

## Case Report

### A Comprehensive Case Report on Submandibular Space Infection: Clinical Presentation, Diagnostic Strategies, and Multidisciplinary Management

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#### ABSTRACT:

Submandibular space infections are a significant and potentially life-threatening subset of deep neck space infections that can progress rapidly without prompt and effective medical intervention. This detailed case report highlights the clinical presentation, diagnostic process, and multifaceted management of a 42-year-old female patient who presented with a submandibular space infection arising from an odontogenic source. Emphasis is placed on the critical role of early identification, careful airway management, advanced imaging, and the necessity of collaborative, multidisciplinary care. This report further discusses outcomes and preventive strategies to mitigate the occurrence of such infections in the future.

**Keywords:** Submandibular space infection, deep neck infection, odontogenic infection, Ludwig's angina, CT imaging, multidisciplinary approach

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#### INTRODUCTION

Deep neck space infections encompass a spectrum of potentially severe infections involving the fascial compartments and spaces of the neck. These infections are most frequently caused by odontogenic, tonsillar, or salivary gland sources. Among these, submandibular space infections are particularly perilous due to their anatomical proximity to the airway and potential for progression to life-threatening complications such as descending mediastinitis or septic shock. The submandibular space, bounded by the mandible and mylohyoid muscle, is highly susceptible to infections originating from the mandibular molars. Clinical manifestations may include intense pain, progressive swelling, trismus, dysphagia, fever, and other systemic signs of

infection. Early and accurate diagnosis, alongside effective medical and surgical management, are imperative to prevent morbidity and mortality.

#### CASE PRESENTATION

##### Patient Information

A 42-year-old female presented to the emergency department with a 4-day history of progressively increasing pain and noticeable swelling in the right submandibular region. He complained of dysphagia (difficulty swallowing), trismus (restricted mouth opening), subjective fevers, generalized weakness, and malaise. The patient reported experiencing dental pain localized to the lower right molar region approximately two weeks prior to presentation but did not seek dental or medical care at that time.

### Clinical Findings

On physical examination, the patient appeared febrile with a temperature of 38.9°C, tachycardia with a pulse of 104 beats per minute, and generally unwell. There was a firm, fluctuant, and extremely tender swelling on the right submandibular aspect measuring approximately 6 cm × 5 cm, with overlying skin exhibiting erythema, increased warmth, and mild induration. Intraoral examination revealed poor oral

hygiene, halitosis, and a partially erupted, grossly carious right mandibular third molar. Bimanual palpation elicited tenderness in the floor of the mouth, which appeared elevated. The patient had a maximal interincisal opening of less than 1.5cm, indicating significant trismus. There was bilateral cervical lymphadenopathy, and although respiratory parameters were stable, the patient reported increased difficulty breathing while lying flat.



Fig 1A and 1B: Preoperative picture warms view showing right submandibular space infection

### Investigations

Laboratory studies revealed:

- Elevated white blood cell count (WBC: 15,300/mm<sup>3</sup>), suggesting an acute infection
- Raised inflammatory markers, including C-reactive protein (CRP: 89 mg/L)
- Normal renal and liver function tests, indicating preserved organ function

Radiological imaging included a contrast-enhanced OPG scan of the neck, which showed:

- A well-circumscribed fluid collection within the right submandibular space with peripheral rim enhancement
- Extension into the adjacent sublingual space and mild midline shift
- Obscuration of surrounding fascial planes, suggesting cellulitis

