

# A case series on post-traumatic facial nerve palsy



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## ABSTRACT

Road traffic accidents accounts a for substantial proportion of traumatic facial nerve injuries. Facial nerve paralysis causes considerable facial disfigurement and emotional distress to the patient. It can cause detrimental effect on both voluntary and involuntary actions of facial muscles. Importantly, it can interrupt normal daily functions such as eating and drinking. Therefore, early identification and surgical intervention are of prime importance in the management of traumatic facial nerve palsies, which is described below in this case series. The goal is to find out type of temporal bone fractures in patients with traumatic facial nerve palsy, to find out the common site of facial nerve injury in patients with traumatic facial nerve palsy, and to assess the surgical outcomes in patients who underwent facial nerve decompression. Case series of five patients who are admitted in ENT Wards in Rajiv Gandhi Government General hospital with traumatic facial nerve palsy were included in this study. Thorough history taking, otoscopic examination, audiological evaluation, radiological imaging (HRCT temporal bone), topodiagnostic tests, and nerve conduction studies were done in all the five cases. All five patients presented with either grade 3/grade 4 facial palsy according to House–Brackmann’s grading system. HRCT temporal bone showed a fracture line in all the five cases. Electroneuronography showed more than 90% degeneration in all the cases. All the patients underwent facial nerve decompression followed by a course of oral steroids and post-operative physiotherapy. All five cases showed remarkable improvement in facial palsy after surgery with leveling up to House–Brackmann grade 2 and grade 1, early identification of facial nerve palsy due to trauma and prompt management by surgical intervention plays a important role in the management of facial nerve palsy.

**Key words:** Facial nerve; Nerve conduction study; Pure-tone audiometry; House–Brackmann’s grading; HRCT temporal bone

## INTRODUCTION

Facial nerve palsy is one of the important presenting features of temporal bone fractures. Sharp and piercing objects as well as blunt trauma can affect the facial nerve.<sup>1,2</sup> Frequent causes include road traffic accidents, facial injuries or gunshot wounds (often found in urban areas), and iatrogenic injuries from otological head and neck surgeries.<sup>1,3</sup> Stretching, compression, and transection of the nerve are the main modes of injury. Three segments – intracranial, intratemporal, and extratemporal or peripheral – make up the nerve’s path from the brainstem to the facial musculature.<sup>1,4,5</sup>

There are several potential reasons of acute facial paralysis, but intratemporal facial nerve palsy is one of the most prevalent ones due to its long course within the temporal bone.<sup>6-8</sup> Thorough clinical history, physical examination, and radiological studies are used to make the diagnosis of facial palsy<sup>9-11</sup> To determine the best timing of surgery and the prognosis, electrophysiological studies are crucial.<sup>15,16</sup> This study aims to emphasize the importance of restoring the facial nerve function by surgical decompression of facial nerve in patients with traumatic facial nerve palsy.<sup>12,13,14</sup> Early identification of nerve degeneration followed by surgical decompression forms the main stay of treatment for post-traumatic facial nerve palsy.

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**Aims and objectives**

The aims of this study were as follows:

1. The goal is to find out type of temporal bone fractures in patients with traumatic facial nerve palsy
2. To find out the common site of facial nerve injury in patients with traumatic facial nerve palsy
3. To assess the surgical outcomes in patients who underwent facial nerve decompression.

**MATERIALS AND METHODS**

**Case series**

**Case 1**

A 45-year-old female with history of RTA 2 weeks back now presented with complaints of

- Right ear bleed for 2 weeks
- Difficulty in closing right eye for 2 weeks
- Right ear hard of hearing for 2 weeks.

Local examination:

EAR:

- Right tympanic membrane-hemotympanum
- Left tympanic membrane-normal

Tuning fork tests	Right	Left
RINNE'S (with 512 Hz tuning fork)	AC > BC	AC > BC
WEBERS	Lateralized to right ear	
Absolute bone conduction	Not reduced	Not reduced

Examination of facial nerve:

	Right	Left
Facial symmetry/asymmetry	Asymmetry +	Normal
Wrinkling of forehead	Absent	Present
Eye closure	Absent	Present
Nasolabial fold	Absent	Present
Deviation of angle of mouth	To left side	

