



Case report: Detection of maxillary sinusitis with inverted impacted teeth using Cone-beam Computed Tomography

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ABSTRACT

Objectives: The aim of this case report is to describe radiographically the specific features of maxillary sinusitis on CBCT radiograph.

Case Report: A 20-year-old female patient came to RSGM UNPAD with a consul letter from Oral Surgery specialist for a CBCT radiography examination to see impacted teeth. The results showed radiointermediate images in the maxillary sinus

which showed thickening of the sinus mucosa and an inverted impacted teeth on the right maxillary.

Conclusion: Maxillary sinusitis could be assessed using extra oral radiography and CBCT. CBCT examination was used in determining the source of the lesion, the extent of the lesion, and the thickness of the maxillary sinus mucosa.

Keywords: Maxillary sinusitis, impacted teeth, CBCT

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INTRODUCTION

Maxillary sinusitis can occur in both children and adults. Maxillary sinusitis is an inflammatory condition of the sinus mucosa which interferes with ciliary function and sinus secretion. Maxillary sinusitis can be caused by allergens, bacteria, or viruses.^{1,2} Assessment of maxillary sinusitis can be done through clinical examination, supporting examination of conventional extra oral radiography and CBCT. The radiographic image of the maxillary sinus floor is thin radiopaque lines. Tooth impaction in the maxillary sinus is a rare case, and is usually found accidentally on radiographic examination.³⁻⁵ Radiographic image of maxillary sinusitis is radiopacification along the sinus floor, around the entire wall of the sinus, or near-complete or complete of the sinus, and fluid level of antral cavity with a characteristic meniscus shape.^{6,7}

Panoramic radiographs can detect impacted teeth, as well as viewing pathological conditions in the jaws. Panoramic radiographs can clearly depict the mesiodistal and vertical positions of impacted teeth. However, it cannot evaluate the position of the impaction or lesion in the buccolingual direction. Therefore, a follow-up examination using 3D CBCT is sometimes required.^{6,7} 3D CBCT is indicated when the ectopic tooth is associated with a lesion in the maxillary sinus and requires surgery.⁸ 3D CBCT is helpful for the clinician in determining the hard tissue margin of the soft tissue invasion of the lesion. The advantage of 3D CBCT is that it provides multiplanar reformation with

volume reconstruction and 3D images with a much lower radiation dose compared to computed tomography (CT). 3D CBCT allows clinicians to accurately assess the extent of the lesion and its proximity to adjacent vital structures.⁹

CASE REPORT

A 20-year-old female patient came to the Radiology Installation of Dentistry, Padjadjaran University Dental and Oral Hospital on consulship from an Oral Surgery specialist for a CBCT examination related to tooth impaction. The CBCT examination results showed coronal, sagittal, and axial views of the sinistra mandible (Figure 1). The panoramic view of the mandibular sinistra showed an inverted impacted tooth in region 18 and a radiointermediate lesion in the maxillary sinus showing thickening of the sinus mucosa (Figure 2). The coronal view showed the impaction of tooth 18 in an inverted position, located in the dextra maxillary sinus. The crown width was 10.46 mm and the height (coronal-apical) was 13.46 mm. There was a thickening of the dextra maxillary sinus mucosa, with a thickness of 4.86mm from the crown and a radiolucent appearance at the edge of the crown (yellow arrow) (Figure 3). The sagittal view showed the impaction of tooth 18 in an inverted position, located in the maxillary sinus. The tooth width (mesial-distal) was 10.87 mm and height (coronal-apical) was 14.19 mm. There was

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thickening of the sinus mucosa on the superoanterior wall of about 13.00 mm and on the posteroinferior 7.70mm. and radiolucent appearance on the apical (blue arrow) (Figure 4). The axial view showed the impaction of tooth 18 with a tooth width (buccal-palatal) of 10.30 mm and a tooth width (mesial- distal) of 11.16 mm. There was radiolucency at the crown edge (yellow arrow). The impression of this case is the impaction

of tooth 18 with an inverted angulation position, the crown position is in the dextra maxillary sinus. Radiodiagnosis suspicion is inverted impaction level C sinus approximation, accompanied by dextra maxillary sinusitis. The patient will undergo odontectomy surgery on the impacted tooth and will be treated for maxillary sinusitis found on radiographic examination.