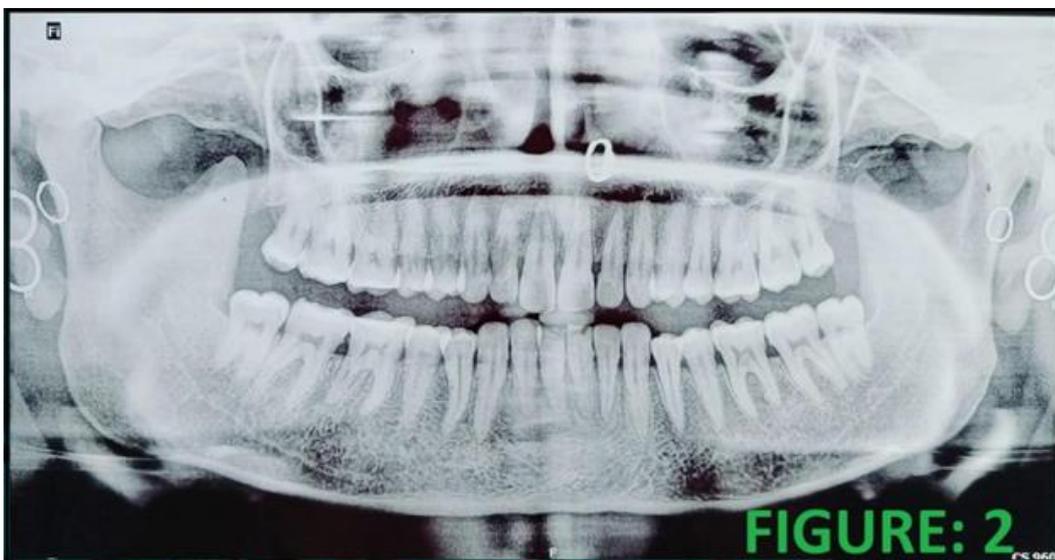


Fig 2: OPG showing well circumscribed fluid collection within the right submandibular space

### Diagnosis

Based on the comprehensive clinical and radiological findings, a diagnosis of **acute right-sided submandibular space infection of odontogenic origin**, most likely resulting from the infected mandibular third molar, was established.

### Treatment and Management

#### Airway Management

Despite the absence of overt airway obstruction at the time of examination, airway protection remained a top priority due to the known potential for rapid progression in such infections. The anaesthesiology team was promptly consulted, and preparations were made for potential difficult intubation. The patient was monitored closely for any signs of respiratory distress.

### Medical Management

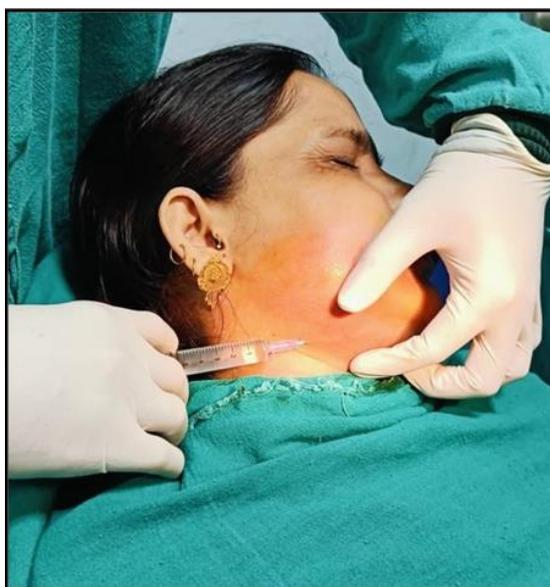
Broad-spectrum intravenous antibiotics were initiated empirically to cover common aerobic and anaerobic pathogens:

- **Ceftriaxone** 1g IV every 12 hours
- **Metronidazole** 500 mg IV every 8 hours
- **Paracetamol** 1g IV every 6–8 hours for antipyresis and analgesia

Fluid resuscitation was initiated, and the patient was closely monitored in a high-dependency setting. Despite 12 hours of aggressive antibiotic therapy, the swelling and trismus showed minimal improvement, prompting surgical evaluation.