House-Brackmann grade-4

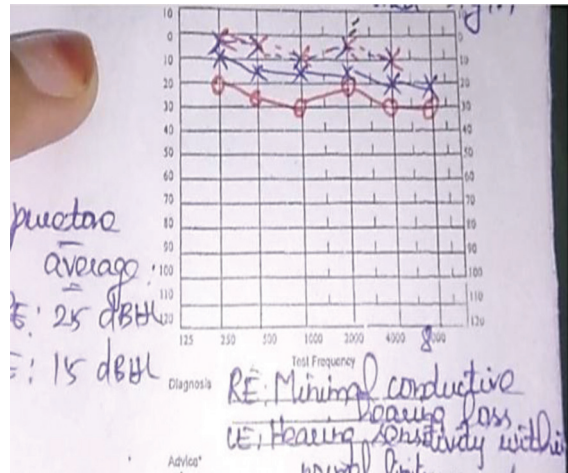
Topodiagnostic tests:

	Right	Left
Schimer's test	Negative	Positive
Stapedial reflex	Ipsilateral-absent contralateral-absent	Ipsilateral-present contralateral-absent
Taste sensation	Reduced over anterior two-third of tongue on the right side	



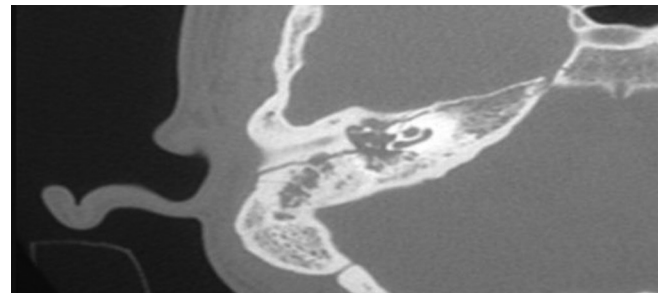
**Investigations**

Pure-tone audiometry



HRCT temporal bone: Linear longitudinal fracture of the right petrous and mastoid bone. A small bony fragment protruding in to external auditory canal

Site of injury: Perigeniculate region near the labyrinthine segment.



Nerve conduction study

Nerve	Stim	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
Nerve: Maxilla-Face-RS	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	3.85	5.43	0.9			
Nerve: Maxilla-Face-LS	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	3.25	21.25	3.9			
Nerve: Oculocardia-ocul-RR	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	3.85	6.25	0.7			
Nerve: Oculocardia-ocul-LS	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	2.60	23.23	4.9			
Nerve: Oculocardia-ocul-RS	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	3.25	22.71	1.1			
Nerve: Oculocardia-ocul-LS	Rate	Lat (ms)	Dist (ms)	Amp	Distal (ms)	NCV (m/s)
1: Styliomastoid	2.92	25.21	4.9			

Post-operative outcome:  
House-Brackmann's grade-2  
Recovery scale-score B

**Case 2**

A 55-year-old male with history of RTA 15 days back now presented with complaints of



- Difficulty in closing right eye for 15 days
- Right ear hard of hearing for 15 days
- Deviation of angle of mouth for 15 days.

Local examination

EAR:

- Right-Hemotympanum present
- Left-normal

Tuning fork tests	Right	Left
RINNE'S (using 512 Hz tuning fork)	AC > BC	AC > BC
WEBERS test	Lateralized to right ear	
Absolute bone conduction	Not reduced	Not reduced

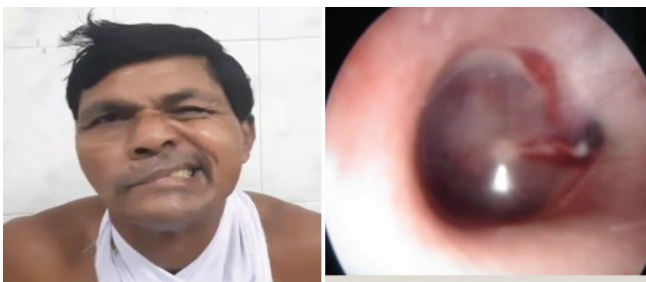
Examination of facial nerve:

	Right	Left
Facial symmetry/asymmetry	Asymmetry +	Normal
Wrinkling of forehead	Absent	Present
Eye closure	Absent	Present
Nasolabial fold	Absent	Present
Deviation of angle of mouth	To left side	

