parents; and (ii) that PT children show more cognitive and behavioural problems in selected number of everyday situations.

Materials and methods

Subjects

All children born between 23 and 32 weeks of gestation from 1994 to 1996 in the catchment area of the university hospitals of Lund and Malmö in southern Sweden were invited to participate. For each child born PT, a matched C was identified based on age, sex, ethnicity, dental clinic, and dentist. The study populations have previously been described in detail by Brogårdh-Roth *et al.*[14].

In total, 187 children born PT, of whom 144 VPT and 43 EPT, and 187 matched Cs who had participated in the preceding study[14] were eligible for the present survey. The study was approved by the Regional Ethical Review Board of Lund University. Verbal and written information about the study, including information on full confidentiality and the right to discontinue participation at any time, was given to the parents, and a written informed consent form was obtained.

Parents of 26 PT children declined participation in this study for reasons unknown, and seven PT children were excluded owing to learning disability (*Am.* mental retardation). Thus, 154 PT children entered the study and were followed. For each of these, a C patient was included.

Procedures

Telephone interviews were conducted with the parents by one of the authors (S.B.R.) on two occasions. At the first interview (INT1), the children were 8–10 years old and the interviews concerned the preschool period (i.e. when the children were 3–6 years old. The second, follow-up interview (INT2) was conducted 2 years later when the children were 10–12 years old, and concerned the period from 7 to 10 years (i.e. the early school years).

At INT1, the parents of one child (PT) and at INT2, the parents of four PT children could not be reached. Thus, 153 out of 187 PT children (82%) participated in INT1, and 150 (80%) in INT2. Of the children at INT1, 116 children met the World Health Organization criteria for VPT, and 37 for EPT, and 114 VPT and 36 EPT children participated in INT2. The parents of all C children were contacted at both INT1 and INT2, and 153 C children were reached and included at both INT1 and INT2. This corresponded to 152 matched pairs at INT1 and 149 at INT2. The participating PT and C children were regular patients at 53 public and 11 private dental clinics.

The same structured interview protocol was used at both INT1 and INT2 (Table 1). The questions were modified from Holst[15]. Regarding chronic illness, the following definition according to Westbom and Kornfält[16] was used: (i) a disorder which was disabling and obviously chronic or incurable; (ii) a disorder

Table 1. Items covered in interview 1 (INT1) and follow-up interview (INT2), respectively.

Items	INT1	INT2
Medical health		
General health problems	×	×
Chronic illness	×	×
Hospitalization	×	×
Dental behaviour management problems (BMPs)		
BMP	×	×
Perceived lack of time		
by the dental team	×	×
Oral health behaviours		
Sweets = 2 times per week	×	×
Soft drinks = 2 times per week	×	×
Problems with toothbrushing	×	×
Parental assistance		
with toothbrushing	×	×
Extra fluoride supplements	×	×
Behaviour in stressful situations and temperamental factors		
Anxious or shy in		
unfamiliar situations	×	
Anxious and shy when		
meeting strangers	×	
Afraid of the dark	×	
Frequently having		
nightmares	×	
School situation		
Problems at school		×
Extra resource of support teacher		×
Peer relationship problems		×
Low self-confidence		×
Socio-demographic characteristics		
Immigrant background		×
Living area		×
Family status		×
Maternal education level		×

of at least 3 months during a 1-year period and interfering with daily life functioning and/or needing treatment or special aids during at least 3 months; or (iii) a disorder requiring hospitalization for at least 1 month or at least three periods during a 1-year period. General health problems were defined as the child having medical problems but of lesser severity or duration (e.g. allergies or minor respiratory disorders). The criterion of longer period of hospitalization was defined as staying in hospital for at least 1 month or three times during a 1-year period, whereas the criterion of a shorter period of hospitalization was hospital treatment for less than 1 month.

Statistical methods

McNemar's test for paired observations was used for comparisons between PT and C children at INT1 and INT2 (matched pairs). The chi-squared test was used for comparisons between genders (within PT and C groups, respectively), between VPT and EPT, as well as between twins/triplets and singletons within the PT group. Further, chi-squared test was used, and to investigate the relationships between BMP and various variables within the PT and C groups. The chi-squared test was also used to analyse differences regarding BMP between participants and non-participants, whereas Student's *t*-test was used to analyse differences in caries prevalence (dft) between these groups. Differences at the 5% level of probability were considered statistically significant. The Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL, USA), version 13.0, was used for all analyses.