### Surgical Intervention

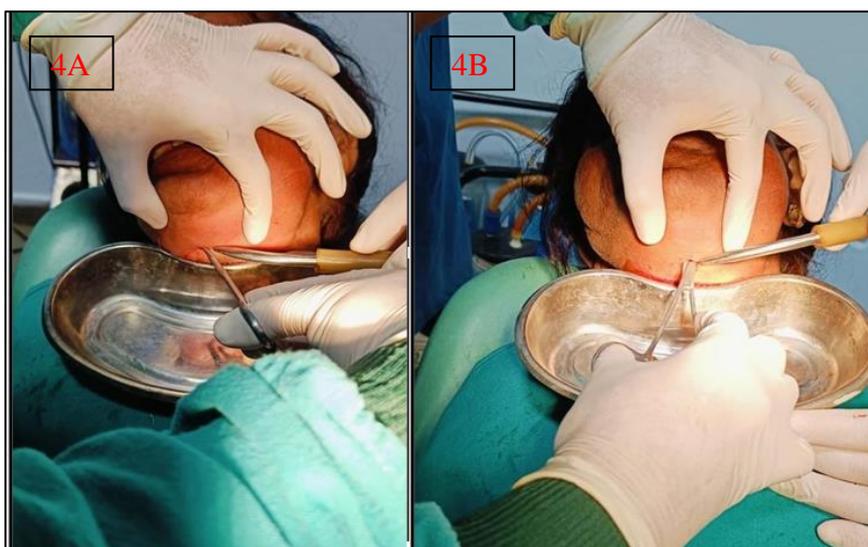
An emergency incision and drainage procedure was performed under local anaesthesia.



**Fig 3: Showing application of local anaesthesia**

#### Operative steps:

- A transverse incision was made 2 cm below the inferior border of the mandible in the right submandibular region.
- Dissection was carefully carried through the platysma and cervical fascia to access the abscess cavity.
- Approximately 20–25 ml of thick, foul-smelling purulent material was evacuated.
- The cavity was thoroughly irrigated with saline and antiseptic solution.
- A corrugated rubber drain was placed to facilitate continuous drainage.
- Intraoperatively, the diseased mandibular third molar was extracted to eliminate the source of infection. Pus culture and sensitivity revealed growth of **Streptococcus anginosus**, a facultative anaerobic organism, susceptible to penicillin and clindamycin.



**Fig 4A and 4B: Showing incision & drainage**



**Fig 5: Showing closure along with tube drain**

### Postoperative Course

Following surgical drainage and tooth extraction, the patient exhibited significant clinical improvement. By postoperative day 2, trismus had resolved considerably, and the submandibular swelling had decreased substantially. The drain was removed on day 3, and intravenous antibiotics were transitioned to oral **amoxicillin-clavulanate** for an additional 5-day course. The patient was discharged on day 6 in stable condition with clear instructions regarding oral hygiene and the necessity of regular dental follow-up.

### DISCUSSION

Infections of the submandibular space, though relatively infrequent, pose substantial risk due to their anatomical location and potential for rapid downward spread through cervical fascial planes into the mediastinum. The majority of such infections are odontogenic in nature, particularly involving lower second and third molars. These teeth have apices

located below the mylohyoid line, facilitating direct spread of infection into the submandibular space.

Potential complications include:

- **Airway obstruction** due to edema or posterior tongue displacement
- **Ludwig's angina**, a severe bilateral cellulitis involving multiple deep neck spaces
- **Descending necrotizing mediastinitis**, requiring thoracic surgical intervention
- **Sepsis**, with risk of multi-organ dysfunction and mortality

The management of submandibular space infections requires a comprehensive and prompt approach:

- Clinical vigilance for signs of airway compromise
- Empirical and culture-directed antibiotic therapy
- Timely surgical drainage of abscesses
- Removal of the infectious nidus, such as a diseased tooth

- Supportive care and patient education on dental hygiene

A coordinated, multidisciplinary team—consisting of otolaryngologists, oral and maxillofacial surgeons, anesthesiologists, and infectious disease experts—is essential for optimal outcomes.

## CONCLUSION

This case demonstrates the importance of swift recognition, diagnosis, and intervention in cases of submandibular space infection. The odontogenic origin, coupled with delayed presentation, can escalate to a critical condition if not treated promptly. Surgical drainage, supported by appropriate antibiotic therapy and airway precautions, remains the gold standard for management. Long-term prevention includes improving public awareness regarding oral health, regular dental checkups, and timely treatment of dental infections.

## Patient Perspective

The patient expressed gratitude for the comprehensive care received, particularly highlighting the rapid relief following surgery. He acknowledged that neglecting initial dental symptoms contributed to the complication and committed to improved oral hygiene practices and timely dental visits in the future.

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## Conflict of Interest

The authors declare no conflicts of interest related to this case report.

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## Consent

Written informed consent was obtained from the patient for the publication of this case report and any associated clinical images.

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