IN BRIEF

- Severe untreated dental caries is very common in pre-school children in many countries.
- Following treatment of affected decayed teeth there is more rapid weight gain and growth velocity in the treated children.
- Children with untreated early childhood caries (ECC) have significantly poorer oral health-related quality of life than children without ECC.
- Comprehensive treatment in pre-school children makes a very significant difference to the psychological and social aspects of the child's life.

# Dental caries affects body weight, growth and quality of life in pre-school children

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The effect of a relatively common chronic disease, severe dental caries, affects young childrens' growth and well-being. Treating dental caries in pre-school children would increase growth rates and the quality of life of millions of children. Severe untreated dental caries is common in pre-school children in many countries. Children with severe caries weighed less than controls, and after treatment of decayed teeth there was more rapid weight gain and improvements in their quality of life. This may be due to dietary intake improving because pain affected the quantity and variety of food eaten, and second, chronic inflammation from caries related pulpitis and abscesses is known to suppress growth through a metabolic pathway and to reduce haemoglobin as a result of depressed erythrocyte production.

The emphasis of dental research has shifted from causes of dental diseases to how dental diseases affect general health. Despite the change in emphasis, the growing evidence on the probable effects of untreated dental caries on growth and health has been ignored. What is most important from a general health and well-being point of view is that in pre-school children, over 90% of caries is untreated and toothache is common in many developed and developing countries.[1-4] In the UK, 96% of caries in five-year-olds was untreated in some health districts.[2] If a common condition, such as untreated dental caries, does affect the growth and well-being of millions of young children, then dental intervention to eradicate dental pain and pulpitis is an important way to enhance growth and well-being in young children.

Untreated dental caries with associated discomfort or toothache contributes to weight gain, growth and quality of life as well as the cognitive development of young children.[4-10] A review of the possible effects of dental caries on failure to thrive (FTT) showed that in otherwise healthy children, severe dental decay could contribute to FTT.[11] The impact of comprehensive dental intervention affected patients with both organic and non-organic FTT.[11] Acs *et al.*[6] showed that three-year-olds with nursing caries with at least one pulpally involved tooth weighed about 1 kg less than control children without nursing caries. 8.7% of children with caries weighed less than 80% of ideal weight compared to 1.7% of the comparison group – a finding confirmed in young Turkish children with rampant or nursing caries. They were significantly lighter and shorter than controls without caries.[8] The mean weight of children with caries was between the 25th and 50th percentiles compared to controls who were between the 50th and 75th percentiles. Seven percent of cases and 0.7% of controls weighed less than the 20th percentile.[8]

Further evidence of the effect of dental caries on growth comes from studies of 'catch-up growth' following comprehensive dental treatment, which indicated that the previous oral condition compromised nutritional intake.[7] Children with early childhood caries were dentally treated or rehabilitated. Again, dental treatment was followed by greater weight gain.[6,7] Acs *et al.*[7] showed that prior to dental rehabilitation, test subjects' percentile weight categories were significantly less than the comparison group. The weight categories of children with early childhood caries were compared with caries-free patients before and after comprehensive dental treatment under general anaesthesia. Percentile weight categories of caries children were significantly less than controls. Of the early childhood caries (ECC) children, 13.7% weighed less than 80% of their ideal weight. Following therapeutic dental treatment the children with ECC had significantly increased growth velocities. After treatment there was no difference in age adjusted weights between

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the ECC and control groups. Children in the treated group had growth velocities in the 75th percentile at the end of the observation period, *'thereby propelling them from age-adjusted weights between 25th and 50th percentiles to between the 50th and 75th percentiles'*. All the children showed an immediate increase in weight, shifting them to higher percentile categories with increased six-month increments of growth after carious teeth had been restored. At the end of the study, none of the children were considered to have faltering growth.

Although undernourished children may develop more dental caries because a high sugar intake may be detrimental to teeth and nutrition, there are at least three other highly plausible mechanisms for how dental caries may be associated with underweight and poor growth in young children.

First, untreated caries and associated infection can cause pain and discomfort and reduce intake of foods because eating is painful.[7,12] Second, severe caries can affect children's quality of life and thereby growth. Impacts include pain, irritability and disturbed sleeping habits.[13,14] Disturbed sleep may affect glucosteroid production and growth. Although not all untreated dental caries affects general health, it significantly impacts on the quality of life of children and their dietary intake. Children with untreated ECC had significantly poorer oral health-related quality of life (OHRQoL) than children without ECC as assessed both by the children and their parents.[13,15] The consequences of high caries levels also include a higher risk of hospitalisations and emergency dental visits,[16] increased days with restricted activity and absence from school[4,17,18] and a diminished ability to learn. Dental pain has an impact not only on the child's educational development, but also on the economy due to time taken off by parents to take children to the dentist.[3,4]

Dental treatment makes a very significant difference to the psychological and social aspects of the child's life.[9,10,13,15,19] These improvements include less pain and improved abilities to eat and sleep. In one study, parents perceived treatment had positive social impacts on their child: more smiling, improved school performance and increased social interaction.[20]

A third possible mechanism of how untreated severe caries with pulpitis affects growth is that chronic inflammation from pulpitis and chronic dental abscesses affects growth via chronic inflammation affecting metabolic pathways where cytokines affect erythropoiesis. For example, interleukin-1 (IL-1), which has a wide variety of actions in inflammation, can induce inhibition of erythropoiesis. This suppression of haemoglobin can lead to anaemia of chronic disease as a result of depressed erythrocyte production in the bone marrow.[21,22]

This review indicates that treating dental caries in pre-school children would increase growth rates and the quality of life of millions of children. Obviously, prevention of caries would be preferable to treatment, but the high level of untreated caries worldwide suggests that current preventive approaches are not working.


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