

# Unilateral Marginal Mandibular Nerve Palsy in a Case of Submandibular Space Abscess -A Rare Case Report with Review of Literature

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## Abstract

Deep Neck space anatomy is complex and unique. Infection of any part of these spaces can lead to life threatening condition. In most cases, source of infection is odontogenic in nature. Infection of lower molar teeth leads to submandibular infection which can result in complication like Ludwig's angina, necrotizing cervical fasciitis of head and neck region, mediastinitis. It is highly unusual for paralysis of facial nerve or its branch to occur from submandibular space infection. Here, we report a case of marginal mandibular nerve paralysis as a result of submandibular space abscess originating from mandibular second molar and third molar which is considered rare.

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**Index terms**— deep neck space, odontogenic infection, submandibular area, marginal mandibular nerve paralysis.

## 1 I. Introduction

Life-threatening infections of the head and neck are much less common since the introduction of antibiotics and mortality rates are lower. The widespread use of antibiotics has also altered their clinical presentation. But increasing number of patients with severe immunosuppression condition like diabetes mellitus, immunosuppressant drug, radiotherapy and the complex anatomic features of the head and neck can lead to life-threatening complications. Common source for head and neck space infection is odontogenic infection<sup>1</sup>. Most infections are however polymicrobial in nature<sup>2</sup>. Notable aerobic species include streptococcus viridans, staphylococcus aureus, staphylococcus epidermidis. Anaerobes probably play a significant role in these abscess. S. viridans is the most common organism isolated<sup>3</sup>. Currently isolated anaerobes include streptococcus, fusobacterium, bacteroides<sup>??</sup>. This infection can spread to any part of neck. Infection in second and third molar tooth drain to submandibular space usually presents with clinical symptoms like fever, swelling, pain, trismus and varying Author<sup>???</sup>: RG Kar Medical College, Kolkata India. e-mails: jdbegins007@gmail.com, ajaymanickam87@gmail.com infection has been rarely reported in literature. Here we report a case of 40 year diabetic male presented with Right side submandibular space abscess and right side marginal mandibular branch of facial nerve palsy as complication.

## 2 II. Case Report

A 40 year male came to our ENT emergency with complaints of swelling over right side submandibular region, fever, difficulty in opening of mouth for last 10 days. Swelling was sudden in onset and progressive in nature associated with pain. He was also complaining of pain in oral cavity and difficulty in opening of mouth. Due to above symptoms, he was having difficulty in food intake. He was a known case of diabetic mellitus for last 6 years and on oral anti diabetic drug. But for last two weeks he was not taking medication regularly. There was no history of tuberculosis or any other previous illness or any head and neck surgery. On examination patient was febrile. There was swelling of about 6x4 cm size over right side submandibular area with overlying skin erythematous. There

### 3 III. DISCUSSION

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42 was no evidence of any sinus or ulcer. There was trismus and halitosis. Superiorly swelling was extended to right  
43 side mandible and inferiorly to a level around 5cm from midline at the level of hyoid bone. On palpation, surface  
44 temperature was raised. It was tender, fluctuant (Figure 1). There was no cervical lymph node enlargement. On  
45 facial nerve examination there was only deviation of angle of mouth to left side while other test like frowning  
46 of forehead, closure of eyes, whistling etc. was normal (Figure 2 ). Informed consent was taken that patients  
47 clinical photograph will be included without hiding his identification. Intraoral examination was compromised  
48 due to limited mouth opening. Detail ear and nose examination was done. Both ears were within normal limit.  
49 Nose on anterior rhinoscopy examination was normal. Other systemic examination was within normal limit.  
50 Patients CBG was measured which was 325mg/dl. Patient was immediately admitted. Intravenous antibiotic  
51 covering both aerobic and anaerobic infections, normal saline fluid, antipyretics, were started. Regular insulin  
52 subcutaneously was started and continued. Depending on sugar level insulin dose was regulated. All routine  
53 investigations were done. Complete hemogram report degree of toxic systemic symptoms. Complication can lead  
54 to Ludwig's angina, neurovascular complications including carotid artery aneurysm, Lemierre's syndrome, Horner  
55 syndrome, mediastinitis, Necrotising cervical fasciitis which are potential lethal entities 5 . But unilateral palsy of  
56 any branch of facial nerve secondary to space showed TLC 15600, ESR 46, RBS 306 mg/dl. CT scan of neck was  
57 done which showed hypodense SOL with rim enhancement measuring 58x35x42 mm is seen in right submandibular  
58 region (Figure 3). There was evidence of air pocket with the lesion. Incision and drainage of abscess was done and  
59 pus was sent for culture and sensitivity. Regular dressing of incised area was done. He showed a gradual recovery  
60 over next 3-4 days. On 4th day, patient was able to open mouth. On examination of oral cavity, there was a right  
61 side 2nd molar and 3rd molar tooth dental carries (Figure ??). Culture and sensitivity report showed mixed  
62 organisms consisting of streptococcus viridians, streptococcus pyogens, staphylococcus aureus and bacteroids.  
63 The healing of the wound was satisfactory. Patient was discharged after 7 days. On post-operative visit after  
64 10 days, there was improvement in paralysis of lower part of face. Wound site was healthy. Patient was sent to  
65 dental surgery department for dental caries, and t 2 nd molar and 3 rd molar teeth were removed. Patient has  
66 been advised to come for regular follow up.

