



## Evaluation of Abscess of Odontogenic Origin: A Retrospective Study

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### Research Article

#### History

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### ABSTRACT

**Objectives:** This study aimed to investigate the influence of various demographic, clinical, radiographic, and behavioral factors—such as age, gender, systemic conditions, oral hygiene status, and risk habits like smoking and alcohol consumption—on the treatment approaches adopted for odontogenic abscesses. The objective was to identify which factors are significantly associated with the selection of conservative versus invasive management strategies in clinical practice.

**Materials and Methods:** This retrospective study included 23 patients (aged 18–70) treated for odontogenic abscesses at the Department of Oral Surgery, Ege University, between May 2023 and April 2024. Data on demographics, symptom duration, systemic health, clinical and radiographic findings, and behavioral risk factors were collected. Treatment modalities -antibiotic use, drainage, extraction, pulpectomy, and endodontic therapy- were analyzed. Statistical comparisons were performed using Chi-square, Fisher's exact, Mann-Whitney U, and Kruskal-Wallis tests.

**Results:** Antibiotics were prescribed in 78.3% of cases, while 60.9% underwent tooth extraction, 30.4% required drainage, and 39.1% received endodontic treatment. Symptom duration showed a statistically significant association with endodontic treatment ( $p = 0.05$ ), with shorter durations favoring conservative therapy. No significant associations were observed for other variables, except for a correlation between alcohol consumption and antibiotic use ( $p = 0.006$ ).

**Conclusions:** Symptom duration is a key factor influencing the choice of conservative versus invasive treatment in odontogenic abscesses. Although most demographic and clinical variables were not statistically significant, early presentation may allow for tooth-preserving approaches.

**Keywords:** Dental abscess, dental abscess management, etiological factors, odontogenic infections, odontogenic abscess treatment

## Odontojen Kökenli Apse Değerlendirilmesi: Retrospektif Bir Çalışma

### Araştırma Makalesi

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### ÖZ

**Amaç:** Odontojenik apselerin tedavi stratejileriyle ilişkili demografik, klinik, radyografik ve davranışsal faktörleri değerlendirmek.

**Gereç ve Yöntemler:** Bu çalışma, Mayıs 2023 ile Nisan 2024 tarihleri arasında Ege Üniversitesi Ağız Cerrahisi Anabilim Dalı'nda odontojenik apse tedavisi gören 23 hastayı (yaşları 18-70) retrospektif olarak değerlendirmiştir. Veriler arasında hasta demografisi, semptom süresi, sistemik sağlık, klinik bulgular, radyografik özellikler ve davranışsal risk faktörleri yer almaktadır. Tedavi yöntemleri (antibiyotik kullanımı, drenaj, çekim, pulpektomi ve endodontik tedavi) analiz edilmiştir. İstatistiksel karşılaştırmalar Ki-kare, Fisher'in kesin, Mann-Whitney U ve Kruskal-Wallis testleri kullanılarak yapılmıştır.

**Bulgular:** Vakaların %78,3'ünde antibiyotik reçete edilirken, %60,9'unda diş çekimi, %30,4'ünde drenaj ve %39,1'inde endodontik tedavi uygulandı. Semptom süresi, endodontik tedavi ile istatistiksel olarak anlamlı bir ilişki gösterdi ( $p = 0,05$ ), daha kısa süreler konservatif tedaviyi destekledi. Alkol tüketimi ile antibiyotik kullanımı arasındaki korelasyon ( $p = 0,006$ ) dışında, diğer değişkenler için anlamlı bir ilişki gözlenmedi.

**Sonuçlar:** Semptom süresi, odontojenik apselerde konservatif tedavi ile invaziv tedavi seçimi üzerinde etkili olan önemli bir faktördür. Demografik ve klinik değişkenlerin çoğu istatistiksel olarak anlamlı olmasa da, erken başvuru diş koruyucu yaklaşımlara olanak sağlayabilir.

