



### Original Research Article

## **A study of facial nerve palsy in a tertiary care hospital in south Rajasthan - A cross sectional observational study**

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### **Introduction**

Face is the interpreter of emotions, mirror of soul, powerhouse of senses and way for communication. Facial nerve is the seventh cranial nerve which serves vital functions of lacrimation, salivation, taste, hearing and facial expression. It necessitates urgent measures to understand the cause and nature of nerve injury and undertake immediate steps for restoration and rehabilitation of facial symmetry. About 90% of lower motor neuron facial nerve disorders- inflammatory, traumatic or neoplastic, happens along its intratemporal course. Over past two decades, many developments have been made. Newer technologies like radiology, electrodiagnostic study and emergence of intraoperative monitoring have been helpful. Complex course within the bony canal, congenital dehiscence, fine branching, interconnections, segmental blood supply, all these factors show significantly, heading towards causation and final result of insult to nerve. A list of etiologies commonly Bell's palsy, followed by Temporal

bone fracture, Iatrogenic trauma, Herpes Zoster Oticus, Otitis Media (OM), Cerebellopontine (CP) angle or Intratemporal neoplasm (facial nerve Schwannoma), result in facial nerve paralysis.

The nerve testing depends on determining the scale of distal axonal degeneration (electrodiagnosis), function of branches of the nerve (topo diagnosis) and radiologic guidance in indicated cases<sup>1</sup>. The pathways of the facial nerve are variable, and knowledge of the key intratemporal and extratemporal landmarks is essential for accurate physical diagnosis and safe and effective surgical intervention.

### **Aims and Objectives**

To know the prevalence and ascertain an etiology of peripheral facial nerve palsy in patients attending our hospital.

### **Justification for Study**

- Facial nerve is the seventh cranial nerve having important functions, and hence its

paralysis can lead to a great deal of mechanical impairment and emotional embarrassment.

- Etiopathogenesis of lower motor neuron facial palsy is still a diagnostic challenge and the literature has shown varying results pertaining to the same.
- This study was designed to sketch out the prevalence of disease causation and the profile of peripheral facial palsy patients presenting to our hospital at Coimbatore.
- By doing so, disease burden to society , finding etiology earlier helps in early diagnosis, treatment and prognosis of the disease can be done promptly.

### Materials and Methods

**Study Type:** Cross - sectional study

**Study Period:** June 2023 – June 2024

**Study Settings:** Department of ENT

Department of General Medicine Department of Neurology

**Study Population:** All patients attending PSGIMSR with lower motor neuron facial weakness/asymmetry

**Sample Size:** 40

**Inclusion Criteria:** All patients with peripheral facial nerve paralysis in the age of 3 years to 80 years.

**Exclusion Criteria:** Infants

Toddler upto age of 3 years Adults above 80 years.

### Methodology

After obtaining ethical committee approval, this study will be carried out in patients with lower motor neuron facial nerve palsy, attending Geetanjali Medical College and Hospital during the period June 2023 to June 2024. After obtaining the patient information and filling it systematically, careful history will be taken regarding commencement, causation, duration and progression. Functions of facial nerve will be evaluated by Topodiagnostic level of voluntary

movement present in facial musculature during clinical testing. Entire ENT evaluation including neurological examination will be done and further assessment included Schirmer's test, acoustic reflex, subjective taste sensation tests , routine laboratory investigations and audiological evaluation . We will undertake comprehensive radiology including High-Resolution Computed Tomography (HRCT) of temporal bone and Magnetic Resonance Imaging (MRI) of temporal bone if indicated. The ethical considerations are strictly followed and data obtained from the study will be kept confidential and disclosed only for scientific purpose(s).

### Flowchart

All patients with peripheral facial nerve paralysis attending the hospital satisfying inclusion and exclusion criteria.



Informed and Written consent shall be taken



History and physical examination as in variables recorded



Patient fit for study



Data will be recorded



Clinical examination, Topodiagnostic tests, Blood tests and Radiological Examination if indicated will be done.

### Results

In this study we evaluated 40 patients presented with peripheral facial nerve palsy between the age group of 3 and 80 years and patients who were not willing were excluded.

