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Maxillofacial Radiology
CASE REPORT

# Mönckeberg arteriosclerosis

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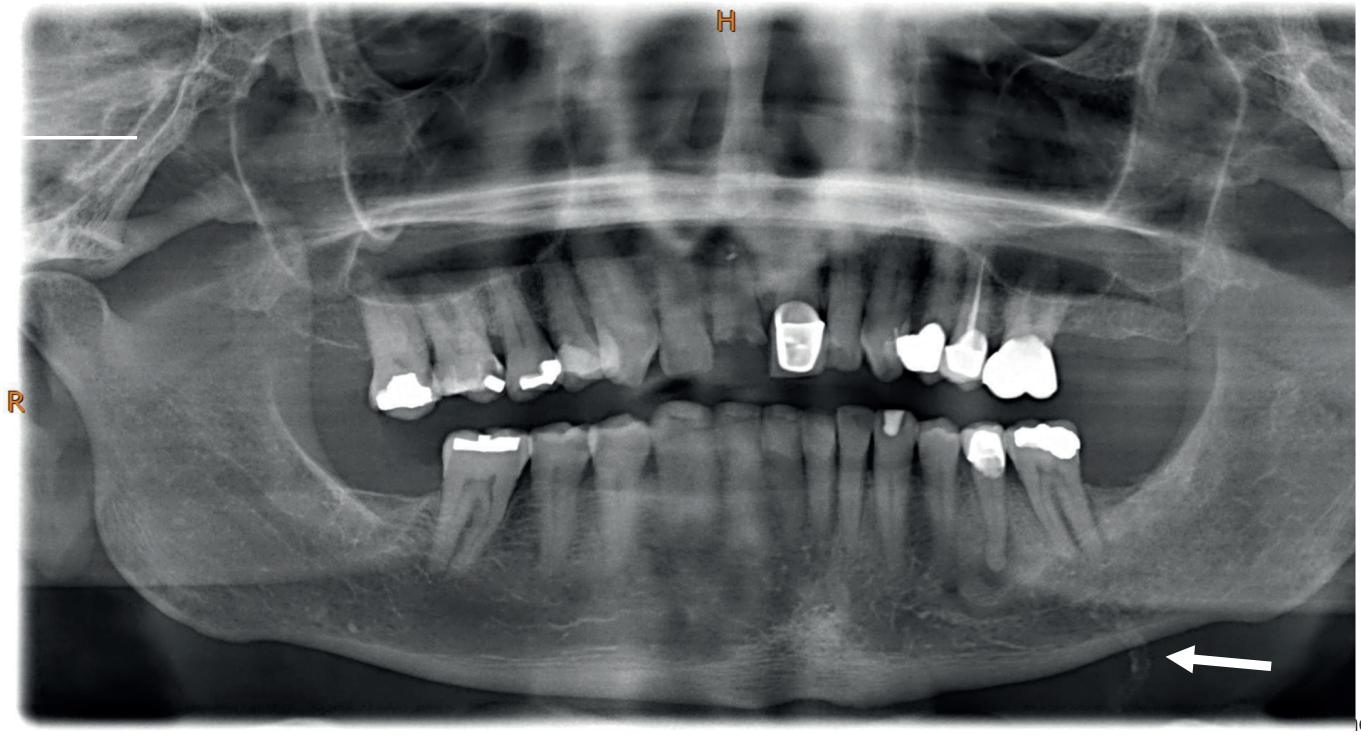
## CASE

**Patient 1:** A 75-year-old male presented to the department for the extraction of the 11. Upon panoramic examination (fig. 1), a well-urvilinear "railroad track" opacity was noted across the inferior border of the left mandible (white arrow).

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The scan slices demonstrate "pipe-track" and "railroad track" hyperdensities along the course of the facial artery on CBCT examination.