**Anahtar Kelimeler:** Dental apse, dental apse yönetimi, etiyolojik faktörler, odontojenik apse tedavisi, odontojenik enfeksiyonlar

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### Introduction

Dental abscesses are localized collections of pus associated with infection in the periapical region of a tooth. They are common yet potentially serious infections in the field of oral health.<sup>1</sup> These infections can extend beyond the oral cavity to deep neck spaces or the

mediastinum, potentially leading to life-threatening complications.<sup>2</sup> Prompt recognition and intervention are critical to prevent such severe outcomes.<sup>3</sup>

The prevalence and severity of dental abscesses can be influenced by several factors. Risk factors include poor

oral hygiene, delayed treatment-seeking behavior, and systemic comorbidities such as diabetes mellitus,<sup>4</sup> immunosuppression, and tobacco or alcohol use.<sup>5-6</sup> Studies have shown that patients with low socioeconomic status and limited access to dental care are more prone to developing advanced stages of infection.<sup>7-8</sup>

The mandibular molars, particularly the first molars, are often the most affected teeth in odontogenic abscess cases due to their complex root anatomy and proximity to fascial spaces.<sup>9</sup> Understanding the anatomical predisposition and microbial diversity associated with these infections helps guide effective management strategies.<sup>10</sup>

Treatment options for odontogenic abscesses include surgical drainage, tooth extraction, or root canal therapy, often in conjunction with empirical antibiotic therapy.<sup>3,11-13</sup> While surgical intervention remains the cornerstone of treatment in severe cases, conservative approaches may be sufficient for localized infections.<sup>14</sup>

Despite the growing body of literature, a gap remains regarding how clinical and demographic variables influence real-time treatment decisions for odontogenic abscesses. The present study aims to evaluate the etiologic factors contributing to the formation of these abscesses and assess current treatment protocols in a university-based oral surgery department.<sup>15-17</sup>

