

## **TREATMENT OF ACUTE INFECTIONS IN THE MAXILLOFACIAL REGION-CASE REPORT**

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### **Abstract**

Treating acute infections in the maxillofacial region requires a multidisciplinary approach. In this paper we are presenting a case and how we treated it while also reviewing literature. The discussion about the use of short-course versus long-course antibiotic treatments in these particular cases is also reviewed both by the literature and by what the everyday practice has taught us. The overall result is that odontogenic infections require a very fast and aggressive treatment to not allow it to spread and cause potential life-threatening complications.

*Keywords:* Maxillofacial infections, treatment, antibiotics

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### **Introduction**

A study from "The National Library of Medicine " determined that pharyngotonsillar infections were the most common cause of maxillofacial infections, while the second most common identified cause of oral and maxillofacial infections were odontogenic infections. Most odontogenic infections develop as intraoral vestibular abscess, and rarely progress to more severe infections. These infections can be treated by routine incisions and drainage without pharmacological support. Good oral hygiene and easy ingress to dental care may decrease the occurrence of odontogenic infections. Another reason as to why the odontogenic factor is the high share of the maxillofacial infections is the presence of tooth pathology characteristics for different age groups. The younger the patient, the more likely the cause of the infection will remain unidentified.

Antibiotics are one of the most frequently prescribed treatments in the world. According to NIH, worldwide antibiotic prescriptions are expanding with remarkable contrasts in prescribing both across nations and between geographic regions with national frontiers. Treatment guidelines of an antibiotic regimen substantially support 10-14 days in order to be superintendent to uncomplicated acute bacterial sinusitis patients. However, according to NIH (National Library of Medicine), treatments of such durations do have disadvantages contrasted with a shorter duration but equally effective regimen, including the encouragement of bacterial drug resistance, poorest patient compliance, higher toxicity, and greater overall economic burden. NIH made a meta-analysis about this topic and they determined that the findings advocate that short-course antibiotics have similar effectiveness for longer-course treatment to patients with uncomplicated bacterial sinusitis. Many factors contribute to the development of antibiotic resistance, the frequency and time span of antibiotic prescriptions play an enormous role in the development of the resistance. "Despite this, patients are frequently recommended to complete a full antibiotic course (even if they have recovered), and there is a perception that resistance develops if they do not complete a full antibiotic course. Since the risk of antibiotic-related adverse events is cumulative with increasing exposure, long courses of antibiotics may be more likely to induce adverse events than short-courses" ([NIH, 2017](#)). With shifting the primary care practice away from the current usual practice of longer antibiotics could reduce the total consumption of antibiotics. An increasing number of research and

systematic reviews propose that short-course antibiotics may be adequate to treat bacterial infections in outpatient settings, so far, with some remarkable exceptions, the use of short courses of antibiotics is not quality practice in most outpatient settings to the knowledge of the authors. The objective of this literature review is to critically summarize and evaluate the authentication from literature reviews of “The Effectiveness and Safety of Short-Course Versus Long-Course Antibiotic Therapy in the Treatment of Acute Bacterial Infections in the Maxillofacial Region”.

### **Case Presentation**

A 35-year-old male patient presented to our clinic, "Apolon" in Tetovo, with complaints of swelling in the lower jaw and the left side of the neck. Approximately one week prior, the patient had experienced a toothache in the lower left molar region. The patient had visited several clinics, but his symptoms persisted before seeking care at our clinic. Three days before his visit, the patient once again complained of toothache in the lower left jaw and had difficulty opening his mouth. Upon arrival at the clinic, the patient exhibited significant swelling extending to the left side of the neck and face, accompanied by redness spreading across the entire left side of the neck. The patient's medical history revealed no prior systemic illnesses.

Clinically, the patient exhibited stiffness in the jaw and neck, a change in voice, difficulty swallowing, and grade III trismus. Vital signs showed a blood pressure of 100/70 mmHg, pulse of 110 beats per minute, temperature of 38.3°C, respiratory rate of 30 breaths per minute, and oxygen saturation of 96% on room air. Extraoral clinical features revealed facial asymmetry with left-sided submandibular swelling, involving the left cheek and neck, which appeared red, warm, localized, fluctuating, and tender upon palpation. Intraoral examination revealed limited mouth opening (about 2 cm), generalized gingival hyperemia, poor oral hygiene, and dental calculus throughout the oral cavity. The dental status on the left side showed a carious lesion on tooth 37, which exhibited no signs of vitality, and radiographs revealed a diffuse bony lesion in the mandible.

Routine blood tests indicated an elevated white blood cell count of 13,000/mm<sup>3</sup> and platelets of 480,000/mm<sup>3</sup>. Both orthopantomography and retroalveolar radiography revealed acute inflammation and a pronounced mandibular lesion. The patient was diagnosed with a left-sided submandibular odontogenic abscess extending to the submental, buccal, and parapharyngeal regions.

Emergency treatment included the administration of intravenous Ringer Lactate fluids for the first six hours. An aspiration of 3 cc of pus was performed from the left mandibular region for laboratory culture and bacterial resistance testing. The patient was administered intravenous Lendacin 2g, Metronidazole infusion 500 mg, and vitamin C. An extraoral incision was made to drain the pus, and a drain was placed in the left submandibular region, followed by the extraction of tooth 37 under local anesthesia. The patient was closely monitored and showed general improvement with a reduction in the extent of the infection.

