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Osteoid Osteoma of the Temporomandibular Joint: A Systematic Review

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Keywords
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Abstract

Purpose: Osteoid osteoma (OO) rarely involves the temporomandibular joint (TMJ) and is frequently misdiagnosed as temporomandibular disorders (TMD), leading to delayed diagnosis. This study aimed to systematically summarize the clinical features, imaging findings, treatment strategies, and outcomes of TMJ OO.

Methods: A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed and ScienceDirect were searched from inception to February 2026. Case reports and small case series reporting TMJ-related OO were included. Data on demographics, clinical presentation, imaging characteristics, treatment, and outcomes were extracted.

Results: Nine studies comprising ten patients were included. Nocturnal preauricular pain was the most common symptom, often partially relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). Computed tomography (CT) or cone beam computed tomography (CBCT) consistently identified the characteristic nidus, whereas magnetic resonance imaging (MRI) mainly demonstrated secondary inflammatory changes. All patients underwent surgical excision, resulting in complete symptom resolution without reported recurrence during follow-up.

Conclusions: TMJ OO should be considered in patients with nocturnal preauricular pain unresponsive to conventional TMD treatment. Early CT-based imaging is essential for accurate diagnosis, and surgical excision provides excellent clinical outcomes.

Introduction

First described by Jaffe in 1935, osteoid osteoma (OO) constitutes a benign osteoblastic bone tumor[1]. Accounting for approximately 3% of all bone tumors and 10%-12% of benign bone lesions, OO predominantly involves long bones such as the femur and tibia, with an incidence exceeding 50% at these sites[2,3]. Compared to long bone involvement, intra-articular occurrence remains relatively uncommon, primarily affecting large joints including the knee, hip, shoulder, and elbow, with the intra-articular variant comprising roughly 10% of cases. Although OO arises most frequently in the diaphysis of long bones, involvement of the craniofacial region may occur, particularly within the mandible, maxilla, and temporomandibular joint (TMJ). The reported prevalence of OO in the maxillofacial region and TMJ remains low. Crucially, the incidence of OO specifically within the TMJ proves exceedingly rare, thereby predisposing to frequent misdiagnosis[4].

The pathogenesis of OO remains incompletely elucidated, with multiple hypotheses currently under investigation. While precise mechanisms continue to be defined, current research highlights osteoblast hyperactivity and osteosclerotic reactions as predominant etiological factors. Concurrently, localized inflammatory responses, vascular hyperplasia, and potential genetic contributors participate in disease progression[5].

Typically characterized by small size and self-limited growth potential, the lesion classically manifests as pain, localized swelling, and functional impairment[6,7]. Initial discomfort often presents as mild, insidious dullness potentially progressing to severe, sleep-disrupting intensity. Furthermore, over 64% of OOs occurring in long bones demonstrate a characteristic pain pattern responsive to nonsteroidal anti-inflammatory drugs (NSAIDs)[8]. Cortical or metaphyseal lesions in the long bones of the extremities commonly present as deep bone pain, with superficial lesions potentially exhibiting local tenderness, accompanied by erythema, swelling, or palpable induration. Periarticular or intra-articular lesions near large joints such as the hip, knee, ankle, or elbow, particularly when they attain a considerable size, frequently manifest more prominent articular symptoms: joint pain, morning stiffness or rigidity, decreased range of motion, and are often accompanied by joint swelling, effusion, synovitis, and periarticular bone marrow edema[9].

When OO arises within the TMJ, it may involve the mandibular condyle, condylar neck, articular eminence, glenoid fossa, or adjacent temporal bone structures, frequently presenting as persistent preauricular pain, restricted mouth opening, mandibular deviation upon opening, or audible joint sounds[4]. Furthermore, OO demonstrates predilection for young and middle-aged adults, with peak prevalence and consultation rates observed in the 20-30 year age range—features demonstrating significant overlap with temporomandibular disorders (TMD)[10-12]. Given the substantially higher incidence of TMD compared to TMJ tumors, OO remains easily overlooked in clinical practice, leading to protracted symptoms and diagnostic delay. Consequently, a systematic review of clinical presentations associated with TMJ OO proves necessary.