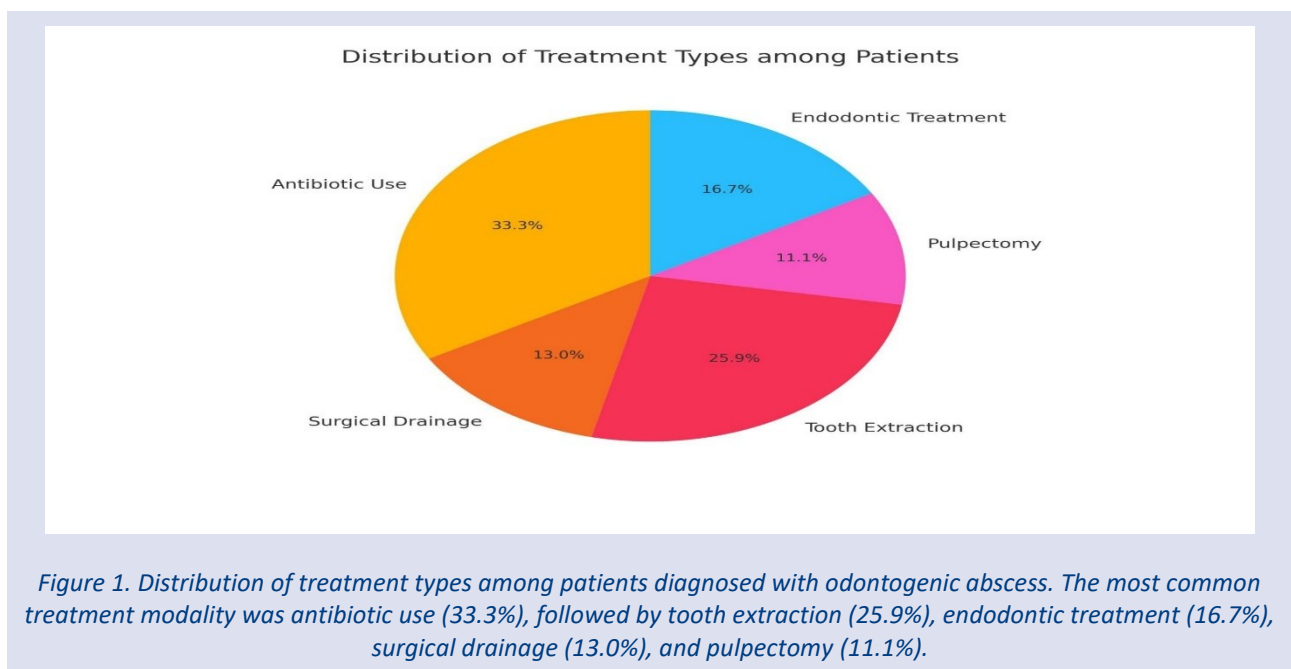
## Materials and Methods

This retrospective observational study was conducted in the Department of Oral Surgery, Faculty of Dentistry, Ege University, and included 23 patients aged between 18 and 70 years who were diagnosed and treated for odontogenic abscesses between May 2023 and April 2024. Ethical approval was obtained from the Clinical Research Ethics Committee of Ege University Faculty of Medicine (Approval No: 23-5/67). The study was conducted in accordance with the Principles of the Declaration of Helsinki. Patients presenting with fluctuant

swellings of dental origin and complete clinical and radiographic records were included in the study. Collected data comprised demographic variables (age, gender), duration of symptoms (in days), clinical findings (pain, swelling, trismus, tenderness to palpation), and systemic conditions (comorbidities, medication use, chemotherapy or radiotherapy history, smoking, alcohol consumption, and bruxism). Radiographic evaluations noted periapical infections, cystic lesions, and eruption status of the involved teeth. Additionally, oral hygiene and socioeconomic status were assessed. Treatment modalities—antibiotic therapy, surgical drainage, tooth extraction, pulpectomy, and endodontic intervention—were recorded for each case. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Categorical variables were compared using Chi-square or Fisher's exact test, and nonparametric comparisons of continuous data were conducted using Mann-Whitney U and Kruskal-Wallis tests. A p-value <0.05 was considered statistically significant. A priori power analysis was performed during the study planning phase, assuming an alpha error probability of 0.05 and a statistical power of 80%, indicating that a minimum sample size of 23 patients was required for the primary analysis.

## Results

A total of 23 patients diagnosed with odontogenic abscesses were included in the study, comprising 12 females (52.2%) and 11 males (47.8%), with a mean age of 43.91 years (SD = 14.81, range = 18–70). The mean duration of symptoms prior to treatment was 18.39 days (SD = 14.81, range = 1–150). Antibiotic therapy was administered in 78.3% of the cases (n = 18), surgical drainage in 30.4% (n = 7), and tooth extraction was performed in 60.9% (n = 14). Pulpectomy and endodontic treatment were applied in 6 (26.1%) and 9 (39.1%) cases, respectively (Figure 1).



Statistical analysis using Chi-square and Fisher's exact tests revealed no significant association between gender and any of the treatment modalities, including antibiotic use ( $p = 1.000$ ), drainage ( $p = 0.232$ ), extraction ( $p = 1.000$ ), pulpectomy ( $p = 0.408$ ), or endodontic therapy ( $p = 0.795$ ). Similarly, age was not significantly associated with antibiotic administration ( $p = 0.313$ ), drainage ( $p = 0.233$ ), extraction ( $p = 0.231$ ), pulpectomy ( $p = 0.400$ ), or endodontic treatment ( $p = 0.231$ ; Figure 2).