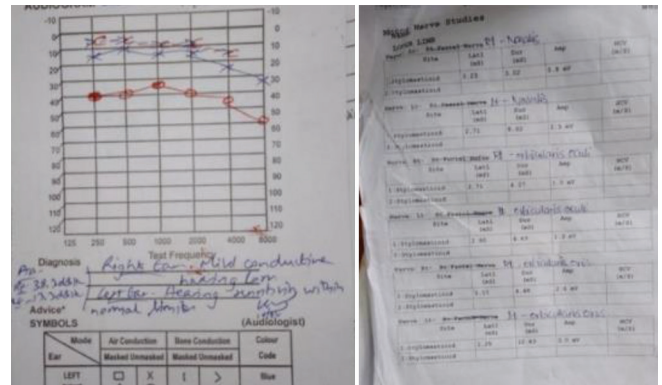
House-Brackmann's grade-4

Topodiagnostic tests:

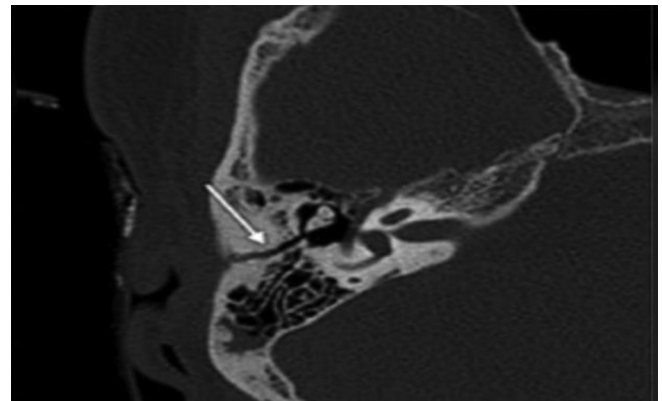
	Right	Left
Schimer's test	Negative	Positive
Stapedial reflex	Ipsilateral-absent contralateral-absent	Ipsilateral-present contralateral-absent
Taste sensation	Reduced over anterior two-third of tongue on right side	



Pure-tone audiometry and nerve conduction study



HRCT temporal bone: Linear longitudinal fracture of the right squamous and petrous bone  
Site of injury: Perigeniculate region.



Post-operative outcome:

House-Brackmann's grade-2  
Recovery scale-score B



Case 3

A 35-year-old female with history of RTA 17 days back now presented with complaints of

- Right ear bleed during trauma
- Difficulty in closing right eye for 17 days

Local examination:

EAR:

- Right: Hemotympanum present
- Left: TM intact



Tuning fork tests	Right	Left
RINNE'S	BC > AC	AC > BC
Webers test	Lateralized to right ear	
Absolute bone conduction	Not reduced	Not reduced

Examination of facial nerve:

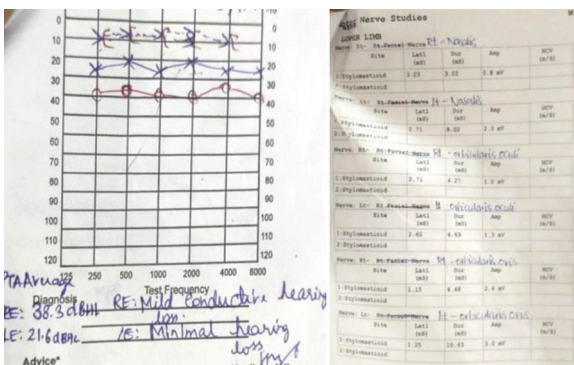
	Right	Left
Facial symmetry/asymmetry	Asymmetry +	Present
Wrinkling of forehead	Absent	Present
Eye closure	Absent	Present
Nasolabial fold	Absent	Present
Deviation of angle of mouth	To left side	

House–Brackmann's grade-2

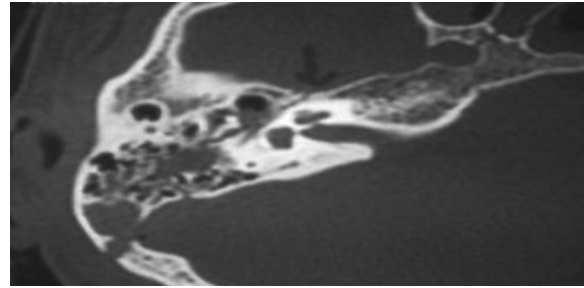
Topodiagnostic tests:

	RIGHT	LEFT
Schimer's test	Negative	Positive
Stapedial reflex	Ipsilateral-absent contralateral-absent	Ipsilateral-present contralateral-absent
Taste sensation	Absent over anterior two-third of tongue on right side	

Pure-tone audiometry and nerve conduction study:



HRCT temporal bone: Oblique fracture extending from petrous and mastoid region of temporal bone.



