

# Summary of: Permanent dentition caries through the first half of life

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## VERIFIABLE CPD PAPER

### FULL PAPER DETAILS

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#### Refereed Paper

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**Aim** To describe the occurrence of dental caries at the person, tooth and tooth surface level from childhood to early mid-life. **Background** No studies have reported on age and caries experience in a population-based sample through the first half of life. **Methods** Prospective cohort study of a complete birth cohort (n = 1,037) born in 1972/73 in Dunedin, New Zealand. Dental examinations were conducted at ages 5, 9, 15, 18, 26, 32 and 38, and participation rates remained high. Surface-level caries data were collected at each age (WHO basic methods). Statistical analyses and graphing of data were undertaken using Intercooled Stata Version 10. **Results** Data are presented on dental caries experience in the permanent dentition at ages 9, 15, 18, 26, 32 and 38. Percentile curves are charted and reported for person-level caries experience. Data are also presented on the number of decayed teeth and tooth surfaces, (including root surfaces at age 38), as a function of the number of teeth and surfaces present, respectively. Across the cohort, the number of tooth surfaces affected by dental caries increased by approximately 0.8 surfaces per year (on average), while the percentage of at-risk tooth surfaces affected by caries increased by approximately 0.5% per year, with negligible variation in that rate throughout the observation period. **Conclusion** These unique data show clearly that dental caries continues as a disease of adulthood, remaining important beyond childhood and adolescence and that rates of dental caries over time remain relatively constant.

### EDITOR'S SUMMARY

Cohort studies, in particular prospective ones, are one of the only ways by which we can currently examine what is really happening with chronic, progressive and cumulative diseases. And dental caries certainly fits into this category of disease. This *BDJ* paper reports on the longest running cohort study tracking oral health – the Dunedin study, now at 'age 38'.

Amazingly, the Dunedin study has now been going for nearly 40 years with 95% of the original study members still being assessed at regular intervals. The study cohort is made up of the 1,037 babies born at the Queen Mary Maternity Hospital, Dunedin, New Zealand between 1 April 1972 and 31 March 1973. Of those 1,037 babies, 535 were boys, 502 were girls, with 1013 singletons and 24 twins. They were studied at birth, and then followed up and assessed at the age of 3, and then at 5, 7, 9, 11,

13, 15, 18, 21, 26, 32 and now at 38. The study organisers plan to next see the study members at age 44, then again at age 50, and beyond.

Dunedin study members still come back to the Dunedin research unit for the regular one-day assessments from wherever in the world they are living; indeed, 50 now live in the UK. At these assessments almost all aspects of their physical and mental health are examined, including cardiovascular, dental, respiratory, sexual and mental health and psychosocial well-being.

This paper reports on the incidence of caries in the Dunedin cohort, including data from the most recent assessment with members now at 38 years of age. Analysis of the data confirms that rates of dental caries over time remain fairly constant. Thus, caries is not a disease of childhood and continues as a disease throughout life to at least the late 30s.

In the Dunedin study, teeth were exam-

ined in detail to determine patterns in dental caries affecting particular teeth more than others. The authors of the paper have created a useful animation of a dental chart showing the participants' caries and restorative experience at the tooth and tooth surface level. This can be found in the supplementary information attached to this paper online – certainly worth a look.

The full paper can be accessed from the *BDJ* website ([www.bdj.co.uk](http://www.bdj.co.uk)), under 'Research' in the table of contents for Volume 215 issue 7.

Ruth Doherty  
Managing Editor

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**IN BRIEF**

- Few studies have tracked the oral health of a cohort over time, and none for as long as the Dunedin study or with such a high long-term participation rate in a representative birth cohort.
- Shows how dental caries begins as a childhood disease, but remains important through adolescence and into adulthood.
- Provides hard data to demonstrate the differential susceptibility of the various teeth within the mouth with age.

**COMMENTARY**

Traditionally, epidemiological studies and randomised clinical trials primarily involved children and adolescents, being age groups easily accessed in schools. It was generally assumed that dental caries was primarily a problem for youngsters. Regarding clinical trials the assumption was that products that would work at a young age should be efficacious throughout life. Recent studies on older subjects revealed how important it is to investigate various age groups. With respect to the development of caries (DMFT/S) with age most investigators relied on cross-sectional studies. This approach has the drawback that subjects lived in periods when environmental conditions often changed considerably, in particular the use of fluoride.

The Dunedin Multidisciplinary Health and Development Study is unique in having followed an entire cohort born in 1972-73, with only 5% attrition, over a 40-year study period. The remarkable principle finding is that DMFS increases almost linearly in time, showing that susceptibility to caries does not decrease after adolescence. Further analysis shows that the number of affected surfaces per tooth increases with time. Particularly in the maxilla the number of affected teeth tapers off after age 30, but this is compensated by more surfaces being either decayed(D), missing(M) or filled(F). In this study population, a substantial increase in the number of teeth extracted due to caries was observed between the age of 32 and 38.

This study confirms that caries at a young age is a predictor for future caries, although little attention is given to whether subjects switch at all to another caries progression (trajectory) pattern. Already at age 9 around 25% of the first molars were affected by caries, and this tooth type kept the lead throughout the study, although third molars and second premolars gradually showed more surfaces being affected.

The study shows the importance of continued prevention (and restoration) efforts with age, also to teeth with surfaces being decayed or filled. It will be worthwhile to follow this study population as subjects grow older, in particular also regarding caries on root surfaces.

**JM ten Cate, Academy Professor, ACTA Amsterdam, the Netherlands**

**AUTHOR QUESTIONS AND ANSWERS****1. Why did you undertake this research?**

We wanted to compare and contrast rates of change in dental caries experience of different teeth and tooth surfaces by age. We wanted to provide data that would be of use and interest to general practising dentists. We had accumulated a large amount of data on dental caries experience in a single cohort over four decades, and wanted to present a comprehensive descriptive picture of this information.

**2. What would you like to do next in this area to follow on from this work?**

Our next paper in this area will focus on our comprehensive early-life risk factor data, including perinatal events, socioeconomic status, stress and comorbidities. We will also consider protective factors such as toothbrushing behaviours and exposure to fluoridated water (and/or fluoride tablets) in early life, and their effects/associations with dental caries experience through life and into adulthood.