Diagnosis of OO typically relies on correlating classic clinical symptoms with characteristic imaging findings. Patients frequently present with localized pain, often exacerbating nocturnally and demonstrating marked relief with NSAID administration—a symptom cluster possessing considerable clinical suggestive value[13]. Regarding imaging, magnetic resonance imaging (MRI), while valuable for assessing bone marrow edema and soft tissue reactions, may increase diagnostic difficulty in some cases by obscuring the nidus amidst inflammatory changes. This diagnostic pathway is relatively well-established for common sites like the long bones of the extremities[14]. However, when OO occurs in anatomically complex or joint-related regions, its clinical and radiographic features often become more nonspecific, thereby increasing the risk of misdiagnosis and delayed recognition. OO of the TMJ represents precisely such a scenario, posing diagnostic challenges in differentiation from more common TMJ pathologies.

The therapeutic objective for OO centers on complete removal of the nidus to achieve durable pain relief[15]. For symptomatic patients, surgical excision has long been considered the traditional and reliable treatment modality, particularly when the lesion is well-localized. In recent years, with advancements in image-guided techniques, minimally invasive treatments such as percutaneous radiofrequency ablation have gained increasing application for OOs in the extremities, offering advantages of reduced trauma and quicker recovery[16]. However, treatment strategy selection depends significantly on the lesion's anatomical location and its relationship to surrounding critical structures. When OO occurs intra-articularly or adjacent to complex anatomical regions, the applicability and safety of minimally invasive ablation techniques may be constrained, necessitating more cautious therapeutic decision-making[15]. OO of the TMJ represents precisely such a circumstance, where treatment often requires balancing nidus eradication, joint function preservation, and the safety of adjacent vital structures.

Integrating the aforementioned discussion on the incidence, pathogenesis, clinical presentation, diagnosis, and treatment of OO, systematic aggregation of cases related to the TMJ holds significant clinical value for identifying recurring symptomatic patterns, imaging characteristics, diagnostic pitfalls, and treatment outcomes, thereby enhancing recognition of this rare disease.

Although narrative reviews and case compilations on craniofacial OO have been published, a synthesis specifically focused on TMJ-related OO, conducted under a Preferred Reporting Items for Systematic Reviews and Meta-Analyses(PRISMA)-compliant framework, carries substantial merit for structuring evidence presentation and improving reproducibility[17]. Therefore, this systematic review of published case reports and small case series aims to employ a PRISMA-compatible framework to aggregate reported cases of OO occurring within or adjacent to the TMJ, summarizing their clinical manifestations, imaging features, diagnostic challenges, treatment strategies, and outcomes.

The purpose of this systematic review is to synthesize existing evidence on OO occurring within or adjacent to the TMJ under a PRISMA-compatible methodological

framework, with focused attention on its clinical presentation, imaging characteristics, diagnostic pitfalls, treatment strategies, and outcomes.

Materials and Methods

This systematic review of case reports and small case series in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines.

Search Strategy

A systematic literature search was performed in PubMed and ScienceDirect from database inception to February 21, 2026. The search combined controlled vocabulary and free-text terms related to osteoid osteoma and the temporomandibular joint.

The search strategy combined controlled vocabulary terms and free-text keywords related to osteoid osteoma and the temporomandibular joint region. The PubMed search strategy was as follows:

("Osteoma, Osteoid"[Mesh] OR "osteoid osteoma"[tiab]) AND ("temporomandibular joint"[Mesh] OR TMJ[tiab] OR condyle[tiab] OR "condylar process"[tiab] OR "articular eminence"[tiab] OR "glenoid fossa"[tiab] OR mandibular[tiab])

For ScienceDirect, the following search strategy was used:

("osteoid osteoma") AND ("temporomandibular joint" OR "TMJ" OR "mandibular condyle" OR "temporal bone" OR "mandible").

Reference lists of included studies were manually screened to identify additional relevant reports.

Inclusion and Exclusion Criteria

Inclusion criteria were pre-defined to ensure the inclusion of clinically relevant and diagnostically reliable cases while minimizing heterogeneity from incomplete reporting.

The inclusion criteria were developed based on the PICO (Population, Intervention, Comparison, Outcome) framework, adapted for systematic reviews of case reports:

Population (P): Human patients of any age or gender diagnosed with osteoid osteoma located within or immediately adjacent to the temporomandibular joint (TMJ).

