

## AAO Foundation Award Final Report

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| Principal Investigator  | Kenneth W. Snowdowne, Ph.D.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Co-Investigator         | Dr. Cass Leknius, Dr. S.A. Dugoni                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Secondary Investigators | Dr. J. F. Reutter and Dr. B. Emrich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Award Type              | Research                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Project Title           | Analysis of a Mathematical Model of Cranio-Facial Growth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Project Year            | 1998                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Institution             | University of the Pacific<br>Arthur A. Dugoni School of Dentistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Summary/Abstract        | <p>The purpose of this study is to develop a mathematical tool to allow the orthodontist to predict the amount of growth available from apical radiograms. We were able to show that the extent of cranial-facial growth was highly correlated (&gt;0.9) to the ratio of the anterior-posterior to the ventral-caudal aspect (D) of the third vertebrae, a fairly constant, well-visualized feature on apical radiographs. The mathematical model was <math>D = A + [1/(1 + \exp(C-x))](B-A)</math> where X is patient age, B and A are the ratios before and after the growth spurt, C the observed inflection point half way through the growth spurt. This model was tested on a rigorously collected longitudinal cephalometric study of 31 subjects the Matthew's collection. Distances between condyle, menton, point B, and gonion in each mandible were plotted as a function of age used in the mathematical model and compared to one another. We applied two tests: (1) distanced controlled by the same growth field of osteoblasts should have greater correlation that distances controlled by different growth fields and (2) inflection points (C) for girls should be younger than boys due to well-known differences in maturation rates. Neither of these predictions was true. We concluded that the model was unable to describe all growth fields with a sufficient level of statistical correlation and therefore it is not adequate to describe growth using this model.</p> <p>It was reported at the AADR Reutter, JF, Snowdowne, KW, Dugoni, SA, Emrich, B "Growth and development of the body of C3 as a timer of adolescent growth spurt" <u>J Dental Research</u>. 78: 436, 1999.</p> |