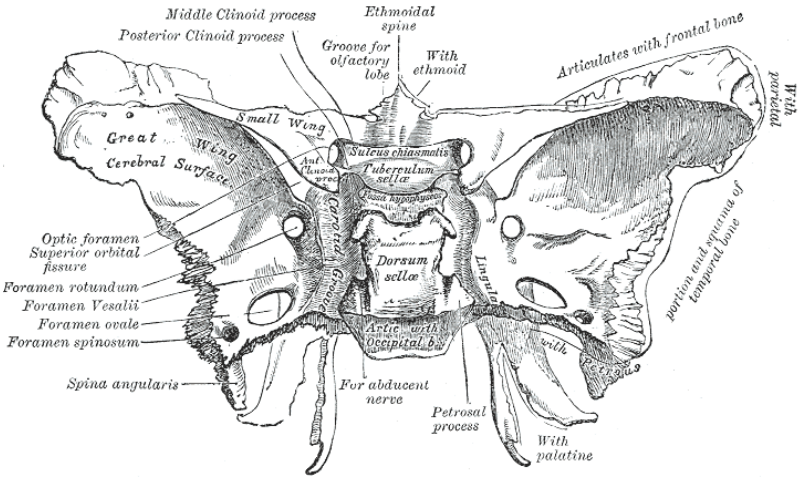
Middle clinoid process



The anterior boundary of the sella turcica is completed by two small eminences, one on either side, called the middle clinoid processes.

The middle clinoid process (MCP) is a bony projection that extends from the sphenoid bone near the lateral margin of the sella turcica.

The varied prevalence and morphological features of the MCP in populations stratified by age, race, and sex are unknown; however, the knowledge of its anatomy and preoperative recognition on CT scans can aid greatly in complication avoidance and management. The aim of this study was to further illustrate the surgical anatomy of the parasellar region and to quantify the incidence of MCP and caroticoclinoid rings (CCRs) in dried preserved human anatomical specimens. METHODS The presence, dimensions, morphological classification (incomplete, contact, and CCR), and intracranial relations of the MCP were measured in 2726 dried skull specimens at the Hamann-Todd Osteological Collection at the Cleveland Museum of Natural History. Specific morphometric data points were recorded from each of these hemiskulls, and categorized based on age, sex, and ethnicity. Linear and logistic regressions were used to determine associations between explanatory variables and MCP morphology. Computed tomography scans of the skull specimens were obtained to explore radiological landmarks for different types of MCPs. Illustrative intraoperative videos were also analyzed in the light of these crucial surgical landmarks. RESULTS The sample included 2250 specimens from males and 476 from females. Specimens were classified as either “white” (60.5%) or “black” (39.2%). An 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 sex 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. The CT scans of skulls replicated and validated the authors' morphometric observations on incomplete, contact, and CCR patterns adequately. The surgical strategies of clinoid bone removal are validated, with appropriate video illustrations. CONCLUSIONS Variations in the patterns of bony MCPs can pose a significant risk for internal carotid artery injury during parasellar procedures, especially those involving clinoidectomy and optic strut drilling. Understanding parasellar anatomy, especially on skull-

base CT imaging, may be integral to surgical planning and preoperative risk counseling in both transcranial and extended endonasal procedures, as well as to preparing for complications management perioperatively [1].

1)
Sharma A, Rieth GE, Tanenbaum JE, Williams JS, Ota N, Chakravarthi S, Manjila S, Kassam A, Yapicilar B. A morphometric survey of the parasellar region in more than 2700 skulls: emphasis on the middle clinoid process variants and implications in endoscopic and microsurgical approaches. J Neurosurg. 2017 Aug 11:1-11. doi: 10.3171/2017.2.JNS162114. [Epub ahead of print] PubMed PMID: 28799880.