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Original Research Article

Management of Trigeminal Neuralgia and Other Facial Pain Syndromes: A 12-Month Retrospective Study from a Dental Teaching Hospital in Eastern India

Bhavna

M.D.S, Department of Oral Medicine and Radiology, Buddha Institute of Dental Sciences and Hospital, Patna, Bihar, India

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Corresponding Author: Bhavna
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Abstract:

Background: Trigeminal neuralgia (TN) and other chronic facial pain syndromes pose diagnostic and therapeutic challenges in dental settings. Evidence from Indian dental hospitals remains limited.

Objective: To describe the clinical profile, treatment patterns, and outcomes of patients with TN and other facial pain syndromes over 12 months.

Design: Retrospective chart review.

Setting: Department of Oral Medicine and Maxillofacial Surgery, Buddha Institute of Dental Sciences and Hospital, Patna, Bihar.

Methods: Records of 100 consecutive patients with documented facial pain (October 2024 – September 2025) were analyzed for demographics, diagnosis, imaging findings, treatment, and outcomes.

Results: Classical TN constituted 55% of cases, secondary TN 10%, idiopathic TN 5%, and other syndromes 30% (post-herpetic neuralgia 12%, burning mouth syndrome 8%, temporomandibular disorder 7%, persistent idiopathic facial pain 3%). Mean age was 54 years; 58% were female. In TN cases, V2 (40%) and V3 (34%) divisions were most affected; triggers were documented in 89%. MRI revealed neurovascular compression in 60% of imaged TN patients. Carbamazepine was the most frequently initiated therapy (60%), followed by oxcarbazepine (15%) and gabapentinoids (20%). Fourteen patients underwent surgical procedures. At 3 months, 71% achieved ≥50% pain reduction (classical TN 85%, secondary TN 50%, post-herpetic neuralgia 58%, burning mouth syndrome 38%). Adverse effects were noted in 25% of patients, most commonly dizziness and somnolence. Recurrence was observed in 25% of responders at a median of 5 months.

Conclusions: Classical TN predominated and responded well to standard medical therapy and procedures. Secondary TN and non-TN neuropathic pains showed poorer outcomes, highlighting the need for tailored management and multidisciplinary care.

Introduction

Facial pain syndromes remain among the most distressing disorders encountered in clinical practice, often leading patients to seek help in dental and oral medicine settings. Trigeminal neuralgia (TN) is the most widely recognized of these conditions, described as brief, unilateral, lancinating or electric shock-like pain affecting one or more divisions of the trigeminal nerve. The disorder typically exhibits features such as sudden onset, triggerability by routine activities like chewing or talking, and the presence of refractory periods. While the exact prevalence varies, epidemiological data suggest an incidence of 4–13 per 100,000 individuals annually, with peak occurrence in middle and older age groups. The impact on daily life is severe, with many patients reporting functional limitations, emotional distress, and impaired quality of life. Apart from TN, dental practitioners often encounter a wide spectrum of chronic orofacial pain disorders including postherpetic neuralgia (PHN), burning mouth syndrome (BMS), temporomandibular disorders (TMDs), and persistent idiopathic facial pain (PIFP). These conditions are diverse in origin—ranging from viral injury in PHN to neuromuscular dysfunction in TMDs—but are frequently indistinguishable at first presentation, underscoring the need for careful evaluation.

The pathophysiology of TN has been studied extensively and provides the basis for both pharmacological and surgical treatment. Classical TN is most commonly linked to vascular compression at the trigeminal root entry zone, leading to focal demyelination and abnormal nerve

conduction. This mechanism explains the dramatic response to sodium channel-blocking drugs such as carbamazepine and oxcarbazepine, which remain the mainstay of therapy. Secondary TN, in contrast, arises from multiple sclerosis plaques, cerebellopontine angle tumors, or other structural causes, and is often less responsive to standard medication. Patients who fail medical therapy or develop intolerable side effects may require surgical or percutaneous procedures including microvascular decompression, radiofrequency rhizotomy, balloon compression, or stereotactic radiosurgery. Other chronic facial pain syndromes demand different strategies: gabapentinoids and tricyclic antidepressants for PHN, clonazepam or antioxidants for BMS, and multimodal conservative approaches for TMD. Despite the variety of available therapies, recurrence is common, drug tolerability is often limited, and outcomes in secondary or atypical cases are generally less favorable than in classical TN.