### **Discussion**

This case presents a severe odontogenic infection, which arose due to the inadequate treatment of the causative tooth and the subsequent delay in administering appropriate therapy. Odontogenic infections often stem from dental issues, with lower molars being a particularly common source. Due to their proximity to critical anatomical structures, infections originating from these teeth can rapidly progress to adjacent areas, including the sublingual, submandibular, and cervical spaces. The intricate anatomical relationships between these

spaces and the molars can facilitate the spread of infections, especially when they go untreated or receive insufficient care.

Anatomically, the lower molars are situated near important muscle insertions, including the mylohyoid muscle, which plays a significant role in controlling the infection's potential pathways. Some molars have longer roots that extend beyond the mylohyoid muscle's insertion point, making it easier for the infection to propagate to surrounding areas. This anatomical structure predisposes patients to the rapid spread of infection into the sublingual, submandibular, and cervical regions, increasing the risk of more serious complications. Once the infection breaches these initial boundaries, it can extend further through connected tissue planes and fascial spaces.

Infections can spread not only to nearby spaces but also to more distant regions, carried by the tissue planes that offer little resistance to bacterial invasion. This spread often involves several spaces simultaneously, creating a complex clinical picture. The involvement of multiple fascial spaces, particularly the submandibular, parapharyngeal, and retromandibular spaces, is a hallmark of severe odontogenic infections. When these spaces are compromised, patients are at significant risk of airway compromise due to the swelling and pressure that develop in these regions. As the infection spreads, the danger of airway obstruction becomes more pronounced, with potentially life-threatening consequences.

Complications from severe odontogenic infections are numerous and can be catastrophic if not addressed promptly. Some of the most severe complications include airway obstruction, which can lead to respiratory failure, mediastinitis (an inflammation of the tissues in the chest cavity), necrotizing fasciitis (a rapidly spreading infection that destroys soft tissues), and cavernous sinus thrombosis (CST), a serious condition involving the formation of a blood clot in the cavernous sinus near the brain. Additionally, the infection can result in sepsis, a systemic inflammatory response that can lead to multi-organ failure, as well as thoracic empyema, which is the accumulation of pus in the pleural cavity, a brain abscess, and osteomyelitis, a bone infection. These complications are not only debilitating but can be fatal if left untreated or improperly managed.

In this particular case, the clinical and laboratory findings clearly indicate the presence of a severe odontogenic infection. The patient exhibited multiple signs of systemic involvement, including trismus (difficulty opening the mouth), which is often a sign of deep-seated infection, rapid breathing indicative of respiratory distress, hypotension (low blood pressure), fever, decreased oxygen saturation, leukocytosis (an elevated white blood cell count), and thrombocytosis (an elevated platelet count). These findings suggest a widespread infection with systemic involvement, which places the patient at significant risk for further complications, including organ failure and death. The rapid onset of these symptoms highlights the need for immediate intervention.

Given the severity of the patient's condition, urgent and aggressive treatment is required. The primary goals of treatment in such cases are to control the source of infection, prevent further spread, and support the patient's respiratory and cardiovascular systems. Initial management should include securing the airway, if necessary, especially in cases where airway obstruction is imminent. Broad-spectrum empirical antibiotics that target both aerobic and anaerobic bacteria should be initiated as soon as possible, given the polymicrobial nature of odontogenic infections. These antibiotics should be administered without delay, even before culture results are available, as time is of the essence in preventing further spread of the infection. Once culture and sensitivity results are obtained, therapy can be narrowed to target the specific pathogens involved.

In addition to antibiotic therapy, surgical intervention may be necessary to drain any abscesses and remove necrotic tissue. Incision and drainage procedures are often required to evacuate pus and reduce the pressure in the affected areas, thereby preventing further tissue destruction

and aiding in infection control. In some cases, more extensive debridement may be needed, particularly if necrotizing fasciitis or other deep tissue involvement is present. Close monitoring in an intensive care setting is often required for patients with severe odontogenic infections, especially when systemic symptoms such as sepsis or respiratory distress are present.

Given the high risk of rapid deterioration and the potential for fatal outcomes, patients with severe odontogenic infections must be monitored closely, with frequent reassessments of their respiratory status, hemodynamic stability, and overall clinical condition. The development of complications such as mediastinitis or cavernous sinus thrombosis necessitates immediate escalation of care, often involving a multidisciplinary team including maxillofacial surgeons, infectious disease specialists, and critical care physicians. Early recognition and prompt treatment are essential to improving outcomes in these high-risk patients.

## Conclusion

In conclusion, severe odontogenic infections are a medical emergency that requires swift, aggressive treatment to prevent life-threatening complications. The involvement of multiple fascial spaces, the potential for airway obstruction, and the risk of systemic infection all underscore the need for early diagnosis, appropriate antibiotic therapy, and, when necessary, surgical intervention. Without timely and effective treatment, these infections can progress rapidly, leading to catastrophic outcomes, including death.

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