Intervention (I): Any diagnostic or therapeutic interventions performed for TMJ osteoid osteoma.

Comparison (C): Not applicable (case reports and case series do not include control groups).

Outcome (O): Reported clinical presentation, imaging characteristics, treatment modalities, and postoperative outcomes (including symptom resolution, functional recovery, and recurrence).

Inclusion Criteria

1. **Population:** Human patients with TMJ-related OO confirmed histopathologically and/or exhibiting characteristic imaging findings of a nidus with surrounding reactive sclerotic bone. Lesions must be located within or immediately adjacent to the TMJ, with clinical or radiological evidence of direct involvement of TMJ structures.
2. **Intervention:** Studies providing detailed description of diagnostic workup and treatment modality administered for TMJ OO.
3. **Outcome:** Studies reporting sufficient clinical information describing presenting symptoms (particularly pain characteristics and TMJ-related dysfunction), imaging findings, and postoperative outcomes including symptomatic response and available follow-up data.
4. **Study design:** Published case reports and small case series (≤10 patients) written in English. Randomized controlled trials (RCTs), cohort studies, case-control studies, cross-sectional studies, and other analytical study designs were explicitly excluded.

Exclusion Criteria

1. OOs located in the mandible or maxilla without involvement of the TMJ or its immediately adjacent anatomical region.
2. Lesions reclassified as osteoblastoma or other benign/malignant bone tumors.
3. Review articles, conference abstracts, editorials, letters, RCTs, cohort studies, case-control studies, and other publications lacking original individual patient-level data.
4. Animal or in vitro studies.
5. Duplicate reports of the same clinical case; in cases of duplication, the most comprehensive and recent report was retained.

Study selection

Two reviewers independently screened titles and abstracts, followed by full-text assessment. Disagreements were resolved through discussion. The study selection process was documented using a PRISMA flow diagram.

Data extraction

Data were independently extracted by two reviewers

using a standardized form. Extracted variables included: author, year, patient demographics, lesion location, clinical presentation, imaging findings, treatment modality, and outcomes.

Methodological Quality Assessment

Given that the included studies consisted exclusively of case reports and small case series, methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Case Reports. The checklist evaluates whether patient demographic characteristics, clinical history and timeline, current clinical condition, diagnostic assessment, intervention, post-intervention condition, adverse events, and takeaway lessons were clearly reported. The assessment results were summarized in Table 2.

Results

Study Selection

Database searches identified 869 records. After removing 4 duplicate records, 865 records proceeded to title and abstract screening, resulting in the exclusion of 855 records that did not satisfy the inclusion criteria. Ten reports were sought for retrieval. All 10 reports were retrieved and assessed for eligibility. One report was excluded because it was published in Chinese. Consequently, nine reports underwent full-text eligibility assessment[4,12,18-24]. No additional reports were excluded after full-text assessment. Ultimately, nine studies were included in the qualitative synthesis. The study selection process is illustrated in Figure 1.

