# A Case Report of a Submental and Submandibular Space Infection

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## Abstract

In most of the cases of space infections are secondary to an odontogenic infection. In space infection, spread occurs through the fascial plane because of the degradation of connective tissue by action of different enzymes produced by microorganisms. Different factors like age, nutritional status of the host, host defense, virulence of the microorganism play an important role in the spread of the infection. Sometimes it may take the fetal course if not treated on time because of its local and systemic complications. It should be treated as an emergency condition to prevent its rapid progression leading to fatal outcome. Here the case report describes an old lady suffering from fascial space infection and treated by incision and drainage. Incomplete removal of any odontogenic infection may cause the recurrence of the infection or infection that may spread to fascial spaces.

***Keywords:*** *Odontogenic infection; Fascial space infection; Host defense; Management.*

## Introduction

Odontogenic infections originate from the tooth and its supporting structures. Odontogenic infection arises when oral flora from spread alveolar process to deeper tissue plane of the head and neck region. Different Streptococcus (particularly alpha-hemolytic Streptococcus) are major pathogens of space infection. Spaces in the head and neck region are the potential spaces between the layer of fascia which contains loose connective tissue, areolar tissue, and contain different vital structures. Primary spaces are involved first. Direct secondary space involvement is unlikely.[1] Untreated cases produce systemic complications and also obstruct respiratory tract obstruction. Pathogens of the space infection produce hyaluronidase, streptokinase, and other enzymes which are the cause of the spread of the infection and cellulitis. Decreased host defense, increased bacterial resistance, nutritional status of the patient, the virulence of bacteria also with socioeconomic status and local factors like hygiene of the patient also plays an important role in the spread of the infection. In this article, we reported the case of fascial space infection which first involved buccal space which migrated to superficial temporal space even after drainage from primary space.[2]

**Case Report:** A lady who is in the 6$^{th}$ decade of life presented with swelling and pain of the bilateral submandibular and submental region for the last 3 days. The swelling appeared after extraction of right mandibular 1$^{st}$ premolar which was carious and had a periapical abscess. There was a 7-day window period between the extraction of the tooth and the development of the swelling. The patient has a history of diabetes and was not under medication for the same.

On general examination, the patient appears toxic, dehydrated, with mild pyrexia a complaint of severe pain

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in the right submandibular region anterior neck region, and difficulty in swallowing. Overlying skin appears erythematous. On palpation there was pain and there was a mild rise of temperature than the adjacent area. There was pain on palpation. Swelling was fluctuant. Intraorally there was vestibular obliteration in the right canine and premolar region. Mouth opening and tongue movement was restricted. The patient complains of difficulty in swallowing too. Partially healed socket irt right mandibular 1st premolar region.

Orthopantomogram done for diagnostic purposes. The patient diagnosed with right submandibular and submental infection. Both the spaces drained through a single incision placed over the most fluctuant part of the swelling. Hilton's method is used to drain the abscess. Rubber drain placed and intravenous piperacillin withtazobactam 4.5 gm and metronidazole 500mg with intravenous fluid given. Pus sample send for culture and sensitivity. There was no bacterial growth found in the culture media in 48 hours a patient was under antibiotic therapy.A blood investigation report reveals patient was diabetic and insulin started as per endocrinologist and balanced diabetic diet advised.

**Figure 1. Pre-operative picture**

**Figure 2. Pre-operative picture 2**


**Figure 3: Picture after drainage.**

## Discussion

Sublingual space is a paired, v-shaped space lies lateral to the muscles of the tongue including the hyoglossus, genioglossus and geniohyoid. Situated at the midline and communicate with the opposite side space anteriorly.[3] Again sublingual space also connected with the submandibular space around the posterior border of the mylohyoid muscle. So infection of the unilateral submandibular gland can spread easily to the sublingual and to contralateral submandibular space and submental space and my cause Ludwig's angina which is a serious life-threatening complication itself. Again the from the sublingual space the infection spreads backward

direction in the substance of the tongue within the cleft created by the genioglossus and hyoglossus muscle. It follows the course of the sublingual artery. Through this route, the infection can spread to the epiglottic region and cause swelling of the inlet of larynx. Because of anatomical continuity of the submandibular space with the submasseteric, pterymandibular space and the spread of infection may occur in these spaces. More posteriorly the parapharyngeal and peritonsillar space may also involve by infection which causes serious airway obstruction. Infection from the submandibular region, can spread downwards along and beneath the investing layer of deep cervical fascia, towards clavicle and subsequently to mediastinum causing mediastinitis. A prevertebral layer of deep cervical fascia, lincoln's highway or carotid sheath, space between the alar and prevertebral fascia (danger space) play an important role in the spread of infection to the mediastinum.[4-7]

It is difficult to recognize mediastinitis in the early stage and it is one of the major causes of high mortality in case of deep space infections. Primary mediastinitis appears as pyrexia, dysphagia, odynophagia, retrosternal chest pain, swelling over the neck and the chest region along with the chest pain. Physical examination reveals the patient having tachycardia, tachypnea, crepitus over the neck and chest, positive Hamman sign (crunching sound on auscultation of heart) along with other signs and symptoms.[8] Even though the symptoms are not always marked in the primary stage of the disease. The diagnostic criteria for descending mediastinitis described by Estrera et al. are as follows:

(a) Symptoms of clinically severe oropharyngeal infection

(b) Radiographic findings of mediastinitisutilizing CT

(c) The presence of a mediastinal infection, which is detected during an operation or autopsy

(d) A relationship between an oropharyngeal infection and mediastinitis.

Aggressive treatment is necessary for these complications. The airway should be maintained along with early administration of antibiotics in proper dose and frequency, removal of the offending tooth and surgical drainage and decompression of the fascial plane. Intravenous fluids are also given. To main the airway fiberoptic intubation was done in the patient and it is preferred over blind intubation. Surgical airway may be required in cases of severe respiratory obstruction. Laryngotomy, cricothyroidotomy (tracheotomy) are always preferred over tracheostomy, or rather emergency tracheostomy is avoided because of 1. Identification of landmarks that may be required before it, is most of the time quite difficult due to associated massive edema and tissue distortion.[9] 2. The surgery itself may lead to the spread of infection to deeper tissues due to additional incision required. 3.There are high chances of getting pneumonia as sequelae of tracheostomy which itself is a life-threatening condition. 4. Tracheal stenosis is observed in 25–50% of cases following tracheostomy.[10-12]

Again in the presence of pre-existing diseases like malignancy, HIV infection, diabetes mellitus, a patient undergoing chemotherapy within 1 year, chronic renal diseases require dialysis cause compromised host defense and this patient can easily have affected odontogenic infection and they can spread to the deep spaces easily because of reduce host defense. Particularly in diabetic patient host defense is compromised in any way like poor blood perfusion through the capillaries, impaired diapedesis of the neutrophils, abnormal phagocytosis late maturation, and degranulation of the neutrophil, etc. again acidosis produces in the presence of diabetes mellitus impair the immune system of the host.[13-16]

## Conclusion

So these patient needs to recognize the situation of immune compromise and modify the treatment accordingly. Some of the modification includes the use of a higher dose of antibiotic, use of broad-spectrum antibiotic, use of proper oral hypoglycemic agent or insulin in required dose to control blood glucose level, etc. in immune-compromised patient macrolides and tetracycline should be avoided.Again complete removal of the infected foci is also necessary for complete resolution otherwise it may cause serious complications in later stages.

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