

DENTAL-ARCH MORPHOLOGY

OF

AUSTRALIAN ABORIGINES



**DENTAL-ARCH MORPHOLOGY OF AUSTRALIAN ABORIGINES:**  
**a metric study of arch size and shape**

**Peter Chung Kwong Cheng, B.D.S.**

**Department of Restorative Dentistry**  
**The University of Adelaide, Adelaide, South Australia**

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## SUMMARY

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The size and shape morphology of dental arches was studied by means of measurements obtained from 276 serial dental casts representing 28 male and 16 female Australian Aborigines. The age range of the subjects over the observation period was from about seven to seventeen years, corresponding to a change in dental status from the early mixed dentition to eruption of all the permanent teeth except third molars.

The casts were photographed and the reference points of tooth landmarks were recorded in Cartesian coordinates. Ten polynomial equations were fitted to each set of dental-arch reference points and a selection was made to determine the equation best describing the shape of each dental arch. Arch areas, perimeters, polar vectors and polar overjets were derived from the shape-representing polynomial equations and average values were computed for males and for females categorized in four groups determined by tooth emergence status. Polynomial curves and dental-arch heptagons constructed from the polar vectors were used to describe arch size and shape diagrammatically for the four groups. Areas were used as measures of arch size and polar vectors as measures of arch shape.

The arches of males were found to be larger in area and perimeter than those of females at corresponding stages of dental development. They were also broader and more pronounced in overjet. The sex difference in size was more noticeable in the maxillary canine region. Changes in size and shape of dental arches for males and females from the early mixed dentition stage to the early permanent dentition stage involved decreases in area and perimeter. The arches became broader posteriorly and somewhat narrower anteriorly. There was a reduction in depth and an increase in overjet.

It is suggested that shape-representing polynomials may have useful applications in clinical orthodontics for diagnosis and treatment planning. Further research on a simpler methodology is suggested to give a wider scope for the application of polynomials in dentistry.

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SIGNED STATEMENT

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This thesis contains no material which has been accepted for the award of any other degree or diploma in any University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

PETER CHUNG KWONG CHENG

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