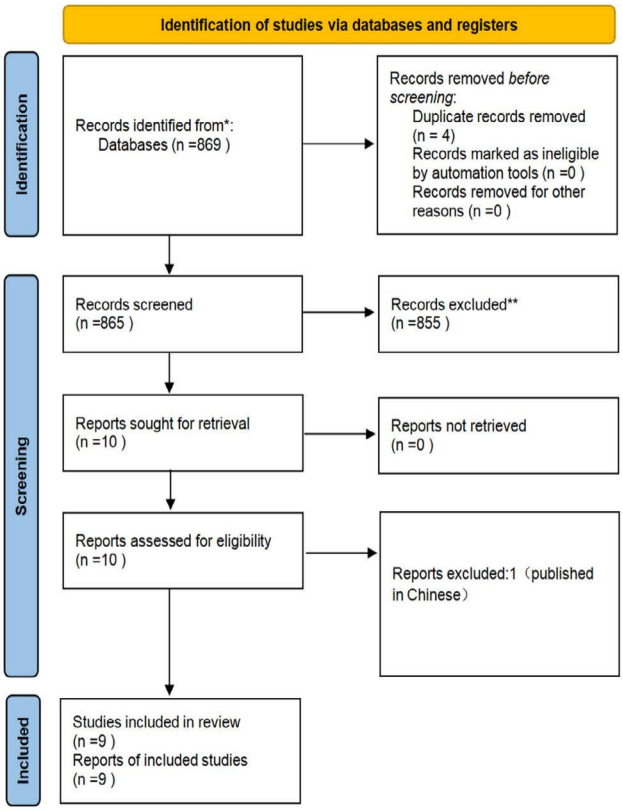

Figure 1: PRISMA flow diagram of the screening and selection process

Study and Demographic Characteristics

The included studies were published between 1964 and 2025 and consisted exclusively of case reports or small case series. Among the cases, females (n=6, 60%) slightly exceeded males (n=4, 40%). Age ranged from 21 to 77 years, with half of the patients (50%) belonging to the 21–27 year age group; one case occurred in a 77-year-old. The glenoid fossa and condyle represented the most common sites, with fewer cases involving the articular eminence and subcondylar region. Regarding medical history, one patient had a history of bimaxillary orthognathic surgery and Ehlers-Danlos syndrome (type III)[4], one had prior joint surgery[20], while the remaining patients reported no significant past medical history. Detailed characteristics of all included cases are summarized in Table 1.

The table summarizes patient demographics, lesion location, clinical presentation, treatment modalities, and outcomes of all included cases.

Clinical Presentation

Nocturnal pain was the predominant symptom in all cases, typically described as persistent and worsening, with characteristic nocturnal exacerbation. Partial relief with nonsteroidal anti-inflammatory drugs (NSAIDs) was reported in some patients. Additional symptoms included limited mouth opening, mandibular deviation, and preauricular swelling. Due to symptom overlap with temporomandibular disorders (TMD), most patients experienced delayed diagnosis.

Imaging Findings

CT (including CBCT) consistently identified the characteristic nidus in all reported cases, clearly demonstrating the characteristic “nidus”: a well-circumscribed, round or oval hypodense focus, typically less than 2 cm in diameter, often containing central punctate or patchy calcification, surrounded by a reactive sclerotic bone rim. The nidus may be located within the cortex or cancellous bone of the condyle, articular eminence, or glenoid fossa.

MRI was less sensitive than CT for direct nidus visualization but effectively assessed secondary changes including peri-lesional bone marrow edema, joint effusion, synovial thickening, and adjacent muscle inflammation, thereby aiding in the evaluation of soft tissue involvement.

Table 1: Summary of included cases of TMJ osteoid osteoma

	Author (year)	Age	Gender	Location	Core Symptoms	Treatment Methods	Outcome
1	Lind and Hillerström 1964	48	M	Right condyle	Joint ankylosis, pain	Condylectomy	Improved joint function, no recurrence
2	Tochihara et al.2001	21	F	Left condyle	Pain	Condylectomy	No recurrence 8 years postoperatively
3	Yang and Qiu 2001	24	F	Left articular eminence	Swelling, pain	Lesion resection	No recurrence 4 years postoperatively
4	do Egito Vasconcelos et al.2007	23	F	Right condyle	Pain, limited mouth open	Preauricular approach lesion resection	No recurrence 12 months postoperatively
5	Rahsepar et al.2009	21	M	Right subcondyle	Swelling, dull pain	Local lesion resection,curettage	Immediate pain relief postoperatively, no recurrence
6	Deferm et al.2017(case 1)	56	F	Right articular eminence	Swelling, dull pain	Preauricular approach lesion resection	No recurrence 2 years postoperatively
7	Deferm et al. 2017(case 2)	39	F	Left glenoid fossa	Pain	Preauricular approach lesion resection	Complete pain relief 1 year postoperatively
8	Sabah Abdulaziz Issa et al. 2019	46	F	Right articular eminence	Swelling, pain	Preauricular approach lesion resection	No recurrence
9	Ozel MA et al. 2022	77	M	Left condyle	Pain	Surgical resection	No recurrence recorded
10	Xue et al. 2025	27	M	Left glenoid fossa	Pain	Preauricular approach lesion resection	No recurrence 3 months postoperatively

Abbreviations: M, male; F, female; TMJ, temporomandibular joint.
The table summarizes patient demographics, lesion location, clinical presentation, treatment modalities, and outcomes of all included cases.

