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Regression Equations for Prediction of Permanent Canine and Premolar Mesiodistal Width in Thai Population: A Cross-sectional Study

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Abstract

Objectives: This study aimed to formulate regression equation(s) for predicting human permanent canine and premolar mesiodistal (MD) widths of Thai population.

Methods: 176 Mae Fah Luang University students with Thai nationality were selected for this study. Based on their domicile, participants were grouped by four different regions of Thailand, including central, northern, southern, and northeastern. An intraoral scanner was used to record digital dental models, and the tooth MD widths were measured using SolidWorks 2020 EP1 software. Significant differences were tested by two-sample *t*-test or one-way ANOVA. By Pearson's correlation coefficient, the relationships between the maxillary and/or mandibular incisor MD width and the upper and/or lower canine and premolar MD widths were determined for prediction equations.

Results: There were statistically significant differences in a sum of the maxillary and mandibular incisor and in that of the upper and lower canine and premolar MD widths between males and females ($p < 0.001$). Statistically significant differences in the sum of the mandibular incisor MD width and in that of the maxillary and mandibular central incisor MD width were found among four different regions ($p < 0.05$). By linear regression analysis, correlation coefficients of eight prediction equations were between 0.62 and 0.75 with the percentages of prediction accuracy from 47.16 to 53.41. These percentages were significantly greater than those predicted by previous models for the upper canine and premolar MD widths ($p < 0.01$).

Conclusions: Our novel regression equations may predict the MD width of unerupted canine and premolars of Thai population precisely enough to be applicable for mixed dentition space analysis.

Keywords: canine, intraoral scanner, mixed dentition, premolar, regression equation, tooth size prediction