All the statistical data entered in MICROSOFT EXCEL SHEET for master chart preparation.

The collected data were analysed with IBM SPSS Statistics for Windows, Version

26.0. (Armonk, NY : IBM Corp ). To describe the data descriptive statistics frequency analysis and

percentage analysis were used for continuous variables.

Pie and bar graph have been used for pictographic representation . Values are expressed in numerical and percentage as %.

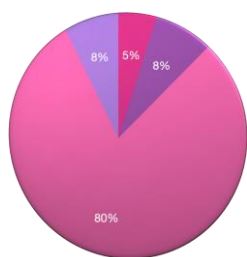
In the study process we found that ,

**Table 1 - Age Incidence (N=40)**

S.NO	AGE	FREQUENCY	PROPOTION
1	3-12 YEARS	2	5%
2	13-19 YEARS	3	8%
3	20-64 YEARS	32	80%
4	65-80 YEARS	3	8%

In our study we examined 5% of patients in 3-12 years , 8 % of patients between 13-19 years , 80% of patients between 20-64 years and 8 % of patients between 65-80 years.

● 3-12 YEARS ● 13-19 YEARS ● 20-64 YEARS ● 65-80 YEARS

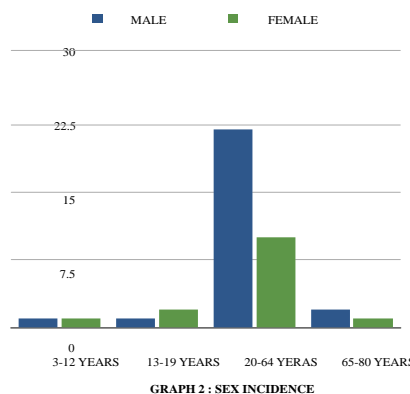


**Graph 1 : Age Incidence**

**Table 2 - Sex Incidence (N=40)**

	3-12 YEARS	13-19 YEARS	20-64 YEARS	65-80 YEARS	PROPOTI ON
MALE	1	1	22	2	65%
FEMALE	1	2	10	1	35%

In our study out of 40 patients 65% were male and 35% were female and among thennumber of male patients were 1,1,22,2 in the age group between 3-12 years, 13-19 years, 20-64 years, 65-80 years respectively and female patients were 1,2,10,1 in the age group between 3-12 years, 13-19 years, 20-64 years, 65-80 years respectively.

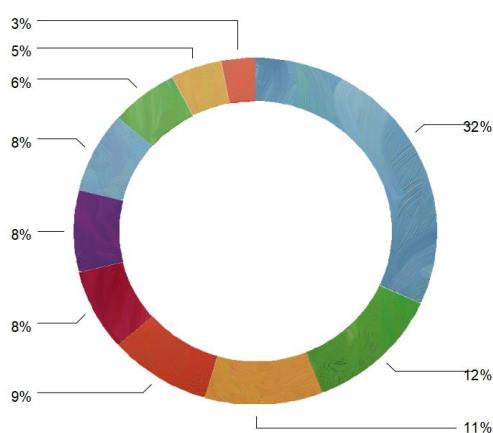


**Table 3 - Presenting Complaints**

COMPLAINTS	FREQUENCY	PROPOTION
DEVIATION OF MOUTH TOCONTRALATERAL SIDE	21	52.5%
HARD OF HEARING	8	20%
EAR DISCHARGE	7	17.5%
POST SURGERY	6	15%
EAR PAIN	5	12.5%
IPSILATERAL EAR RINGINGSENSATION	5	12.5%
TRAUMA & EAR BLEEDING	5	12.5%
FACIAL ASYMMETRY	4	10%
VERTIGO	3	7.5%
SKIN LESIONS OVER FACE	2	5%

In our study 52.5% of patients presented with deviation of mouth to contralateral side of face and 20% with hard of hearing on same side and 17.5% and 10% of patients presented with ear discharge and 15% patients presented with peripheral facial nerve palsy post surgery . 12.5% patients presented with facial palsy following trauma which was associated with ear bleeding. 7.5% of the study patients presented with vertigo and vesicle like skin lesion were present in 5% of our study population.

