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Surgical outcomes in idiopathic recurrent facial nerve paralysis; a rare clinical entity

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Abstract

Objective: To evaluate the post-operative facial nerve dysfunction, audiometric outcomes, and long-term quality of life outcomes of patients with idiopathic recurrent facial nerve paralysis (RFP) after middle cranial fossa (MCF) microsurgical decompression.

Methods: Retrospective chart analysis of 11 (mean age 37.0 years, range 5–67) patients at an academic tertiary referral center who underwent MCF facial nerve decompression. Data analysis included evaluation of pre- and post-operative House-Brackmann (HB) score, pre- and post-operative pure-tone average (PTA), pre- and post-operative word recognition scores (WRS), post-operative Facial Clinimetric Evaluation (FaCE) survey.

Results: Mean number of pre-operative facial paralysis episodes was 3.5 (range 2–6) and pre-operative HB score was 4.5 (range 1–6). Post-operatively, 0 patients had further episodes of facial nerve paralysis at an average of 6.5 years (range 0.1 – 17.6) ($p = 0.005$), and the average post-operative HB score was 2.1 (range 1–3) ($p = 0.011$). Post-operative audiometry was stably maintained as assessed with PTA and WRS scores.

Conclusions: Microsurgical facial nerve decompression for idiopathic RFP may be a reliable therapeutic modality to prophylactically decrease the number of facial nerve paralysis episodes and may also help to improve facial nerve functional status.

Keywords

facial nerve; cranial base; quality of life

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Introduction

Idiopathic recurrent facial nerve paralysis (RFP) is a rare clinical entity that affects 4–7% of individuals who have a history of acute, nontraumatic facial nerve paralysis.¹ Idiopathic RFP and isolated, idiopathic, acute facial nerve paralysis, or Bell's palsy, share many clinical characteristics, such as unilateral facial weakness involving all branches of the affected facial nerve. RFP, however, is characterized by recurrent, discrete episodes of ipsilateral facial paralysis separated in time without associated hearing loss and/or other cranial nerve or neurologic deficits. While the clinical course of idiopathic RFP, including age at presentation and frequency of episodes, may be quite variable and unpredictable,¹ there is a tendency towards steady decline in recoverable facial nerve function with each repeated episode of paresis or paralysis.² In contrast to Bell's palsy, RFP is thought to be a different clinical phenomenon with a distinct pathogenesis. Although data are lacking on the etiologies of this rare clinical condition, hypotheses include familial and immune-mediated factors.¹

Given the rarity of the condition, there is also a paucity of data on medical and surgical management strategies.^{1,2} Similar to Bell's palsy, medical management typically consists of an oral corticosteroid course with each recurrent episode. Surgical facial nerve decompression has been variably investigated, although limited by small sample sizes, short follow-up periods, and heterogeneity in surgical approach and extent of facial nerve decompression.^{1,2} In a study by Wu et al, patients with RFP treated with corticosteroids had a 40% recurrence rate compared to 0% who were treated with a transmastoid subtotal facial nerve microsurgical decompression, which included decompression of the mastoid segment, tympanic segment, geniculate ganglion and labyrinthine segment.³ In another study, Zhu et al found that after facial nerve decompression via an MCF approach, 92% of patients did not experience another episode of facial nerve palsy over a mean follow up period of 5.8 years.²

The objective of the current study is to examine the safety and efficacy of middle fossa microsurgical decompression in a series of 11 consecutive patients treated for idiopathic RFP by assessing disease control, adverse effects, long-term facial nerve dysfunction, and implications on quality of life.

Materials and Methods

Subjects

Institutional review board approval was obtained for this study. Inclusion criteria were a history of recurrent, isolated, unilateral facial nerve palsy (>1 episode) and microsurgical decompression of the facial nerve via the MCF approach. Exclusion criteria included facial nerve paralysis due to congenital facial nerve paralysis, neoplasm, temporal bone fracture, infection, Melkerrson-Rosenthal syndrome, and isolated Bell's palsy (1 episode). Between November 2000 and April 2017, 11 patients met these inclusion and exclusion criteria, and their clinical, audiometric, and radiographic data were extracted from medical records and compiled in a database. Pre-operative facial nerve function was assessed at clinic visit using the House-Brackmann score by one of the senior authors. Some but not all patients presented during an acute episode of facial palsy. Facial palsy history