In the Indian context, diagnosis and management of these conditions present unique challenges. A large proportion of patients initially present to dental hospitals, where neuropathic pain is frequently mistaken for odontogenic pathology. This has historically led to unnecessary extractions or endodontic procedures before appropriate referral is made. Variability in access to advanced imaging such as magnetic resonance imaging (MRI) and in availability of neurosurgical facilities further complicates care. While several tertiary neurology and neurosurgery centers in India have published data on surgical outcomes of TN, there remains a relative scarcity of information from dental institutions, which often serve as the first point of contact for such patients. Moreover, few studies have examined the combined spectrum of TN and non-TN facial pain syndromes in a single hospital cohort. Understanding the clinical profile, diagnostic pathways, and treatment outcomes in this setting is essential not only for improving patient care but also for shaping undergraduate and postgraduate dental training, strengthening referral systems, and fostering multidisciplinary collaboration.

In view of these considerations, the present study was undertaken to review the cases of trigeminal neuralgia and other facial pain syndromes managed at Buddha Institute of Dental Sciences and Hospital, Patna, Bihar, over a continuous 12-month period. The study aimed to document demographic and clinical characteristics, analyze the distribution of trigeminal divisions involved, report imaging findings, describe pharmacological and interventional treatment practices, and evaluate treatment outcomes including pain relief, recurrence, and adverse effects. By consolidating real-world data from a dental teaching hospital in Eastern India, this work seeks to provide valuable insights into the management of facial pain within dental practice. The findings are intended to guide clinicians toward timely recognition and rational treatment planning, and to highlight the need for integrating dental specialists more closely with neurologists, neurosurgeons, and pain physicians in addressing these complex disorders.

Methods

Study design and setting: Retrospective review of patient records at the Department of Oral Medicine and Maxillofacial Surgery, Buddha Institute of Dental Sciences and Hospital, Patna.

Study Period: 12 consecutive months (October 2024 – September 2025).

Sample: 100 consecutive patients with facial pain syndromes documented in outpatient registers and case files.

Inclusion Criteria: Age ≥18 years; documented diagnosis of TN or other chronic facial pain syndrome; available details on treatment and at least one follow-up or recorded early response.

Exclusion Criteria: Pain purely odontogenic without neuropathic features; incomplete records.

Variables: Age, sex, residence, pain distribution, triggers, imaging findings, treatment initiated, procedural interventions, outcomes (≥50% pain reduction at 2 weeks and 3 months), adverse events, recurrence.

Data analysis: Descriptive statistics; χ^2 and t-tests for comparisons; logistic regression for predictors of response.

Ethics: Institutional Ethics Committee approval obtained; patient identifiers removed.

Results

Patient Characteristics: A total of 100 patients with facial pain syndromes were included over the 12-month study period. The mean age was 54.3 ± 12.7 years (range 28–79 years), with a slight female predominance (58% female; n=58). The majority of patients came from Patna district (42%), while the remainder were distributed across other parts of Bihar and neighboring states.

Trigeminal neuralgia (TN) constituted 70% of cases (n=70). Among them, classical TN was the most frequent (55%), followed by secondary TN (10%) and idiopathic TN (5%). Non-TN diagnoses comprised postherpetic neuralgia (12%), burning mouth syndrome (8%), temporomandibular disorders (7%), and persistent idiopathic facial pain (3%).