Among all variables tested, a statistically significant association was found only between symptom duration and endodontic treatment. Patients who received endodontic therapy had significantly shorter complaint durations (mean =  $4.11 \pm 2.71$  days) than those who did not (mean =  $27.57 \pm 41.95$  days) (Mann-Whitney U test,  $p = 0.05$ ). (Figure 3) No significant association was observed between symptom duration and antibiotic use ( $p = 0.639$ ),

drainage ( $p = 0.570$ ), pulpectomy ( $p = 0.833$ ), or extraction ( $p = 0.007$ ; borderline significance, above the study threshold of  $p < 0.05$ ; Figure 4)

No significant associations were found between the presence of pain ( $p = 0.963$ ), swelling ( $p = 0.565$ ), trismus ( $p = 0.113$ ), or lymphadenopathy ( $p = 0.468$ ) and any of the treatment modalities. Additionally, systemic conditions such as diabetes or other comorbidities ( $p > 0.4$ ), smoking ( $p > 0.5$ ), alcohol consumption ( $p = 0.006$  for antibiotics, significant at the common threshold), and bruxism ( $p > 0.1$ ) did not correlate with treatment choices. Radiographic findings, including periapical infection ( $p = 0.223$  for antibiotics) and cystic lesion presence ( $p = 0.963$ ), also showed no significant influence on treatment approach. Socioeconomic status ( $p = 0.565$ ) and oral hygiene levels ( $p > 0.05$ ) were not associated with differences in clinical management.

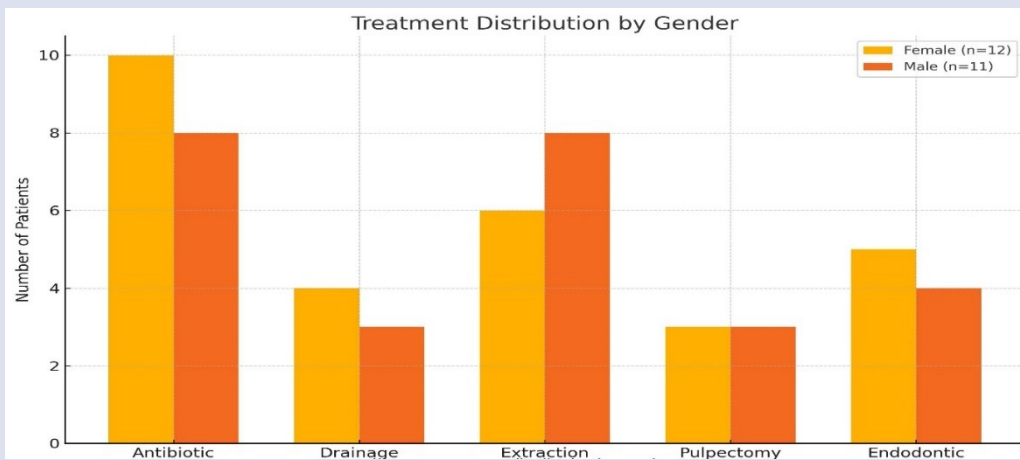


Figure 2. Treatment distribution by gender among patients with odontogenic abscess. Antibiotic prescription was the most frequent treatment in both genders, observed in 10 female and 8 male patients. Tooth extraction was slightly more common in males ( $n = 8$ ) than females ( $n = 6$ ), whereas endodontic treatment and surgical drainage showed similar distributions across genders. Pulpectomy was equally applied to both genders ( $n = 3$ ).