Results

Birth data and sex distribution of all participating PT and full-term C children are given in Table 2. Non-participants and drop-outs data (regarding BMP and dental caries) were evaluated for the PT and C groups by the use of previously compiled dental records[14]. The comparisons between participants and non-participants did not reveal any differences in these respects. No statistically significant differences were revealed between the PT and C groups regarding socio-demographic characteristics.

Medical health

General health problems were reported more common in PT children (38%) than in C children (17%) at INT1, as well as at INT2 (35% and 17%, respectively), ($P < 0.001$ at both occasions). Within the PT group, parents did not report any differences in general health problems between VPT and EPT children at either INT1 or INT2; 67% of the PT children and 54% of the C children reported general health problems at both interviews. Twins/triplets revealed more general health problems than singletons at INT2 (41% vs. 22%; $P = 0.028$), whereas no differences were reported at INT1.

Also, chronic illness was more common in PT children (14%) than in C children (4%) at

Table 2. Characteristics of all participating children (preterm and full-term controls).

	Preterm INT1 *n* = 153	Full-term controls INT1 *n* = 153	Preterm INT2 *n* = 150	Full-term controls INT2 *n* = 153
Age of the child	3–6	3–6	7–10	7–10
Sex				
Boys	82 (54%)	81 (53%)	79 (53%)	81 (53%)
Girls	71 (46%)	72 (47%)	71 (47%)	72 (47%)
Twins or triplets	45 (29%)	1 (0.65%)	45 (30%)	2 (1.3%)
Mean gestational age in weeks (range)	30 (24–32)	≥ 37	30 (24–32)	≥ 37
Mean birth weight (g)	1424	3574	1428	3574
(Range)	(604–2430)	(2590–4590)	(604–2430)	(2590–4590)

First interview (INT1) concerning age 3–6 years, and follow-up interview (INT2) concerning age 7–10 years.

INT1 ($P = 0.040$). The difference was similar at INT2 (11% vs. 3%; $P = 0.008$). Within the PT group, chronic illness was reported for a higher proportion of EPT children than VPT children at INT1 (24% vs. 11%; $P = 0.048$) but not at INT2; 59% of the PT children and 29% of the C children reported chronic illness at both interviews.

There were no differences between the groups concerning longer periods of hospitalization, whereas shorter periods of hospitalization were more common in the PT group than in the C group at INT2 (13% vs. 5%; $P = 0.029$).

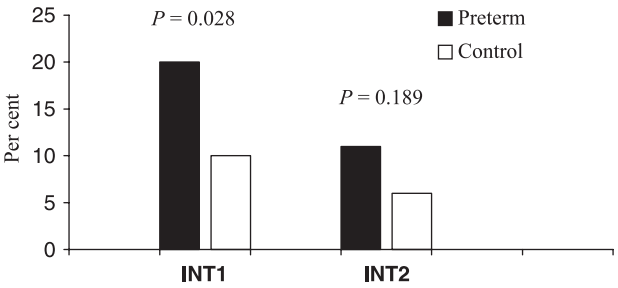

Fig. 1. Children's behaviour at dental visits as reported by parents for preterm (PT) and full-term (C) children at interview 1 (INT1) and follow-up interview (INT2). *N* = 152 matched pairs at INT1; *N* = 149 matched pairs at INT2. McNemar's test.

Dental BMPs

Thirty (20%) of the parents of the PT children reported BMP during the preschool years (INT1), as compared with 15 (10%) for the C children ($P = 0.028$) (Fig. 1). The frequencies decreased during the early school years, and there was no statistically significant difference at INT2. From the PT group, girls reported more BMP than boys at INT2 (17% vs. 5%; $P = 0.032$), but not at INT1. No differences were seen between genders within the C group at either INT1 or INT2. Within the PT group, there were no statistically significant differences between EPT and VPT children at either INT1 or INT2; 35% of the parents of PT children who reported BMP at INT1 also reported it at INT2. The corresponding figure for C children was 33%. No relationships were found in either PT or C group between reported BMP, on the one hand, and any of the medical health variables, variables related to behaviour in stressful situations, temperamental factors, or variables related to the school situation, on the other.

Oral health behaviours

Oral health behaviours for PT children and full-term Cs are presented in Table 3. At INT1, more parents of PT children (21%) reported problems with toothbrushing than parents of C children (11%) ($P = 0.036$). No such difference was noted at INT2. Regarding the other investigated oral health behaviour factors, there were no statistically significant differences between PT and C children. Within the PT group, there were no differences between EPT and VPT children for any of the oral health behaviours. At INT1, the parents

Table 3. Oral health behaviours as reported by parents for preterm (PT) and full-term (C) children at interview 1 (INT1) and follow-up interview INT2; McNemar's test.