- DEVIATION OF MOUTH TO CONTRALATERAL SIDE 32%
- HARD OF HEARING 12%
- EAR DISCHARGE 11%
- POST SURGERY 9%
- EAR PAIN 8%
- IPSILATERAL EAR RINGING SENSATION 8%
- TRAUMA & EAR BLEEDING 8%
- FACIAL ASYMMETRY 6%
- VERTIGO 5%
- SKIN LESIONS OVER FACE 3%



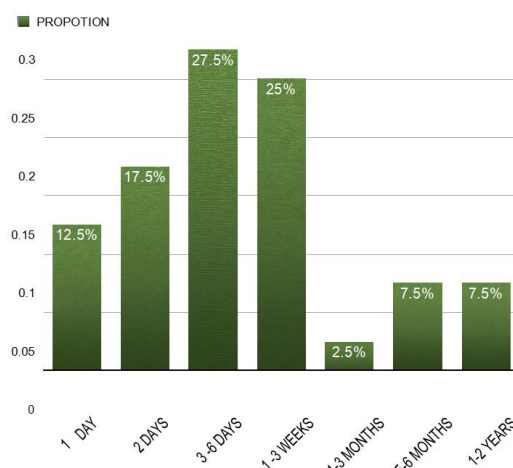
GRAPH 3 : PRESENTING COMPLAINTS

Table 4 - Duration at the time of Presentation

DURATION AT THE TIME OF PRESENTATION	FREQUENCY	PROPORTION
1 DAY	5	12.5%
2 DAYS	7	17.5%
3 -6 DAYS	11	27.5%
1 -3 WEEKS	10	25%
1-3 MONTHS	1	2.5%
5-6 MONTHS	3	7.5%
1-2 YEARS	3	7.5%

In our study 27.5 % of the study population presented during 3-6 days of duration and 12.5 % presented on the very first day and 25% presented with duration of 1-3 weeks and 10 % presented between 1-6 months and 7.5 % presented during 1-2 years duration.

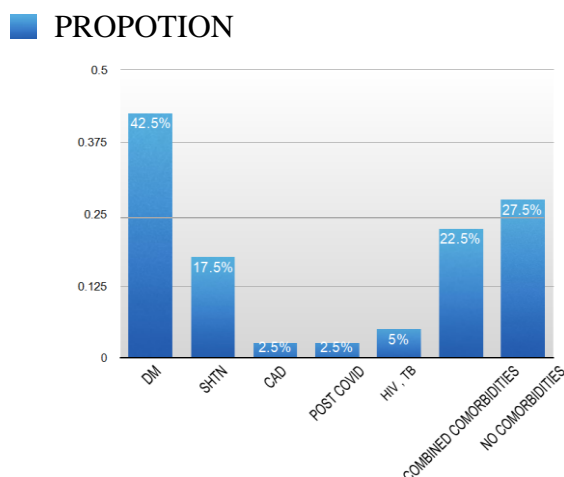
Most common duration at the time presentation was between 3-6 days.



Graph 4 : Duration at the time of Presentation

Table 5 – Comorbidities

COMORBIDITIES	FREQUENCY	PROPORTION
DM	17	42.5%
SHTN	7	17.5%
CAD	1	2.5%
CVA	1	2.5%
POST COVID	1	2.5%
HIV , TB	2	5%
COMBINED COMORBIDITIES	9	22.5%
NO COMORBIDITIES	11	27.5%



Graph 5 : Comorbidities

In our study 42.5% of our study population were found to be diabetic on medications and among them 17.5% had associated systemic hypertension

