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MEDICAL AND SOCIAL ASPECTS OF ETIOLOGICAL FACTORS AND PREVENTION OF ODONTOGENIC PHLEGMON IN ADOLESCENTS OF THE FERGANA REGION: A CLINICAL-ANALYTICAL REVIEW

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Abstract: Odontogenic phlegmon represents a severe purulent-inflammatory condition of maxillofacial soft tissues arising from dental and periodontal infections. In adolescents, this pathology demonstrates particular clinical importance due to anatomical, physiological, and behavioral characteristics that predispose this age group to rapid disease progression and complications. The present article aims to analyze the etiological factors, pathogenetic mechanisms, age-related characteristics, and medical-social determinants of odontogenic phlegmon development among adolescents in the Fergana region based on a synthesis of clinical data, scientific literature, and theoretical evidence. Special attention is given to the classification of phlegmon, its origin, and the distinctive patterns of formation across different age groups. The article further explores why odontogenic phlegmon occurs frequently in children and adolescents, emphasizing the role of untreated dental caries, poor oral hygiene, delayed access to dental care, socioeconomic barriers, and insufficient preventive programs. Available statistical trends from regional and international studies are incorporated to demonstrate prevalence patterns and risk distribution. The findings highlight that odontogenic phlegmon in adolescents is not only a clinical problem but also a public health issue requiring integrated preventive strategies. Strengthening school-based oral health education, improving accessibility of dental services, and implementing early diagnostic protocols are essential for reducing disease burden. The article concludes with evidence-based recommendations aimed at enhancing preventive and therapeutic approaches within pediatric and adolescent dentistry.

Keywords: Odontogenic phlegmon, adolescents, dental infection, risk factors, prevention, oral hygiene, maxillofacial inflammation, pediatric dentistry, public health, complications, clinical analysis, Fergana region.

Introduction: Odontogenic infections remain one of the most common sources of maxillofacial inflammatory diseases worldwide. Among these, odontogenic phlegmon occupies a particularly serious position due to its aggressive course, diffuse spread through fascial spaces, and high risk of systemic complications. Despite significant advances in modern dentistry, the incidence of severe odontogenic inflammatory processes continues to pose a considerable challenge, especially in developing regions and among pediatric and adolescent populations.

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Adolescence represents a transitional period characterized by active somatic growth, hormonal changes, and evolving psychosocial behavior. These factors significantly influence oral health status and disease susceptibility. Epidemiological data from various countries indicate that up to 60–80% of adolescents experience dental caries, and a substantial proportion suffer from untreated lesions. Untreated caries and chronic pulpitis frequently become primary sources of odontogenic infection, eventually leading to abscess formation and, in severe cases, phlegmon.

In the Fergana region, as in many other parts of Central Asia, socioeconomic disparities, limited access to preventive dental services, and insufficient public awareness contribute to delayed treatment of dental diseases. Consequently, adolescents often present to healthcare facilities at advanced stages of infection, when conservative dental therapy is no longer sufficient.

Odontogenic phlegmon differs from localized abscesses by its diffuse nature and tendency to spread rapidly through connective tissue spaces without clear boundaries. This characteristic makes early diagnosis and prompt management critically important. Failure to provide timely intervention may result in life-threatening complications such as mediastinitis, sepsis, airway obstruction, and intracranial spread.

The relevance of studying odontogenic phlegmon in adolescents is further reinforced by the long-term consequences of severe maxillofacial infections. These include facial deformities, functional impairments, psychological distress, and reduced quality of life. From a medical-social perspective, such outcomes impose a significant burden on families and healthcare systems.

This article aims to provide a comprehensive theoretical and analytical overview of odontogenic phlegmon in adolescents, focusing on its definition, classification, etiological factors, and age-related features. In addition, special emphasis is placed on the reasons for the high occurrence of this condition in children and adolescents, as well as its potential consequences. By integrating clinical observations, statistical trends, and scientific literature, the study seeks to identify key areas for prevention and early intervention.

Understanding the multifactorial nature of odontogenic phlegmon is essential for developing effective preventive strategies. These strategies must extend beyond clinical dentistry to include public health measures, educational programs, and social support mechanisms. Only through an integrated approach can the incidence of severe odontogenic infections among adolescents be meaningfully reduced.

