Predictors of Facial Nerve Dysfunction by Time of Discharge Following Vestibular Schwannoma Resection

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Background

- Facial nerve (FN) preservation is a critical consideration in vestibular schwannoma resection, as **dysfunction can severely impair quality of life.**[1-3]

- FN status at discharge **reflects initial postoperative recovery trajectory** and **influences the need for rehabilitation services**.

- Demographic and clinical predictors of early postoperative FN function remain incompletely characterized.

Objective

- Identify predictors of facial nerve dysfunction at time of discharge following vestibular schwannoma resection.

Methods

- Retrospective, single-center study of patients who underwent first-time surgical resection of sporadic VS between 2004 and 2024.

- FN function at discharge graded using House-Brackmann (HB) scale.

- Following univariate analyses, variables associated with FN dysfunction (p<0.200) were entered onto multivariate ordinal logistic regression model.

## Results: Baseline Characteristics
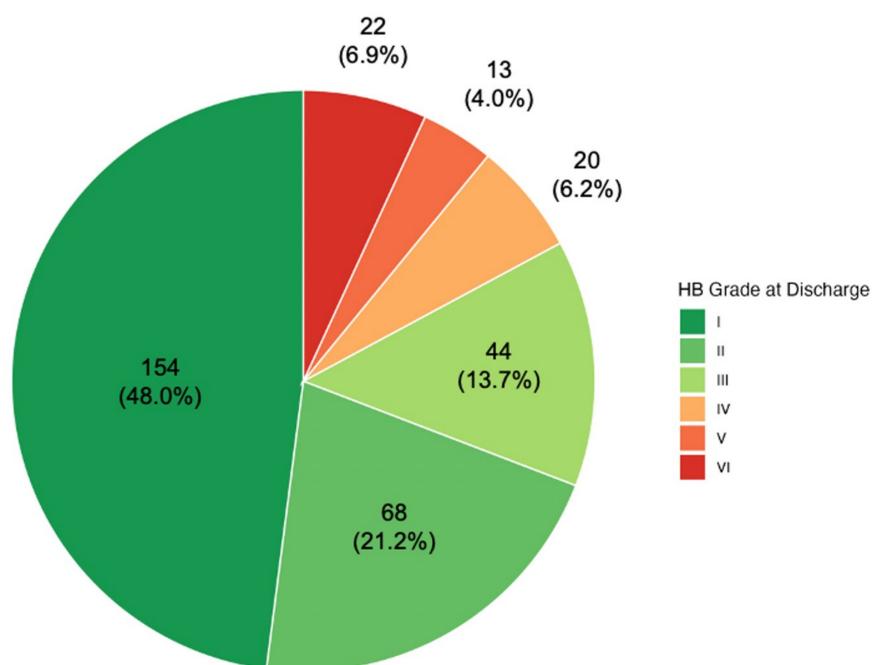
Figure 1. Facial nerve function at discharge following VS resection. Pie chart shows distribution of House-Brackman grades at time of discharge following vestibular schwannoma resection.

Results

Variable	Overall (N=321)	Facial Nerve Dysfunction at Discharge				Sig. (p)
		None (HB I) (N=154)	Mild (HB II) (N=68)	Moderate (HB III-IV) (N=64)	Severe (HB V-VI) (N=35)	
Age, Mean (SD)	51.8 (14.9)	51.1 (14.7)	53.1 (13.1)	52.8 (17.5)	50.9 (14.4)	0.653
Sex, N (%)						0.299
Female	172 (53.6%)	89 (57.8%)	37 (54.4%)	28 (43.8%)	18 (51.4%)	
Male	149 (46.4%)	65 (42.2%)	31 (45.6%)	36 (56.3%)	17 (48.6%)	
Initial Observation >6 Months, N (%)	89 (29.2%)	59 (40.7%) a	12 (17.9%) b	13 (21.0%) b	5 (16.1%) b	<0.001
Prior Radiation Therapy, N (%)	3 (0.9%)	2 (1.3%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	0.853
Pretreatment Hydrocephalus, N (%)	61 (19.3%)	23 (15.2%) a	10 (14.7%) a	12 (19.0%) a	16 (47.1%) b	<0.001
Preop Tumor Volume (cm³), Mean (SD)	10.0 (9.8)	8.1 (8.5) a	8.8 (7.1) a	11.8 (11.4) a	17.3 (12.8) b	<0.001
Koos Grade, N (%)						<0.001
1	9 (2.9%)	8 (5.3%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	
2	22 (7.0%)	17 (11.3%)	2 (2.9%)	2 (3.2%)	1 (3.0%)	
3	40 (12.7%)	21 (13.9%)	10 (14.7%)	7 (11.3%)	2 (6.1%)	
4	243 (77.4%)	105 (69.5%) a	56 (82.4%) b	52 (83.9%) b	30 (90.9%) b	*
Fundal Cap, N (%)	144 (45.7%)	73 (48.3%)	29 (42.6%)	29 (46.8%)	13 (38.2%)	0.688
Macrocystic Features, N (%)	64 (20.3%)	26 (17.2%)	12 (17.6%)	15 (23.8%)	11 (32.4%)	0.193
Surgical Approach, N (%)						0.357
Retrosigmoid	273 (85.0%)	130 (84.4%)	60 (88.2%)	55 (85.9%)	28 (80.0%)	
Translabyrinthine	42 (13.1%)	18 (11.7%)	8 (11.8%)	9 (14.1%)	7 (20.0%)	
Middle Fossa	6 (1.9%)	6 (3.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Op Time (min), Mean (SD)	388 (139)	356 (125) a	393 (129) ns	419 (146) b	468 (168) b	<0.001
Extent of Resection, N (%)						0.460
GTR	60 (19.6%)	28 (19.2%)	10 (15.2%)	16 (26.2%)	6 (18.2%)	
STR	246 (80.4%)	118 (80.8%)	56 (84.8%)	45 (73.8%)	27 (81.8%)	
Postop Tumor Volume (cm³), Mean (SD)	1.8 (2.7)	2.1 (3.1)	1.6 (2.2)	1.4 (2.4)	1.5 (1.9)	0.394