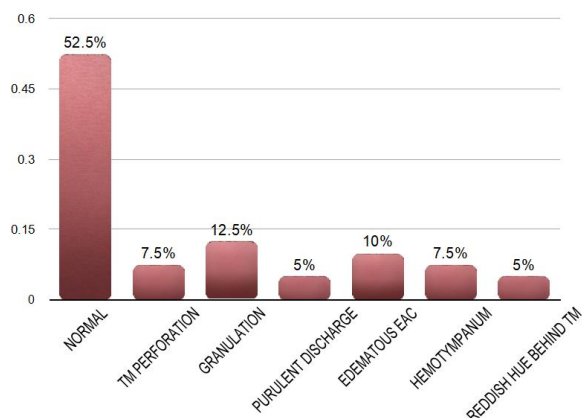
, and 2.5 % had CVA, CAD, 5% had HIV and TB which included 22.5% of combined comorbidities among 40 patients , and 27.5% had no comorbidities . And 1 patient was found to had post covid mucormycosis (5%) which involved multiple cranial nerve palsy.

**Table 6 - Clinical Ear Finding**

EAR CLINICAL FINDING	FREQUENCY	PROPORTION
NORMAL	21	52.5%
TM PERFORATION	3	7.5%
GRANULATION	5	12.5%
PURULENT DISCHARGE	2	5%
EDEMATOUS EAC	4	10%
HEMOTYMPANUM	3	7.5%
REDDISH HUE BEHIND TM	2	5%

In our study 52.5% patients had a normal tympanic membrane on clinical examination, 12.5% had granulation and 10 % had oedematous EAC , 7.5 % had TM perforation and 5% had purulent ear discharge on ipsilateral ear following chronic otitis media and 7.5% had haemotympanum following trauma and 5% reddish hue behind TM due to glomus jugulare.

**PROPORTION**



**Graph 6 : Clinical Ear Finding**

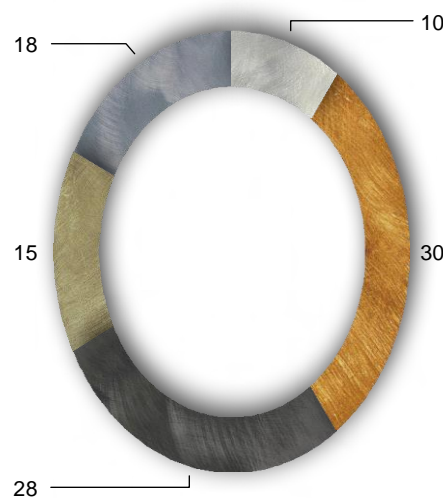
**Table 7 - House Brackmann Grading On Day Of Presentation**

HOUSE BRACKMAN GRADING ON DAY OF PRESENTATION	FREQUENCY	PROPORTION
1/6	0	0%
2/6	4	10%
3/6	12	30%
4/6	11	27.5%
5/6	6	15%
6/6	7	17.5%

In our study 30% of the study population presented with House Brackmann grading of 3/6, 27.5% had 4/6, 17.5% had 6/6, 15% had 5/6, 10% had 2/6.

Most common HOUSE BRACKMANN grading during presentation was 3/6.

● 1/6 ● 2/6 ● 3/6 ● 4/6 ● 5/6 ● 6/6



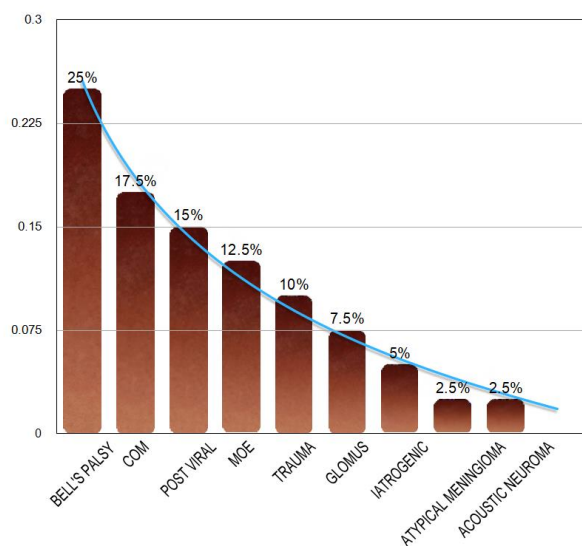
**Graph 7 - House Brackmann Grading During Presentation**