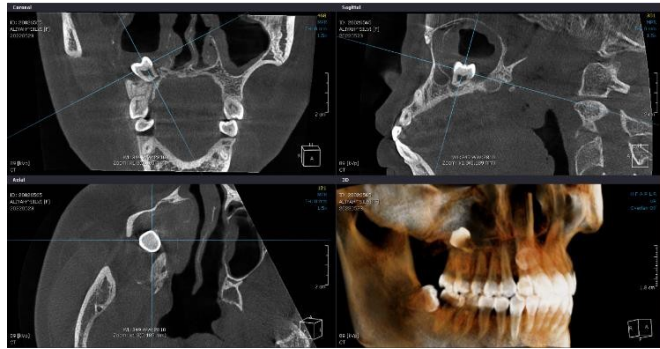


Figure 1. MPR view of tooth 18 region

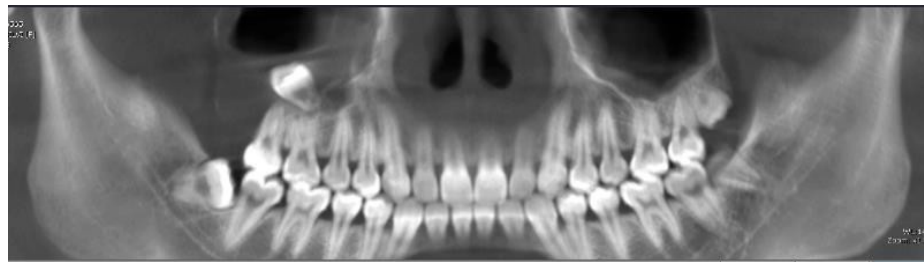


Figure 2. Panorama view of tooth 18 region

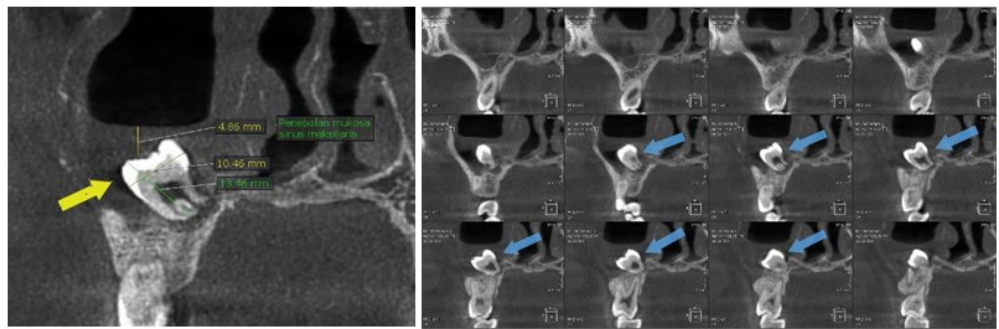


Figure 3. Coronal view (left) and coronal slicing view (right) of tooth 18 region

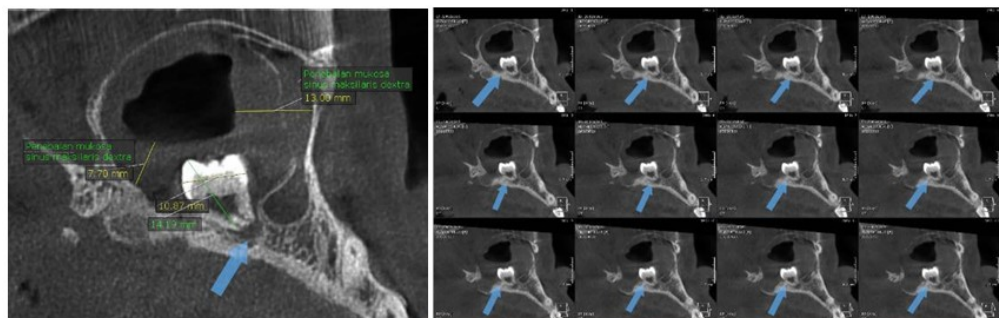


Figure 4. Sagittal view (left) and sagittal slicing view (right) of tooth 18 region