and number of previous episodes was by patient report, although sometimes independent verification was possible via patient-produced photographs or assessment by referral physicians. Electrodiagnostic testing was not routinely employed in the study population pre-operatively as patients often presented to clinic when they were not experiencing an acute episode of facial paralysis. Pre-operative imaging was routinely performed but with significant variation. Magnetic resonance imaging was done in 8 (73%) patients, computed tomography was completed in 9 (82%) patients, and 1 (9%) patient only had a dedicated skull x-ray. Further serologic testing may be ordered based on clinical evaluation but was not routinely done for all patients. As a quaternary referral center, many patients have undergone primary medical work up elsewhere. All patients had isolated facial palsy without evidence of other cranial neuropathies. While serologic data were not available for every patient, preoperative contrast-enhanced MR imaging when completed was unremarkable and did not reveal features suggestive of neurosarcoidosis, neurosyphilis, or neuroborreliosis.

With extensive counseling, facial nerve decompression was offered to patients who had 2 or more episodes of unilateral facial nerve palsy after exclusion of other etiologies. Decompression was performed via a standard MCF approach to the internal auditory canal as previously described at our institution.⁴ Facial neural integrity monitoring was routinely used. In accordance with practice at our institution, audiologic monitoring was not used routinely since only bony decompression without extensive IAC dissection was performed. In each case, facial nerve decompression included the lateral portion of the internal auditory canal (IAC), labyrinthine, geniculate, and proximal tympanic segments (Figure 1). Most critically, constricting dural ring at the meatal foramen of the labyrinthine segment, which is the point of greatest compression of the fallopian nerve segment, was lysed.

Post-operative facial nerve function and number of recurrent episodes were extracted from post-operative clinic visits. As many patients elected to pursue routine post-operative follow-up locally, these data were supplemented by a structured interview conducted by phone for each patient in the study between April and June 2018. In addition, the Facial Clinimetric Evaluation (FaCE) Scale, a validated post-operative quality of life instrument, was administered via paper survey, electronic mailing, or by phone at the time of the interview based on patient preference.^{5,6} The FaCE Scale was not administered pre-operatively as the patients underwent surgical decompression prior to implementation. The FaCE Scale allows for patient-based responses that are able to assess individual functional domains of facial nerve function that are not readily assessed with physician-based scales.⁵ The survey consists of 15 questions, and the answers are subsequently grouped into 6 sub-domains, which include facial movement, facial comfort, oral function, eye comfort, lacrimal control, and social function. A score from 0 to 100 (best) is calculated from a previously established formula.⁵

Audiometry

Pure tone audiometry (PTA) thresholds and word recognition scores (WRS) were assessed on the operated and non-operated surgical side and were completed pre-operatively and post-operatively. PTA thresholds were averaged from air conduction thresholds at 0.25, 0.5, 1, 2, 3, 4, and 8 kHz. When 3kHz was not available, the mean between thresholds at 2

and 4kHz was used.⁷ Per institutional protocol, post-operative audiometry was performed approximately 1 month post-operatively.

Statistical Analysis

Statistical analysis was performed using SPSS 25, Inc., (Chicago, IL). For univariate analysis, T-tests were used for normally distributed data, and Wilcoxon signed-rank tests were used for non-parametric analysis. All tests were considered statistically significant with $p < 0.05$.

Results

Demographic and clinical characteristics of the patient population are summarized in Table 1. The study population was composed of 8 (73%) females and 3 (27%) males, with an age range of 37.0 years (range 5–67 years). The average number of facial nerve palsy episodes on the surgical side prior to surgery was 3.5 (range 2–6), with an average pre-operative HB score of 4.5 (range 1–6). The average length of antecedent spells prior to surgery was 11.6 years (range 0.58–33 years), and each spell lasted an average of 59.6 days (range 7–210 days). The most common presenting symptom was facial paresis/paralysis (100 %), followed by symptoms of otalgia (36%), or facial pain/numbness (27%). One patient presented with a complaint of hearing loss on the affected side, and audiometry showed a moderate mixed hearing loss. A familial history of facial nerve paralysis was present in 2 patients. Routine medical treatment prior to referral and evaluation at our institution included short courses of oral corticosteroids, anti-viral medications, and/or oral antibiotics. Facial paralysis necessitating surgery occurred on the right in 6 patients (55%) vs. the left-side in 5 patients (45%).