**Table 8 - Etiology of LMN Facial Nerve Palsy**

ETIOLOGY	FREQUENCY	PROPOTION
BELL'S PALSY	10	25%
COM	7	17.5%
POST VIRAL INFECTIONS	6	15%
MALIGNANT OTITIS EXTERNA	5	12.5%
TRAUMA	4	10%
GLOMUS	3	7.5%
IATROGENIC	3	7.5%
ATYPICAL MENINGIOMA	1	2.5%
ACOUSTIC NEUROMA	1	2.5%

In this study it is found that 25% of the study population had Bell's Palsy; 17.5 % had COM ; 15% had following post viral infections . 12.5% had MOE; 10% had trauma; glomus as a cause for LMN facial nerve palsy in 7.5% . 5% of the patients developed LMN facial nerve palsy iatrogenically following MRM, cortical mastoidectomy and submandibular gland resection surgeries. Other causes like atypical meningioma and acoustic neuroma leading to facial nerve palsy were only 2.5%

**PROPOTION**

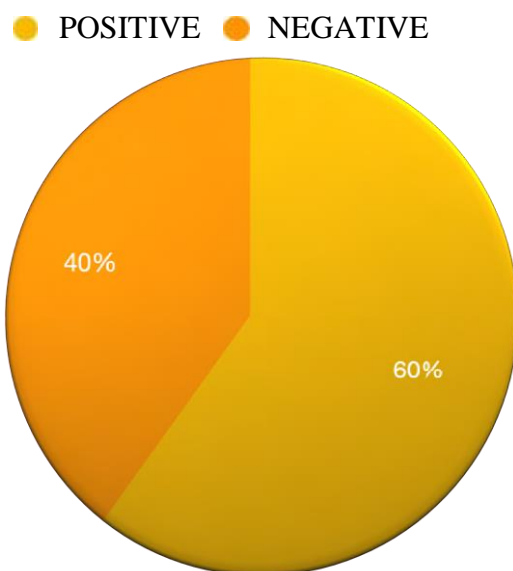


**Graph 8 : Etiology of LMN Facial Palsy**

**Table 9 - Schirmer Test**

SCHIRMER TEST	FREQUENCY	PROPOTION
POSITIVE	24	60%
NEGATIVE	16	40%

In our study we found 60% of the patients tested positive and 40% negative for Schirmer test at the time of presentation with LMN facial nerve palsy.

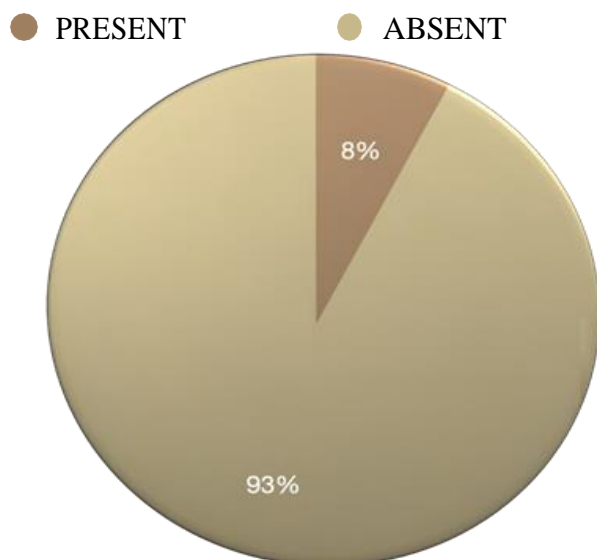


**Graph 9: Schirmer's Test**

**Table 10 - Acoustic Reflex**

ACOUSTIC REFLEX	FREQUENCY	PROPOTION
PRESENT	3	7.5%
ABSENT	37	92.5%

In our study acoustic reflex was absent on 93% of patients and preserved in only 3 % patients who were diagnosed either with post RTA , or post submandibular gland excision with marginal mandibular nerve palsy or retro positive patient presenting with acute clinical features.