Table 1: Baseline Characteristics by Diagnosis

Diagnosis	n (%)	Mean age (years)	Female n (%)	Right-sided n (%)	Division involved (TN only)
Classical TN	55 (55)	56.1 ± 10.9	30 (55)	36 (65)	V1: 6, V2: 24, V3: 19, Mixed: 6
Secondary TN	10 (10)	51.4 ± 13.2	6 (60)	6 (60)	V1: 1, V2: 4, V3: 3, Mixed: 2
Idiopathic TN	5 (5)	52.0 ± 11.7	3 (60)	3 (60)	V2: 2, V3: 2, Mixed: 1
Postherpetic neuralgia	12 (12)	60.2 ± 9.4	7 (58)	8 (67)	–
Burning mouth syndrome	8 (8)	57.3 ± 8.7	6 (75)	–	–
Temporomandibular disorder	7 (7)	43.1 ± 12.1	5 (71)	–	–
Persistent idiopathic facial pain	3 (3)	49.0 ± 7.8	1 (33)	–	–

Diagnostic Findings: Imaging was performed in 80% of TN patients (56/70). Neurovascular compression (NVC) was identified in 42 cases (60%), most often involving the superior cerebellar artery. Secondary lesions included multiple sclerosis plaques in 6 patients and cerebellopontine angle tumors in 2 patients. Neurological examination was unremarkable in the majority of classical TN cases, whereas sensory changes were more frequent in secondary TN and PHN patients.

Treatments and Interventions: Carbamazepine was initiated in 60% of all patients, with oxcarbazepine in 15% and gabapentinoids in 20%. Baclofen was used as an adjuvant in 10 cases. A total of 14 TN patients underwent procedural interventions: microvascular decompression (6), radiofrequency rhizotomy (4), balloon compression (3), and stereotactic radiosurgery (1). In addition, peripheral nerve blocks were administered to 12 patients, and botulinum toxin A injections were used in 8 cases.

Table 2: Early and 3-Month Pain Relief Outcomes

Diagnosis	n	Responders at 2 weeks (≥50% reduction)	Responders at 3 months (≥50% reduction)
Classical TN	55	42 (76%)	47 (85%)
Secondary TN	10	4 (40%)	5 (50%)
Idiopathic TN	5	3 (60%)	3 (60%)
Postherpetic neuralgia	12	6 (50%)	7 (58%)
Burning mouth syndrome	8	2 (25%)	3 (38%)
Temporomandibular disorder	7	4 (57%)	5 (71%)
Persistent idiopathic facial pain	3	0 (0%)	1 (33%)
Overall	100	61 (61%)	**71 (71%)**

Adverse Effects and Recurrence: Adverse effects were observed in 25% of patients. The most common were dizziness and somnolence (20 cases), followed by hyponatremia (3 cases) and cutaneous rash (2 cases). Minor bruising was noted in 2 patients following botulinum toxin injections.

The median follow-up duration was 7 months (IQR 4–10). Among the 71 responders at 3 months, 18 patients (25%) experienced recurrence during follow-up, with a median time to recurrence of 5 months (IQR 3–7). Surgical outcomes were generally favorable: 71% achieved immediate pain freedom, and 64% remained pain-free at the last follow-up. Transient hypoesthesia occurred in 3 patients but no major complications were recorded.

