

CASE REPORT***CBCT-A third eye, Bone invasion in oral cancer: A case report***Satarupa Debnath¹, Rajendragouda Patil², Udit Singh³, Astha Durgvanshi⁴**ABSTRACT**

Three-dimensional radiological evaluation of oral cancer in comparison with two-dimensional study offers many advantages that can help in the diagnosis & preoperative evaluations of the early minute changes in bone that can reduce the risk of intraoperative and postoperative complications. This report presents a case of oral cancer in retromolar area in which bone invasion in mandibular region was observed by 3D-Cone Beam Computed Tomography which was otherwise not seen on a routine panoramic radiograph.

Keyword: Oral cancer, bone invasion, Cone Beam Computed Tomography, diagnostic accuracy.

INTRODUCTION:

Cancer is defined as the uncontrolled and uncoordinated growth of cells that invade and cause damage to the surrounding tissue. Oral cancer is one of the 10 most common cancers in the world¹. It develops in the tissues of any part of the oral cavity which may appear as a growth, ulcer or swelling anywhere in the mouth with additional symptoms of pain or difficulty in swallowing, bleeding from the mouth, significant weight loss etc. Oral cancer is a preventable disease, where smoking and alcohol-consumption are considered major risk factor in 90% of cases and having them together has a synergistic effect.² It is fairly common and curable if diagnosed and treated at an early stage so early diagnosis is critically important to decrease the mortality rate.

One of the important factors in the pretreatment evaluation of patients with oral cancer is the detection of bone invasion by the tumor, which is significant for planning the therapy and determining the prognosis.³

Introduction of Cone Beam Computed Tomography (CBCT) to imaging of the maxillofacial region led to a true shift from 2D to 3D approach. The CBCT has revolutionized maxillofacial imaging extensively and has a wide range of application in all the fields of dentistry ranging from diagnosis to treatment planning. CBCT has been frequently considered as the “gold standard” imaging of oral and maxillofacial area.⁴ So, here we are presenting a case of oral cancer where bone invasion was quite difficult to detect by an analogue radiograph but it was able to be confirmed by the 3-Dimensional Cone Beam Computed Tomography.

CASE REPORT:

A 40 years old male patient reported to the Department of Oral Medicine and Radiology, Kothiwal Dental College and Research Centre with the chief complaint of pain and growth in lower left back tooth region since 2 years. 2 years back he first experienced pain and discomfort in that region while chewing food and the pain was increasing day by day and there was continuous increase in the size of the growth for which he consulted a local doctor 1 year back who prescribed some medications and also performed a biopsy for the growth and it was histopathologically reported as keratinizing squamous dysplasia. After that he was referred to Kothiwal Dental College and Research Centre, Moradabad for further treatment.

Although patient did not report any medically debilitating disease but since few days he experienced loss of appetite and weight loss. Patient is a smoker since almost 30 years, 11-12 bidis per day and habit of 2-3 packet gutkha chewing since 1 year. He used to place the gutkha

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in left side of the cheek. On extraoral examination, submandibular lymph nodes of right side were palpable and tender on palpation, firm in consistency & multiple in number. They were movable, was not adhered to the underlying structure



Fig:1 Extraoral photograph

On intraoral examination, an ulcero-proliferative growth was present on the retromolar region and left mucogingival junction which extends antero-posteriorly from mesial surface of 34 teeth region to posterior third of retromolar pad & supero-inferiorly it extends above the cemento-enamel junction of 34,35,36,37 & 38 to base of the lower vestibule measuring about 4x2 cm² in size, irregular, pale pink to greyish yellow slough covering the lesion was seen and surrounded mucosa appeared pale.

On palpation, all the inspectory findings were confirmed & the growth was tender, hard in consistency and fixed to the underlying structure. Considering the history and clinical examination, the lesion was diagnosed as malignant ulcer with a TNM staging of T2 N0 M0 which represented as stage 2 of malignancy.



Fig: 2 Intraoral photographs

RADIOGRAPHIC FINDINGS:

The patient was subjected to radiographic investigation and a digital panoramic radiography was done to rule out any bony involvement. The digital OPG revealed no bone invasion except for some alteration in the trabecular pattern of the bone in relation to 36, 37 & 38 teeth region.



Fig: Orthopantomogram

As the lesion was persisting since one year and the patient was histopathologically diagnosed for a malignancy, it was mandatory for a radiographic examination to rule out any involvement of bone. Due to limited view in the 2D radiograph, a further advanced radiographic investigation became obligatory. Because of the higher resolution and 3-dimensional views, the CBCT was chosen for the next diagnostic tool to identify any bony involvement.

