

A Morphometric Survey of the Parasellar Region of Over 2700 Skulls With Particular Emphasis on the Middle Clinoid Process

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Introduction

The middle clinoid process (MCP) is a bony projection with varied prevalence and morphology that extends from the sphenoid bone near the lateral margin of the sella turcica. The prevalence and morphology of the MCP in populations stratified by age, race, and gender are unknown.

Methods

The presence, dimensions, morphological classification (incomplete, contact, and caroticoclinoid ring [CCR]), and intracranial relations of the MCP were measured in 2,726 cranial specimens with intact parasellar regions. Data were recorded on specimen age, gender, and ethnicity. The presence, dimensions, morphological classification (incomplete, contact, and caroticoclinoid ring) and intracranial relations of the middle clinoid were measured. Linear and logistic regressions were used to determine associations between explanatory variables and MCP morphology.

Results

The sample included 2,249 males and 476 females. Specimens were classified as either “white” (60.5%) or “black” (39.2%). MCP was found in 42% of specimens, with 60% of those specimens presenting bilaterally. Fully ossified CCR comprised 27% of all MCPs and contact (defined as contact without ossification between MCP and anterior clinoid process) comprised 4% of all MCPs. White race (relative to black race) and increasing age were significant predictors of MCP presence ($p < 0.001$). White race was significantly associated with greater average MCP height ($p < 0.001$). Among skulls with CCR, both male gender and older age (>70 years relative to < 50 years) were associated with increased CCR diameter ($p < 0.001$). No other significant predictors or associations were observed.

Learning Objectives

1) Understand the racial, sexual, and age-related anatomic variation of the parasellar region

Conclusions

Variations in the formation of the MCP pose a risk for injury to the ICA during clinoidectomy in regional procedures. Understanding parasellar anatomy is integral to surgical planning and preoperative risk counseling.