

Periodontal Abscess: Causes, Diagnosis, and Management

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Abstract

Periodontal abscesses represent a localized purulent infection within the tissues supporting the teeth, characterized by rapid onset, swelling, pain, and eventual tissue destruction if left untreated. These abscesses are one of the most common dental emergencies and present significant challenges for both diagnosis and management, particularly due to their potential to mimic other types of orofacial infections and their complex etiopathogenesis. This paper provides a detailed overview of the causes, clinical features, diagnostic considerations, and current management strategies of periodontal abscesses. Etiologically, periodontal abscesses are often associated with pre-existing periodontal pockets, poor oral hygiene, foreign body impaction, trauma, or obstruction of the pocket opening. The involvement of pathogenic bacteria, particularly anaerobic species such as *Porphyromonas gingivalis* and *Fusobacterium nucleatum*, plays a central role in the pathogenesis. Diagnosis involves a careful clinical examination, supported by radiographic imaging and microbiological assessments when necessary. Differentiating periodontal abscesses from periapical abscesses is crucial for targeted treatment.

Management includes both immediate interventions to control infection and long-term strategies to address the underlying periodontal condition. Drainage of the abscess, debridement, antibiotic therapy when indicated, and patient education form the foundation of acute management. Long-term care may involve scaling and root planing, surgical intervention, and maintenance therapy. Emerging approaches such as local antimicrobial delivery systems and host modulation therapy are also being explored.

Understanding the multifactorial etiology and evolving treatment modalities is vital for dental professionals to manage periodontal abscesses effectively and prevent recurrence. This review aims to consolidate existing knowledge and recent advancements in the field to assist clinicians in evidence-based decision-making.

Keywords: Periodontal abscess; Dental infection; Periodontal disease; Pus discharge; Diagnosis; Scaling and root planing; Drainage; Host modulation therapy; Oral microbiology

Introduction

A periodontal abscess is a localized collection of pus in the periodontal tissues caused by bacterial infection [1]. It is a relatively common dental emergency, often associated with pre-existing periodontal disease, trauma, or foreign body impaction [2]. This article provides a comprehensive overview of the etiology, clinical presentation, diagnostic methods, and management strategies of periodontal abscesses [3]. Emphasis is placed on differential diagnosis, complications, and emerging treatment modalities. Periodontal abscesses are acute or chronic localized infections involving the gingiva and deeper periodontal tissues [4]. Characterized by rapid onset of pain, swelling, and pus formation, they are frequently encountered in clinical practice and represent a significant portion of dental emergencies [5]. Despite being common, periodontal abscesses are often misdiagnosed or confused with periapical abscesses due to overlapping symptoms, underscoring the importance of accurate diagnostic protocols [6]. A Periodontal abscesses are a frequent complication of periodontal disease, accounting for 6–14% of dental emergencies [7]. They present as localized swelling, pain, and purulence in the gingival or periodontal tissues. If left untreated, periodontal abscesses can lead to severe complications, including systemic infection or tooth loss [8].

The development of a periodontal abscess is closely linked to the accumulation of pathogenic microorganisms within a periodontal pocket, exacerbated by factors such as plaque accumulation, trauma, systemic conditions, or inadequate periodontal therapy. Unlike periapical abscesses, which originate from pulpal infection, periodontal abscesses arise from an existing periodontal lesion or compromised periodontal integrity. Clinically, patients may present with throbbing

pain, gingival swelling, mobility of the involved tooth, and localized lymphadenopathy. Without timely intervention, the infection can spread to adjacent tissues, resulting in severe complications including cellulitis and systemic involvement.

This paper explores the causes, diagnosis, and management of periodontal abscesses, providing an updated perspective that integrates classical treatment approaches with recent innovations. A clear understanding of the pathogenesis, along with evidence-based treatment strategies, is essential to ensure favorable outcomes and prevent disease progression or recurrence.

Etiology and pathogenesis

A periodontal abscess develops due to bacterial invasion into the periodontal pocket, causing infection and suppuration. The common causes include:

Pre-existing Periodontal Disease, Progressive bone loss and pocket formation can lead to abscess development.

