Medial Arterial Calcification (MAC): A Possible Biomarker of Undiagnosed Diabetes.

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OBJECTIVE

To evaluate patterns of vascular calcification in cone beam computed tomography (CBCT) scans of persons with diabetes and matched controls

INTRODUCTION

Use of CBCT has increased in Dentistry and Incidental findings (IFs) are prevalent (25% to 94%), and can serve as useful diagnostic data. Vascular calcifications are pathological mineral deposits that are found in vascular systems. Specifically, arteriosclerosis involves **concentric media thickening of muscular arteries without lipid deposits, also known as medial arterial calcification (MAC).** MAC has been associated with end stage renal disease (ESRD) when noted in the femoral arteries. Our study aims to evaluate CBCT imaging of dental patients while looking for **patterns of vascular calcification in the head and neck region**, IFs, and concomitant comorbidities.

SCHEMA: MAC

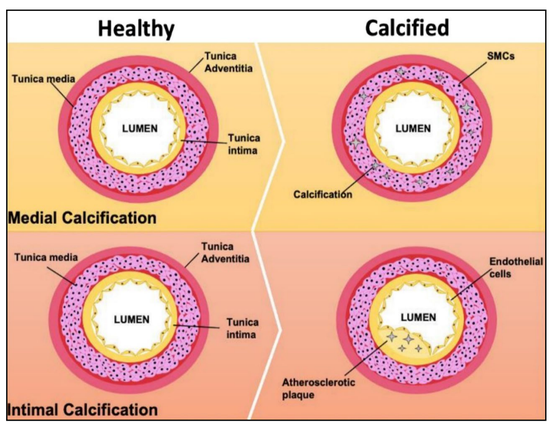


Figure 1. Comparison of medial and intimal calcification.

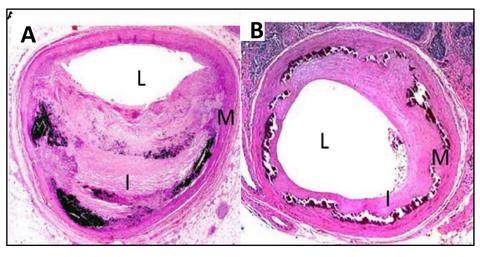
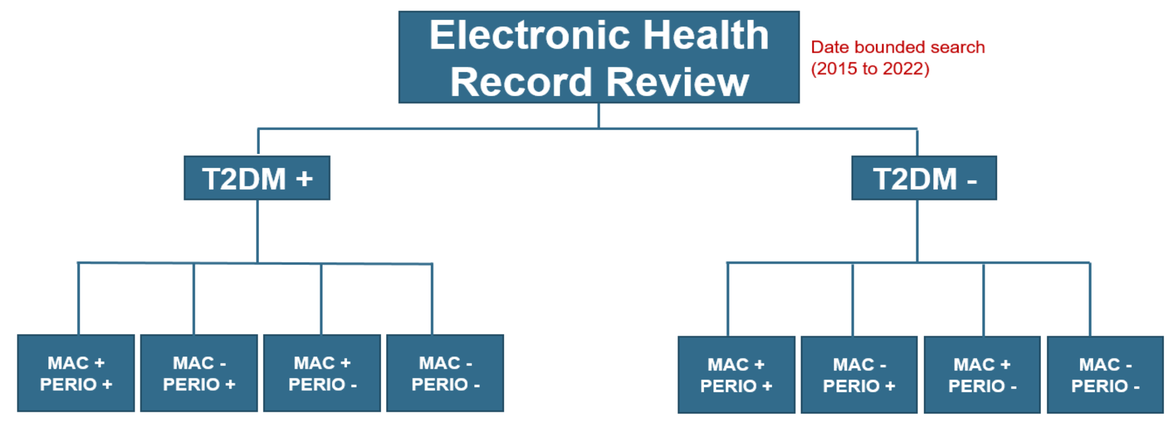


Figure 2. H&E stain of intimal (A) and medial (B) calcification. L denotes lumen, I denotes intima, M denotes media.

METHODS & MATERIAL

A retrospective case-control study involving 78 participants from University of Pennsylvania School of Dental Medicine who had CBCT imaging. Controls were matched to diabetic participants for gender and age within +/- 5 years. Electronic health record information was extracted and radiographs reviewed.



IMAGES

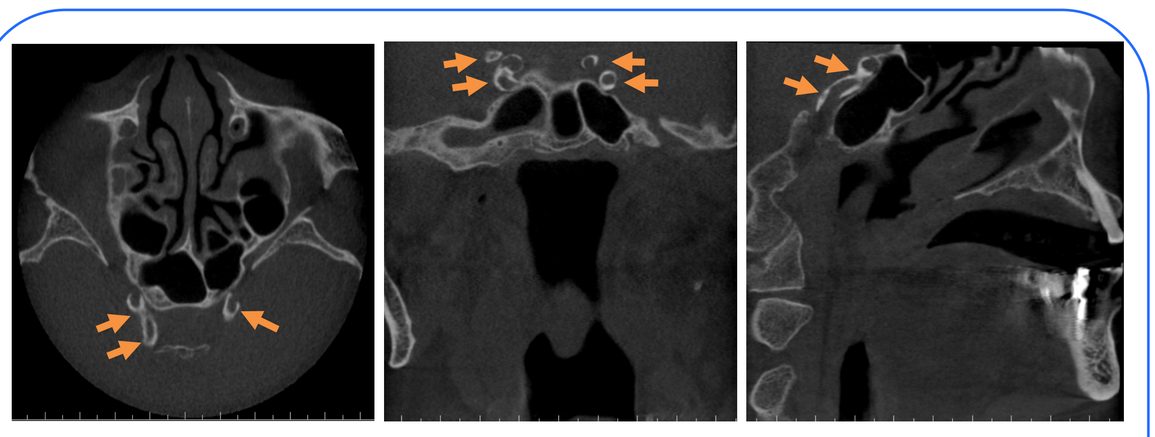


Figure 3. CBCT radiograph of severe MAC located in the ICA (orange arrows). Axial, coronal and parasagittal CBCT sections respectively.

RESULTS

There were seventy-eight participants in total. Fifty six percent were male and the age range of the group was 59 to 73. Forty five percent of the group had MAC and 62% had moderate to severe periodontal bone loss.

Finding	Known Diabetics	Matched Subjects	p-value
Any MAC	**21 (53.8%)**	14 (35.9%)	0.11
ICA present (all other segments)	18 (46.2%)	7 (17.9%)	**0.008**
ICA present (cervical segment)	9 (23.1%)	10 (25.6%)	>0.50
Mild MAC only	11 (28.2%)	5 (12.8%)	0.092
Severe MAC	4 (10.3%)	3 (7.7%)	>0.50

CLINICAL SIGNIFICANCE

MAC of the internal carotid arteries had a statistically significant association with diabetes (*p-value = 0.008*). There is sufficient evidence to conclude that the known diabetics have a higher rate of MAC in the ICA compared with matched controls. This bolsters our theory that **subjects not known to have diabetes, but with evidence of MAC of the ICA, could benefit from being evaluated for the possibility of diabetes, hence,** reducing the global burden of diabetes.

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