Post-operative outcome:

House–Brackmann's grade: 2

Recovery scale: Score B



#### Case 4

A 22-year-old male with history of RTA came with chief complaints of

- Difficulty in closing right eye for the past 1 month
- Deviation of angle of mouth to left for the past 1 month

Local examination:

EAR:

- Right-Tympanic membrane – normal
- Left-hemotympanum +



Tuning fork tests	Right	Left
RINNE'S	AC > BC	AC > BC
Webers	Lateralized to left ear	
Absolute bone conduction	Not reduced	Not reduced

Examination of facial nerve:

	RIGHT	LEFT
Facial symmetry/asymmetry	Normal	Asymmetry +
Wrinkling of forehead	Present	Absent
Eye closure	Present	Absent
Nasolabial fold	Present	Absent
Deviation of angle of mouth	To right side	

House-Brackmann's grade-4  
Topodiagnostic tests:

	Right	Left
Schimer's test	Positive	Negative
Stapedial reflex	Ipsilateral-present contralateral-absent	Ipsilateral-absent Contralateral-absent
Taste sensation	Reduced over anterior two-third of tongue on left side	



**Case 5**

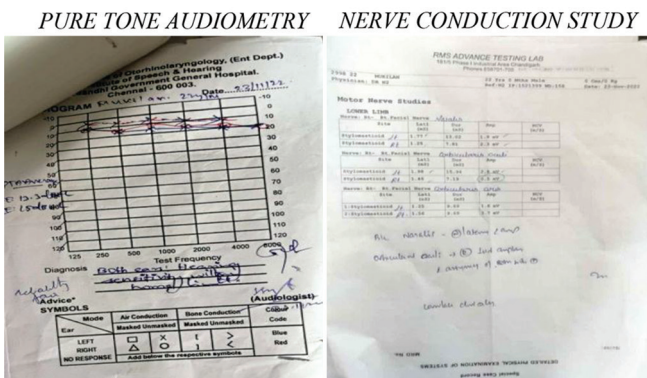
A 40-year-old male with history of RTA presented with chief complaints of

- Inability to close right eye for 10 days
- Deviation of angle of mouth to left for the past 10 days

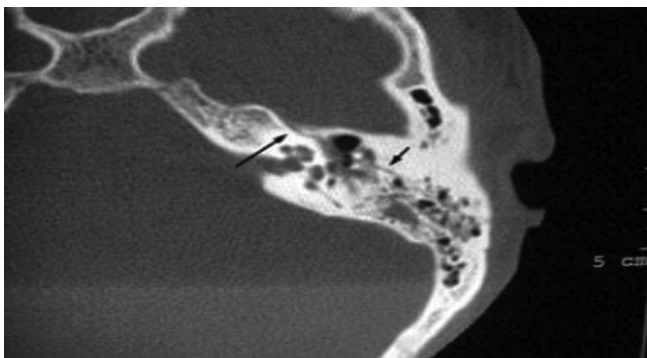
Local examination

EAR

Right tympanic membrane-hemotympanum, left-normal



HRCT temporal bone: A linear longitudinal fracture seen running along the axis of petrous temporal bone. Site of injury: Labyrinthine segment near the geniculate ganglion.