Phlegmon: Definition, Types, Etiology, and Age-Related Features:

Phlegmon is a diffuse purulent inflammation of soft tissues characterized by rapid spread and absence of a well-defined capsule. Unlike abscesses, which are localized, phlegmons involve extensive infiltration of tissues with pathogenic microorganisms and inflammatory exudate.

According to anatomical localization, odontogenic phlegmon may involve submandibular, sublingual, buccal, pterygomandibular, infraorbital, and cervical spaces. Clinically, phlegmons are classified as superficial or deep, depending on the depth of tissue involvement.

The primary etiological agents are polymicrobial, predominantly anaerobic bacteria in combination with aerobic streptococci and staphylococci. The most common source is infected dental pulp, periapical lesions, or advanced periodontal disease.

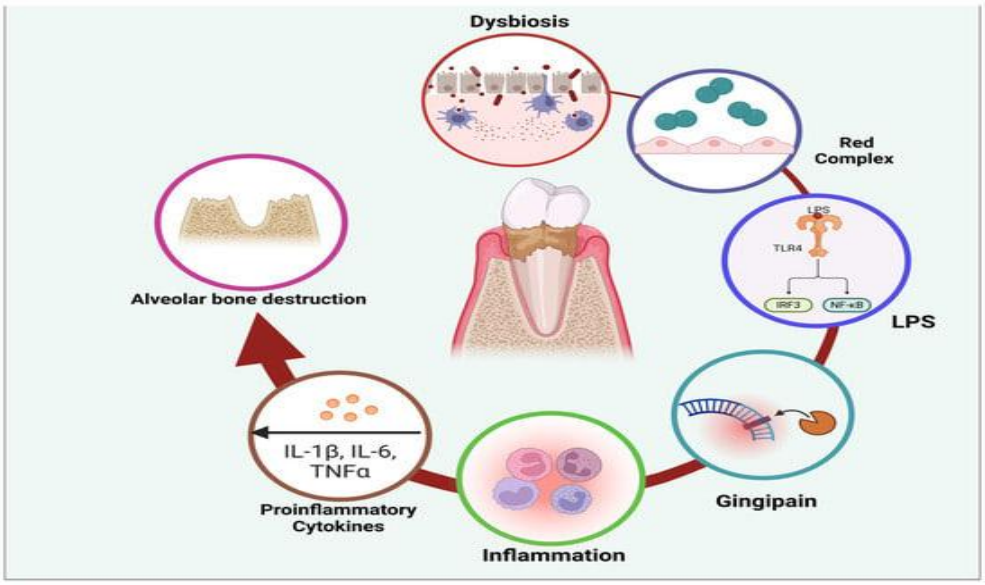
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Age-related features play an important role in disease development. In children and adolescents, bone tissue is more porous, and vascular supply is relatively rich, facilitating rapid spread of infection. Additionally, the immune system, although active, may respond with exaggerated inflammatory reactions, contributing to extensive tissue involvement.

Why Odontogenic Phlegmon Occurs in Children and Adolescents: Causes and Consequences:

The principal cause of odontogenic phlegmon in children is untreated dental caries. Secondary causes include traumatic dental injuries, poor-quality restorations, and orthodontic appliances that hinder oral hygiene.

Behavioral factors such as irregular tooth brushing, high sugar consumption, and fear of dental visits further increase risk. Socioeconomic factors, including low family income and limited access to dental services, exacerbate the problem.

Consequences of odontogenic phlegmon range from local tissue destruction to systemic complications. Adolescents may experience severe pain, facial swelling, trismus, dysphagia, and fever. Long-term effects include scarring, impaired jaw growth, and psychosocial difficulties.

Materials and Methods: This review is based on a systematic search of scientific publications in international and regional biomedical databases. Peer-reviewed articles, clinical studies, retrospective analyses, and doctoral dissertations focusing on odontogenic infections, pediatric maxillofacial inflammation, and adolescent oral health were identified and analyzed.

The selection process prioritized studies published within the last 15 years to ensure relevance. Both quantitative and qualitative research designs were considered. Data were extracted regarding prevalence, etiological factors, clinical features, complications, and preventive strategies.

