



## Radiodiagnostic Approach To Ganglion Cyst Of Temporomandibular Joint: A Case Report And Literature Review

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### Abstract

A ganglion cyst of the temporomandibular joint is a very rare benign cyst. It is most commonly reported as a cyst in the wrist, knee, or ankle joint. Approximately a thousand cases have been reported in regards to Ganglion cyst, and of those only 44 cases of Ganglion cyst of TMJ have been reported till date. This report presents a case of a 30-year-old female with a chief complaint of pain in the left Temporomandibular Joint (TMJ) for several months. After ruling out all the usual etiologies, investigations such as CBCT and MRI guided us toward the diagnosis of a very rare entity "Ganglion Cyst of TMJ". In this report, the factors are meticulously laid out as to why such cases must not be deprived of a thorough investigation. This report and literature review discuss the importance of advanced imaging like CBCT and MRI in the diagnosis of Ganglion cyst of TMJ, in patients reporting with common signs and symptoms of temporomandibular disorders.

**Keywords:** NIL

### Introduction

A ganglion cyst of the temporomandibular joint is a very rare benign cyst [1]. It is most commonly reported in wrist, knee, or ankle joints.[2] Patients usually present with symptoms that mimic TMDs like experiencing pain while opening and closing, clicking and popping sounds, swelling in the preauricular region, trismus, difficulty in mastication, headache, dizziness, and auriculotemporal neuralgia-like pain, etc. [3]

In 1977, Heydt S. was the first to report ganglion cyst of TMJ and a total of 45 cases have been reported since then. [4] Ganglion cysts are pseudocysts that arise from myxoid degeneration of the connective tissue of the joint capsule and are filled with a

viscous fluid or gelatinous material and have a fibrous lining. It is most often confused with a synovial cyst, which is a true cyst of TMJ filled with synovial fluid and lined with endothelial cells. [5]

Diagnostic tools like Cone Beam Computed Tomography (CBCT), Computed Tomography (CT), and Magnetic resonance imaging (MRI) always aid in the diagnosis however histological examination leads to a definitive diagnosis.

### Case Presentation

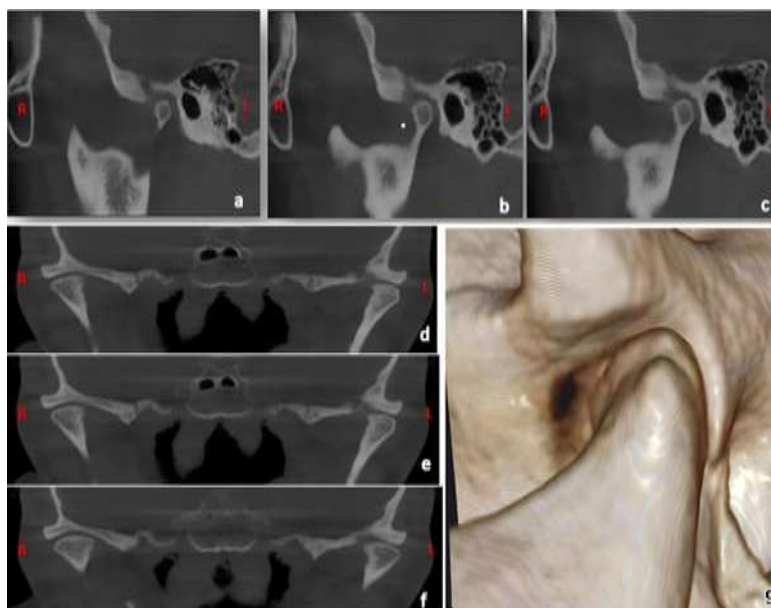
A 30-year-old female presented with a chief complaint of pain in the left TMJ. There was no history of trauma to the ear, TMJ, or mandible. Her

past medical, and dental history was non-contributory. On physical examination, there was pain in the left TMJ associated with reduced mouth opening. The intensity of pain increased while opening and closing the mouth, and also while chewing. There was no enlargement of the regional lymph node or of the parotid or submandibular gland. For screening of maxillofacial structures Orthopantomogram (OPG) was done. Since the clinical and Two - Dimensional imaging findings were non-conclusive, for the accurate evaluation of the joint, the patient was advised of Cone Beam Computed Tomography (CBCT).

### Cone Beam Computed Tomography (CBCT)

The left condylar head showed normal shape and size; a small bony protrusion was observed in the

medial pole of the condylar head. Mild sclerosis was observed in the superior and medial aspect of the condylar head; with decreased joint space from normal limits. A grossly thickened floor of the glenoid fossa was observed involving the lateral, middle, and medial aspects of the glenoid fossa. A large (5.1mm in height and 6.9mm in Medio laterally dimension), diffuse bony erosion was observed in the anterior and medial aspect of the glenoid fossa, posterior to the articular eminence (*Figure 1*). Three Dimensional reconstructed image and perforation are seen (*Figure 1. g*). To rule out the involvement of the middle cranial fossa, and to locate and define pathological features more accurately, MRI was advised.