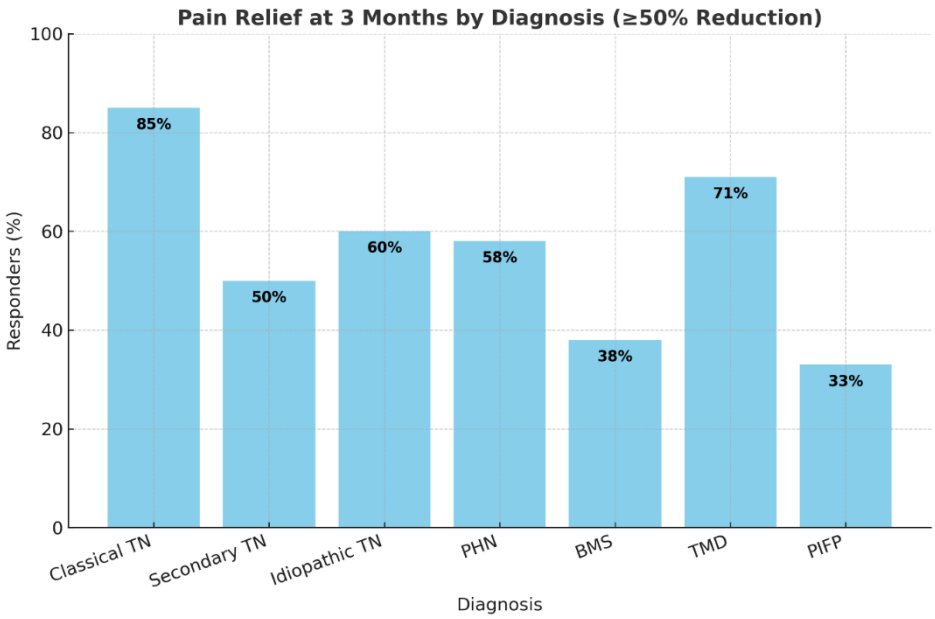

Figure 1: Pain Relief at 3 Months by Diagnosis

Discussion

This review of one hundred patients with trigeminal neuralgia and other facial pain syndromes seen in a dental teaching hospital over a period of twelve months provides a valuable snapshot of the clinical reality in such settings. The majority of cases were diagnosed as classical trigeminal neuralgia, with smaller proportions of secondary and idiopathic forms. Non-neuralgic facial pain syndromes such as postherpetic neuralgia, burning mouth syndrome, temporomandibular disorder, and persistent idiopathic facial pain together represented almost one third of the study population, showing that the spectrum of chronic facial pain encountered in dental practice is wider than is often assumed. Most of the patients with neuralgia presented with maxillary or mandibular division involvement, and triggerability was a consistent feature in classical cases. Imaging was available in a substantial proportion, and in many of these, neurovascular compression was evident, supporting the clinical diagnosis.

The pattern of treatment was in line with international standards, with carbamazepine remaining the most frequently prescribed first-line medication. Oxcarbazepine and gabapentinoids were used either as alternatives or adjuncts, and baclofen was occasionally added. A significant minority of patients eventually required surgical or interventional procedures, including microvascular decompression and percutaneous techniques. Short-term outcomes were generally encouraging, with most patients achieving at least a 50% reduction in pain at three months. The response was particularly good in classical trigeminal neuralgia, while secondary cases and atypical presentations fared less well. Among non-neuralgic conditions, temporomandibular disorder showed better outcomes with conservative management, but burning mouth syndrome and persistent idiopathic facial pain remained refractory to standard measures.

When these results are compared with reports from specialized neurological or neurosurgical centers, the similarities are striking. Classical trigeminal neuralgia continues to dominate the spectrum, and the proportion of cases with vascular compression is consistent with earlier imaging studies. The response rate to carbamazepine in this series is comparable to the figures documented in clinical trials and long-term cohorts, where improvement rates of seventy to ninety percent have been described in early stages of the illness. The poorer results observed in secondary neuralgia mirror the well-recognized impact of underlying structural lesions on prognosis. The outcomes for postherpetic neuralgia, burning mouth syndrome, and persistent idiopathic facial pain resemble those in earlier literature, which has consistently emphasized the limited benefit of conventional drug therapy for these syndromes.

The findings carry important implications for everyday dental practice. Many patients with facial pain initially present to dentists rather than neurologists, and distinguishing between neuropathic and odontogenic pain is crucial. It is not uncommon for such patients to undergo unnecessary extractions or endodontic procedures before an accurate diagnosis is established. This study demonstrates that a structured clinical approach, emphasizing the recognition of paroxysmal pain, trigger zones, and refractory periods, can help avoid

misdiagnosis. It also shows that continuous, burning pain without obvious triggers should alert the clinician to the possibility of burning mouth syndrome or postherpetic neuralgia. The role of imaging becomes clear when atypical features are present, and access to magnetic resonance imaging should be considered whenever the clinical picture is not typical of classical neuralgia.

