

Analysis of maxillary sinus volume by Computed Tomography (CT) scan for age and gender detection in a sample of Sri Lankans

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It has been reported that maxillary sinus remains intact although the skull and other bones may be badly disfigured. Therefore the measurements of maxillary sinuses in computed tomography (CT) scans can be used for determination of age and gender when other methods are inconclusive. The aim of this study was to compare the volume of the maxillary sinus, between the left and right, and between males and females by CT scan for gender and age determination. 146 patients (84 males & 62 females) were examined on *Toshiba (Alexion)* 16 slice Helical CT scanner. Volume images were collected from the CT database and analysed by medical graded Vitrea FX (Toshiba) vital image post processing work station. The longest distances measured on right and left maxillary sinuses were antero-posterior (AP) diameter on axial reconstructed image, transverse diameter/width on axial reconstructed image and cranio-caudal (CC) diameter/height on coronal reconstructed image. Maxillary sinus volume of each side was calculated using a proven mathematical formula of (AP diameter*height*width*0.52). The mean of each sinus volume was calculated for males and females. Data were analysed using the independent sample *t-test*.

The mean volume of the right male sinus was 12164 (± 3347) mm³ with a range of 5591 - 16978 mm³ while it was 12459 (± 3474) mm³ for the left side with a range of 5788 - 17954 mm³. The mean volume of the right female sinus was 11553 (± 2776) mm³ and ranged from 7128 - 16471 mm³ while it was 11518 (± 2378) mm³ for the left side with a range of 8142- 15619 mm³. The volume of the sinus increased with age in both genders. The volume of the maxillary sinus of males was found to be greater than those of females and this difference was statistically significant ($p < 0.05$) for left sinus. We concluded that CT measurement of maxillary sinus volume may be useful in determining the age and gender in forensic anthropology to some extent and further the measurement of the left side maxillary sinus volume can be used to determine the gender.