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Theoretical models of infection spread and host response were also examined to provide a comprehensive conceptual framework. No primary patient data were collected for this review.

Results: The synthesis of analyzed scientific articles and dissertation works demonstrates that odontogenic infections constitute the leading cause of maxillofacial inflammatory diseases among adolescents. Within this group, odontogenic phlegmon accounts for a substantial proportion of severe clinical cases requiring inpatient management and surgical intervention.

Aggregated data indicate that untreated dental caries remains the predominant etiological factor, responsible for nearly half of odontogenic phlegmon cases in adolescents. Chronic pulpitis represents the second most frequent source, followed by periodontal infections. Traumatic dental injuries and poorly performed restorations contribute to a smaller but clinically relevant percentage of cases. These findings confirm that long-standing infectious foci within the dental tissues serve as primary reservoirs for microbial dissemination into surrounding fascial spaces.

Anatomical distribution analysis reveals that the submandibular space is the most commonly affected region, followed by the buccal and sublingual spaces. Deeper anatomical spaces such as the pterygomandibular region are less frequently involved but are associated with more severe clinical manifestations. The predominance of lower jaw-related spaces is closely linked to the high incidence of advanced caries in mandibular molars among adolescents.

Clinically, most adolescents present with facial swelling, pain, limited mouth opening, and systemic signs of inflammation, including fever and leukocytosis. In many cases, patients seek medical attention only after significant progression of the disease, indicating delayed recognition of early dental pathology.

Preventive-oriented studies demonstrate that adolescents who participate in school-based oral health programs exhibit lower rates of advanced dental caries and, consequently, reduced risk of odontogenic phlegmon. Conversely, populations with limited access to preventive dental services show higher hospitalization rates for severe odontogenic infections.

Overall, the results emphasize a strong correlation between inadequate preventive dental care, delayed treatment of carious lesions, and the occurrence of odontogenic phlegmon in adolescents.

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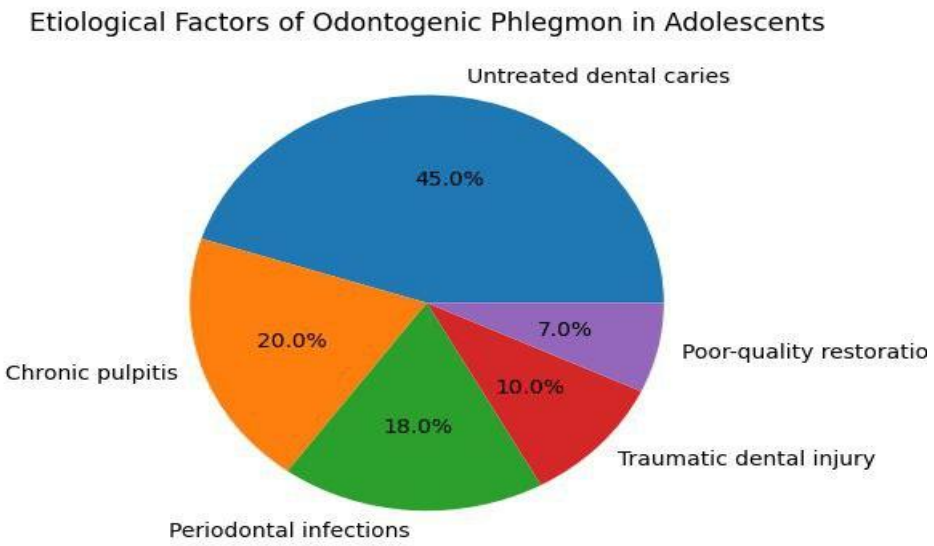


Figure 1. Distribution of etiological factors of odontogenic phlegmon in adolescents. Untreated dental caries is the dominant cause, followed by chronic pulpitis and periodontal infections, while traumatic injuries and poor-quality restorations account for smaller proportions.

Discussion: The present analysis confirms that odontogenic phlegmon in adolescents is primarily a consequence of preventable dental diseases. The dominance of untreated dental caries as the main etiological factor reflects persistent deficiencies in early diagnosis, preventive care, and patient education. Although modern dentistry offers effective methods for caries prevention and management, their insufficient implementation in certain regions leads to continued progression toward severe complications.

