

# Anterior Skull Base Osteomas with Paranasal Sinuses Invasion; Surgical Strategy Based on Site of Origin: A Systematic Review



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## Background

Osteomas are benign osseous tumors that predominantly arise within the paranasal sinuses. Their growth patterns are variable, with some remaining asymptomatic and others expanding to cause significant deformities or exert pressure on adjacent intracranial structures. The complexity of these lesions, particularly when involving the anterior skull base, necessitates a careful evaluation of surgical strategies. This systematic review aims to assess the surgical management of anterior skull base osteomas with paranasal sinus invasion, with a focus on the lesion's site of origin and extent.

## Methods

We conducted a comprehensive systematic review of 55 studies, encompassing a total of 409 patients diagnosed with anterior skull base osteomas. We meticulously extracted data on demographics, lesion location, surgical approach, and recurrence rates. Patients were stratified into three distinct groups based on lesion extent and site of origin: Group 1 with osteomas involving the medial part of the frontal sinus (FS), Group 2 with osteomas occupying more than two-thirds of the FS, and Group 3 with skull base osteomas filling the whole FS. We employed statistical methods to analyze the variations in surgical approaches and their outcomes across these groups.

## Results

Our analysis delineated a significant disparity in the surgical management strategies employed across the groups. In Group 1, endoscopic surgery was the predominant approach, utilized in 83% of cases, followed by external surgery in 11.56%, and combined approaches in 5.44%. Group 2 presented a more balanced distribution, with 31.51% undergoing endoscopic surgery, 34.93% external surgery, and 33.56% combined approaches. Group 3 was primarily managed with external surgery (61.21%) and combined approaches (37.07%), with endoscopic surgery being notably less common (1.72%). Recurrence rates were notably disparate, with Group 1 exhibiting a 16.52% recurrence, Group 2 at 3.97%, and Group 3 at 9.26%. The highest recurrence rates were observed in patients with medial FS lesions and those undergoing endoscopic surgeries exclusively.

## Conclusion

The systematic review elucidates a pivotal correlation between the surgical approach for anterior skull base osteomas and the lesion's extent and site of origin. Our findings advocate that larger lesions, particularly those extensively involving the entire anterior skull base and FS, are more amenable to management with external or combined surgical approaches, while endoscopic endonasal approaches were deployed in osteomas involving the medial part only.

These results emphasize the necessity of individualizing surgical strategies based on the specific characteristics of osteomas to enhance patient outcomes and minimize the risk of recurrence.

