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Morphometric Analysis of the Clivus in a Nigerian Population- CT Based Study

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Abstract

Background: The management of clival pathologies require accurate measurements of the clivus to aid in preoperative planning and inform the design of population specific clival implants. Clival morphometry is also important in forensic identification of unknown skeletal remains. This study aimed to evaluate the dimensions of the clivus and elucidate its variations based on age and sex in a Nigerian population.

Methods: This cross-sectional study retrospectively assessed clival dimension using 230 cranial computed tomography (CT) images of 115 males and 115 females, aged 20-80 years, which were archived in the radiological database of a Teaching Hospital in Delta State Nigeria. Access to this database was granted after approval from the institution's ethics committee. The Statistical Package for Social Sciences was employed to compare means across various sex and age groups utilizing the independent t-test and analysis of variance, respectively. The Pearson correlation test assessed the relationship between variables. These analyses were considered significant at $P<0.05$.

Results: The clival length and width demonstrated sexual dimorphism but lacked significant association with age. After adjusting for age, sex had a significant effect on the clival dimensions. The dimensions displayed a significantly strong positive relationship with one another ($p<0.05$).

Conclusion: The study provides a population-specific baseline CT data that are vital in preoperative planning of craniovertebral junction (CVJ) procedures such as endoscopic skull base and posterior cranial fossa surgeries besides the manufacture of suitable clival implants and screws for the Nigerians in Delta State. The demonstrated sexual dimorphism of the clivus indicates its potential use as an adjunct skeletal marker for sex determination in forensic investigations.

Keywords: Clivus, Morphometry, Brain, Computed Tomography, Neurosurgery