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Original Research Article

Patterns, triggers and relieving factors of pain in third molar pericoronitis: a cross-sectional study

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ABSTRACT

Background: Pericoronitis is a common inflammatory with pain being one of its most prominent clinical manifestations. Yet, the specific characteristics and patterns of pain associated with pericoronitis remain relatively underexplored. This study aimed to assess the pattern of pain associated with pericoronitis in the third molar region.
Methods: A cross-sectional observational study was conducted among 359 patients with third-molar pericoronitis. Data were for type, onset, severity, aggravating factors, relieving factors and clinical symptoms was collected. Clinical and radiographic examination was performed to confirm the presence and eruption status of the affected third molar.
Results: Throbbing pain was the most commonly reported pain type (49.86%), followed by dull (29.81%) and sharp pain (20.33%). Pain onset was predominantly gradual (74.37%).
Eating hard food was the most frequently reported factor aggravating pain (42.34%), followed by poor oral hygiene (28.69%). Moderate pain was the most common severity grade (48.47%), followed by mild (31.20%) and severe pain (15.32%). Avoiding chewing on the affected side was the most frequently reported relieving measure (43.25%).
Conclusions: Pain associated with third-molar pericoronitis predominantly presented as gradually developing, throbbing, and moderate in severity. Mastication, particularly eating hard food was the most common aggravating factor while avoidance of chewing on the affected side was the most frequently reported relieving measure

Keywords: Pericoronitis, Third molar, Pain characteristics, Aggravating factors, Cross-sectional study

INTRODUCTION

Pericoronitis is a common inflammatory condition that affects the contiguous soft gingival tissue surrounding partially erupted or impacted third molars, particularly in the mandibular region.[1] It typically observed during the second and third decades of life, coinciding with the eruption of third molars, and is often characterized by pain, swelling, trismus, and difficulty in mastication or swallowing.[1-3] These symptoms can substantially impair oral functions and negatively affect quality of life.[3,4]

The pathogenesis of pericoronitis is multifactorial.[5] The operculum, which is a soft tissue flap overlying the partially erupted tooth, creates a sheltered niche that is difficult to clean and facilitates microbial accumulation, including colonization by facultative anaerobic bacteria such as *Bacteroides* and *Fusobacterium* species.[6] Local mechanic traumas from opposing maxillary molar dentition, poor oral hygiene and cleanability, and food impaction may initiate or further exacerbate the inflammatory response.[7,14]

Among the clinical manifestations of pericoronitis, pain is the most common and frequently the primary reason for seeking treatment/undergoing 3rd molar extraction.[8,9] Pain typically originates in posterior mandible around erupting third molar and may intensify with functional activities such as chewing and mouth opening. It may

also radiate to adjacent structures, including ear, throat/floor of mouth, and is often accompanied by localized swelling in retromolar region.[8,9]

The complex sensory innervation of the orofacial region by the trigeminal nerve may contribute to the referral of pain to anatomically adjacent or distant structures, potentially complicating clinical assessment and delaying appropriate diagnosis and treatment.[9] Resulting symptoms may interfere with essential daily activities, including chewing, speaking, mouth opening, and sleep, thereby contributing to a reduction in overall quality of life.[1,9,10]

Despite pain being one of the most prominent features of pericoronitis, the specific pattern and characteristics of this pain remain relatively underexplored. Pain is a subjective experience that may vary considerably in its onset, type, intensity, distribution, precipitating factors, and relieving factors.[11] In patients with pericoronitis, activities involving the affected region, such as chewing and oral hygiene practices, may influence the onset or severity of pain, while individual anatomical and psychological factors may further contribute to variations in pain perception[12]. A detailed understanding of these characteristics may improve the clinical appreciation of pain associated with pericoronitis and provide a more patient-centred understanding of its presentation.

Therefore, the present study aimed to assess the pattern of pain associated with pericoronitis in the third molar region, with particular emphasis on its onset and type, as well as the common triggers and relieving factors reported by affected patients.

METHODS

Study design and setting

A cross-sectional, questionnaire study was conducted to assess the pattern and characteristics of pain associated with pericoronitis involving the third molar region. The study was carried out in the Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital Nagpur, over a six-month period from January 2025 to June 2025.

Ethical considerations

Ethical approval was obtained from the institutional ethics committee before the study commenced (Approval number: IEC/GDCHN/04/2024) Written informed consent was obtained from all participants and they were informed about the purpose and procedures of the study.

Sample size estimation

The sample size was calculated based on previously reported prevalence data for pericoronitis, with a 95% confidence level and a 5% allowable margin of error.