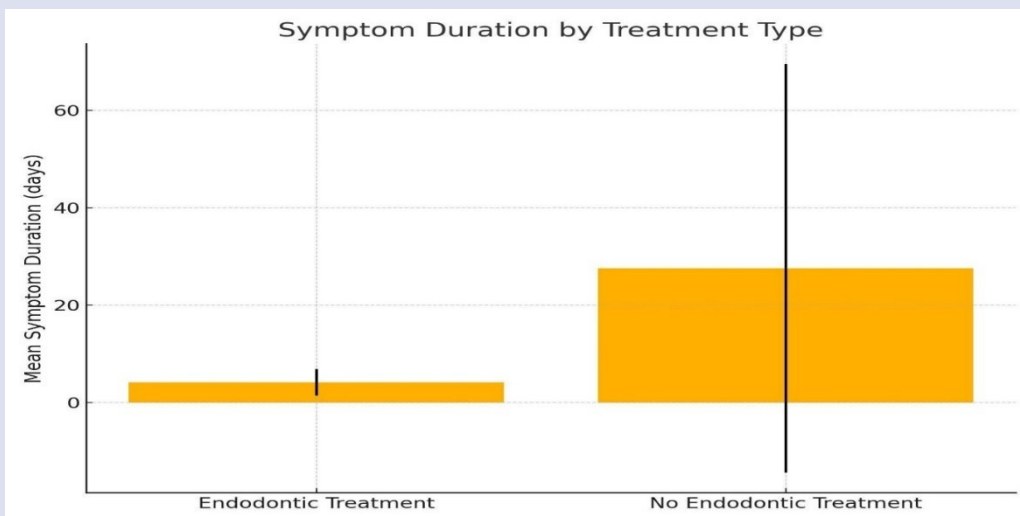


Figure 3. Comparison of mean symptom duration between patients who received endodontic treatment and those who did not. Patients who underwent endodontic treatment had a significantly shorter mean symptom duration (4.1 days) compared to those who received alternative treatments (27.6 days).

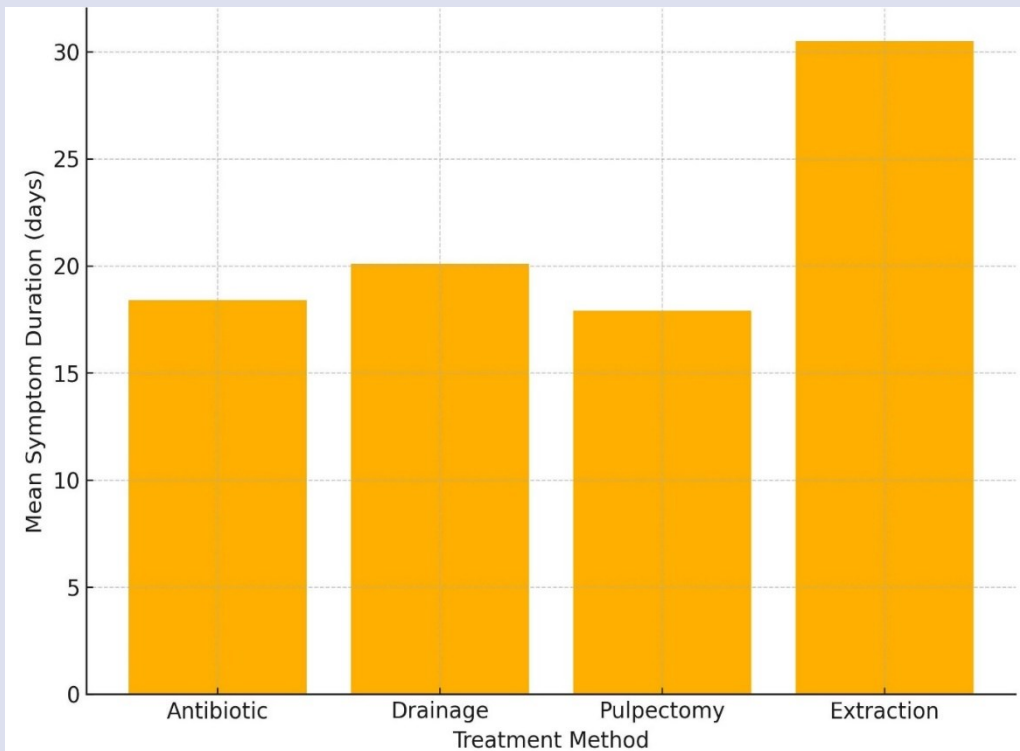


Figure 4. Mean symptom duration (in days) according to treatment methods applied in patients with odontogenic abscess. Patients who underwent tooth extraction exhibited the longest mean symptom duration (30.4 days), while those treated with pulpectomy had the shortest (17.9 days).

## Discussion

Odontogenic infections, although less common today due to improved oral hygiene and dental care, remain a serious clinical concern with potential for rapid progression and severe complications if not promptly treated. In this retrospective study, we aimed to identify clinical, behavioral, radiographic, and demographic factors influencing treatment decisions for odontogenic abscesses.

