



**ANALYSIS OF MAXILLARY SINUS DISEASES BY CONE-BEAM COMPUTED TOMOGRAPHY; A RETROSPECTIVE STUDY**

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CBCT, Maxillary Sinus, Mucosal Thickening.

**ABSTRACT**

**Aim:** The aim of this study was to assess the presence of the various pathologies of the maxillary sinus using cone beam computed tomography (CBCT) of the maxilla

**Objective:** To determine the Incidental abnormalities of the maxillary sinus in asymptomatic patients which are common findings in CBCT scans

**Materials and methods.:** This retrospective study was based on the scanning and the subsequent analysis of the maxillary sinus of the dental patients referred from various dental clinics to the CBCT center.

**Results.:** The following pathologies that were observed in the study included mucosal thickening and sinusitis, dentigerous cysts, odontomes, fibro-osseous disease, fractures and mucosal polyps. In our present study the most common pathology was Mucosal thickening. 38 patients reported with Mucosal thickening, in which Unilateral 28 ie 41.17% and bilateral Mucosal thickening was 10, ie 14.73%.

**Conclusion :** CBCT assessment of the maxillary sinuses are of particular importance to the dentist because of their proximity to the dental structures. Routine CBCT scans, of maxillary sinus are recommended for risk assessment prior to surgery.

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**INTRODUCTION**

Cone-beam computed tomography (CBCT) is a newer imaging modality which provides detailed three-dimensional images of the structures scanned.<sup>1</sup> The use of CBCT scans in dental practice provides an improved treatment planning of various dental procedures by showing the size and location of the lesion in relation to other anatomic structures. Computed tomography scanning has become the standard in medicine for visualizing the maxillary sinuses because of the ability to visualize both bone and soft tissue in multiple views with thin sectioning<sup>2</sup>. CBCT can accurately capture, display and provide 3-dimensional visualization of maxillofacial anatomy and pathology<sup>3</sup>. In maxillary sinus floor elevation procedure, it is important to be acquainted with different anatomic and pathologic findings in sinus, to minimize the risk of postoperative complications.<sup>4</sup>

Sinusitis of odontogenic origin has traditionally been considered to account for approximately 10% of sinusitis cases<sup>5</sup>. In the maxilla, odontogenic infections will most frequently spread through the thin buccal alveolar wall and into the buccal vestibule.

The floor of the sinus is composed of dense cortical bone; therefore, sinus infections from a dental source were thought to be uncommon, but they can occur, particularly in the case of a pneumatized sinus in which the Schneiderian membrane can be easily penetrated by pathogens<sup>6</sup>. This study was conducted to determine the various pathologies in patient reporting to our centre for CBCT scan of Maxillary Sinuses.

**MATERIALS AND METHODS**

**Aim;** The aim of this study was to assess the presence of the various pathologies of the maxillary sinus using cone beam computed tomography (CBCT) of the maxilla

**Objective;** To determine the Incidental abnormalities of the maxillary sinus which are common findings in CBCT scans

**Source of Data:** The present study was conducted in CBCT centre at Patna, Bihar, for a period of 3months.

**Sample Size:** The study group was comprised of 68 subjects. All patients reporting to the centre at Patna, fulfilling the inclusion and exclusion criteria was enrolled in the study. All the individuals, of both gender, between the age group of 20-60 years was included. Ethical clearance was obtained.

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A retrospective study was conducted on 68 patients. This retrospective study included CBCT scans of bilateral maxillary sinus where individual factors of gender and age had been recorded. To provide appropriate treatment and follow-up, the CBCT scans were obtained with 3D imaging Cone-Beam CT Scanner CS scanner 9300 CBCT scanner (with the effective radiation dose of 27-166  $\mu$ Sv]. Various Pathological findings were evaluated in all three planes (axial, coronal, sagittal). All selected cases were evaluated for diagnosis.

Pathological findings were categorized as Odontogenic tumours, bone-related lesions, fibrous dysplasia and bony fracture, mucosal thickening, retention cysts, sinus polyps and odontome. All The images were analyzed.



Figure 1 CBCT scans showing mild unilateral mucosal thickening,



Figure 2 CBCT scans showing bilateral moderate to severe mucosal thickening, in axial image section

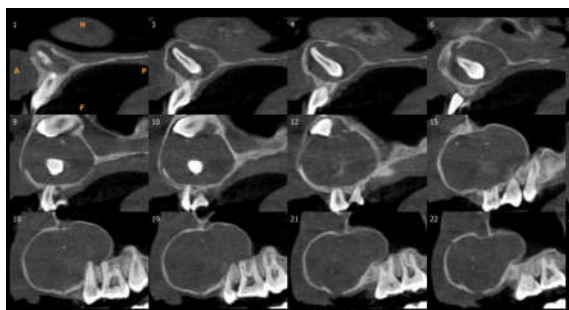


Figure 3 CBCT scans showing tooth like structure with radiopacification within maxillary sinus, cystic lesion in sections

