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Title: Dimensions of the eye and orbit in a South African paediatric CBCT sample

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Abstract

Introduction: Facial features grow at different rates and little information is available regarding the growth of the orbit, eyes and palpebral fissures in South African children. The growth of the orbital region is of particular relevance to forensic anthropologists to accurately produce facial approximation of unknown deceased children. In a clinical setting, normative values are used to accurately diagnose eye conditions, e.g. exophthalmos and ptosis. Innovation: This study aims to report the normative values of the dimensions of South African paediatric eyes, orbits and palpebral fissures. These dimensions will be calculated based on CBCT scans, which eliminates the effect of gravity. and has no tissue distortion commonly encountered during cadaver based studies. Variations in the growth rate of the orbital and periorbital structures have been reported between sex and population groups in the literature, and similar findings is expected for this study. Aims and objectives: The aim of this study is to determine the dimensions of the orbit, eye and periorbital structures in various childhood ages in a South African CBCT scan collection. Methods: This is a quantitative retrospective descriptive study based on 160 cone-beam computed tomography (CBCT) scans. Scans will be collected from a repository collected from the Cintocare Hospital, Pretoria. Children between the ages of four and eighteen will be included in the study. Optimally the sample will include 40 patients from each ancestral group (white and black South Africans, respectively) and sex group (male and female). Landmarks will be placed on the 2D slices of the eye and 3D rendering of the orbit and eyelids using the MeVisLab © v.3.0.2 programme. Linear distances will be measured between the placed 3D points. Basic descriptive statistics will be recorded for each sex-population group and the influence of age, sex and population group will be assessed. Dissemination: Results will be presented at national and international conferences and will be sent in for publication in a peer reviewed accredited journal.