Table 2 provides a comprehensive clinical and treatment description of each of the 11 patients. Post-operatively, facial palsy did not recur in any patient up to a follow-up period of 6.5 years (range 34 days–17.6 years), representing a significant improvement ($p < 0.05$) compared to pre-operatively (Figure 2). Post-operatively, the average HB score was 2.1 (range 1–3) at the most recent clinic visit (12.6 months, range 1.1–31.5 months). Similarly, post-operative HB score is significantly ($Z = -2.539$, $p = 0.011$) improved at the most recent clinical assessment (12.64 months, range 1.1–31.5) compared to pre-operative assessment (5 days, range 1–13 days), as seen in Figure 3. Eight of the 11 patient's post-operative HB score improved from pre-operatively, while 3 patients stably maintained facial nerve function (HB I, II, and III) after surgical decompression. However, due to rarity of this clinical entity, the limited study population accrued here is not sufficiently powered to address clinical or pathologic factors correlated with HB improvement. There were no significant complications, such as cerebral spinal leak, hearing loss, or infection during the post-operative period other than a prolonged hospitalization due to aphasia and temporal lobe swelling which resolved prior to discharge.

Figure 4 evaluates the patients' audiometry with a composite audiogram, which compares pre- (8.4 days, range 1–27 days) and most recent post-operative (mean 5.2 months, range 0.87–13.3 months) audiometry findings. No significant difference was detected between pre- and post-operating pure-tone thresholds or WRS, except for 8 kHz.

FaCE Scale survey was completed by 73% (8 of the 11) patients. Results are depicted in Figure 5. There was an average follow-up time of 8.5 years (range 2.8–17.9 years). Of the sub-domains assessed, the highest scores were eye comfort (87.5) and facial comfort (75.9), while lacrimal control (36.1) received the lowest score. The mean total FaCE score was 69.5. As depicted, there is much heterogeneity among the individual sub-domains and also within the cohort. All patients who completed the survey reported significant subjective improvement post-operatively with respect to the functional status of the affected facial nerve. There was no statistically significant relationship between post-operative HB score and total FaCE score ($p > 0.05$). Table 2 is a summary of previous retrospective studies.

Discussion

Idiopathic RFP is confined to a small subset of patients with acute idiopathic facial nerve palsy, and the clinical presentation is heterogeneous. Initial age at presentation, number and intensity of facial nerve palsy episodes, and time interval between episodes are highly variable.¹ The etiology of this rare clinical entity has not been well studied and continues to be widely debated.^{1,8} A small retrospective review by Yetiser et al. suggested a role for an immune-mediated pathogenesis.¹ Other hypotheses include a familial predilection and chromosomal mutations.¹ Another possibility is that idiopathic RFP may also be due to recurrent activation of a latent viral infection akin to recurrent episodes of oral ulcers due to reactivation of herpes simplex virus. Interestingly, in an analysis of 140 patients, Pitts et al. found a 2.5 higher incidence of diabetes mellitus in patients with RFP compared to Bell's palsy, but only 1 patient in our cohort had diabetes.⁹

Medical management with oral corticosteroids and antiviral medications continues to be a cornerstone in the treatment of both Bell's palsy and idiopathic RFP. While surgical management via hearing preservation MCF approach for decompression of the perigeniculate facial nerve has demonstrated clinical benefit in carefully selected patients with Bell's palsy,^{10,11} its extension to idiopathic RFP has not been well studied. Surgical decompression in Bell's palsy is based on electrodiagnostic criteria aimed at maximizing likelihood of favorable facial nerve recovery in those with complete paralysis and poor prognostic features of the electrodiagnostic testing.¹² In contrast, the relapsing-remitting course of idiopathic RFP implies that many patients present with incomplete facial paralysis, worsening recovery of facial function following episodes or even normal facial nerve function. Therefore, the primary candidacy criterion is a patient history of recurrent facial palsy rather than objective electrodiagnostic testing, and the primary goal of decompression to decrease the likelihood of future episodes of facial palsy rather than improving the likelihood of favorable facial nerve outcome from preexisting paralysis.

Consistently, we found that surgical intervention significantly decreased the frequency of facial palsy episodes compared to pre-intervention in both absolute number of episodes and when normalized by clinical timescale. Indeed, over an average follow-up period of 8.8 years, no recurrence occurred in any patient. These results are similar to previous studies by Zhu et al and Li et al, where only 8.3% (1 of 12) and 6.2% (1 of 16) had further episodes of paralysis after MCF decompression and combined MCF and transmastoid decompressions, respectively.^{2,13} Furthermore, evaluation of pre- and post-operative audiometry with PTA

and WRS demonstrated that hearing was unchanged on the affected surgical side without conductive hearing loss from exposure of the ossicles. Further, no adverse events occurred as a result of surgery.

