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The Parietal Notch: A Surgical Landmark for Students Learning Mastoid Surgery



Michael Castle MS III
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Introduction

Mastoidectomy is a procedural skill that must be mastered by otolaryngology residents to perform otologic surgery. Surgical exposure of the middle and inner ear through the mastoid using cadaveric specimens is a standard simulation method to teach three-dimensional anatomy of the ear to residents. Neurovascular structures, sensory organs and minute components of the hearing apparatus are hidden inside dense bone, and therefore, exposing these delicate features is challenging. Landmarks on the mastoid surface guide the initial dissection, using a drill, allowing the operator to identify deeper landmarks. For novice surgeons, these landmarks are critical to perform safe otologic surgery. We asked whether the parietal notch, a bony suture line, is a reliable and accurate surface landmark that defines the posterior aspect of the mastoid process of the temporal bone. This posterior margin should be defined by the sinodural angle internally. If the parietal notch is demonstrated to provide a reliable approximation of the sinodural angle it will greatly help novice surgeons understand the extent of their temporal bone dissections.

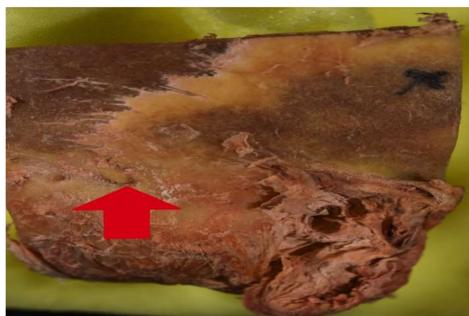


Figure 1: Red arrow pointing to the parietal notch.

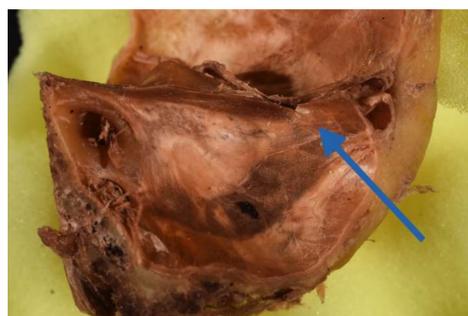


Figure 2: Blue arrow pointing to the sinodural angle.

Objectives

- ❖ Determine how often the parietal notch can be identified as a surface landmark in cadaveric temporal bones.
- ❖ Use CT images of cadaveric temporal bone specimens to measure the horizontal and vertical relationship between the parietal notch and the sinodural angle.
- ❖ Determine if the parietal notch can be used as an external landmark to define the posterosuperior margin of students dissections

Methods

- ❖ 47 cadaveric temporal bones were selected for use in the study.
- ❖ The parietal notch was then separately identified by both an expert and a novice observer.
- ❖ The temporal bones in which the expert and novice agreed upon the location of the parietal notch were marked prior to imaging.
- ❖ The parietal notch served as the external landmark of interest, while the sinodural angle served as the internal landmark of interest. These landmarks were then labeled with radiopaque beads in figure 3.
- ❖ We used computerized tomography to measure the horizontal and vertical relationship between the internal and external radiopaque markers.



Figure 3: Radiopaque marker placed on parietal notch. The same marker is also placed on the sinodural angle internally.

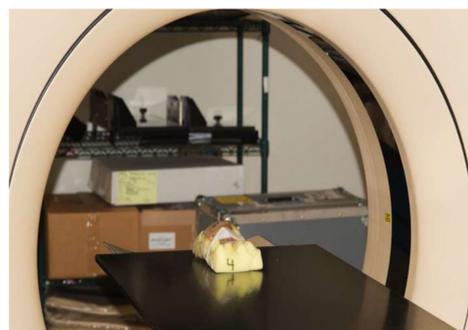


Figure 4: Temporal bone with radiopaque markers mounted on foam in an operating room orientation for CT scanning.

Results

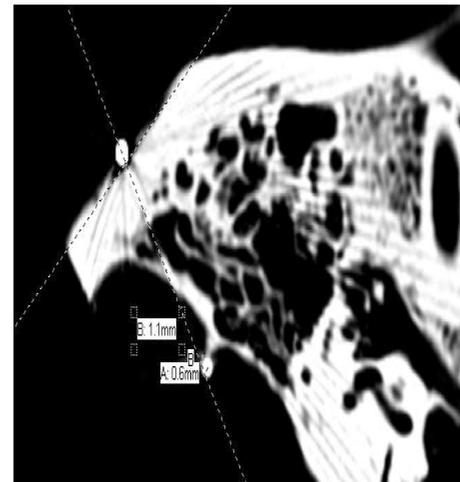


Figure 5: CT image of temporal bone with radiopaque markers and measurements.

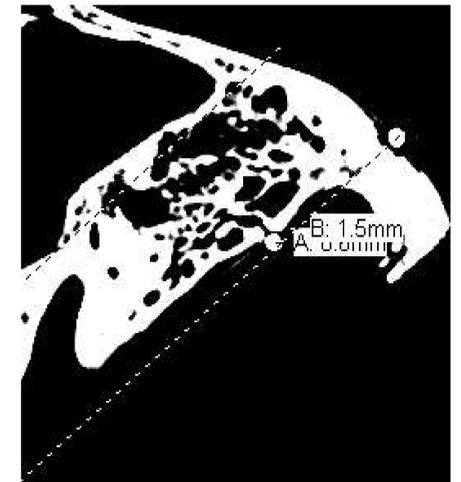


Figure 6: CT image of temporal bone with radiopaque markers and measurements

- ❖ The parietal notch was identified by a novice and expert observer independently in 92% of the cases.
- ❖ The parietal notch was posterior to the sinodural angle in all 43 imaged specimens (100%).
- ❖ The average horizontal distance between the landmarks was 3.5 mm, standard deviation of 2.8 mm.
- ❖ The average vertical distance between the landmarks was 0.15 mm, standard deviation of 9.8 mm.

Conclusions

- ❖ The parietal notch can be reliably identified correctly by a novice in about 92% of our specimens and may be helpful to novice resident surgeons .
- ❖ The parietal notch effectively approximates the location of the sinodural angle in the horizontal plane and vertical plane. The parietal notch was also posterior to the sinodural angle on all specimens, while it was both superior and inferior to the angle in the vertical dimension.
- ❖ The parietal notch serves as a reliable surface landmark of the temporal bone for novice surgeons.

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