Based on previous prevalence data of pericoronitis and keeping a 95% confidence level, using sample size estimation formula: $n=[DEFF\times Np(1-p)]/[(d^2/Z^2_1-\alpha/2\times(N-1))+p(1-p)]$

The required sample size was calculated to be 359 patients.[13]

Inclusion criteria

Participants were eligible for inclusion if they were between 18 and 40 years of age, had a partially erupted or impacted third molar confirmed through clinical and radiographic examination and presented with clinical features consistent with pericoronitis including pain with or without associated swelling or trismus.

Participants were also required to be willing to participate in the study and provide written informed consent prior to enrolment.

Exclusion criteria

Patients were excluded if they had systemic conditions that could substantially influence oral health or pain perception. Such as uncontrolled diabetes mellitus, autoimmune disorders, were pregnant or lactating or had a history of smoking or tobacco chewing, as these factors could potentially influence oral inflammatory status and pain perception and thereby act as confounding factors.

Patients who had previously undergone surgical extraction of the affected third molar were also excluded. Additionally, patients with other dental or temporomandibular conditions in the same region that could contribute to or mimic the reported pain, including dental caries, periodontitis, or temporomandibular joint disorders, were excluded.

Data collection instrument

Data were collected using a structured questionnaire developed specifically for the study and validated by experts prior to commencement. It comprised two sections: demographic characteristics and pain characteristics with associated clinical features.

The latter assessed pain onset, duration, type, site, radiation, precipitating factors (chewing, swallowing, and touch), relieving factors (medication, compresses, and oral rinses), and associated symptoms including swelling, trismus, cheek biting, and recurrence.

The questionnaire was administered by the investigator during the patient's outpatient visit.

Clinical and radiographic assessment

All participants underwent clinical examination of the affected third molar region. The presence of clinical

features suggestive of pericoronitis was recorded. Radiographic confirmation of the presence and eruption status of the third molar was obtained using an intraoral periapical radiograph or panoramic radiograph as clinically indicated.

Statistical analysis

The collected data were entered into Microsoft excel and subsequently analyzed using IBM SPSS statistics version 25.0.

Associations between categorical variables were assessed using the chi-square test or Fisher's exact test, as appropriate. A two-sided $p<0.05$ was considered statistically significant

RESULTS

A total of 359 participants with third-molar pericoronitis were included in the study. The majority of participants were aged 18-25 years (223; 62.12%) followed by those aged 26-30 years (84; 23.40%), 31-35 years (42; 11.70%), and 36-40 years (10; 2.79%).

The study population showed a near-equal gender distribution, comprising 185 males (51.53%) and 174 females (48.47%). Most participants were graduates (37.08%), followed by those with a diploma (23.68%), higher secondary education (21.17%), secondary education (12.53%), and primary education (3.06%). With respect to occupation, 170 participants (47.35%) were workers, 107 (29.81%) were students, and 82 (22.84%) were housewives.

Pattern and characteristics of pain

Throbbing pain was the most frequently reported pain type, observed in 179 participants (49.86%), followed by dull pain in 107 (29.81%) and sharp pain in 73 (20.33%). Thus, approximately half of the study population described their pain as throbbing.

Table 1: Distribution of current pain experience.

Pain experiences	N	Percentage (%)
Dull	107	29.81
Sharp	73	20.33
Throbbing	179	49.86
Total	359	100.0

The onset of pain was predominantly gradual, reported by 267 participants (74.37%), whereas 92 participants (25.63%) reported a sudden onset.

Among the reported factors that aggravated pain, eating hard food was the most frequently identified trigger (152; 42.34%), followed by poor oral hygiene (103; 28.69%). Stress was reported by 47 participants (13.09%), while 24 (6.69%) attributed worsening pain to a recent dental procedure and 33 (9.19%) reported other factors.

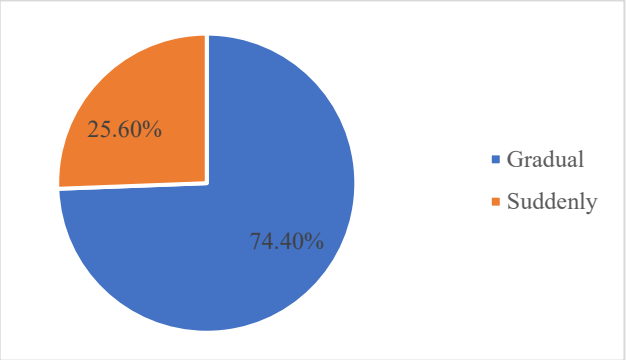

Figure 1: Onset of pain.

Table 2: Distribution of triggers that worsen pain.