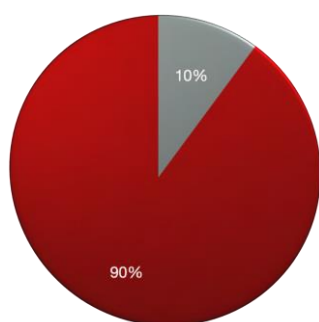
**Graph 10 : Acoustic Reflex**

**Table 11 - Taste Sensation**

TASTE SENSATION	FREQUENCY	PROPOTION
INTACT	3	7.5%
DECREASED	37	92.5%

In our study, 92.5% of the patients had reduced taste sensation and it was found intact in only 7.5% (3 patients ) who are diagnosed with LMN facial palsy post RTA, post submandibular gland excision with marginal mandibular nerve palsy , retroviral disease patient in whom acoustic reflex and taste sensation were preserved

● INTACT ● DECREASED



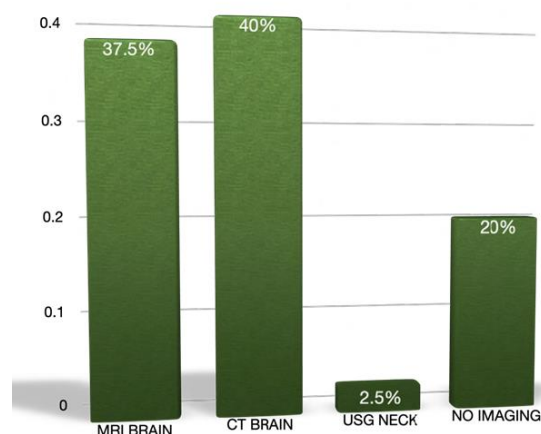
**Graph 11 : Taste Sensation**

**Table 12 - Imaging Modalities**

IMAGING	FREQUENCY	PROPOTION
MRI BRAIN	15	37.5%
CT BRAIN	16	40%
USG NECK	1	2.5%
NO IMAGING	8	20%

In our study MRI Brain has been used as an imaging modality in 37.5 % of patients in whom clinical disease involving soft tissues and vascular structures in brain and 40% patients required CT brain as an imaging modality where skull, petrous and temporal bone were involved.1 patient (2.5%) required USG neck for confirming parotitis. 20% patients have been diagnosed clinically and required no imaging facilities.

■ IMAGING MODALITIES



**Graph 12: Imaging Modalities**

**Discussion**

The study was conducted among 40 participants, with preponderance of male patients (65%) and females (35%) between 4 - 80 years. The most common presenting complaint was deviation of mouth to contralateral side (52.5%) followed by hard of hearing (20%) and were diagnosed with peripheral facial nerve palsy at most common duration of presentation at 3-6 days (27.5%) .

Among our study population 42.5% were found to be associated with diabetes mellitus and associated comorbidities which include SHTN, CVA, CAD, HIV, TB, MUCORMYCOSIS

(22.5%).

The most of our study population had normal ear finding (52.5%) on clinical examination. The other clinical findings included, granulation in EAC (12.5%), oedematous EAC (10%), TM perforation, haemotympanum (7.5%).

We found 30% of the study population presented with HOUSE BRACKMANN grade of 3/6.

The most common cause of peripheral facial nerve palsy was found to be BELL'S PALSY (25%) followed by the second most common cause being chronic otitis media (17.5%). The other causes included post viral infection (15%) malignant otitis externa (12.5%), trauma (10%), glomus jugulare (7.5%) iatrogenic (7.5%) atypical meningioma and acoustic neuroma (2.5%).

Venugopal et al 105 found that trauma (41.7%) contributed to the major proportion of cases. It may be Iatrogenic (20%) or Non-Iatrogenic (21.7%). A large number of road traffic accidents constituted 21.7% cases of facial palsy were accounted for trauma of which 16.7% showed fracture of temporal bone (longitudinal) and 5% showing blunt trauma to temporal region. The second most common aetiology was Bell's palsy (23.3%). Incidence of facial palsy secondary to Chronic otitis media is 67% of which one case was tuberculous otitis media. Cholesteatoma was the most common infective cause. Malignant otitis externa was cause of facial palsy in diabetic patients in whom there was poor glycemic control. 5% of patients had Ramsay Hunt syndrome. Tumour was the cause of facial palsy in 13.3% of patients. Male preponderance of tumour to facial palsy was 83%. Majority of patients in their study was between 31 – 40 years. A slight male predominance was seen. Road traffic accident was common in young males and infectious pathologies were more in woman. Majority reported with House Brackmann grade III palsy (30%), followed by grade IV palsy (25%).

