

# Inner canthal distance and geometric progression as a predictor of maxillary central incisor width

Mohammed Aleem Abdullah, BDS, MDS<sup>a</sup>

College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia

**Statement of problem.** Estimating the mesiodistal width of maxillary central incisors may be difficult when artificial teeth are selected for edentulous subjects.

**Purpose.** This study examined the relationship between inner canthal distance and maxillary central incisor mesiodistal width in terms of the geometric progression popularly known as the *golden proportion*.

**Material and methods.** Two hundred twenty-nine dentate Saudi subjects (120 males, 109 females; mean age 21.46 years) free from facial and dental deformities were examined. The mesiodistal width of each maxillary central incisor was measured between its interproximal contact points. The inner canthal distance was measured from medial angle to medial angle of the palpebral fissures of the eyes. The common ratios of geometric progression are 0.618 and 1.618. The inner canthal distance of each subject was multiplied by a decreasing function value of the geometric progression term (0.618) to provide the combined width of 2 central incisors. The product was then divided by 2 to obtain the width of a single maxillary central incisor. A *t* test was used to identify any significant differences in mesiodistal tooth width and inner canthal distance by gender. Agreement between the measured and calculated central incisor widths was evaluated with Pearson's correlation coefficients, as was intraexaminer reliability. Significance was set at  $\alpha = .05$ .

**Results.** The mean inner canthal distance of male and female subjects was  $28.7 \pm 1.7$  mm and  $27.9 \pm 2.1$  mm, respectively. The mean maxillary central incisor width of male and female subjects was  $8.87 \pm 0.5$  mm and  $8.68 \text{ mm} \pm 0.4$  mm, respectively. Differences between the mean values for both measurements were significant ( $P = .002$ ). The actual and calculated widths of the natural maxillary central incisors were found to be highly correlated ( $r = .943$ ).

**Conclusion.** Within the population tested, a significantly higher mean inner canthal distance and maxillary central incisor width were recorded for male subjects. Inner canthal distance, when multiplied by a decreasing function value of the geometric progression term and then divided by 2, was a reliable predictor of maxillary central incisor width. (J Prosthet Dent 2002;88:16-20.)

## CLINICAL IMPLICATIONS

*Within the limitations of this study on Saudi subjects, the results suggest that inner canthal distance can be used to estimate the mesiodistal width of a maxillary central incisor for an edentulous patient.*

When anterior teeth are selected for edentulous subjects, the mesiodistal width of the maxillary central incisors is important because they are the most prominent teeth in the arch when viewed from the frontal aspect.<sup>1-4</sup> Shillingburg et al<sup>5</sup> reported that the combined width of the maxillary central incisors occupied 37% of the circumferential arch distance between the distal surface of the maxillary canines. The combined width of the lateral incisors and canines accounted for 31% and 32% of the distance, respectively.

Certain anthropometric measurements of the face have been suggested to determine the mesiodistal width of maxillary central incisors for edentulous patients. Young,<sup>6</sup> House and Loop,<sup>7</sup> and Berry<sup>8</sup> all re-

ported a ratio of maxillary central incisor width to face size. The central incisor was said to be  $\frac{1}{6}$  that of the bizygomatic width. However, others<sup>9,10</sup> have shown that bizygomatic measurement may not be a reliable means of determining the width of maxillary central incisors.

Scandrett et al<sup>10</sup> studied the ratio between maxillary central incisor width and certain anthropometric parameters, including intercommisural width, interalar width, bizygomatic width, sagittal cranial diameter, interbuccal frenum distance, and philtrum width. They reported that more than one measurement of the face was needed to obtain the best predictor model for maxillary central incisor width. Cesario and Latta<sup>11</sup> studied the relationship between interpupillary distance and maxillary incisor width. They reported the ratio as 6.5 for white men and black women, 6.6 for white women, and 7.0 for black men.

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<sup>a</sup>Associate Professor, Department of Prosthetic Dental Sciences.