	INT1			INT2		
	PT *N* = 152	C *N* = 152	Significance	PT *N* = 149	C *N* = 149	Significance
Candy ≥ 2 times per week	84 (55%)	90 (59%)	*P* = 0.539	70 (47%)	82 (55/%)	*P* = 0.188
Soft drinks ≥ 2 times per week	69 (45%)	73 (48%)	*P* = 0.716	62 (42%)	71 (48%)	*P* = 0.362
Daily toothbrushing	147 (97%)	150 (99%)	*P* = 0.453	143 (96%)	139 (93%)	*P* = 0.454
Problems with toothbrushing	32 (21%)	17 (11%)	*P* = 0.036	40 (27%)	32 (21%)	*P* = 0.358
Parental assistance with toothbrushing	65 (43%)	53 (35%)	*P* = 0.169	90 (60%)	84 (56%)	*P* = 0.539
Extra fluoride supplements	20 (13%)	22 (14%)	*P* = 0.864	69 (46%)	66 (44%)	*P* = 0.804

reported helping children with chronic illness with toothbrushing more often than children without chronic illness. This relationship was found in both PT and C children (64% vs. 39%; $P = 0.037$; 71% vs. 33%; $P = 0.049$ for PT and C groups, respectively). At INT2, no such relationship could be revealed.

Behaviour in stressful situations and temperamental factors (3–6 years)

At INT1, 80 (53%) of the PT children were reported as being anxious or shy in unfamiliar situations compared with 60 (39%) of the C children ($P = 0.031$). Regarding other temperamental factors, such as anxious or shy when meeting strangers or being afraid of the dark, or having frequent nightmares, there were no statistically significant differences between the groups. Neither were there any differences between the groups regarding cooperation problems at medical visits. Within the PT group, there were no differences between EPT and VPT children regarding either of these factors.

School situation (7–10 years)

Information about the school situation was obtained at INT2. Problems at school were reported more frequently by parents of PT children than parents of C children (40% vs. 15%; $P < 0.001$). Thirty-nine per cent of the PT children needed extra assistance or support teachers at school compared with 15% of the C children ($P < 0.001$). Problems at school were more common in EPT children than in VPT children (67% vs. 32%; $P < 0.001$), as was the need for extra resource or support teachers (67% vs. 31%; $P < 0.001$). Within the PT group, more children with chronic illness were reported to have problems in school compared with children without chronic illness; however, this difference was not statistically significant. No difference was found in the group of C children. Further, no differences between PT and C children were found regarding school problems, problems with peer relationship, or reports of low self-confidence.

Discussion

This study showed that parental reports of dental BMP were more common in PT children than in C children during the preschool period. This difference decreased with increasing age, and by the early school years there were no significant differences between the groups. The study also showed that general health problems, chronic illness, and problems related to the school situation were more common in PT children than in C children. In the PT group, there was no relationship between dental BMP, on the one hand, and general health problems and school problems on the other.

As far as we know, our previous study based on information from dental records was the first study of PT children and behavioural problems in the dental situation[14]. The findings from INT1 in this study, that there was more BMP in PT children, confirmed the results from that study. Although information from

the dental records indicated BMP in 32% of the PT children during the preschool period[14], 20% of the parents of the children reported BMP in the interview covering the same period (INT1). This frequency then decreased at the second interviews, concerning the early school years (INT2). The decrease in dental BMP with increasing age is in accordance with previous studies[17]. The reasons could be several for the discrepancy between BMP during the preschool period as reported by parents and as found in the dental records. It is well known that the correlation between different measures of dental BMP is far from ideal[17], and in this case BMP was defined somewhat differently in the two studies and collected from different sources.

The present population-based study included all children born PT in a defined catchment area during a period of 3 years. Repeated information was gathered from more than 80% of the children (both PT and C groups), which is a high figure of participation in this kind of study, and probably reflects a high general interest among parents concerning oral health in their children. The number of EPT children was low, which made statistical comparisons between EPT and VPT children in the PT group difficult. Still, the frequency of EPT children corresponds well with official statistics from Sweden, as relatively few children are born at 28 weeks of gestation or earlier[2], and to obtain a relevant number of EPT children a larger sample of PT children had been needed. A strength of the study was that both interviews were conducted by the same author (S.B.R.), and followed a defined protocol. A possible methodological limitation, however, was that the interviews were retrospective and the outcome data reflected a period a few years back. Still, the questions were asked very precisely and the parents were thoroughly and repeatedly informed that the questions concerned a specific past period of time.