Secondary outcomes of the current study assessed whether the functional status of the facial nerve improved after surgical decompression. Consistent with previous reports, patients presented with a functional deficit of the facial nerve that had deteriorated after subsequent episodes of paralysis.² Seventy-three percent of patient's facial nerve functional status improved, while the remaining patients stably maintained their functional status. Some patients in the cohort elected for facial nerve decompression during an acute phase of paralysis. When these patients suffered an acute episode of paralysis resulting in a complete paralysis, they underwent decompression during this phase. As would be expected, the facial nerve function improved following this acute episode. Thus, the facial nerve function was a HB VI prior to decompression but the baseline function would have been improved but impossible to grade given that these patients presented during an acute episode of paralysis. In our cohort, no patient had complete paralysis for many years prior to decompression. Other patients elected for surgical decompression after recovery from multiple episodes of facial paralysis but not during an acute phase of paralysis. In these cases, the preoperative facial nerve function reflects the baseline function. These results suggest microsurgical decompression does not worsen baseline facial nerve function, and it may improve facial nerve function in select cases.

The extent of decompression has also been subject for debate.^{2,14} Consistent with neurogenic edema exacerbated by constriction at the meatal foramen of the labyrinthine segment seen in Bell's palsy, we applied similar principles of decompression to patients with idiopathic RFP and intraoperative observations indeed also indicated perigeniculate edema in a majority of patients. Other approaches proposed in literature, such as transmastoid decompression, do not provide adequate access to the perigeniculate region while preserving hearing.¹⁴

We sought to evaluate facial nerve-specific quality of life using an instrument previously applied in cohorts with skull base pathologies.^{5,15} This validated assessment survey allowed us to explore the subtle differences in components of facial nerve function that are not readily addressed in aggregate scores such as the HB scale. Sub-domain analysis showed much variation in their outcomes with the highest scores in facial comfort and eye comfort. Lacrimal control scored the lowest, which may be reflective of greater superficial petrosal nerve (GSPN) dysfunction secondary to poorer regenerative capacity of the parasympathetic fibers compared to motor fibers following nerve injury and/or further injury to those fibers from dural elevation in MCF approaches. Morbidity associated with GSPN dysfunction is seldom examined in depth in clinical cohorts although it is evident that it can have significant impact on quality of life independent of facial motor function. All survey responders reported a significant facial nerve functional benefit after definitive surgical management, and the majority of patients did not limit their social function due to facial paralysis. There was no predictive pattern between HB score and total FaCE score in this small cohort of patients.

The timing of decompression in our subjects was variable. It was rare for the subjects to present within 14 days of the onset of the most recent paralysis as is our rule for decompression for Bell's palsy with severe neural degeneration documented on electroneurography testing. The choice of timing was based on the patient's desire. We counseled patients that they could have the decompression scheduled now or at the time of their next episode of paralysis. Most wanted to prevent another episode and elected to proceed with decompression.

To study treatment outcomes in a very rare clinical entity, this retrospective study was conducted in a small cohort of patients all of whom underwent a standardized surgical treatment without a corresponding observation cohort. The small sample size lacked adequate statistical power to explore questions such as whether certain clinical or patient factors may be associated with favorable or unfavorable response to surgical decompression. Future studies employing a larger, prospective cohort including an observation group are needed for validation. Facial nerve function was assessed with the widely utilized HB score, but interobserver variability can exist with patient assessment, as a previous study has shown increased variability with the severity of facial nerve palsy.¹⁵ While the majority of the study patients completed the post-operative survey, 3 patients did not. As with any questionnaire survey, multiple types of bias need to be considered that could affect critical data assessment. The FaCE survey has not been administered in a population with idiopathic RFP, which is a limitation for analyzing this current cohort.

Conclusions

Microsurgical decompression via a middle fossa approach may be a safe and effective definitive treatment in decreasing the number of facial palsy episodes and improving facial nerve functional status in patients with idiopathic RFP. The post-operative quality of life survey shows significant heterogeneity among the individual components of facial nerve function, but all patients who completed the study show an overall clinical benefit from surgical management.

