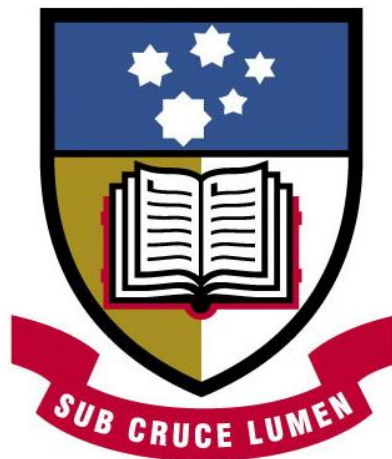


Genetic and environmental influences on variation in overbite, overjet and tooth wear

A thesis submitted to The University of Adelaide in partial fulfilment of the
requirement for the Degree of Doctor of Clinical Dentistry (Prosthodontics)

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SUMMARY

Introduction

Tooth wear is clinical problem that has been attracting the attention of dental professionals in recent times. Although tooth wear might be considered an age-related, physiological process its incidence has been increasing in younger individuals. The effect of tooth wear can be minimal, but it can have serious negative effects on both oral function and aesthetics.

In the past occlusal variations and interferences were believed to be causative factors for tooth wear, however there is little compelling evidence of such an effect. Genetic factors have been shown to contribute significantly to the observed variation in dento-facial growth and development, but to the best of our knowledge the contribution of genetic factors to the aetiology of tooth wear has not been investigated in detail.

The aim of this study was to determine the relationship between two significant occlusal variables (overbite and overjet) and tooth wear, and to determine the relative contribution of genetic and environmental factors to the observed variation in these measures.

Material and Methods

Twins' models, which have been collected as part of an ongoing craniofacial study at The University of Adelaide, were used. In total 128 twins pairs were included.

Selection was based on age (14-20 years old) and the eruption of all the permanent teeth apart from the third molars. Information such as age, gender and zygosity were all available.

Tooth wear was scored according to the following scale:

- (0) No wear facet detected

- (1) Wear facet that involved enamel only, flat facet without cupping

- (2) Wear facet that involved enamel and dentine, detected by the extent of tooth structure loss and/or the presence of cupping.

- (m) Tooth not present, primary tooth retained, or if stone model distorted in any way preventing adequate scoring.

Overjet and overbite were measured using digital callipers.

Statistical analysis

All data were analysed using Microsoft Excel spreadsheets (Microsoft Office Excel 2010). For the descriptive statistics one member of each twin pair was randomly

selected to avoid the possible bias that may arise from the shared environment of twin pairs.

To determine the heritability of overjet, overbite and tooth wear, structural equation modelling was undertaken with software package Mx: Statistic modelling (Neale 1992, 2003).

Results

Tooth wear prevalence was high with no apparent effect of gender, zygosity or tooth position.

No statistically significant relationship was found between either overjet or and tooth wear.

Heritability values for overjet, overbite and tooth wear low with no detected genetic contribution; however there was evidence that the shared environment had an effect on the heritability of these occlusal variables.

The findings of this study indicate that genetic factors do not consistently influence wear scores for the first molar teeth but that the combined effect of all possible genetic factors account for between 46% and 63% of the observed variation in wear scores for canines and central incisors.

DECLARATION

This work contains no material which has been accepted for the award of any other degree or diploma in any other university or other tertiary institution to and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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ZAINAB HAMUDI

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