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Age Estimation and Sex Determination by CT-Scan Analysis of the Hyoid Bone: Application on a Tunisian Population

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Abstract : Introduction: The hyoid bone is considered as one of many bones used to identify a missed person. There is a specificity of each population group in human identifications. Objective: To analyze the relationship between age, sex and metric parameters of hyoid bone in Tunisian population sample, using CT-scan. Materials and Methods: A prospective study was conducted in the Department of Forensic Medicine of FattoumaBourguiba Hospital of Monastir-Tunisia during 4 years. A total of 240 samples of hyoid bone were studied. The age of cases ranged from 18 days to 81 years. The specimens were collected only from the deceased of known age. Once dried, each hyoid bone was scanned using CT scan. For each specimen, 10 measurements were taken using a computer program. The measurements consisted of 6 lengths and 4 widths. A regression analysis was used to estimate the relationship between age, sex, and different measurements. For age estimation, a multiple logistic regression was carried out for samples ≤ 35 years. For sex determination, ROC curve was performed. Discriminant value finally retained was based on the best specificity with the best sensitivity. Results: The correlation between real age and estimated age was good (r^2=0.72) for samples aged 35 years or less. The unstandardised canonical function equation was estimated using three variables: maximum length of the right greater cornua, length from the middle of the left joint space to the middle of the right joint space and perpendicular length from the centre point of a line between the distal ends of the right and left greater cornua to the centre point of the anterior view of the body of the hyoid bone. For sex determination, the ROC curve analysis reveals that the area under curve was at 81.8%. Discriminant value was 0.451 with a specificity of 73% and sensibility of 79%. The equation function was estimated based on two variables: maximum length of the greater cornua and maximum length of the hyoid bone. Conclusion: The findings of the current study suggest that metric analysis of the hyoid bone may predict the age ≤ 35 years. Sex estimation seems to be more reliable. Further studies dealing with the fusion of the hyoid bone and the current study could help to achieve more accurate age estimation rates.

Keywords : anthropology, age estimation, CT scan, sex determination, Tunisia
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