Topodiagnostic tests showed Bell's palsy involving suprageniculate region (44.4%). Iatrogenic trauma was common in infrastapedial

region. Temporal bone fractures had suprageniculate lesion.

Bharathi M et al 123 did a study in which 101 patients were analysed of which 25.7% were in third decade of age; 55.4% were males, and both right and left sides of the face are involved equally. Most patients (50.5%) had a history of post aural pain at presentation. Topodiagnostic tests showed majority of Bell's palsy patients had geniculate or suprageniculate lesions (67.3%) in the study. 20.8% had lesion above the nerve to stapedius, and 11.9% had lesion below the nerve to stapedius. 50.4% of patients had a House-Brackmann (HB) facial nerve grade IV while they presented to study.

But we found that in our study most of the patients with facial nerve palsy at the time of presentation was found to have 3/6.

Topodiagnostic tests among our study population showed 60% positive Schirmer's tests, absent acoustic reflex in 92.5%, compromised taste sensation in 92.5%.

Manish Munjal et al 116 conducted a retrospective study of 500 cases of head injury. 48 patients of facial palsy were taken to study the role of topodiagnostic tests in localizing the lesion site. In 48 patients of facial palsy, taste sensation was decreased in 67% (21 cases); acoustic reflex was absent in 86.8% (33 cases) and Schirmer's test showed decreased lacrimation in 29.1% (14 cases). He also concluded that topodiagnostic tests do not always localize the lesion site in head injury.

In our study we have considered MRI in 37.5% patients, CT in 40% of the patients for localization of the pathology.

At the end the study we found that, Peripheral facial nerve palsy is associated with male preponderance presenting with deviation of mouth to contralateral side on 3-6 days of presentation with most common HOUSE BRACKMANN GRADE 3/6 & etiology being BELL'S PALSY and the site of lesion were localized with the help of topodiagnostic tests and imaging modalities



(MRI/CT/USG).

### Conclusion

On the basis of current clinical prospective cross sectional study we conclude that , the peripheral facial nerve palsy has male preponderance with most common etiology being BELL'S PALSY presenting with contralateral side deviation of mouth & HOUSE BRACKMANN grade 3/6 and site of lesion localised with the help of topo diagnostic tests and non-invasive imaging modalities .

### Limitation of the Study

- This study did not include follow up or recovery of the patients.
- Topodiagnostic tests are less reliable and limited correlation with precise site of nerve damage.
- This study did not use electrophysiologic tests for prognostication.

### Summary

- The study was conducted among 40 participants, with preponderance of male patients (65%) and females (35%) between 4 - 80 years.
- The most common presenting complaint was deviation of mouth to contralateral side (52.5%).
- The most common duration of presentation at 3-6 days (27.5%).
- Among our study population 42.5% were found to be associated with diabetes mellitus.
- The most of our study population had normal ear finding (52.5%) on clinical examination.
- We found 30% of the study population presented with HOUSE BRACKMANN grade of 3/6.
- The most common cause of peripheral facial nerve palsy was found to be BELL' PALSY (25%).

- Topo diagnostic tests among our study population showed 60% positive Schirmer's tests, absent acoustic reflex in 92.5%, compromised taste sensation in 92.5%.
- In our study we have considered MRI in 37.5% patients, CT in 40% of the patients for localisation of the pathology.
- We conclude that, the peripheral facial nerve palsy has male preponderance with most common etiology being BELL'S PALSY presenting with contralateral side deviation of mouth & HOUSE BRACKMANN grade 3/6 and site of lesion localised with the help of topodiagnostic tests and non-invasive imaging modalities.

**Ethical Clearance:** cleared

**Funds:** self / patients

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