Among all variables tested, only symptom duration showed a statistically significant association with endodontic treatment ( $p = 0.007$ ). Patients who received endodontic therapy presented earlier (mean = 4.11 days), while those treated with alternative methods had significantly longer complaint durations (mean = 27.57 days). This supports previous findings by Flynn et al.<sup>18</sup> who demonstrated better outcomes and more conservative treatment potential in early presenters.

In contrast, no significant associations were found between symptom duration and other treatments, such as antibiotics, drainage, pulpectomy, or extraction ( $p > 0.05$ ). This suggests that while timing may influence the feasibility of endodontic intervention, other treatment choices are likely more dependent on clinical severity or anatomical involvement.

Antibiotic prescription, observed in 78.3% of cases, primarily involved amoxicillin-clavulanate, alone or with metronidazole. A significant relationship was observed between alcohol use and antibiotic administration ( $p = 0.006$ ), which may reflect clinicians' concerns about

systemic vulnerability. Similar patterns of precautionary prescribing have been discussed in broader literature,<sup>17</sup> although more targeted studies are needed to understand whether this trend improves outcomes or contributes to antibiotic overuse.

Radiographic findings, such as periapical infections and cystic lesions, did not significantly affect treatment decisions. This might be due to the absence of CBCT imaging in this study, limiting the ability to evaluate lesion extent or cortical involvement. In acute clinical settings, as Aliabadi et al. suggest, visible and palpable findings often take precedence over radiographic indicators.<sup>13</sup>

Our demographic findings are largely in agreement with the literature. The mean age of patients was 43.9 years, comparable to that reported in several studies ranging from 39 to 47 years.<sup>4,5,7,9,10,19</sup> While some literature suggests a slight male predominance in abscess cases,<sup>11-13</sup> our study showed a slightly higher female representation (52.2%). However, no statistically significant association was found between gender and treatment modality, including antibiotic use ( $p = 1.000$ ), drainage ( $p = 0.232$ ), extraction ( $p = 1.000$ ), or endodontic therapy ( $p = 1.000$ ). These findings suggest that gender does not influence clinical decision-making in abscess management, consistent with prior studies.<sup>20</sup>

Mandibular molars, particularly the lower right first molar, were the most frequently affected teeth (30.4%), with no involvement of anterior teeth. This is consistent with prior studies highlighting the posterior mandible as the most common origin of odontogenic infections due to

anatomical proximity to fascial spaces and denser bone structures.<sup>5,7,9,13,15,20</sup>

While oral hygiene and socioeconomic status were not statistically associated with treatment approach, descriptive data revealed that 95.7% of patients had low socioeconomic status and 82.6% had intermediate oral hygiene. These findings mirror those of Tozoglu et al.<sup>4</sup> who emphasized the role of social determinants in the development of severe dental infections. Although statistical tests did not confirm their predictive value in our small sample, these variables may still influence access to timely care and disease progression.

Clinical signs such as pain, swelling, trismus, and lymphadenopathy were common across patients but did not significantly affect treatment decisions. Similarly, behavioral variables including smoking, bruxism, and systemic diseases like diabetes did not show significant associations with treatment type. These findings suggest that acute decision-making is often symptom-driven rather than strictly determined by background factors.

The main limitation of this study is the relatively small sample size, which is inherent to its retrospective design. However, a priori power analysis confirmed that the included number of patients was sufficient to detect statistically meaningful differences for the primary outcomes. Nevertheless, the findings should be interpreted with caution and validated by larger prospective studies.

## Conclusions

This study underscores the multifactorial etiology of odontogenic abscesses, with delayed presentation, inadequate oral hygiene, and low socioeconomic status emerging as prominent predisposing factors. Although limited by the small sample size, the descriptive findings emphasize the potential influence of these variables on disease onset and progression. Understanding such etiological determinants is essential for both prevention and targeted management of odontogenic infections.

## Acknowledgements

None.

## Conflicts of Interest Statement

The authors declare no conflict of interest.

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