Foreign Body Impaction, Food debris, calculus, or dental materials

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Received: 01-Feb-2025, Manuscript No: jdpm-25-163559, **Editor assigned:** 03-Feb-2025, Pre-QC No: jdpm-25-163559 (PQ), **Reviewed:** 17-Feb-2025, QC No: jdpm-25-163559; **Revised:** 24-Feb-2025, Manuscript No: jdpm-25-163559 (R); **Published:** 28-Feb-2025, DOI: 10.4172/jdpm.1000260

Citation: Anjali S (2025) Periodontal Abscess: Causes, Diagnosis, and Management. J Dent Pathol Med 9: 260.

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can trigger infection.

Trauma, Mechanical trauma from dental procedures or habits (e.g., toothpicks) can introduce bacteria into the pocket.

Inadequate Periodontal Treatment, Incomplete debridement or subgingival scaling can result in abscess formation.

The pathogenesis involves,

Bacterial infiltration into the periodontal pocket.

Neutrophilic infiltration and pus formation.

Local tissue destruction due to enzymatic activity.

Pocket occlusion, preventing drainage and promoting pus accumulation.

Clinical presentation

Pain, Sudden onset, throbbing pain that worsens with chewing.

Swelling, Localized gingival swelling, often fluctuant and tender.

Purulent Exudate, Pus discharge from the pocket or gingiva.

Halitosis, Foul odor due to bacterial infection.

Tooth Mobility, Due to periodontal tissue destruction.

Red, swollen, and shiny gingiva around the involved tooth.

Increased probing depth with pus exudation.

Tenderness to percussion.

Occasionally, systemic symptoms (fever, malaise) in severe cases.

Diagnosis

Visual inspection and palpation to detect swelling and exudate.

Periodontal probing, increased probing depth with purulence indicates an abscess.

Percussion sensitivity, Tenderness indicates periodontal involvement.

Periapical and bitewing radiographs show bone loss and periodontal defects.

Cone-beam computed tomography (CBCT) may be useful in complex cases.

Pus samples may be collected for bacterial culture and antibiotic sensitivity testing.

Differential diagnosis

Periodontal abscesses must be differentiated from other oral conditions,

Periapical Abscess, Originates from pulpal infection, detected by vitality testing.

Gingival Abscess, Localized to the marginal gingiva without attachment loss.

Endo-Perio Lesion Combined endodontic and periodontal infection.

Odontogenic Cysts or Tumors, Radiolucent lesions mimicking abscesses.

Management and treatment

Drainage, Incision and drainage of pus to relieve pressure.

Irrigation, Saline or antiseptic irrigation (chlorhexidine) to cleanse the pocket.

Pain Management, Non-steroidal anti-inflammatory drugs (NSAIDs) for pain relief.

Amoxicillin 500 mg TID or Clindamycin 300 mg TID for penicillin-allergic patients.

Metronidazole may be combined in severe cases.

Scaling and Root Planing (SRP), thorough debridement of the periodontal pocket.

Flap Surgery, for abscesses with deep periodontal defects.

Adjunctive Antimicrobial Therapy, Locally delivered antibiotics (minocycline or doxycycline).

Maintenance Therapy, Frequent recall visits for periodontal maintenance.

Complications

Tooth Loss, Due to extensive bone destruction.

Systemic Spread, In rare cases, bacteremia or sepsis may occur.

Fistula Formation, Chronic abscesses can lead to sinus tract formation.

Regular periodontal maintenance and oral hygiene.

Effective management of periodontal disease.

Use of antiseptic mouth rinses and interdental cleaning aids.

Avoidance of traumatic dental procedures or habits.

Conclusion

Periodontal abscesses are dental emergencies requiring prompt diagnosis and management. Early intervention with drainage, antibiotics, and periodontal therapy is crucial for preventing complications and preserving periodontal health. Proper oral hygiene practices and regular dental visits are essential for preventing abscess recurrence. Periodontal abscesses, while frequently encountered in dental practice, require careful clinical evaluation to distinguish them from other orofacial infections. A multidisciplinary approach that combines prompt drainage, infection control, and definitive periodontal therapy is essential for effective management. Recognizing the underlying etiological factors, including microbial colonization and systemic influences, helps tailor individualized treatment plans. With advancements in diagnostic tools and therapeutic modalities, including host modulation and local drug delivery systems; clinicians are better equipped to manage these infections comprehensively. Ongoing research and clinical vigilance are crucial to further improve outcomes and reduce recurrence rates. Effective patient education and regular maintenance play pivotal roles in long-term periodontal health and the prevention of abscess formation.

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