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The relationship between parenting, family interaction and childhood dental caries: A case-control study

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ABSTRACT

The aim of this case-control study was to explore the relationship between parenting practices, parent–child interaction and childhood dental caries, using a sample of 5–8-year old children from the Netherlands. Cases were defined as children with four or more decayed, missing or filled teeth and controls were caries free. Cases ($n = 28$) and controls ($n = 26$) were recruited from a referral centre for paediatric dental care and a general dental practice, respectively. Parenting practices and parent–child interactions of the child's primary caregiver were observed using Structured Interaction Tasks and subsequently rated on seven dimensions: positive involvement, encouragement, problem-solving, discipline, monitoring, coercion and interpersonal atmosphere. All Structured Interaction Tasks were videotaped, and coded by trained and calibrated observers blind to the dental condition. Differences in parenting dimensions between cases and controls were analysed using multivariate analysis of variance, independent samples *T*-tests, χ^2-tests and multiple logistic regression analyses. Controls had significantly higher scores on the dimensions positive involvement, encouragement, problem-solving and interpersonal atmosphere, compared to cases. Parents of controls were also less likely to show coercive behaviours. These associations remained statistically significant after adjustment for the mother's education level, tooth brushing frequency and the frequency of consuming sugary foods and drinks, except for coercion. There was no significant difference in discipline between cases and controls. In conclusion, this case-control study found a significant relationship between parenting practices, parent–child interaction quality and childhood dental caries. Our findings suggest that parenting practices may be an important factor to consider in caries preventive programs.

1. Introduction

Early childhood is a critical phase in which important foundations for lifelong health are laid (Blane, 1999). It is empirically established that the conditions in which children grow up leave an indelible imprint on the health of an individual throughout the lifespan (Kuh et al., 1997; Waldfogel, 2004). For example, relatively stable patterns of health-related behaviours are acquired at home during early life (e.g., fruit and vegetable intake, sugar-snacking, physical activity and oral hygiene), and these patterns are difficult to change in adulthood (Kelder et al., 1994). Parents play a pivotal role in the initiation and maintenance of these health-related behaviours. They shape their children's behaviours, attitudes and social norms through modelling, the use of specific parenting practices and more broadly through interpersonal interactions within the family (Rhee, 2008).

Parenting practices are the ways by which parents, intentionally and unintentionally, influence their child's development. Effective parenting practices include the parent's ability to encourage self-control and responsible behaviour in their child through parental direction, monitoring, and disciplinary efforts in the context of

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warm and affectionate family interactions (Darling and Steinberg, 1993; Sanders et al., 2000). A large body of evidence has demonstrated that effective parenting and supportive family interactions are associated with positive childhood outcomes, such as higher academic achievement, better psychosocial and emotional development, less disruptive child behaviours, fewer depressive symptoms and higher self-esteem (Dornbusch et al., 1987; Lamborn et al., 1991; Maccoby and Martin, 1983; Radziszewska et al., 1996; Steinberg et al., 1992). In terms of physical health, ineffective parenting (in particular parenting characterised by high levels of demand along with low levels of warmth and positive involvement) is related to higher rates of childhood obesity and an unhealthy diet, including lower fruit and vegetable consumption, higher caloric intake and lower frequency of eating breakfast (Arredondo et al., 2006; Kremers et al., 2003; Patrick et al., 2005; Rhee, 2008; Wake et al., 2007).

There is reason to believe that parenting practices and family interactions may also affect another common child health problem: dental caries. The role of parents is vital in establishing specific behaviours related to childhood dental caries, including children's oral hygiene and frequency of sugar consumption (Hooley et al., 2012). However, studies that have investigated the influence of parenting practices and, more broadly, family relationships on children's dental health are scarce. One study by Duijster et al. (2013) found that children with good family functioning and family relationships in terms of organisation, communication, responsiveness and social networks, had lower levels of dental decay and better oral hygiene compared to children with poor family relationships. Interestingly, in terms of parenting in particular, the studies that have been conducted in this area were unable to demonstrate an association between specific parenting styles and children's caries experience and adolescents' oral hygiene behaviours (Aleksejūnienė and Brukienė, 2012; Seow et al., 2009).