Another notable aspect is the pattern of adverse effects and recurrence. One quarter of patients developed side effects from medication, most commonly dizziness and somnolence, which is in keeping with the pharmacological profile of sodium channel blockers. Hyponatremia and skin rashes were less frequent but clinically significant. This underlines the importance of monitoring and dose adjustment during follow-up. Recurrence was recorded in a quarter of patients who initially responded, with a median interval of five months, a figure that closely parallels international observations. Such relapses emphasize the chronic and relapsing nature of these conditions and the need for ongoing surveillance and timely intervention, including consideration of surgical referral for those with repeated episodes.

The presence of non-neuralgic conditions such as burning mouth syndrome and persistent idiopathic facial pain highlights the complexity of orofacial pain in a dental setting. Burning mouth syndrome, in particular, remains difficult to treat, with only a minority of patients reporting meaningful improvement. Its multifactorial etiology, involving neuropathic, hormonal, and psychological elements, calls for a multidisciplinary approach that goes beyond pharmacological interventions. Similarly, persistent idiopathic facial pain represents a challenging diagnosis of exclusion and often requires careful counseling, psychological support, and long-term follow-up. Temporomandibular disorder, although less frequent, responded better to conservative strategies, reinforcing the value of physiotherapy, occlusal appliances, and behavioral modification.

Like all retrospective reviews, this study has limitations. Data quality depended on the accuracy of clinical records, and some information such as quality-of-life measures and standardized pain scales was incomplete. Follow-up was not uniform across patients, which restricted evaluation of long-term outcomes. The relatively small number of surgical procedures performed also limits broader conclusions about their effectiveness, though the results observed here are in line with the literature. Not all patients underwent advanced imaging, which may have led to under-recognition of vascular compression or secondary lesions. Despite these limitations, the consecutive inclusion of patients and the diversity of conditions covered provide a realistic overview of the burden and management of facial pain syndromes in a dental hospital environment.

The study underscores several directions for future work. Prospective studies with standardized diagnostic and outcome measures are needed to confirm these findings and better assess quality-of-life changes. The development of integrated care pathways linking dental hospitals with neurology, neurosurgery, and pain clinics would improve early recognition and ensure timely referral for advanced management. Training programs for dental professionals should include focused teaching on distinguishing neuropathic from odontogenic pain, as early identification can reduce unnecessary procedures and shorten the time to effective therapy. Finally, more research is required into the mechanisms and management of burning mouth syndrome and persistent idiopathic facial pain, which remain poorly responsive to current treatments.

In summary, this review highlights that classical trigeminal neuralgia remains the most common facial pain disorder encountered in dental practice, with favorable outcomes when managed appropriately with carbamazepine and, where necessary, surgical procedures. Secondary neuralgia and non-neuralgic syndromes are more resistant to treatment, requiring individualized, often multidisciplinary strategies. The recurrence of symptoms and the frequency of adverse drug reactions remind clinicians that long-term follow-up and patient education are essential. By presenting the experience of a dental teaching hospital in Eastern India, the study emphasizes the important role dentists play in the early recognition and ongoing management of facial pain syndromes, and the need for closer integration with other specialties to improve patient outcomes.

Conclusion

In this 12-month retrospective review of 100 patients, trigeminal neuralgia was the most frequent facial pain syndrome presenting to a dental teaching hospital, with classical cases showing the highest rates of pain reduction after carbamazepine therapy and, in selected patients, surgical intervention. Secondary trigeminal neuralgia and non-neuralgic disorders, including postherpetic neuralgia, burning mouth syndrome, and persistent idiopathic facial pain, demonstrated lower response rates, reflecting their more complex pathophysiology and limited treatment options. Temporomandibular disorders responded favorably to conservative measures. Adverse drug effects were reported in one quarter of patients, and symptom recurrence occurred in a similar proportion, underscoring the need for ongoing monitoring and timely adjustment of management strategies. These findings highlight the central role of dental hospitals in the initial

recognition and treatment of facial pain and the importance of multidisciplinary referral pathways to optimize outcomes in patients with refractory or atypical presentations.

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