Title: Sex Determination of Han Adults in Northeast China Using Cone Beam Computer Tomography

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Abstract：The purpose of this study was to obtain the morphological data of the maxillofacial region of Han nationality adults in Northeast China, and to explore the methods and appropriate variables of three-dimensional reconstruction technology for sex determination using Cone beam computer tomography (CBCT). The CBCT images of 420 adults (210 males, 210 females) aged 18-70 years were reconstructed by MIMICS 17.0 software and sixteen observation indexes were measured and analyzed statistically. The results demonstrated that twelve of sixteen variables expressed significant sexual difference($p<0.01$) which were as follows: mandibular angle(X_1),area of mandibular foramen(X_2),bi-gonial breadth(X_3),koronoidbreite (X_4),Height of symphysis(X_5),Min-height of mandibular notch(X_6),Min-breadth of mandibular ramus(X_7),Buccal side bone thickness of MF(X_8),Horizontal diameter of MF(X_{11}),Vertical from prosthion to palatal breadth(X_{12}),palatal breadth(X_{13}),The ratio of HD-MF and VD-MF(X_{15}). Then the sexual discriminant equation which was suitable for people at the age of 18-70 was established using stepwise method: $Y=-0.059X_1+0.313X_2+0.1X_3+0.061X_4+0.044X_5+0.041X_6+0.076X_{13}-17.215$.It was found that the cross-validated grouped overall predictive accuracy was 87.4%. It could correctly identify males in 85.7% and females in 89% of the cases. This study has accumulated morphological data of maxillofacial skeleton from adults of Han nationality in Northeast China, which provided guiding significance for sex determination and clinical application in forensic science, archaeology, criminal investigation, iconography and clinical three-dimensional (3D) print. Evaluation variables and related discriminant functions of