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References

1. Yetiser S, Satar B, Kazkayasi M. Immunologic abnormalities and surgical experiences in recurrent facial nerve paralysis. *Otol Neurotol*. 2002;23(5):772–8; discussion 778. <http://www.ncbi.nlm.nih.gov/pubmed/12218633>. [PubMed: 12218633]
2. Zhu Y, Yang Y, Wang D, Dong M. Idiopathic recurrent facial palsy: Facial nerve decompression via middle cranial fossa approach. *Am J Otolaryngol*. 37(1):31–33. doi:10.1016/j.amjoto.2015.09.004.
3. hui Wu S, Chen X, Wang J, Liu H, zhong Qian X, liang Pan X. Subtotal facial nerve decompression in preventing further recurrence and promoting facial nerve recovery of severe idiopathic recurrent facial palsy. *Eur Arch Oto-Rhino-Laryngology*. 2015;272(11):3295–3298. doi:10.1007/s00405-014-2991-9.
4. Woodson EA, Dempewolf RD, Gubbels SP, et al. Long-term hearing preservation after microsurgical excision of vestibular schwannoma. *Otol Neurotol*. 2010;31(7):1144–1152. doi:10.1097/MAO.0b013e3181edb8b2. [PubMed: 20679955]

5. Kahn JB, Gliklich RE, Boyev KP, Stewart MG, Metson RB, McKenna MJ. Validation of a patient-graded instrument for facial nerve paralysis: the FaCE scale. *Laryngoscope*. 2001;111(3):387–398. doi:10.1097/00005537-200103000-00005. [PubMed: 11224766]
6. Leong SC, Lesser TH. A national survey of facial paralysis on the quality of life of patients with acoustic neuroma. *Otol Neurotol*. 2015;36(3):503–509. doi:10.1097/MAO.0000000000000428. [PubMed: 24797569]
7. Gurgel RK, Popelka GR, Oghalai JS, Blevins NH, Chang KW, Jackler RK. Is it valid to calculate the 3-kilohertz threshold by averaging 2 and 4 kilohertz? *Otolaryngol Head Neck Surg*. 2012;147(1):102–104. doi:10.1177/0194599812437156. [PubMed: 22301102]
8. Cirpaci D, Goanta CM, Cirpaci MD. Recurrences of Bell's palsy. *J Med Life*. 2014;7 Spec No.:68–77. <http://www.ncbi.nlm.nih.gov/pubmed/25870699>.
9. Pitts DB, Adour KK, Hilsinger RL. Recurrent Bell's palsy: analysis of 140 patients. *Laryngoscope*. 1988;98(5):535–540. doi:10.1288/00005537-198805000-00012. [PubMed: 3362016]
10. Gantz BJ, Rubinstein JT, Gidley P, Woodworth GG. Surgical management of Bell's palsy. *Laryngoscope*. 1999;109(8):1177–1188. doi:10.1097/00005537-199908000-00001. [PubMed: 10443817]
11. Cannon RB, Gurgel RK, Warren FM, Shelton C. Facial nerve outcomes after middle fossa decompression for Bell's palsy. *Otol Neurotol*. 2015;36(3):513–518. doi:10.1097/MAO.0000000000000513. [PubMed: 25058839]
12. Schularick NM, Mowry SE, Soken H, Hansen MR. Is electroneurography beneficial in the management of Bell's palsy? *Laryngoscope*. 2013;123(5):1066–1067. doi:10.1002/lary.23560. [PubMed: 23619618]
13. Li Y, Li Z, Yan C, Hui L. The effect of total facial nerve decompression in preventing further recurrence of idiopathic recurrent facial palsy. *Eur Arch Otorhinolaryngol*. 2015;272(5):1087–1090. doi:10.1007/s00405-014-2891-z. [PubMed: 24493560]
14. Wu S, Chen X, Wang J, Liu H, Qian X, Pan X. Subtotal facial nerve decompression in preventing further recurrence and promoting facial nerve recovery of severe idiopathic recurrent facial palsy. *Eur Arch Otorhinolaryngol*. 2015;272(11):3295–3298. doi:10.1007/s00405-014-2991-9. [PubMed: 24619203]
15. Scheller C, Wienke A, Tatagiba M, et al. Interobserver variability of the House-Brackmann facial nerve grading system for the analysis of a randomized multi-center phase III trial. *Acta Neurochir (Wien)*. 2017;159(4):733–738. doi:10.1007/s00701-017-3109-0. [PubMed: 28188418]

Abbreviations: IAC, internal auditory canal; M, malleus; T, tympanic segment; G, geniculate ganglion

Figure 1:
Intraoperative photograph of a left middle fossa approach demonstrating a total microsurgical decompression, from the lateral internal auditory canal to the proximal tympanic segment of a facial nerve.