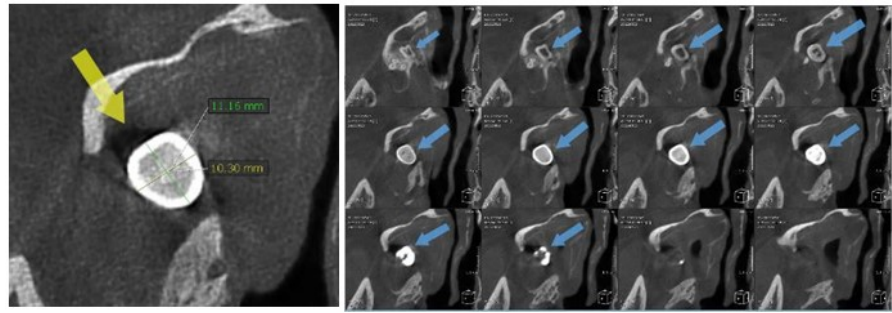


Figure 5. Axial view (left) and axial slicing view (right) of tooth 18 region

DISCUSSION

Impaction is usually not visible in the oral cavity. Although rare, impacted teeth in different areas such as the mandibular condyle, coronoid process, nasal cavity, palate, and maxillary sinus have been reported.¹⁰ The etiology of these impacted teeth is still unknown, but many theories such as trauma, infection, genetic factors, developmental anomalies, iatrogenic, idiopathic activities, and pathological conditions such as dentigerous cysts can be the cause. This condition is believed to push the tooth seed due to expansion of the cyst lesion causing the tooth to become impacted.^{11,12}

Panoramic, water's view, and plain skull are simple methods that are easy to perform in daily practice. However, they present two-dimensional images that are difficult to interpret due to the overlap with other cranial bone structures.¹³ Advanced specialized radiographic techniques such as Computed Tomography (CT) and Cone Beam Computed Tomography (CBCT) are essential in diagnosing cysts involving the maxillary sinus.¹⁴

Radiographic examination to see the condition of the maxillary sinus can use extra oral radiography and CBCT. Maxillary sinusitis is an inflammation because of infection, chemical irritation, allergy, introduction of a foreign body, of facial trauma. The imaging changes associated with inflammation include thickened sinus mucosa, air-fluid levels, polyps, empyema, and retention pseudocysts.^{6,7} Radiographic images of maxillary sinusitis are radiointermediate meets or air-fluid levels in the maxillary sinus.¹⁵ This case show radiopaque near-complete around the entire wall of the sinus, indicates sinus maxillaris. Sometimes it is difficult to differentiate mucositis from sinusitis mucositis is localized thickened sinus mucosa. Radiographic imaging of mucositis is a well-defined, noncorticated radiopaque band of increased radiopacity paralleling the bony wall of the sinus while sinusitis radiopacification along the sinus floor, around the entire wall of the sinus, or near-complete or complete of the sinus, and fluid level of antral cavity with a characteristic meniscus shape.^{6,7}

CBCT is very useful in demarcating hard tissue edges from soft tissue invasion of lesions.¹⁶ The main advantage of CBCT is that it can present multiplanar reformation with volume reconstruction and 3D images with a much lower

radiation dose when compared to CT. This allows the surgeon to accurately assess the extent of the lesion as well as assess its proximity to adjacent vital structures.^{17,18} Unilocular radiolucency with well-corticated margins above the crown of the involved tooth, attached to the cemento-enamel junction (CEJ) of impacted tooth was seen at the CBCT. As the result in the radiographic finding the characteristic is similar as dentigerous cyst or also known as follicular cyst. The CBCT in this patient's case showed an inverted impacted tooth with a dentigerous cyst extending into the maxillary sinus.¹⁹

The goals of treatment of maxillary sinusitis are to control the infection, promote drainage, and relieve pain. Acute maxillary sinusitis is usually treated medically with decongestants to reduce mucosal swelling and with antibiotics in the case of a bacterial maxillary sinusitis. Chronic maxillary sinusitis is primarily a disease of obstruction of the ostia; thus the goal is ventilation and drainage. This is often accomplished through endoscopic surgery to enlarge obstructed ostia or by establishing an alternate path of drainage.^{1,3,6,7,20}

CONCLUSION

Maxillary sinusitis can be assessed using extra oral radiographs and CBCT. CBCT examination is useful in determining the source of the lesion, the extent of the lesion, and the thickness of the maxillary sinus mucosa. The CBCT results showed a radiointermediate image of the maxillary sinus showing thickening of the sinus mucosa and an inverted impacted tooth on the dextra maxilla.

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FOOTNOTES

All authors have no potential conflict of interest to declare for this article. Informed consent was obtained from the patient for being included in this case report.

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