Triggers	N	Percentage (%)
Eating hard food	152	42.34
Poor oral hygiene	103	28.69
Recent dental procedure	24	6.69
Stress	47	13.09
Other	33	9.19
Total	359	100.0

Pain severity

According to the questionnaire-based grading system, moderate symptoms (Grade 3) were most prevalent, affecting 174 participants (48.47%), followed by mild symptoms (Grade 2) in 112 participants (31.20%).[15] Severe symptoms (Grade 4) were reported by 55 participants (15.32%), while 18 participants (5.01%) reported bearable symptoms (Grade 1). Overall, 79.67% of participants were classified as having mild-to-moderate symptoms.

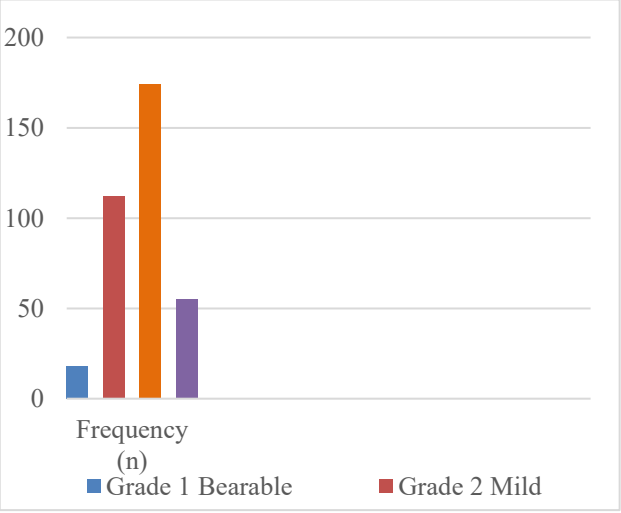

Figure 2: Pain severity distribution.

Association of pain characteristics with demographic and clinical variables

No statistically significant association was observed between type of pain and gender (p=0.480). Similarly, pain type was not significantly associated with age group (p=0.571). No statistically significant association was observed between the reported trigger of pain and the onset pattern of pain (p=0.604).

Relieving factors

Avoiding chewing on the affected side was the most frequently reported method of relieving pain (221 responses; 43.25%), followed by other methods (136; 26.61%) and over-the-counter analgesics (123; 24.07%). Cold or warm compresses accounted for 31 responses (6.07%). As the total number of reported responses exceeded the number of participants, these findings should be interpreted as multiple-response data if participants were permitted to select more than one relieving factor.

DISCUSSION

The present study assessed the pattern and characteristics of pain associated with third-molar pericoronitis among 359 patients. The predominant pain pattern was characterized by a gradual onset, throbbing quality, and moderate severity.

Eating hard food was the most frequently reported factor aggravating pain, while avoiding chewing on the affected side was the most commonly reported relieving measure. These findings highlight the predominantly inflammatory and functionally limiting nature of pain associated with pericoronitis.

As this study revealed, throbbing pain was reported by (49.86%) of participants, followed by dull pain (29.81%) and sharp pain (20.33%). This predominance of throbbing pain is broadly consistent with previous descriptions of pericoronitis-related pain. Seymour et al in a study of 50 patients with pericoronitis, identified throbbing, sharp and aching descriptors among the principal words used to characterize dental pain.[16]

Eating hard food was the most commonly reported aggravating factor (42.34%), followed by poor oral hygiene (28.69%). The findings are similar to Nissanka et al[17], who reported pain on biting in (68.5%) of participants, supporting the prominent role of mastication-related mechanical stimulation in symptomatic pericoronitis.

Poor oral hygiene was reported as an aggravating factor by (28.69%) of participants. Similarly, a clinical epidemiological study by Katsarou et al found that adequate tooth-brushing frequency and mouthwash use were associated with a lower occurrence of pericoronitis, (31.03%) of pericoronitis affected participants had a plaque index above 75.[18] These findings support the contribution of plaque accumulation and inadequate oral hygiene to the development or aggravation of pericoronitis.

No significant association was observed between pain type and either age or gender, and no significant association was found between pain trigger and onset pattern. These findings suggest that the principal characteristics of pericoronitis-related pain may occur across demographic groups rather than being restricted to a particular age or sex.

However, the cross-sectional design and reliance on self-reported pain characteristics limit causal interpretation. The single-centre setting and exclusion of tobacco users and individuals with selected systemic conditions may also limit generalizability. Further multicentric studies using standardized pain assessment tools may help clarify the determinants and progression of pain associated with third-molar pericoronitis.

CONCLUSION

Pain associated with third-molar pericoronitis predominantly presented with a gradual onset, throbbing character and moderate severity.

Mastication, particularly eating hard food, was the most common aggravating factor while avoiding chewing on the affected side was the most frequently reported relieving measure. These findings highlight the importance of assessing pain characteristics and functional impact, rather than pain intensity alone for clinical evaluation of pericoronitis.

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Ethical approval: The study was approved by the Institutional Ethics Committee IEC/GDCHN/04/2024.

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