**Figure 1:** a, b, c: Showing the sagittal section of Left TMJ CBCT. The bone defect-making communication between intra-articular space and middle cranial fossa, d, e, f: Showing coronal sections of CBCT. A large (5.1mm in height and 6.9mm in Medio laterally dimension), diffuse bony erosion was observed in the anterior and medial aspect of the left glenoid fossa, posterior to the articular eminence, compared to right glenoid fossa, g: Showing 3D reconstructed imaging of CBCT. The bone defect involves the inferior Intra articular space and superiorly involves the floor of the glenoid fossa.

### Magnetic Resonance Imaging (MRI)

In MRI findings the articular disc subluxated anteromedially. Mild irregularity of the articular surface of the glenoid fossa of the left TMJ, with an 8x7x6 mm sized septate cystic abnormality in the bone, showing intracranial extension and indenting the adjacent temporal parenchyma; representing a ganglion cyst secondary to early degenerative changes in the left TMJ. (*Figure 2*).

**Figure 2: Coronal section of MRI showing septate cystic abnormality in the bone, showing intracranial extension and indenting the adjacent temporal parenchyma; representing a ganglion cyst secondary to early degenerative changes in the left TM joint**



**Figure 3: Sagittal Section MRI**



### Literature Review

Studies and case report on TMJ Ganglion Cyst from their inception till October 1st, 2022. The terms used were Ganglion Cyst AND Temporomandibular Joint. In accordance with the search strategy, 54 articles were found out of which 41 case reports and reviews were used for full-text review.

The terms "ganglion" and "synovial cyst" are frequently used interchangeably, but these are two distinct lesions: The synovial cyst is lined with synoviocytes and contains synovial fluid. Synovial cysts appear to be caused by the displacement of synovial tissue during embryogenesis or by an increase in intra-articular pressure brought on by

injury or inflammation that results in capsular herniation.[6] Various theories are reported in the past regarding the etiology of ganglion cysts with no present consensus. Ganglion cysts are thought to develop as a result of synovial tissue herniating from joints, according to one of the earliest theories put forth by Eller in 1746. Carp and Stout in 1926, stated that ganglion cysts are caused by the connective tissue's mucinous degeneration as a result of persistent injury. Presently, the most widely accepted theory repetitive micro-injury to the supporting capsular and ligamentous structures stimulates the mesenchymal cells at the synovial capsular junction which then transform into fibroblasts and produce hyaluronic acid, which builds up to form the mucin

"jelly-like" substance frequently found in ganglion cysts.[5]

The first case of ganglion cyst of TMJ was reported in 1977 since then total of 45 cases has been reported including the present case. This is the first case reported in India. Out of 45 cases, 31 were females (68.88%), with a mean age of 46 years.

Twenty-nine patients came with a chief complaint of Swelling in the preauricular region out of which 11 were associated with pain, and 11 others came with a complaint of exclusive pain. Five patients came with a chief complaint of reduced mouth opening. Nine patients showed signs of clicking, popping, crepitus sounds, and pain while parafunctional moments [7]. Three patients consulted with ENT specialists for fullness in the ear which on further investigation was found to be a mass in the External auditory meatus [8][9][10]. Individual cases of inferior alveolar nerve paraesthesia [6] and facial nerve palsy were reported. Only one case has been reported as a ganglion cyst mimicking auriculotemporal neuralgia,[3] came with

a chief complaint of severe throbbing pain in the retro-orbital and temporal regions without Aura.

Out of 41 patients, who were advised for Radiographic investigation, 16 were diagnosed through MRI, 12 through Computed Tomography (CT), and 7 were diagnosed through both CT and MRI. Four out of the remaining 8, were diagnosed through Ultrasonography (USG), and 4 others through simple X-ray.

In most of the cases MRI, T1 weighted images showed hypointense and T2 Images showed a hyperintense cystic lesion that was extending from the capsule lateral to TMJ, depicting swelling in the preauricular region.

Out of all the cases, 4 of the cases investigated through CT displayed some distinct features, such as lytic lesions in the condyle and glenoid fossa, 2 of these were diagnosed as intraosseous ganglion cysts [8] [11] and in the other 2 cases (including current case) on the further investigation through MRI confirmed Intra cranial extension of ganglion cyst of TMJ into middle cranial fossa.[12] (*Table 1*)

**Table 1: Cases of Ganglion Cyst of TMJ reported with Radiographic Interpretation**

S.NO.	YEAR	AUTHOR	Radiographic imaging	Radiographic interpretation
1	1990	Tom et al[14]	MRI	Right TMJ in the sagittal plane reveals a high signal cystic mass slightly anterior to the joint below the articular eminence. Left TMJ reveals a similar but smaller high-signal cystic mass.
2	1993	McGuirt[15]	MRI	Cystic lesion with the synovium of the temporomandibular joint
3	1999	Goudot et al[6]	CT, MR I	A juxta-articular round mass with a liquid content
4	2000	Nahlieli et al [16]	USG,CT,MRI	Paradiscal cystic-like lesion producing erosion of the lateral aspect of the left condyle.
5	2001	Takaku et al [17]	MRI	The joint capsule appears to contain a heterogeneous low signal-intensity as
6	2003	Kim et al [18]	MRI	An oval-shaped lateral to the left TMJ
7	2006	Kerawala [19]	MRI	The mass lay entirely within subcutaneous fat.
8	2006	Ali et al	MRI	Fluid-filled cystic lesion just beneath the retrodiscal soft

