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An investigation of the relationship between untreated decayed teeth and dental sepsis

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Abstract

A tooth abscess is a pocket of pus that's caused by a bacterial infection. The abscess can occur at different regions of the tooth for different reasons. A periapical (per-e-AP-ih-kul) abscess occurs at the tip of the root, whereas a periodontal (per-e-o-DON-tul) abscess occurs in the gums at the side of a tooth root this report is made in order to investigate the prevalence of dental sepsis in Scotland and the relationship between sepsis, treated and untreated decayed teeth, oral cleanliness (visible plaque on anterior teeth) and socio-economic deprivation. Six thousand, nine hundred and ninety-four children of mean age 5.3 years were examined as part of a survey conducted under the Scottish Health Board's Dental Epidemiological Programme. The presence of dental sepsis was recorded, in addition to caries status, and presence of plaque. Main results In the whole sample, 4.8% of children examined had dental sepsis, ranging from 2% in the most affluent areas to 11% in the most deprived. Children with sepsis had much higher caries experience than those without sepsis. However, when these factors and the presence of plaque were entered into a logistic regression model to predict presence or absence of dental sepsis, the most important factor was not deprivation, but untreated decay. The proportion of children with sepsis increases markedly with caries experience. This disadvantage can be mitigated if more of the caries experience is treated. These findings would not support a policy of non-intervention for deciduous caries if oral sepsis is to be minimized.

Introduction

Untreated dental caries in children can cause both pain and infection. The prevalence of dental pain experienced by children is surprisingly high — in a survey of 8-year-olds in Harrow, 48% had experienced toothache and for 18% their worst experience of toothache had made them cry.1 However, very little is known about the prevalence of dental sepsis. Dental sepsis in children can be defined as dental abscesses presenting as localised swellings or draining sinuses adjacent to carious or traumatised teeth. The consequences of such an infection, in addition to pain and discomfort, are two-fold: firstly a chronic abscess can result in damage to developing permanent teeth;2 secondly, acute abscesses related to deciduous teeth can lead to rare, although serious, sequelae such as orbital cellulitus,3,4 brain abscesses5 and 'unexplained' recurrent fever. In a population with a high prevalence of dental caries in children, it is likely that some dental sepsis exists. Although epidemiological surveys monitoring the prevalence of dental caries in 5-year-olds are regularly undertaken in the UK, none have reported the prevalence of dental sepsis in the population, nor investigated the relationship with treated and untreated teeth. Children in Scotland have been shown to have relatively high levels of disease when compared with other areas of the UK. Therefore, it was agreed to include an assessment recording the presence of dental sepsis in the survey undertaken as part of the Scottish Health Boards' Dental Epidemiological Programme (Analysis of these data allows an exploration of the association between the restoration of deciduous teeth and the presence of dental sepsis[1.2.3]

Aim of the study to discover the relationship between untreated decayed teeth and dental sepsis.

Method and material

During the school year 1999/2000, 6,994 children of mean age 5.3 years were examined for the annual survey conducted within the Scottish Health Boards' Dental Epidemiological Programme (SHBDEP). The children comprised representative samples within each Health Board in Scotland of children in P1 (the first year of primary school). Children were examined in school with a visual assessment of dental caries experience at the dentinal level of involvement by standardised examiners. The presence or absence of visible plaque on upper anterior teeth was recorded as a

measure of oral cleanliness. Furthermore, in this examination the presence of 'dental abscesses' was recorded for the first time The data were weighted by health board to give a representative sample for Scotland. The relationships between sepsis and its possible contributory factors were explored using stepwise logistic regression.[1.2.3.4]

Results

Six thousand, nine hundred and ninety-four children were examined in total. Thirty cases were excluded because of missing data on dental sepsis, leaving 6,964 cases included in the analysis for this paper. The prevalence of dental sepsis in Scottish 5-year-olds was found to be 4.8% (337). More children living in areas with the highest level of socio-economic deprivation were found to have dental sepsis (11% of those in DEPCAT 7, the highest deprivation category) compared to those from more affluent areas (2% of those examined in DEPCAT 1, the most affluent grouping, had dental sepsis)[5.6]

Children with dental sepsis had a mean dmft of 6.30 (SD = 3.63) whereas those with no dental sepsis had a mean dmft of 2.36 (SD = 3.25). The biggest difference is in untreated decay (dt), with those with sepsis having three times as much as their counterparts without sepsis. Those children with sepsis also have higher numbers of filled teeth, but when considered as a percentage of total caries experience, filled teeth contribute 6% of the caries experience of those with sepsis, compared to 10% of those without sepsis. Children with no sepsis also have a larger proportion of teeth with decay experience extracted (21% of dmft) than those with sepsis (6% of dmft.(around one in 10 children with untreated decay (9.3% with dt>0) were found to have dental sepsis compared with only around 1 in 100 children with fillings and no untreated decay (0.9% with dt = 0 and ft>0; Table 3). Thirteen children in the sample were found to have sepsis but neither had untreated caries or any fillings and it is likely that the sepsis is related in these instances to traumatised incisors. Figure 1 illustrates the relationship between numbers of untreated decayed teeth and the percentage of children observed to have dental sepsis. The relationship between oral cleanliness (the presence of visible plaque on anterior teeth) and the presence of dental sepsis was also investigated. Of those children assessed to have no visible plaque on anterior teeth, 3.2% (142) had dental sepsis, compared to 7.8% (194) of those with some visible plaque[5.6]

Discussion

Epidemiological dental studies of 5-year-olds have been criticised because they focus on a normative assessment of need and provide little information on the impact of the disease.[11] This study does provide information on the impact of disease in terms of dental sepsis. Since the data are cross-sectional, the figures for the prevalence of dental sepsis may be an underestimate since the manifestation of dental abscesses can be episodic. The data also allow an investigation of the association between untreated decayed teeth and dental sepsis on a population basis rather than on a selected sample of children who regularly attend dental practices. While the cross-sectional nature of the study precludes drawing causal inferences between the two variables, it does provide data that contribute to the discussion generated by the findings of other observational studies concerning the merits of restoration of deciduous teeth.[6.7.8]

Tickle et al. in a retrospective study based on case-notes of children with interproximal caries in primary molars who regularly attended the General Dental Service, found that there was no difference in the proportion of unrestored as opposed to restored teeth which prompted a course of antibiotics to be prescribed by the practitioner, and that unrestored teeth are no more likely to have been extracted because of pain than restored teeth. The authors suggest that this may indicate that there really is no advantage in restoring primary teeth if avoidance of pain or sepsis is the desired outcome.[8]

The data from Scottish 5-year-olds do not confirm this approach. Even though the findings in this high caries population show that a significant proportion of disease remains untreated, and the proportion of children with sepsis increases markedly with caries experience, this disadvantage can be mitigated if more of their caries experience is treated. The reduced level of fillings and extractions in these children is a significant contributor to their oral sepsis. These relationships are independent of area of residence. These findings would not support a policy of non-intervention for deciduous caries if oral sepsis is to be minimized.[9.10]

Conclusion

The Scottish data suggest that by not treating primary teeth, particularly where many teeth are affected by caries, the risk of the occurrence of dental sepsis is increased.

The evidence-base for the restoration of carious primary teeth is an important area where the evidence for the intervention must be weighed against the possible risks related to the intervention.

Future Work

Further work based on longitudinal studies is needed to provide more information on the risks of non-intervention for carious primary teeth.

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