Post-operative outcome:  
House-Brackmann's grade: 2  
Recovery scale: Score B



Tuning fork tests	Right	LEFT
Rinne's	AC > BC	AC > BC
Webers	Lateralized to right ear	
Absolute bone conduction	Not reduced	Not reduced

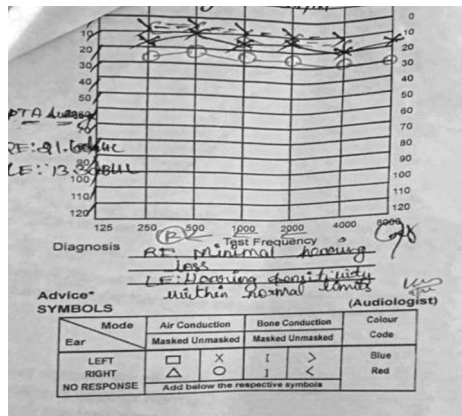
Examination of facial nerve:

	Right	Left
Facial symmetry/asymmetry	Asymmetry +	present
Wrinkling of forehead	Absent	present
Eye closure	Absent	present
Nasolabial fold	Absent	present
Deviation of angle of mouth	To left side	

House–Brackmann’s Grade-4  
Topodiagnostic tests:

	Right	Left
Schimer’s test	Negative	Positive
Stapedial reflex	Ipsilateral-absent contralateral-absent	Ipsilateral-present contralateral -absent
Taste sensation	Reduced over anterior two-third of tongue on the right side	

Pure-tone audiometry



HRCT temporal bone: Linear undisplaced fracture of the right squamous part of temporal bone



Nerve conduction study:

RMS ADVANCE TESTING LAB  
107/8, Phase 1, Industrial Area, Chandigarh  
Phone: 99731755

471 23 BAGHU  
Physician: DR. HA  
40, VPO, BHAH, HALL  
501, PO, HA, 15102274, MOHO, DATES: 15/

**Motor Nerve Studies**

NERVE	STIM	Latency (ms)	Amplitude (mV)	Conduction Velocity (m/s)	Remarks
Nerve: R5 - RL Facial	Latency	14.11	1.00	mp	RT - Normal
	1:100ms	14.11	1.00	mp	
	2:100ms	14.11	1.00	mp	
Nerve: L5 - RL Facial	Latency	13.44	15.63	11.1 m/s	RT - Normal
	1:100ms	13.44	15.63	11.1 m/s	
	2:100ms	13.44	15.63	11.1 m/s	
Nerve: R5 - RL Facial	Latency	12.92	12.50	7.5 m/s	RT - Normal
	1:100ms	12.92	12.50	7.5 m/s	
	2:100ms	12.92	12.50	7.5 m/s	
Nerve: R5 - RL Facial	Latency	3.33	16.46	11.1 m/s	RT - Normal
	1:100ms	3.33	16.46	11.1 m/s	
	2:100ms	3.33	16.46	11.1 m/s	
Nerve: L5 - RL Facial	Latency	2.29	12.00	8.6 m/s	RT - Normal
	1:100ms	2.29	12.00	8.6 m/s	
	2:100ms	2.29	12.00	8.6 m/s	
Nerve: R5 - RL Facial	Latency	1.25	15.63	11.1 m/s	RT - Normal
	1:100ms	1.25	15.63	11.1 m/s	
	2:100ms	1.25	15.63	11.1 m/s	
Nerve: L5 - RL Facial	Latency	3.02	11.27	7.6 m/s	RT - Normal
	1:100ms	3.02	11.27	7.6 m/s	
	2:100ms	3.02	11.27	7.6 m/s	

Post-operative outcome:  
House–Brackmann’s grading: 2  
Recovery scale: Score B



## DISCUSSION

Facial paralysis is a severely disfiguring complication of temporal bone fractures.<sup>17,18</sup> Although traumatic facial nerve palsy is more common in transverse fractures of temporal bone, all the five patients in our case series presented with longitudinal fracture of temporal bone.<sup>19,20</sup> All the five patients underwent surgical decompression of facial nerve following facial nerve palsy post-trauma and they showed marked improvement in post-operative period following facial nerve decompression.<sup>21-23</sup> Out of five patients three males and two were female, among them three cases underwent transcanal facial nerve decompression, other two cases underwent transmastoid facial nerve decompression.<sup>24,25</sup> Post-operative iv antibiotics and oral steroids were given to all the five patients. Serial follow-up was carried out. All the patients had significant improvement from grade 4 to grade 2.

## CONCLUSION

We draw the conclusion from our study that early diagnosis and surgical intervention significantly contribute to an improved prognosis for facial palsy following trauma appropriate post-operative management with oral steroids and physiotherapy plays an important role in traumatic facial nerve palsy.

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