Table 2: Methodological quality assessment of included studies using the JBI Critical Appraisal Checklist for Case Reports

Study / Case	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Overall quality
Lind and Hillerström, 1964	Y	P	Y	Y	Y	Y	U	P	Moderate
Tochihara et al., 2001	Y	P	Y	Y	Y	Y	U	Y	Moderate
Yang and Qiu, 2001	Y	P	Y	Y	Y	Y	U	Y	Moderate
do Egito Vasconcelos et al., 2007	Y	P	Y	Y	Y	Y	U	Y	Moderate
Rahsepar et al., 2009	Y	P	Y	Y	Y	Y	U	Y	Moderate
Deferm et al., 2017 (case 1)	Y	Y	Y	Y	Y	Y	P	Y	Good
Deferm et al., 2017 (case 2)	Y	Y	Y	Y	Y	Y	P	Y	Good
Issa et al., 2019	Y	P	Y	Y	Y	Y	U	Y	Moderate
Ozel and Ogul, 2022	Y	P	Y	Y	P	P	U	P	Moderate
Xue et al., 2025	Y	Y	Y	Y	Y	Y	P	Y	Good

Checklist items: Q1, patient demographic characteristics; Q2, patient history and timeline; Q3, current clinical condition; Q4, diagnostic assessment and results; Q5, intervention/treatment procedure; Q6, post-intervention clinical condition; Q7, adverse events or unanticipated events; Q8, takeaway lessons. Y, yes; P, partial; N, no; U, unclear.
Note: Overall quality was judged qualitatively based on completeness of reporting across the JBI checklist items. No numerical score was used because the included evidence consisted of case reports and small case series.

Treatment Modalities

All cases underwent surgical excision. Open surgery via a preauricular approach was the primary method, involving direct visualization for thorough curettage or en bloc resection of the nidus along with a margin of surrounding sclerotic bone. Postoperatively, all patients achieved immediate and complete pain relief with satisfactory functional recovery.

Conservative measures (e.g., NSAIDs, arthrocentesis, occlusal splints) were attempted in some cases, though they provided only transient symptomatic relief.

Clinical Outcomes

Following surgical excision, all 10 patients achieved immediate and complete pain resolution, accompanied by significant improvement in mouth opening range and joint function. Follow-up periods ranged between 3 months and 8 years. No cases of tumor recurrence were reported, and all patients recovered uneventfully without long-term complications.

Methodological Quality Assessment

The methodological quality assessment of the included studies is summarized in Table 2. Most reports adequately described patient demographic characteristics, clinical presentation, diagnostic methods, intervention procedures, and post-treatment outcomes. However, several reports lacked detailed timeline information,

complete adverse event reporting, or long-term follow-up. Overall, the methodological quality of the included studies was considered moderate to good.

Discussion

Osteoid osteoma (OO) constitutes a common benign bone tumor, with approximately 80% of cases occurring in long bones, particularly the metaphyseal regions of the femur and tibia. Large series and reviews indicate that the lower extremities account for over half of all cases, with the femur and tibia involved in more than 50% of instances, the humerus in about 8%, and the spine, hands, and feet collectively comprising roughly 30%[25]. Anatomically, most lesions are cortical. However, when located in the epiphysis or within or adjacent to the joint capsule, they present as intra-articular OO. This variant constitutes less than 10% of all OOs and is considered relatively uncommon, primarily affecting large joints such as the knee, hip, shoulder, and elbow[26]. Compared to the typical presentation in long bones, involvement of the jaw and craniofacial region by OO is far rarer, representing an extreme minority of overall cases[27]. Previous reviews and case compilations suggest fewer than 40 reported cases in the maxillofacial region since 1951. Through our review, only 10 cases of OO specifically involving the temporomandibular joint (TMJ) have been reported globally in the English-language literature since 1964, underscoring the exceptionally low incidence of this entity within the TMJ region and highlighting its status as a rare condition that warrants deeper clinical recognition.

The classic presentation of OO in long bones involves persistent dull pain, worsening at night and responsive to nonsteroidal anti-inflammatory drugs, thereby constituting a diagnostic pain pattern. A high proportion of patients (69%) report nocturnal pain, with over 60% demonstrating sensitivity to NSAIDs. When the lesion is located within or near the capsule of joints such as the hip, knee, or elbow, symptoms beyond nocturnal pain may include joint swelling, effusion, limited range of motion, pain on movement, or a sensation of warmth.