The results from INT1 also demonstrate that PT children had more cognitive and behavioural problems in certain everyday situations during the preschool years as compared with C children. PT children were reported as being more anxious and shy in unfamiliar situations and also when meeting strangers. This is in accord with previous studies[8,9,18]. In this study, there were no statistically significant differences between EPT and VPT children. This lack of statistical difference, however, might reflect a small number of EPT children. Several studies have shown a more general relationship between temperamental factors like shyness and negative emotionality, and dental anxiety[17,19,20], and as this temperamental trait is common in PT children, it is reasonable to suspect that PT children run an increased risk of developing dental anxiety. This, and the fact that PT children display more dental BMP, should be taken into account when planning for dental care for children born PT. Allowing sufficient time for the child to become acquainted with both the dental personnel and the dental care situation is essential. Apparently, more parents of PT children than of C children found that this was not provided during the preschool period. One reason for this could be that many of the PT children had to undergo different medical investigations and treatments, and that their parents were more observant regarding their children's needs in similar situations.

The findings of more general health problems and chronic illness in PT children are also in accordance with other studies [9,21]. Chronic health conditions are well-known risk factors for caries and periodontal disease[22–24]. In this perspective, it was gratifying to find that PT children with chronic health conditions tended to receive more help with toothbrushing than healthy PT children during the preschool period.

According to the parents, almost all children brushed their teeth or had their teeth brushed daily with help from parents, which is in agreement with a reported frequency of 98% from another study of 5-year-old Swedish children[25]. A corresponding frequency of 79% has been reported in Swedish 9-year-olds[26]. The frequency in this study was higher, but it was based on daily toothbrushing, at least once a day, whereas the study by Lillehagen *et al.*[26] reported on toothbrushing at least twice a day.

Problems with toothbrushing were more commonly reported in PT children than in Cs.

Parents described how their children sometimes refused or were uncooperative, but they still usually brushed the teeth, although at fork sometimes. These problems with toothbrushing might be linked to a hypersensitivity in the orofacial region related to feeding problems[27], which previously has been reported in PT children[28]. It is well known that during the neonatal period, premature infants may require naso-gastric tube feeding because of medical complications. Oral stimulation may then be reduced for a prolonged period, with consequences for the developmental outcome concerning oral sensory and motor function[27]. In this study, problems with toothbrushing decreased with age in both PT and C children, probably reflecting increased maturity and normal psychological development.

PT children did not eat more sweets or consume more soft drinks than C children, a positive finding from a dental health point of view, especially as the PT children had more medical problems than the C children. It is well known that children with medical conditions may have less favourable dietary habits, owing to problems like infections, an increased need of intake of energy-rich products, eating disorders, or dysphagia[22,23]. The intake of sugar-containing products was lower in this study than previously reported from Sweden[25,26]. One reason for this discrepancy might be classification, in this case of intake of sweets, as this study unlike the others[25,26] did not include sweet buns or soft drinks in the definition of sweets.

It can be concluded that PT children more often than C children present cognitive and behavioural problems that affect their everyday lives, including the dental care situation and oral health-related habits. These factors may contribute to an increased risk of both dental BMP and impaired oral health. The results indicate that children born PT need special attention from the dental services from an early age. To date, our studies have covered data based on viewpoints from dental care professionals and from parents. The most important informant is, however, the child herself/himself. This is an important perspective for future studies.

What this paper adds

- This paper adds new information on how dental BMPs, oral health behaviours, and medical health change during preschool and early school years in PT children.
- PT children present cognitive and behavioural problems that affect their everyday lives, including the dental care situation and oral health-related habits more often than others.
- PT children display more dental BMPs and have less favourable oral health behaviour than full-term children during preschool years.

Why this paper is important to paediatric dentists

- Children born PT exhibit several risk factors for both dental BMPs and impaired oral health, and need early identification and special attention from the dental service especially during the preschool years.

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References

1 World Health Organization (WHO). *International Classification of Diseases and Related Health Problems, 10th Revision*. Geneva, Switzerland: WHO, 2004.
2 National Board of Health and Welfare. *Swedish Medical Birth Registry*. Stockholm: Sweden, 2003.
3 van Baar AL, van Wassenaer AG, Briët JM, Dekker FW, Kok JH. Very preterm birth is associated with disabilities in multiple developmental domains. *J Pediatr Psychol* 2005; **30**: 247–255.
4 Wilson-Costello D, Friedman H, Minich N, Fanaroff AA, Hack M. Improved survival rates with increased neurodevelopmental disability for extremely low birth weight infants in the 1990s. *Pediatrics* 2005; **115**: 997–1003.
5 Hack M, Fanaroff AA. Outcomes of children of extremely low birthweight and gestational age in the 1990s. *Semin Neonatol* 2000; **5**: 89–106.
6 Marlow N, Wolke D, Bracewell MA, Samara M, EPICure Study Group. Neurologic and developmental disability at six years of age after extremely preterm birth. *N Engl J Med* 2005; **352**: 9–19.
7 Johnson S. Cognitive and behavioural outcomes following very preterm birth. *Semin Fetal Neonatal Med* 2007; **12**: 363–373.
8 Stjernqvist K, Svenningsen NW. Ten-year follow-up of children born before 29 gestational weeks: health, cognitive development, behaviour and school achievement. *Acta Paediatr* 1999; **88**: 557–562.

