Quantitative evaluation of correlation of skull morphology in families in an attempt to predict growth change

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ABSTRACT

The purpose of the present study was to obtain quantitative values for human skull structures in a cross-sectional analysis of offspring and their parents. The offspring were classified into three groups according to age. For each of 11 maxillo-facial and nine dento-alveolar structural angular measurements, the mean and SD were calculated for each set of paternal, maternal, midparent and offspring. The standard deviation unit (SDU) values were calculated from the disparity between the measured value in a given individual, i.e. father, mother, midparent, offspring, and their corresponding group mean value. Three disparity values (D.v.), expressed by the difference between the SDU values in each pair (father-offspring; mother-offspring and midparent-offspring), were developed to evaluate the degree of familial resemblance for each of 20 morphometric measurements and the differences among these values in three age groups were then investigated. The similarity ratio (S.r.), expressing the degree of correlation to the father and mother, was derived by processing the D.v. The relationship between the maxillo-facial S.r. and the dento-alveolar S.r. was analysed in each age group. There were significant differences between the D.v. in families and those in unrelated control groups. Consistency between the S.r. for maxillo-facial and that for dento-alveolar measurements was found in the older age groups. It is concluded that individual growth of skull morphology might be more predictable using the present method.