Based on this systematic review, preauricular nocturnal pain emerges as the most characteristic symptom of TMJ OO, which helps distinguish it from common TMD presentations. However, it is important to note that severe TMD may also present with similar pain patterns, and the prevalence of TMJ OO is significantly lower than that of TMD. Other cases of TMD characteristically present with pain associated with mandibular movement—exacerbated by mouth opening or mastication—tenderness on palpation of the joint or masticatory muscles, and unilateral headache radiating to the temporal or occipital region, frequently accompanied by joint clicking or locking[4]. Owing to the overlapping nature of these symptoms, the vast majority of patients undergo prolonged conservative management or misdiagnosis as TMD before a correct diagnosis is established, resulting in delayed intervention. Furthermore, patients with TMJ osteoid osteoma exhibit prompt and marked pain relief following administration of nonsteroidal anti-inflammatory drug(NSAID), whereas individuals with ordinary TMD show only weak, transient, or atypical responses to NSAIDs. Therefore, when encountering patients with prolonged nocturnal pain in the TMJ region that remains unresponsive to conventional treatment, clinicians should maintain a heightened suspicion for an underlying osseous pathology[19].

During the diagnostic process for OO of the TMJ, physical examination remains a critical foundation for clinical evaluation, typically conducted according to the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) protocol. This encompasses systematic history-taking, standardized palpation, measurement of mandibular range of motion, and assessment of joint sounds[28]. Prior literature indicates that even with strict adherence to the DC/TMD physical examination protocol, TMJ OO remains highly susceptible to misclassification as a common functional or degenerative joint disorder.

Following the present systematic review, we found that physical examination findings in patients with TMJ OO frequently diverge from the typical presentation patterns of TMD .For instance, patients with TMJ osteoarthritis frequently exhibit motion-induced arthralgia accompanied by audible joint clicking or crepitus[29], while TMJ synovitis primarily features localized joint pain and limited opening during movement, with pain potentially worsening upon superior joint loading[30]. In contrast, patients with TMJ OO typically present on physical examination with pronounced and severe tenderness on palpation in the preauricular region, restricted mouth opening, mandibular deviation, and ipsilateral preauricular swelling. These findings distinguish them to some extent from patients with other TMD. However, although the majority of osteoid osteoma patients exhibit marked tenderness on palpation, some individuals may present without significant tenderness, and the degree of pain often does not correlate with the physical examination findings. This “symptom-sign inconsistency” should be regarded as an important clinical warning sign, suggesting that reliance solely on physical examination and conventional diagnostic criteria may be insufficient to explain the patient’s presentation. In such scenarios, proceeding with advanced imaging, coupled with histopathological verification, proves critical to avoid misdiagnosis and treatment delay[12].

Definitive diagnosis of TMJ OO necessitates a multidisciplinary approach integrating advanced imaging and histopathological confirmation to ensure diagnostic accuracy. The nidus represents the core feature of OO. Conventional radiographs and panoramic views, due to

the complex, overlapping anatomy of the TMJ, exhibit low sensitivity for small lesions, often appearing negative or showing only nonspecific sclerosis, failing to reveal the typical nidus. On CT (especially thin-slice CT/CBCT), TMJ OO typically presents as a round or oval hypodense "nidus," usually around 1 cm in diameter, located within the condylar head or glenoid fossa. It displays sharp margins, may contain internal punctate or nodular calcification, and is surrounded by focal bone sclerosis and cortical thickening, forming the classic "central lucency with peripheral sclerotic rim" appearance[13,31]. This localized perinidal sclerosis accompanied by mild articular surface irregularity stands in contrast to the generalized flattening, osteophytosis, and diffuse sclerosis characteristic of TMJ osteoarthritis, and further distinguishes it from osteoblastoma, which typically presents radiologically as a hypodense focus exceeding 2 cm in diameter[32]. Therefore, CT/CBCT enables accurate detection and localization of the nidus within the complex joint anatomy, serving as the imaging modality of choice for identifying and confirming intra-articular OO and for planning surgical approach and extent of resection. Although MRI is less accurate than CT in directly depicting the nidus, it provides valuable soft tissue characterization through joint contrast resolution and permits assessment of peri-lesional structural involvement. Secondary indicators such as joint effusion, synovial hyperplasia, and bone marrow edema, while not specific to OO and commonly observed in more prevalent arthropathies, can still aid in diagnostic confirmation and differentiation from other TMJ pathologies[33]. Histopathologically, OO presents as a small, well-demarcated nidus containing haphazardly arranged immature woven bone and osteoid trabeculae, often growing in a trabecular or sheet-like pattern within a loose fibrovascular stroma. The trabecular surfaces are lined by a single layer of uniform osteoblasts, possibly accompanied by few osteoclasts and prominent vascular dilation. The nidus is encircled by a rim of dense reactive sclerotic bone, overall lacking significant cellular atypia or malignant features[34].

