



## MICROBIOLOGICAL AND CLINICAL FEATURES OF ODONTOGENIC INFECTIOUS ANAEROBIC ANALYSIS

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### Abstract:

Odontogenic infections frequently exhibit a polymicrobial nature and may present with atypical clinical courses. Determining the microbial spectrum is essential for appropriate antimicrobial therapy and surgical management. This study aimed to investigate the microbial composition and clinical features of odontogenic infections in 90 patients using standardized aerobic and anaerobic culture techniques. Pus samples were collected aseptically by aspiration or immediately after surgical drainage, followed by quantitative culturing under aerobic and anaerobic conditions. All samples demonstrated bacterial growth. Staphylococcus species were most common (95.2%), dominated by coagulase-negative *S. epidermidis* (66.6%), while *S. aureus* was detected in 47.6% of cases. Streptococcaceae were found in 61.9% of patients, predominantly *S. pyogenes*. Anaerobic bacteria were present in 42.9%, and fungi were isolated in 19%. Enterobacteriaceae and *Pseudomonas aeruginosa* were not detected. Polymicrobial infections were observed in 90.5% of cases, mainly involving Staphylococcus–Streptococcus associations. Clinically, 22.9% of patients showed atypical infection courses, mostly males (64.4%) with a mean age of  $38.6 \pm 10.8$  years. Odontogenic infections are argely polymicrobial with predominance of Gram-positive cocci and anaerobes. Accurate diagnosis requires both aerobic and anaerobic culture methods, and recognition of atypical cases is important for individualized treatment

**Keywords:** Odontogenic infection, polymicrobial infection, Staphylococcus, Streptococcus, anaerobic bacteria, atypical clinical course

### I. INTRODUCTION

Odontogenic infections are among the most common conditions encountered in oral and maxillofacial surgery. They can arise from dental caries, periodontitis, or post-surgical complications, and may lead to severe local or systemic consequences if inadequately treated. Epidemiological data indicate that these infections are predominantly polymicrobial, involving both aerobic and anaerobic bacteria.

Gram-positive cocci, particularly Staphylococcus and Streptococcus species, have been reported as primary pathogens, often in combination with anaerobic organisms such as Bacteroides, Fusobacterium, Peptococcus, and Peptostreptococcus. Rarely, fungi such as *Candida albicans* may be involved.

Despite extensive studies, there remains a need for comprehensive microbiological profiling that correlates microbial etiology with clinical characteristics, especially in patients with atypical infection courses. This study aims to characterize the aerobic and anaerobic microbial flora in odontogenic infections and to analyze the clinical features of patients, including those with atypical presentations.

### II. MATERIALS AND METHODS

#### A) Materials

This study included 90 patients (50 males and 40 females) with clinically diagnosed odontogenic infections. Inclusion criteria were acute or subacute odontogenic infections requiring hospitalization or



surgical drainage, while exclusion criteria included systemic immunodeficiency or antibiotic therapy within the preceding 7 days.

Clinical data collected included age, sex, infection duration, and atypical clinical features. Atypical courses were defined as delayed resolution, torpid progression, or unusual anatomical spread.

Sample material consisted of pus collected under strict aseptic conditions, either by aspiration with sterile disposable syringes or immediately after surgical incision. The skin was disinfected prior to sampling to minimize contamination.

**B) Methods**

Microbiological analysis involved quantitative cultures on solid nutrient media with detection sensitivity  $\geq 10^2$  CFU/mL. Both aerobic and anaerobic cultivation techniques were used; anaerobic cultures were incubated in an anaerobic chamber using selective

media. Microbial species were identified using standard bacteriological and mycological methods.

Polymicrobial assessment recorded the number and combination of microbial species per sample. Associations were categorized as aerobic only, anaerobic only, or mixed aerobic–anaerobic.

Statistical analysis applied descriptive statistics. Microbial frequencies were expressed as absolute numbers and percentages. Quantitative bacterial counts were expressed as log CFU/mL  $\pm$  standard error.

**III. RESULTS AND DISCUSSION**

**A) Results**

During the two-year study period, a total of 380 patients with odontogenic infections were evaluated. Among them, 87 patients (22.9%) exhibited atypical infection courses, which included delayed resolution, slow or torpid progression, and unusual anatomical spread beyond the commonly affected areas.