Table 1. Demographic and clinical characteristics by HB grade at discharge. Welch's t-test and Wilcoxon rank-sum test were used to compare differences in continuous variables. Pearson's chi-square test was used to evaluate differences in categorical variables; post-hoc Bonferroni-corrected z-tests for independent proportions were used to identify statistically different subgroups across each row, indicated by superscript letters a, b, c, d (ns: not significant).
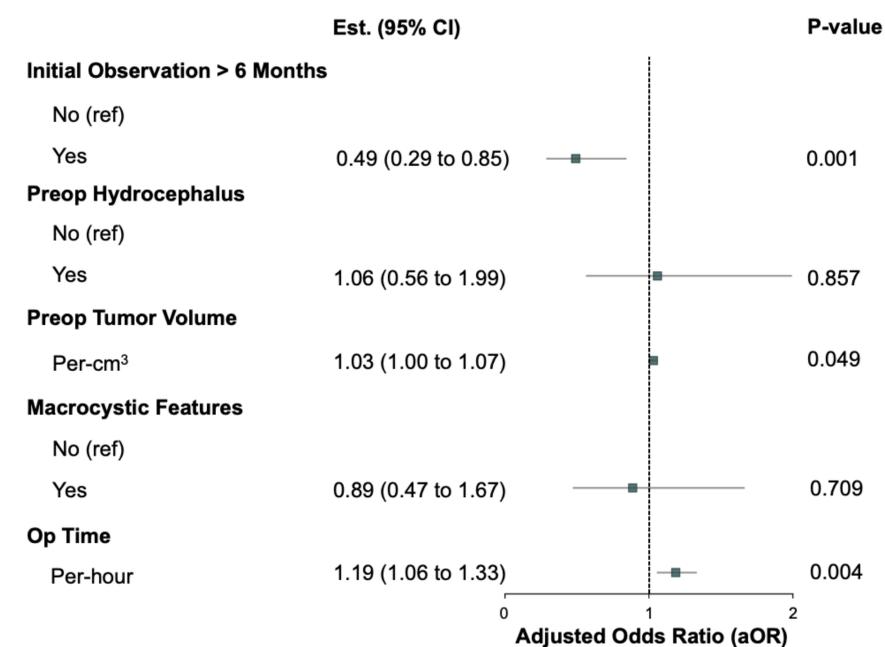
Figure 2. Multivariable ordinal logistic regression predicting HB grade at discharge. Adjusted odds ratios and 95% confidence intervals are shown for all candidate predictors entered onto multivariable ordinal logistic regression predicting HB grade at discharge following vestibular schwannoma resection.

Conclusions

- The **majority of patients maintained normal to near normal FN function at discharge** following vestibular schwannoma resection, while approximately 1 in 10 experienced severe palsy.

- Factors associated with worse FN outcomes included **larger tumor volumes, longer operative duration, and absence of a prolonged observation period prior to surgery**, likely reflecting smaller tumors that were initially observed rather than resected immediately.

References: 1) Falcioni M, Fois P, Taibah A, Sanna M. Facial nerve function after vestibular schwannoma surgery: Clinical article. *JNS*. 2011;115(4):820-826. doi:10.3171/2011.5.JNS101597 **2)** Franz L, Montino S, Agostinelli A, et al. Functional Outcomes and Self-Reported Quality of Life in Patients with Facial Nerve Impairment Following Vestibular Schwannoma Surgery. *Diagnostics*. 2024;14(21):2387. doi:10.3390/diagnostics14212387 **3)** Lassaletta L, Alfonso C, Del Rio L, Roda JM, Gavilan J. Impact of Facial Dysfunction on Quality of Life after Vestibular Schwannoma Surgery. *Ann Otol Rhinol Laryngol*. 2006;115(9):694-698. doi:10.1177/000348940611500908