


## Eustachian tube calcification as an unusual finding on a panoramic radiograph

Galal Omami <sup>1,\*</sup>

<sup>1</sup>Division of Oral Diagnosis, Oral Medicine and Oral Radiology, Department of Oral Health Practice, University of Kentucky College of Dentistry, Lexington, USA

### ABSTRACT

The author herein presents an unusual case of eustachian tube calcification masquerading as loose radiopacities in the temporomandibular joints on a panoramic image, creating a diagnostic challenge. The patient, a 72-year-old woman, presented to the dental service for implant treatment to improve her masticatory function. A cone-beam computed tomography scan was performed and reviewed by a board-certified oral and maxillofacial radiologist. The scan showed no evidence of calcifications in the temporomandibular joints; however, it revealed nodular calcifications within the cartilaginous portion of the eustachian tube bilaterally. Additionally, this report briefly reviews the differential diagnosis of calcified loose bodies in the temporomandibular joint and provides information that needs to be reinforced periodically. (*Imaging Sci Dent* 2024; 54: 105-7)

**KEY WORDS:** Eustachian Tube; Calcinosis; Radiography, Panoramic; Cone-Beam Computed Tomography

The eustachian tube (auditory tube) connects the nasopharynx with the middle ear. It has bony and cartilaginous parts. The cartilaginous part forms about two-thirds of the total length of the tube.<sup>1</sup> The opening of the eustachian tube lies above the soft palate in the lateral wall of the nasopharynx. The opening is guarded superiorly, posteriorly, and anteriorly by a prominent rounded ridge, the torus tubarius, formed by the cartilaginous eustachian tube, the levator veli palatini muscle, and the overlying mucosa. Located just above and behind the torus tubarius is the lateral pharyngeal recess or fossa of Rosenmuller. The cartilaginous eustachian tube is closed at rest and opens only on swallowing or yawning to equalize the air pressure in the middle ear with the pressure in the external auditory canal. It also allows the mucociliary clearance of the middle ear.

Eustachian tube calcification is an uncommon condition in which calcium and phosphate salts are deposited within the cartilaginous part of the tube. The clinical significance of eustachian tube calcification remains unclear; however,

it has been postulated that calcifications decrease the elasticity of the cartilage and compromise its function.<sup>2</sup>

Conventional panoramic imaging is generally useful and cost-effective for patient selection and initial assessment for implant therapy. However, this modality lacks the cross-sectional visualization that can be obtained by advanced imaging techniques such as cone-beam computed tomography (CBCT) and multidetector computed tomography (CT).

The purpose of this report was to present an unusual case of eustachian tube calcification masquerading as calcified bodies in temporomandibular joints (TMJs) on a panoramic film. The definitive diagnosis was made based on CBCT.

### Case Report

A 72-year-old woman presented to the dental service for implant treatment to improve her masticatory function. The patient's past medical history was remarkable for hypertension and type 2 diabetes mellitus. A clinical examination revealed multiple missing and restored teeth. A panoramic radiograph showed small, smooth calcified nodules on the anterior aspect of the mandibular condyles just below the articular eminences, which were initially misdiagnosed as free osteophytes (Fig. 1). The patient reported no TMJ pain or dysfunction. The TMJs did not demonstrate any other

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\*Correspondence to : Prof. Galal Omami