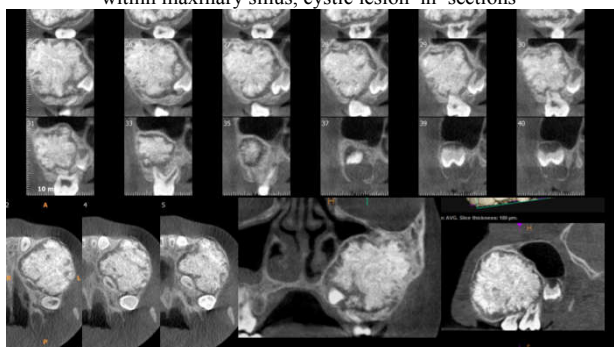


Figure 4 CBCT scans showing multiple tooth like radiopacification encapsulated by radiolucent capsule within maxillary sinus in sections, bony lesion

## RESULT

The study population consisted of 68 subjects (32 females, 36 males) average age range was 20 to 60 years., Following results were recorded among the entire study population.

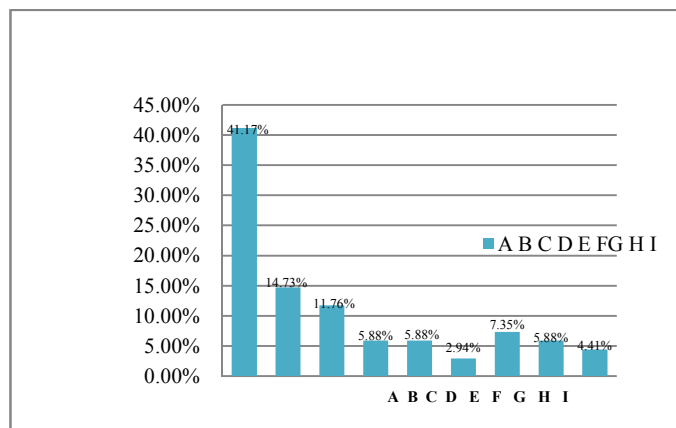


Fig 5 Graph representation of findings of maxillary sinus diseases.

S.No	Maxillary sinus diseases.	Number	Percentage%
A	UNILATERAL - (MUCOSAL THICKENING)	28	41.17%
B	BILATERAL - (MUCOSAL THICKENING )	10	14.73%
C	CYST - (ODONTOGENIC LESION )	08	11.76%
D	TUMOR - (ODONTOGENIC LESION )	04	5.88%
E	FIBROUSSEOUS - (BONE PATHOLOGY)	04	5.88%
F	ODONTOME - (BONE PATHOLOGY )	02	2.94%
G	FRACTURE	05	7.35%
H	ORO-ANDRAL COMMUNICATION	04	5.88%
I	MAYILLARY SINUS POLYP	03	4.41%
	TOTAL	68	100%

Fig 6 Tabular representation of findings of maxillary sinus diseases.

Out of total 68 subjects, 38 patients reported with Mucosal thickening, in which Unilateral mucosal thickening was , 41.17% and bilateral was 14.73%. (fig 1,2)

It was observed that 12 reported with Odontogenic lesions. In which 11.76% reported with Odontogenic cyst and 5.88% with Odontogenic tumor(fig 3)

Bone pathology was assessed in 6 patients, . Out of which 2.94% report revealed Fibrous disease and 2.94% revealed Odontome (fig 4). Fracture was also observed in CBCT scan. The report showed 7.35% had fracture of one of the maxillofacial region. 5.88% reported with Oro- antral communication and 4.41% had Maxillary sinus polyp. Unilateral Maxillary mucosal thickening was the most frequently detected lesion among CBCT scans. ( fig 5,6 ).

In our study there was no correlation between findings in maxillary sinus and gender or age. Various diseases of the maxillary sinus were evaluated and mucosal thickening was the most common findings in CBCT of the maxillofacial region in dental patients referred for treatment.

## DISCUSSION

It has been reported that maxillary sinuses stay intact though the skull and other bones may be severely disfigured in victims who are incinerated and hence, that maxillary sinuses can be used for identification<sup>7</sup>.

The maxillary sinuses are of particular importance to the dentist because of their proximity to the dental structures. Consequently, diseases of the sinuses may mimic odontogenic disease, and conversely, odontogenic disease may spread to the sinuses or mimic sinus disease. Maxillary sinuses may appear on radiographs made for dental purposes, including maxillary periapical and extraoral radiographs such as panoramic radiographs and lateral cephalometric radiographs. Therefore, the dentist should have some familiarity with the normal appearances and more common diseases of the maxillary sinuses<sup>8</sup>. In our study, we analysed different anatomic and pathological variations in order to determine appearances on CBCT<sup>9</sup>.

A CBCT examination of the maxilla anatomy is commonly requested to evaluate the need of a surgical sinus lift for implant placement.

Incidental findings such as mucosal thickening can be associated with a sinus outflow obstruction which can impact on the clinician's treatment decisions<sup>10</sup>. The following pathologies that were observed in our study, mucosal thickening and sinusitis, dentigerous cysts, odontomes and fibro-osseous disease fractures, mucosal polyps.

## CONCLUSION

Abnormalities in maxillary sinus emphasize the importance of the dental radiologist, to visualize and interpret CBCT images. Routine CBCT scans of maxillary sinus are recommended for risk assessment prior to dental treatment.

No conflict of interest.

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