9 Farooqi A. *School-age outcomes of children born at the limit of viability: a Swedish national prospective follow-up study at 10 to 12 years*. Thesis. Umeå, Sweden: Umeå University, 2007.
10 Anderson P, Doyle LW, Victorian Infant Collaborative Study Group. Neurobehavioral outcomes of school-age children born extremely low birth weight or very preterm in the 1990s. *J Am Med Assoc* 2003; **289**: 3264–3272.
11 Marlow N. Neurocognitive outcome after very preterm birth. *Arch Dis Child Fetal Neonatal Ed* 2004; **89**: F224–F228.
12 Holst A, Crossner CG. Direct ratings of acceptance of dental treatment in Swedish children. *Community Dent Oral Epidemiol* 1987; **15**: 258–263.
13 Klingberg G, Vannas Löfqvist L, Bjarnason S, Norén JG. Dental behavior management problems in Swedish children. *Community Dent Oral Epidemiol* 1994; **22**: 201–205.
14 Brogårdh-Roth S, Stjernqvist K, Matsson L. Dental behavioural management problems and dental caries prevalence in 3- to 6-year-old Swedish children born preterm. *Int J Paediatr Dent* 2008; **18**: 341–347.
15 Holst A. *Behaviour management problems in child dentistry. Frequency, therapy and prediction*. Thesis. Malmö, Sweden: Faculty of Dentistry, University of Lund 1998, *Swed Dent J Suppl* 1998; **54**: 1–55.
16 Westbom L, Kornfält R. Chronic illness among children in a total population. An epidemiological study in a Swedish primary health care district. *Scand J Soc Med* 1987; **15**: 87–97.
17 Klingberg G, Broberg A. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. *Int J Paediatr Dent* 2007; **17**: 391–406.
18 Chapieski ML, Evankovich KD. Behavioral effects on prematurity. *Semin Perinatol* 1997; **21**: 221–239.
19 Klingberg G, Broberg AG. Temperament and child dental fear. *Pediatr Dent* 1998; **20**: 237–243.
20 Arnrup K, Broberg AG, Berggren U, Bodin L. Lack of cooperation in pediatric dentistry – the role of child personality characteristics. *Pediatr Dent* 2002; **24**: 119–128.
21 Hack M, Taylor HG, Drotar D, Schluchter M, Cartar L, Andreias L, Wilson-Costello D, Klein N. Chronic conditions, functional limitations, and special health care needs of school-aged children born with extremely low-birth-weight in the 1990s. *JAMA* 2005; **294**: 318–325.
22 Foster H, Fitzgerald J. Dental disease in children with chronic illness. *Arch Dis Child* 2005; **90**: 703–708.
23 Moynihan PJ, Lingström P. Oral consequences of compromised nutritional well-being. In: Touger-Decker R, Sirois DA, Mobley CC (eds). *Nutrition and Oral Medicine*. Totowa, NJ: Humana Press, 2005: 107–128.
24 Kamer AR, Sirois DA, Huhmann M. Bidirectional impact of oral health and general health. In: Touger-Decker R, Sirois DA, Mobley CC (eds). *Nutrition and Oral Medicine*. Totowa, NJ: Humana Press, 2005: 63–86.
25 Anderson M, Stecksén-Blicks C, Stenlund H, Ranggård L, Tsilingaridis G, Mejàre I. Detection of approximal caries in 5-year-old Swedish children. *Caries Res* 2005; **39**: 92–99.
26 Lillehagen M, Grindefjord M, Mejàre I. Detection of approximal caries by clinical and radiographic examination in 9-year-old Swedish children. *Caries Research* 2007; **41**: 177–185.
27 Mason SJ, Harris G, Blissett J. Tube feeding in infancy: implications for the development of normal eating and drinking skills. *Dysphagia* 2005; **20**: 46–61.
28 Rommel N, De Meyer AM, Feenstra L, Veereman-Wauters G. The complexity of feeding problems in 700 infants and young children presenting to a tertiary care institution. *J Pediatr Gastroenterol Nutr* 2003; **37**: 75–84.