Microorganism	Absolute number	%
<i>S. aureus</i>	43	47.6
<i>S. epidermidis</i>	60	66.6
Hemolytic streptococci	30	33.3
Viridans streptococci	21	23.8
<i>S. mutans</i>	4	4.7
<i>C. albicans</i>	17	19.0
Fusobacterium spp.	21	23.8
Peptococcus spp.	21	23.8
Peptostreptococcus spp.	32	38.1
Actinomyces spp.	4	4.8
Bacteroides spp.	47	52.4
Enterobacteriaceae	0	0
<i>Pseudomonas aeruginosa</i>	0	0

**Table 1. Frequency of microorganisms isolated from pus samples (n = 90)**

The majority of atypical cases occurred in males (64.4%), with females accounting for 35.6%. The mean age of patients with atypical courses was  $38.6 \pm 10.8$  years. Most cases (80.4%) were observed in the 20–50

years age group, indicating that middle-aged adults were particularly susceptible to atypical presentations. Specifically, the highest proportion of cases was seen in the 20–30 years age group, followed by the 41–50 years group, while patients older than 60 years were less frequently affected.

Age (years)	Male	Female	Total	%
20–30	23	11	34	39.1
31–40	13	4	17	19.6
41–50	11	8	19	21.8
51–60	6	5	11	12.6



Age (years)	Male	Female	Total	%
>60	3	3	6	6.9
<b>Total</b>	<b>56</b>	<b>31</b>	<b>87</b>	<b>100</b>

**Table 2. Distribution of patients with atypical courses by age and sex**

These atypical infections often required prolonged hospitalization and more intensive clinical management. Clinically, patients presented with signs of persistent inflammation, delayed wound healing after surgical intervention, and in some cases, involvement of adjacent anatomical spaces that is uncommon in typical odontogenic infections.

### **B) Discussion**

The present study demonstrates that atypical courses of odontogenic infections are not rare and represent a significant subset of cases encountered in clinical practice. The predominance of atypical presentations among males aged 20–50 years suggests a potential influence of demographic and behavioral factors, including occupational stress, oral hygiene practices, and lifestyle-related comorbidities.

Clinically, atypical courses may manifest as delayed healing, prolonged inflammation, or spread to unusual anatomical regions. These patterns underscore the need for heightened clinical vigilance and individualized management strategies. Early recognition of atypical progression allows for timely intervention, including appropriate surgical drainage, optimized antimicrobial therapy, and close follow-up to prevent complications such as deep fascial space involvement or systemic spread.

These findings are consistent with previous reports emphasizing that the clinical course of odontogenic infections can be variable, influenced by patient-specific factors and underlying host responses. The higher prevalence of atypical courses in middle-aged males aligns with earlier observations that suggest a role for host susceptibility and potential opportunistic behavior of commensal flora in exacerbating infection severity.

In conclusion, identifying patients at risk for atypical courses is crucial for clinical decision-making. Tailored treatment approaches, attentive monitoring, and early intervention are key to improving outcomes in these patients. Recognition of atypical patterns not only informs clinical practice but also contributes to a better understanding of the factors that influence infection severity and recovery.

### **IV. CONCLUSION**

Odontogenic infections are primarily polymicrobial in nature, with a predominance of Gram-positive cocci and anaerobic bacteria. The complexity of these infections necessitates accurate microbiological diagnosis, which should include both aerobic and anaerobic culture techniques to ensure the full spectrum of pathogens is identified. Such comprehensive diagnostic approaches allow clinicians to select appropriate antimicrobial therapy and tailor surgical interventions effectively.

Atypical clinical courses, although less common, represent a significant clinical challenge. These cases, often characterized by delayed resolution, slow progression, or unusual anatomical spread, require heightened clinical vigilance. Early recognition of atypical presentations is crucial for implementing individualized management strategies, including prompt surgical drainage, targeted antimicrobial therapy, and careful follow-up, which collectively improve patient outcomes and reduce the risk of complications.

Furthermore, understanding the patterns of polymicrobial associations and the demographic factors associated with atypical infections—such as age and sex—enables healthcare providers to anticipate potential challenges in management. Awareness of these factors supports evidence-based decision-making, ensures timely intervention, and contributes to better overall prognosis for patients with odontogenic infections.

In summary, successful management of odontogenic infections relies on a combination of accurate microbiological assessment, recognition of atypical clinical courses, and individualized patient care. Integrating these elements into routine clinical practice enhances therapeutic effectiveness and minimizes the risk of treatment failure or recurrence.

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