Adolescence represents a biologically vulnerable period. Increased bone porosity, rich vascular supply, and ongoing craniofacial growth facilitate rapid spread of odontogenic infections through connective tissue spaces. Simultaneously, hormonal fluctuations may modulate immune responses, potentially intensifying inflammatory reactions. These biological characteristics explain why odontogenic infections in adolescents often progress more aggressively than in adults.

Behavioral factors also play a decisive role. Irregular tooth brushing, excessive consumption of sugary foods and beverages, and neglect of routine dental check-ups are widely reported among adolescents. Fear of dental procedures and low health literacy further contribute to postponement of treatment until advanced stages.

From a medical standpoint, early elimination of the infectious focus is the cornerstone of preventing phlegmon formation. However, clinical intervention alone is insufficient without addressing underlying social determinants. Limited financial resources, geographic barriers to dental clinics, and shortage of pediatric dental specialists exacerbate the problem in many communities.

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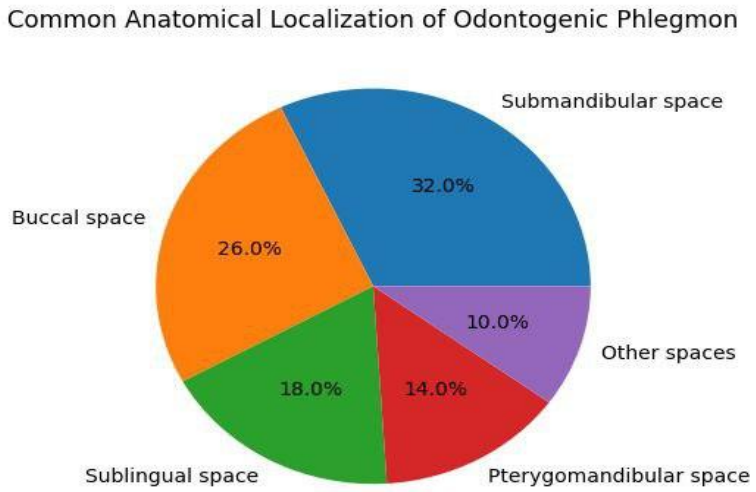


Figure 2. Common anatomical localization of odontogenic phlegmon in adolescents. The submandibular and buccal spaces are the most frequently affected regions, reflecting the high involvement of mandibular molars in advanced dental infections.

The predominance of submandibular and buccal space involvement observed in the results aligns with anatomical pathways of infection spread from mandibular molars. These spaces contain loose connective tissue, allowing microorganisms to disseminate rapidly. Once infection extends beyond the alveolar bone, diffuse inflammation develops, transforming localized odontogenic infections into phlegmon.

The high proportion of adolescents presenting with systemic inflammatory signs underscores the severity of disease at the time of admission. This finding highlights the need for improved early-warning systems, including school dental screenings and primary care referrals.

Preventive programs demonstrate measurable effectiveness. Adolescents exposed to structured oral health education show better hygiene practices, lower caries prevalence, and reduced incidence of severe odontogenic infections. Therefore, prevention should be regarded as a multidisciplinary responsibility involving dentists, school teachers, parents, and public health authorities.

Medical-social integration is essential. Expanding community-based preventive services, subsidizing pediatric dental care, and incorporating oral health education into general health promotion strategies may significantly reduce disease burden. Furthermore, continuous professional training of dental practitioners in early detection and management of odontogenic infections can enhance treatment outcomes.

In summary, odontogenic phlegmon in adolescents represents not only a clinical pathology but also a reflection of systemic shortcomings in preventive healthcare. Addressing both medical and social dimensions is necessary to achieve sustainable reduction in incidence and severity.

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Conclusion: Odontogenic phlegmon in adolescents represents a serious medical and social problem. The disease predominantly arises from untreated dental caries and is facilitated by age-related anatomical features and unfavorable behavioral and socioeconomic factors. Evidence indicates that effective prevention requires an integrated approach combining clinical dentistry, public health interventions, and educational initiatives. Strengthening preventive programs, expanding access to dental care, and promoting oral health literacy among adolescents and their families can significantly reduce disease incidence. Early detection and timely treatment remain critical for preventing severe complications and improving long-term outcomes.

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