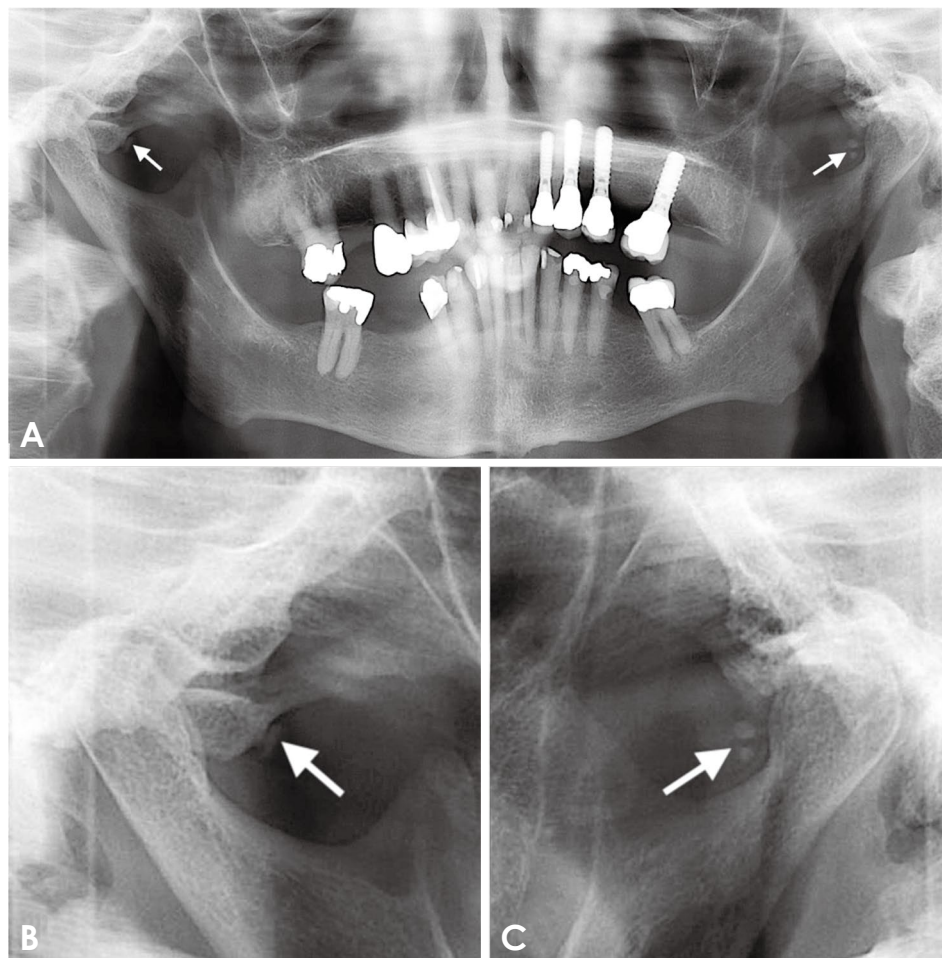
Division of Oral Diagnosis, Oral Medicine and Oral Radiology, Department of Oral Health Practice, University of Kentucky College of Dentistry, 800 Rose Street, Room MN-320, Lexington, KY 40536-0297, USA

(Tel) 1-859- 257-5403, E-mail) Galal.Omami@uky.edu

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**Fig. 1.** Panoramic image (A) and cropped panoramic images (B and C) show small, rounded, calcified loose bodies on the anterior aspect of the condyles (arrows).

degenerative changes. Panoramic imaging was performed using Planmeca ProMax 2D S2 (Planmeca, Helsinki, Finland). The patient was referred for CBCT examination for implant treatment planning. The scan was obtained using a ProMax<sup>®</sup> 3D Mid Planmeca unit (Planmeca, Helsinki, Finland) with a 400-mm isotropic voxel size and 20 cm × 17 cm field of view. The scan volume showed no evidence of calcified bodies surrounding the condyle or within the joint space; however, it revealed the presence of nodular calcifications within the cartilaginous portion of the eustachian tubes (Fig. 2). On questioning, the patient reported no signs or symptoms of eustachian tube dysfunction such as pain, tinnitus, hearing deficit, or vertigo.