Regarding treatment strategies, this systematic review demonstrates that all cases of OO involving the TMJ ultimately underwent surgical excision with favorable clinical outcomes. Most patients experienced rapid pain relief postoperatively, alongside marked improvement in mouth opening and mandibular mobility.

Follow-up results, ranging from months to years, revealed no tumor recurrence or malignant transformation, suggesting an overall favorable long-term prognosis following complete nidus excision. Concerning complications, the existing literature reports no major postoperative complications. A few cases experienced local swelling or transient functional discomfort in the early postoperative period, which resolved over time without causing long-term impacts on joint structure or function. This further supports the relative safety and controllability of surgical excision in the TMJ region when performed with careful anatomical risk assessment and standardized technique[15].

Although minimally invasive techniques including radiofrequency ablation and arthroscopy are widely used for OO in other locations, their applicability in the TMJ region remains somewhat limited due to the proximity to the skull base and critical neurovascular structures, presenting relatively higher anatomical risks. In contrast, surgical excision allows for complete nidus removal under direct visualization, achieving reliable efficacy while maintaining safety. Therefore, within this specific anatomical region, surgical excision is currently regarded as the most dependable and predictable treatment modality[35].

Notably, most patients received conservative treatments such as nonsteroidal anti-inflammatory drugs prior to definitive diagnosis. Although NSAIDs provided short-term pain relief in some cases, their analgesic effect was often temporary, with symptoms recurring upon discontinuation, and failed to halt lesion progression. More importantly, transient efficacy from NSAIDs may mask the underlying bony pathology, thereby delaying imaging studies and definitive diagnosis. Consequently, NSAIDs are better suited as symptomatic palliative measures rather than definitive treatment for TMJ OO[34].

Synthesizing the available evidence, therapeutic decision-making for TMJ OO should avoid prolonged reliance on conservative analgesic management. Once imaging suggests characteristic OO features and clinical symptoms persist, timely surgical excision facilitates reliable outcomes and improves long-term prognosis.

This study possesses certain limitations. Primarily, the included literature consists solely of case reports, resulting in a limited sample size and low evidence level that precludes quantitative meta-analysis. Secondly, publication bias likely exists, meaning some unreported or misdiagnosed cases may not have been captured. Nonetheless, through systematic integration of previously scattered cases, this review summarizes common patterns in clinical presentation, imaging characteristics, and treatment outcomes for TMJ OO, providing a valuable reference to enhance clinician awareness of this rare disease and optimize diagnostic pathways.

Conclusions

Osteoid osteoma (OO) of the temporomandibular joint (TMJ) is a rare but important differential diagnosis in patients with persistent unilateral preauricular pain. Characteristic clinical features include nocturnal pain and partial relief with nonsteroidal anti-inflammatory drugs. CT or CBCT imaging plays an important role in identifying

the nidus and supporting the diagnosis. Surgical excision of the nidus was associated with favorable outcomes in the reported cases, although the currently available evidence remains limited to case reports and small case series. Further case accumulation and long-term follow-up studies are needed to better clarify prognosis and evaluate the potential role of minimally invasive treatment approaches.

Abbreviations

OO: Osteoid Osteoma

NSAID: Non-steroidal anti-inflammatory drug

TMJ: Temporomandibular joint

TMD: Temporomandibular Disorders

CBCT: Cone beam computed tomography

CT: Computed tomography

MRI: Magnetic Resonance Imaging

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Declarations

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki. This study is a systematic review of previously published data and does not involve direct human or animal participation.

Competing Interest

All authors declare that they have no conflict of interest.

Availability of Data and Materials

All data analyzed during this study are derived from previously published articles, which are cited within the manuscript.

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