In the latter studies, self-report questionnaires were used to measure parenting practices, which may have resulted in the absence of the expected association between parenting and child dental health. Although these questionnaires were validated and psychometrically sound, there are some limitations to self-report methods (Hampson et al., 1989; Tutty, 1995). For example, parents' self-report could be biased by their own beliefs and perspectives, and therefore may not reflect actual behaviours. Moreover, there is a tendency of parents to answer questions in a socially desirable manner by over-reporting 'good' behaviours and under-reporting 'bad' behaviours (Thijssen and de Ruiter, 2014). Furthermore, most parenting questionnaires have been developed in a clinical context, designed to discriminate between problem and non-problem families. Yet, the majority of children with dental caries probably come from normative families whose children do not necessarily have significant clinical or behavioural problems (Duijster et al., 2013). Questions remain whether self-report methods are sensitive enough to distinguish between different parenting practices relevant to caries development within the normative range.

An alternative method of assessing parenting practices and family interaction that overcomes these limitations is parent–child observation. This method involves asking family members to perform a number of standardised tasks in which parenting and family interaction are subsequently rated by a trained observer, external to the family. Some researchers claim this method generates more objective and thus more valid data (Kerig and Lindahl, 2001). Therefore, the aim of this study was to explore the relationship between parenting practices, parent–child interaction and childhood dental caries, using observations in a case-control study design.

2. Materials and methods

Approval for this study was obtained from The Central Committee on Research Involving Human Subjects, The Netherlands (CCMO). Prior to the commencement of the study, written informed consent was sought from the parent of the child that was selected for the study.

2.1. Study sample

This case-control study was conducted in The Netherlands from February to August 2013. Cases were defined as children with four or more decayed, missing or filled deciduous and/or permanent teeth (dmft/DMFT $\geq$4). This value was chosen as it represents both the mean dmft and the median dmft of five-year-old children in the Netherlands with dental caries (Poorterman and Schuller, 2006). For each case, an age-matched ($\pm$4 months) and sex-matched control was recruited. Controls were children who were caries free in both their deciduous and permanent dentition (dmft/DMFT = 0). Both cases and controls were between 5 and 8 years old at the time of selection and they were of Dutch origin. Children were considered of Dutch origin when both their parents were born in The Netherlands. Children diagnosed with emotional and behavioural disorders (e.g., autism spectrum disorders and conduct problems), children with special needs and children with missing teeth due to dental trauma or teeth with enamel defects, were excluded from study selection. Only one child per family was included. Cases and controls were recruited from a referral centre for paediatric dental care and a general dental practice, respectively. First, an information letter about the study was sent to the home address of all selected children. Subsequently, parents of the children were invited to participate by telephone.

In order to detect a difference in parenting practices and parent–child interaction between cases and controls (if present), a power calculation indicated that a minimal sample of 42 children would be necessary. This calculation was based on the following parameters: 90% power, 5% level of significance and a standard deviation of 4.1 dmft based on caries levels in five-year-old children in the 2006 Dutch National Oral Health Survey (Poorterman and Schuller, 2006).

2.2. Data collection

2.2.1. Dental health status

Children's dmft/DMFT-scores were extracted from personal dental health records from the referral centre for paediatric dental care and the general dental practice. The diagnosis of dental caries was based on clinical examinations, supported by dental X-rays. Both practices employed two dental practitioners. Data were registered in a standardised way to ensure that the records were up-to-date and complete. The dmft/DMFT-score was computed by adding the number of decayed, missing and filled teeth. Missing teeth were only scored if records indicated that they were extracted due to caries. Missing teeth due to dental trauma, hypomineralization, agenesis or routine exfoliation were not included in the dmft-scores. Enamel caries lesions were also not included. Data from the latest dental visit were used to compute dmft/DMFT-scores. For all children, the latest dental visit had been no more than six months before the time of data collection for the purposes of this study.

2.2.2. Parenting practices and parent–child interaction

Parenting practices and parent–child interaction were observed using Structured Interaction Tasks (SIT) (DeGarmo and Forgatch, 2007; Forgatch and DeGarmo, 1999; Ogden and Hagen, 2008). This observational method derives strength from its basis in the