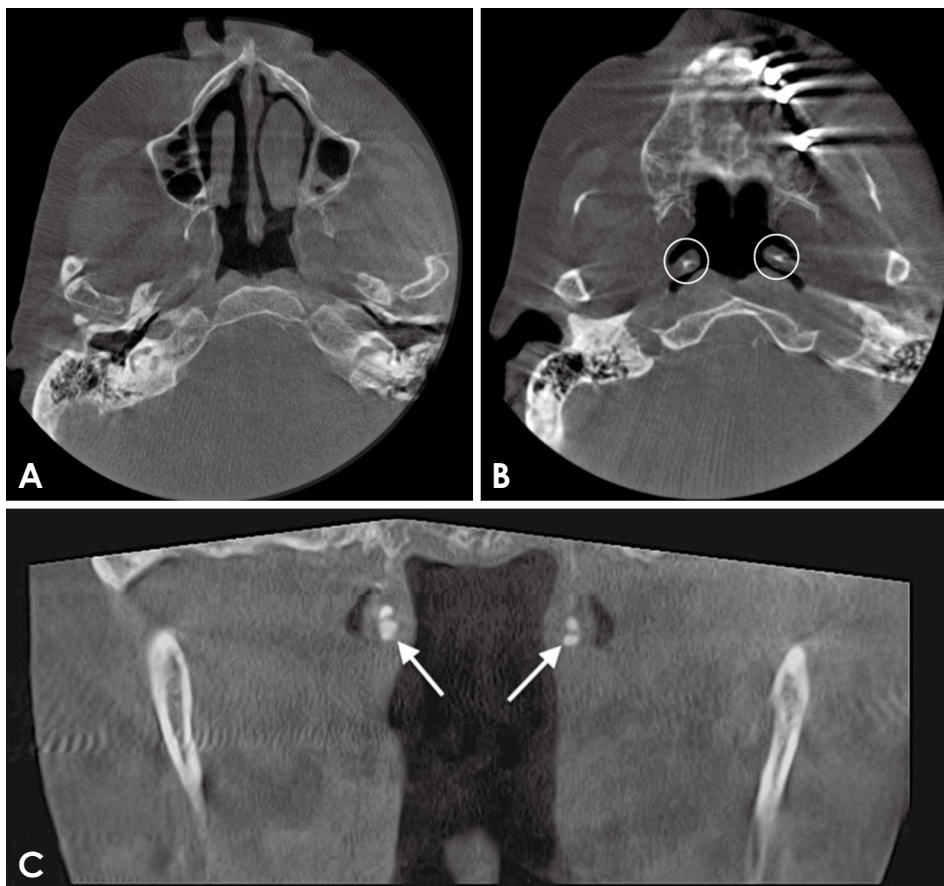
### Discussion

In a computed tomography (CT) study by Buch et al., eustachian tube calcification was reported in only 10 (0.6%) of 1571 consecutive patients, of which 7 (70%) cases were unilateral and 3 (30%) were bilateral.<sup>3</sup> Their study found no significant association between eustachian tube calcifica-

tion and common medical conditions such as otitis media, chronic kidney disease, alcoholism, endocrine disorders, alkaline phosphatase levels, history of head and neck surgery or radiation, and autoimmune diseases. No sex predilection was noted, and the incidence appeared to increase with age. The clinical significance of eustachian tube calcification remains uncertain.<sup>3-5</sup>

In a panoramic image, calcification in the palatine tonsils appears as single or multiple clustered radiopacities that overlap the midportion of the mandibular ramus in the region where the palatoglossal air space crosses the ramus in the oropharyngeal air spaces. The same holds true for the nasopharyngeal air space, which is spread out and superimposed on the coronoid notch and TMJ areas, so that calcifications in the lateral wall of nasopharynx could project in the periarticular area of the TMJ.

Articular loose bodies are radiopacities of varying origin that appear as calcifications around the condylar head. These bodies may represent detached osteophytes that occur in degenerative joint disease, metaplastic formation of cartilaginous and osteocartilaginous nodules as in synovial



**Fig. 2.** A. An axial cone-beam computed tomographic (CBCT) image shows no evidence of calcifications in the anterior periarticular area of the temporomandibular joints. B. An axial CBCT image at a slightly lower level reveals the calcification within the cartilaginous eustachian tube (circles). C. a coronal CBCT image shows the eustachian tube calcification (arrows).

osteocondromatosis, or crystals deposited in the joint space in chondrocalcinosis (pseudogout). In synovial osteochondromatosis, the osseous components of the joint may appear normal or may show degenerative changes, including flattening, erosion, and sclerosis. The ossified bodies in osteochondromatosis often are multiple, larger, and may have a peripheral cortex and cancellous core. In rare cases, chondrosarcoma or osteosarcoma may simulate the appearance of articular loose bodies; however, sarcomas may be accompanied by severe bone destruction.<sup>6</sup>

The reader should be aware that eustachian tube calcification may simulate the appearance of the articular loose bodies seen on panoramic images. However, more definitive osseous assessment of the TMJ requires CBCT or medical CT imaging.

**Conflicts of Interest:** None

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