### 67 3 III. Discussion

68 Head and neck space anatomy is complex. Knowledge of all neck spaces is important in the understanding of  
69 spread of infection. Several reports have indicated that the origins of most DNIs are odontogenic infections.  
70 Consistent with this finding, the submandibular space is frequently involved in these infections ?? .

71 The submandibular space is limited above by the oral mucosa of the floor of the mouth and below by the  
72 superficial layer of the deep cervical fascia as it extends from the mandible to the hyoid bone. Mylohyoid  
73 muscle divides the submandibular space into the sublingual or superior space, containing the sublingual glands,  
74 the deep smaller portion of the submandibular gland, and Wharton's duct, and the sub maxillary or inferior  
75 space, containing the larger superficial portion of the submandibular space and its lymph nodes. These spaces  
76 communicate freely around the posterior border of the mylohyoid muscle. The sub maxillary space may be  
77 further divided into a central sub mental space, between the anterior bellies of the digastric muscles, and lateral  
78 sub maxillary spaces ?? .

79 The mylohyoid muscle also plays a key role in determining the direction of spread of dental infections. It  
80 attaches to the mandible at an angle, leaving the apices of the second and third molars below the mylohyoid line  
81 and the apex of the first molar above. Most apical molar infections perforate the mandible on the lingual side, so if  
82 the tooth apex is above the mylohyoid line it will involve the sublingual space. If it perforates below the mylohyoid  
83 line it involves the submylohyoid space 8 .Patients with submandibular infection generally presented with fever,  
84 trismus, swelling over neck submandibular region, difficulty in opening mouth and taking food. Complication  
85 can lead to ludwigs angina, neurovascular complications including carotid artery aneurysm, Lemierre's syndrome,  
86 Horner syndrome, mediastinitis, Necrotising cervical fasciitis ?? .

87 Unilateral palsy of branch of facial nerve secondary to space infection as seen in our case has been rarely  
88 reported in literature. This complication can be explained on the basis of anatomical landmarks and compression,  
89 especially in association with local inflammation. Facial nerve after entering posterior surface of parotid gland  
90 divides into upper and lower division .Upper division gives rise to frontal, zygomatic, buccal branches and lower  
91 division give rise to marginal mandibular nerve ??0 .

92 Marginal mandibular nerve runs inferior to angle of mandible .It dips down into neck and runs superficial to  
93 submandibular gland. The nerve runs just deep to platysma and superficial to deep fascia. It runs inferior to  
94 greater cornu of hyoid bone then curves upward and crosses mandible for a second time close to facial artery and  
95 vein 11 . Generally lower division branches of facial nerve i.e. marginal mandibular nerve and cervical branches  
96 are thinner and more delicate. Hence nuropraxia is seen particularly with these branches ??2 .

97 Soif abscess develops in submandibular region, it can cause marginal mandibular nerve palsy. Ischemic  
98 neuropathy arising from the local toxic effects of infection and from the compression of the nerve due to  
99 expanding abscess is suggested mechanism 13 .A person with palsy of this marginal mandibular branch of the  
100 facial nerve presents a very conspicuous deformity on opening the mouth, smiling or grimacing 14 . Surgical  
101 incision and drainage is indicated in face of worsening symptoms despite administration of antibiotics 15 . In  
102 our case a diabetic patient presented with fluctuant, tender, erythematous swelling over right side submandibular  
103 region with dental caries, trismus and right side mandibular nerve palsy. As uncontrolled diabetic can cause

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104 immunosuppression, swelling in this case had a rapid course with marginal mandibular nerve palsy. Incision and  
105 drainage of the submandibular abscess was done. During the procedure care was taken to avoid the injury to the  
106 marginal mandibular nerve. A rapid partial recovery of the paralysis was seen within 10 days after the surgical  
107 drainage. This suggested that the marginal mandibular nerve palsy could have resulted from compression effect  
108 or ischemic neuropathy due to inflammatory process arising from space infection. It also showed that this neck  
109 space infection can be avoided if comorbid condition like diabetic mellitus is controlled.  
110 The Authors Declare there is No Conflicts of Interest

#### 111 4 IV. Conclusion

112 Submandibular space infection is most commonly seen in immunocompromised patient with dental infection. It  
113 can cause many complications. But Unilateral palsy of branch of facial nerve secondary to this infection as seen  
114 in our case is not very common and not frequently mentioned in literature .Hence this case is reported.

#### 115 5 References Références Referencias



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Figure 1: Figure 1 :



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Figure 2: Figure 2 :



Figure 3: Figure 3 :



Figure 4: