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# A Prognostic Index for Predicting Facial Nerve Outcome Following Resection of Large Acoustic Neuromas

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## Introduction

Facial nerve injury is still a significant concern for patients undergoing resection of large acoustic neuromas due to its established impact on quality of life. This study analyzes the simple ratio of anterior to posterior extension of large (>2.5 cm) acoustic neuromas relative to the internal auditory canal (A/P index) as a tool for predicting risk of facial nerve (FN) injury.

## Methods

One-hundred and five patients who underwent microsurgical resection for large acoustic neuromas were analyzed retrospectively. House-Brackmann (HB) scores were assessed immediately post-operatively, at one month, and at one year. Lateral-medial, inferior-superior, anterior-posterior, and maximum diameters were measured from pre-operative MRI's. These measurements and A/P index were analyzed using univariable and multivariable statistical models to assess relationship to FN outcomes. The retrosigmoid, translabyrinthine, and combined approaches were used, and extent of resection was evaluated.

## Results

For every one standard deviation increase in A/P index, a patient was 3.87 times more likely have a higher post-operative HB score ($p < .0001$). Accordingly, for every one millimeter increase anterior to the IAC, a patient was 16% more likely have a higher post-operative HB score ($p < .001$). After controlling for tumor size, a patient was still 3.82 times more likely have a higher post-operative HB score for every one standard deviation increase in A/P index ($p < .0001$). While larger tumor size trended towards worse post-operative HB scores, it was not statistically significant.

## Conclusions

Our prognostic index may be useful to assess the risk of FN injury pre-operatively for large acoustic neuromas, while also providing information about the tumor-nerve relationship.

## Learning Objectives

To develop and share a reliable prognostic index for facial nerve outcomes following acoustic neuroma resection

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