		[20]		tissue of the TMJ, behind the right mandibular condyle.
9	2009	Lima et al [21]	CT, MRI	A hyperintense image suggestive of a cystic lesion behind the right condyle.
10	2012	Mumert et al [12]	MRI	TMJ lesion involving the condylar fossa bony wall, floor of the middle cranial fossa, and the geniculate ganglion of the facial nerve on the left.
11	2012	Okochi et al [7]	MRI	Cyst anterior to condyle well defined and Homogenous
12	2012	Okochi et al [7]	MRI	Cyst anterior to condyle well defined and Homogenous
13	2012	Okochi et al [7]	MRI	Cyst lateral to condyle well defined and Homogenous
14	2012	Okochi et al [7]	MRI	Cyst anterior to condyle well defined and Homogenous
15	2012	Savolainen J [22]	MRI	A cystic lesion lateral to the right condyle.
16	2013	Suhr et al [23]	MRI	A globular, multilocular mass with a signal-intense liquid content adjacent to the left TMJ
17	2014	Young Taek [24]	MRI	A cystic lesion lateral to the left condyle
18	2014	Heng-Kun W et al [25]	MRI, CT, USG	A mass located next to the joint capsule
19	2016	Levarek RE [26]	CT, MRI	A large, multilocular, well-circumscribed, homogenous, and hyperintense mass
20	2018	Aguilo et al [3]	MRI	A mass lateral to the left Condyle
21	2018	Segami et al [27]	MRI	A cystic lesion can be observed lateral to the condylar neck.
22	2019	Tal B, Boaz F [28]	CT, MRI	Hypointense soft tissue mass in right masseteric space adjacent to TMJ
23	2022	Current Author	CBCT, MRI	Ill-defined irregularity of the articular surface of the glenoid fossa, septate cystic abnormality in the bone, showing intracranial extension into the middle cranial fossa and indenting the adjacent temporal parenchyma

**Discussion**

The temporomandibular joint ganglion cyst is found more frequently in middle-aged women than in other older men or women and, because of its anatomic region, usually presents as a parotid or preauricular mass. [1]

Different conditions or diseases such as a parotid tumor, parotid cyst, retention cyst, sebaceous cyst, vascular tumor, and lymphangioma must be considered in the differential diagnosis of TMJ ganglion cyst. In addition, rare TMJ lesions such as synovial chondromatosis, osteochondroma, osteoma,



pigmented villous nodular synovitis, bone cyst, Langerhans cell histiocytosis, plasma cell myeloma, and sarcoma must also be considered. [13]

From the radio diagnostic point of view, one of the primitive methods used is a panoramic radiograph (X-ray) which can be useful for making observations such as the bony pathological changes in the maxilla, mandible, dentition, and sometimes for condylar degenerative changes. Another primitive method USG can only help to rule out parotid involvement. Computed Tomography is mainly useful in showing the relationship of the lesion to the TMJ and lytic changes in the Glenoid fossa and Condyle. MRI usually shows the location, size, and density of the lesion, as well as its relationship to surrounding structures. Most preferable sequencing for MRI Proton Density Weighted images (PDWI) and T-2 Weighted Images (T2WI). Ganglion cysts present well-defined homogeneous masses with low signal intensity on PDWI and very high signal intensity on T2WI and are characterized by showing continuity with the joint capsule.[7] MRI remains the best diagnostic imaging technique for determining TMJ pathology as primitive methods remain inconclusive in some aspects of diagnosis.

### Conclusion

As Oral Physicians and maxillofacial radiologists, we commonly encounter patients with Pain and swelling in the TMJ region, and if patients present with some features in combinations such as swelling in the preauricular region with signs of clicking, reduced mouth opening, ENT features like tinnitus, otorrhoea, or neuralgia like pain or facial palsy, paraesthesia, etc. one could consider the possibility of ganglion cyst of TMJ in differential diagnosis and further radiographic investigations such as CT, CBCT, or MRI should be advised to find conclusive evidence. We must carefully observe the lytic changes in CT and CBCT not only in the condyle but also in the glenoid fossa which can be an indication of the extension of cyst in the middle cranial fossa as seen in the present case. But position, size, and extension of the cyst are best visualized in MRI as a hypointense mass in T1WI and homogenous hyperintense mass in T2WI. If any of this conclusive evidence further is confirmed through histopathological examination. Management of

ganglion cysts frequently entails full surgical removal.

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