Figure 2:

Comparison of amount of pre- vs post-operative facial palsy episodes. A) Amount of facial palsy episodes is normalized to year (mean 0.852, range 0.125 – 2) with respect to each patient. B) Total amount of facial palsy episodes (mean 3.5, range 2–6) per patient. Wilcoxon signed-rank test demonstrated a significant difference ($Z = -2.827$, $p = 0.005$) between pre- and post-operative facial palsy episodes.

Figure 3:

Comparison of pre-operative vs. post-operative House-Brackmann score. Patients with a HB of VI were surgically treated during an acute episode of paralysis. Wilcoxon signed-rank test demonstrated a significant difference ($Z = -2.539$, $p = 0.011$) between pre- and post-operative score.

Figure 4:

Composite pure-tone audiogram and word recognition scores of study patients at pre-operative visit and post-operative visit demonstrating that hearing is stably maintained after facial nerve decompression. T-test comparison showed no significance difference between pre-operative frequency and post-operative frequency ($p > 0.05$) except for 8000 Hz ($p = 0.041$).

Figure 5:

A post-operative quality of life instrument with respect to facial function using the Facial Clinimetric Evaluation scale. As depicted, there is significant heterogeneity in sub-domains with respect to facial nerve functional status. The highest scores were seen in facial comfort (75.9) and eye comfort (87.5), while lacrimal control (36.1) received the lowest sub-domain score. 100% of patients who completed the survey reported significant benefit compared to their pre-operative facial nerve function.

Table 1:

Summary of clinical and demographic characteristics of patients undergoing microsurgical decompression of the facial nerve for idiopathic recurrent facial nerve paralysis

	<i>n</i> = 11
Age at time of surgery in years; mean (range)	37.0 (5–67)
Gender; n (%)	
Female	8 (73%)
Male	3 (27%)
Pre-operative FN paralysis episodes; mean (range)	3.5 (2–6)
Clinical features associated with presenting episode (%)	
Facial weakness or paralysis	100%
Otagia	36%
Facial pain or numbness	27%
Surgical laterality; n (%)	
Right	6 (55%)
Left	5 (45%)
HB score; mean (range)	
Pre-operative clinic visit	4.5 (1–6)
Post-operative clinic visit	2.1 (1–3)

Abbreviations: FN, facial nerve; HB, House-Brackmann

Patient	Gender	Age at onset	Age at surgery	Presenting symptoms	Duration from initial facial paralysis until surgery (years)	Facial palsy episodes		House-Brackmann score		Follow-up (years)
						Pre-operative	Post-operative	Pre-operative	Post-operative	
1	F	17	25	R FP	8	2	n/a	VI*	I	34 days
2	M	25	57	L FP	33	4	0	VI*	II	12.4
3	F	44	67	R FP R otalgia	23	3	0	VI*	II	10.9
4	F	17	31	R FP R otalgia Headache	14	6	0	III	III	8.7
5	F	3	5	L FP L facial pain	1.8	3	0	VI*	III	8.5
6	M	17	18	L FP L ear fullness and otalgia	1	2	0	VI*	III	4.7
7	M	20	21	L FP L hearing loss	14	2	0	II	II	4
8	F	47	58	L FP	11	4	0	VI*	II	1.9
9	F	24	51	R FP R facial paresthesia	27	6	0	III	I	2.8
10	F	11	16	R FP R facial pain Hyperacusis	5	3	0	I	I	1.2
11	F	53	56	R FP R otalgia	3	3	0	IV	II	17.6

Abbreviations; F, female; M, male; L, left; R, right; FP, facial paralysis

* Indicates surgery occurred during an acute episode of facial paralysis

Table 3:

Summary of previous retrospective studies

Authors	Year	N	Surgical decompression	Recurrence rate	Average final FN function	Follow-up (years)
Li et al.	2014	16	Total	6.2%	1.4	4.9
Wu et al.	2014	12	Subtotal	0%	1.7	5.3
Yetiser et al.	2002	4	Subtotal	0%	2.5	5.2
Zhu et al.	2015	18	Total	8.3%	1.9	5.8

Abbreviation: FN, facial nerve