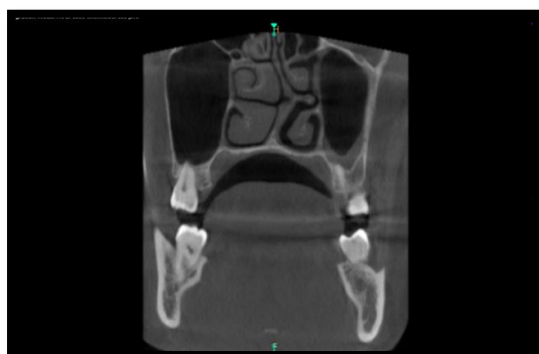


Fig: Coronal view of CBCT showing bone invasion in the superior border of left side of mandible.

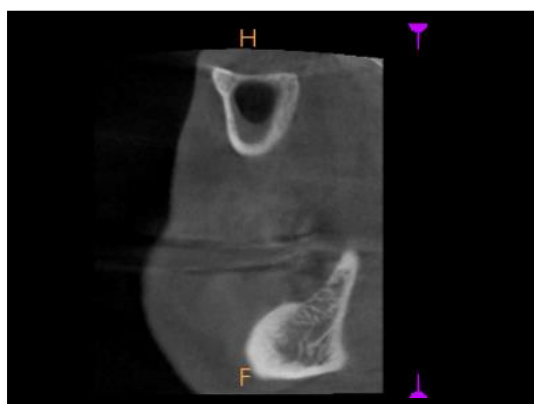


Fig: Sagittal view of CBCT showing bone invasion in the superior border of mandible.

Further Cone Beam Computed Tomography (CBCT) was performed to rule out any bony invasion present, which could have been missed in the 2D radiography.

And interestingly by the CBCT image it was possible to diagnose the bone invasion which was seen in the superior border of the mandible of the affected side which was not evident on the 2-Dimensional radiography.

So we concluded that, CBCT is very useful in detecting every minute initial changes in bone which is not perceptible by other analogue radiography. Therefore, all the practitioners should consider CBCT as a diagnostic tool in suspicious lesions which can be helpful in early detection of bone involvement in oral cancer and could provide a new dimension in the treatment modalities.

DISCUSSION:

This case was clinically diagnosed as carcinoma in the soft tissue of oral cavity. As the lesion was adjacent to the mandibular bone there was high chances of bone involvement so a routine panoramic radiograph was done to rule out any bone involvement, but it showed no evidence of bone invasion. But in the image of CBCT, it revealed a prominent bone invasion in the area of that lesion which was fundamental in treatment planning. So by the early diagnosis of bone involvement in this case made an immense outcome in treatment modalities and was able to improve the prognosis of the patient. Thus it can be stated that CBCT played a crucial role in early detection of pathological changes associated with early stage of cancer.

The use of CBCT technology is profoundly increasing for diagnosis and treatment planning in dentistry as the 3D imaging has made the complex craniofacial structures more accessible for examination and also helped in early and accurate diagnosis of lesions⁵.

In the present case, we evaluated CBCT for the detection of bone invasion compared to Digital OPG. One of the most important roles of imaging for patients with carcinoma of oral cavity is to evaluate the tumor invasion into the mandible, because the surgical procedure is influenced by the presence and extent of bone involvement.^[6-8] When the tumor extends to the mandible, mandibulectomy is necessary. In addition, for such

cases, the supero-inferior extent of bone invasion is important for the surgeon to plan for either marginal or segmental mandibulectomy.⁹ Isometric tomography is an intensely developed diagnostic tool.

The usefulness of CBCT in detecting osteolysis has been confirmed. CBCT is more accurate than panoramic radiography and comparable to MRI, CT and bone scintigraphy.¹⁰ Thus an accurate preoperative staging is important to make a treatment plan. Detecting bone invasion in oral cancer is crucial for therapy planning and the prognosis¹¹. Closmann and Schmidt¹² described the use of CBCT as a complementary examination for the preoperative evaluation of three patients with malignant lesions of oral cavity (two squamous cell carcinoma and one osteosarcoma). Examination by CBCT was superior to that of OPG and MRI for evaluation of mandibular invasion and the extent of the lesion in the hard tissues, with the added advantage of lower radiation dose than CT. The authors concluded that CBCT could be useful for the preoperative staging of oral cancer and for determining the extent of surgical resection necessary, as well as for planning reconstruction techniques.

CONCLUSION:

The introduction of CBCT represents a great technological advancement in the context of oral & maxillofacial radiology as it permits the acquisition of high-quality 3D images and dynamic navigation over an area of interest in real time, with a short scan time and lower dose of radiation than conventional CT.

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