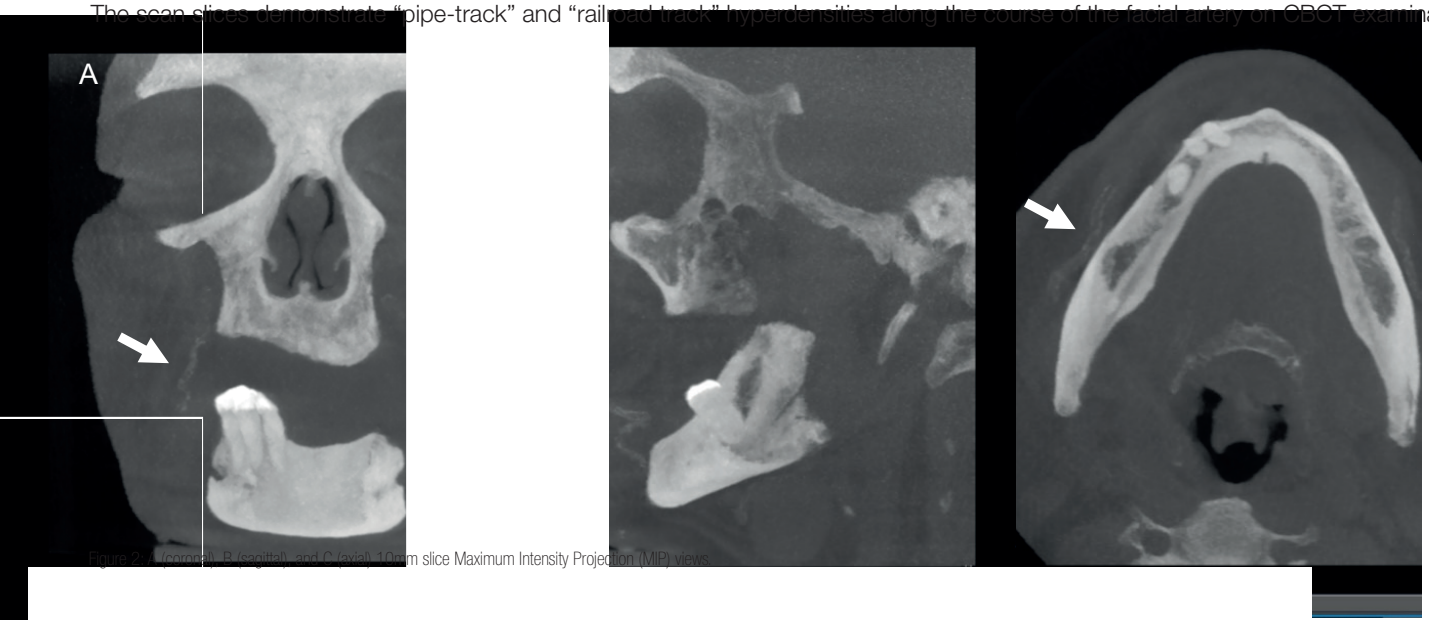


Figure 2: A (coronal), B (sagittal), and C (axial) 10mm slice Maximum Intensity Projection (MIP) views.

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## INTERPRETATION

The incidental calcifications on the conventional (panoramic) and advanced (CBCT) radiographs are consistent with Mönckeberg arteriosclerosis (MAA). MAA, first described by Johann Georg Mönckeberg in 1903, is a type of vascular calcification occurring in the tunica media of small and medium muscular arteries. Elastic fibres, which are commonly found in the arteries, gradually start to degenerate, leading to the deposition of calcium within the medial layer of the arterial wall.[1] Instead of the lumen narrowing, stiffness of the vessel develops, resulting in increased vascular resistance, reduced arterial compliance, and the inability to properly vasodilate in situations of increased stress.[2] The loss of arterial elasticity may also lead to derangement in blood flow and injury to the endothelium, increasing the risk of thrombosis.[3]

Although the exact aetiology of MAA remains unclear, it is thought to be related to ageing, diabetes mellitus, male gender, and chronic kidney disease. It occurs frequently in the lower extremities but may occur in the head and neck region.[4] In patients with diabetes and chronic kidney disease, Mönckeberg arteriosclerosis can have serious cardiovascular effects. Higher levels of these calcifications can eventually lead to amputation due to interference with blood flow.[2] Medial artery calcifications in newly diagnosed type 2 diabetic patients have been proven to be the most powerful predictive marker of future cardiovascular mortality.[3]

Clinically, patients are generally asymptomatic, with the calcification usually being diagnosed as an incidental finding on radiographs.

On conventional radiography, the appearance of the calcified vessel can be described as a "pipestem" or "railroad track" artery, seen as a parallel pair of thin, radiopaque lines with a straight or winding path (as presented in Figure 1).[2] On advanced imaging, such as CBCT (Cone Beam Computed Tomography), MAA tends to be a more generalised form of arteriosclerosis than carotid artery atheromas and radiographically appears as multiple, circumferential "pipestem" hyperdensities along the arterial wall (as presented in figure 2).[5]

Other calcifications appearing within the same region as MAA on panoramic radiography include carotid artery and venous calcifications (phleboliths). Due to the two-dimensional nature of panoramic radiographs, image superimposition of adjacent structures is bound to occur. Calcifications within these structures, such as the carotid arteries or veins, may have a similar appearance to MAA. Carotid artery calcifications can be seen as curved, irregular, parallel radiopacities occurring either in the soft tissue of the neck or below C3 and C4 vertebrae, inferior and lateral to the hyoid bone. In the case presented in Figure 1, the opacity is found anterior to the angle of the mandible, overlying the inferior mandibular cortex, in the region of the facial artery. Figure 2 shows the localisation that is possible on CBCT images, with the hyperdensities being traceable along the path of the facial artery. Phleboliths, on the other hand, occur as round or oval lesions with a homogenously radiopaque centre, displaying a "target" appearance.[2]

Although there is no cure for MAA, identification of this calcification should lead the clinician to assess the patient's medical history closely for diabetes or renal disease,[2,5] prompting appropriate medical referral where necessary.

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**Author's contribution**
1. J Simpson – 60%
2. L Ebrahim – 40%

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