Characterization of Soft Tissue Calcifications in a Diabetic Cohort: A Case Control Study

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RATIONALE

Our study aims to evaluate the presence, anatomical location and type of calcifications in patients suffering from diabetes mellitus.

INTRODUCTION

- ☐ Soft tissue calcifications are typically detected in dental radiographic examinations as incidental findings and about 4% of panoramic radiographs may contain such radiopacities.[1]
- ☐ Cone Beam Computed Tomography (CBCT) affords more opportunity to detect these calcifications because of the multiplanar representation of the scan. Clinical symptoms may not accompany most soft tissue calcifications within the head and neck region; however, it should not be assumed that their detection lacks strong clinical significance[2].
- ☐ Detection of various types of calcifications in diabetic patients, can be an early diagnostic indicator for specific disease conditions or prognostic factor.

METHODS & MATERIAL

- ☐ A retrospective study looking at 92 large large and medium CBCT images of University of Pennsylvania School of Dental Medicine patients with and without diabetes mellitus and across all age groups, to evaluate the presence, anatomical location, type and distribution of calcifications. Controls were matched for age (+/-5years) and gender. There were 26 Females and 20 males for cases and controls for a total of 92 participants. IRB approval #849252.
- ☐ Craniofacial calcifications, including vascular, pulpal, soft tissue, ligament and pathological calcifications were evaluated from CBCT imaging using a third-party software Anatomage® In Vivo 3D and documented
- ☐ Data from Electronic Health Records was also reported. Statistical analysis was carried out to determine the occurrence of specific calcifications as seen on CBCT of patients with and without diabetes mellitus.
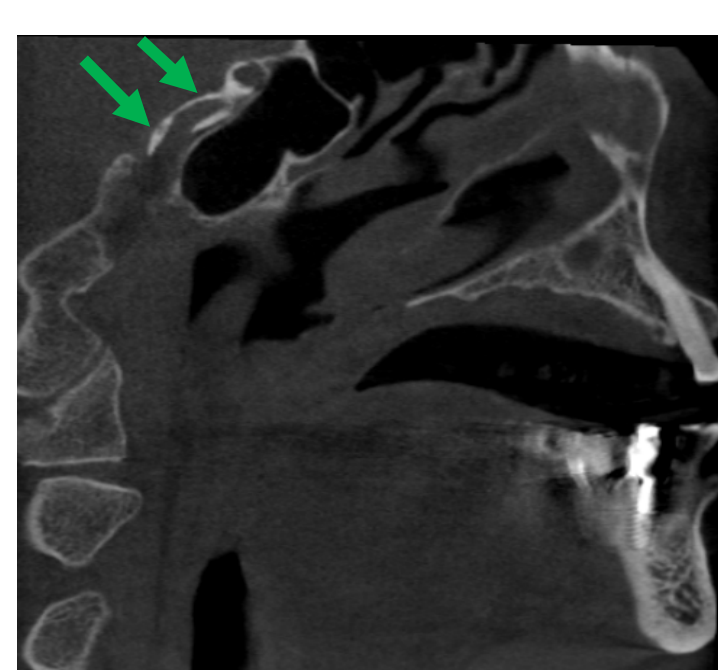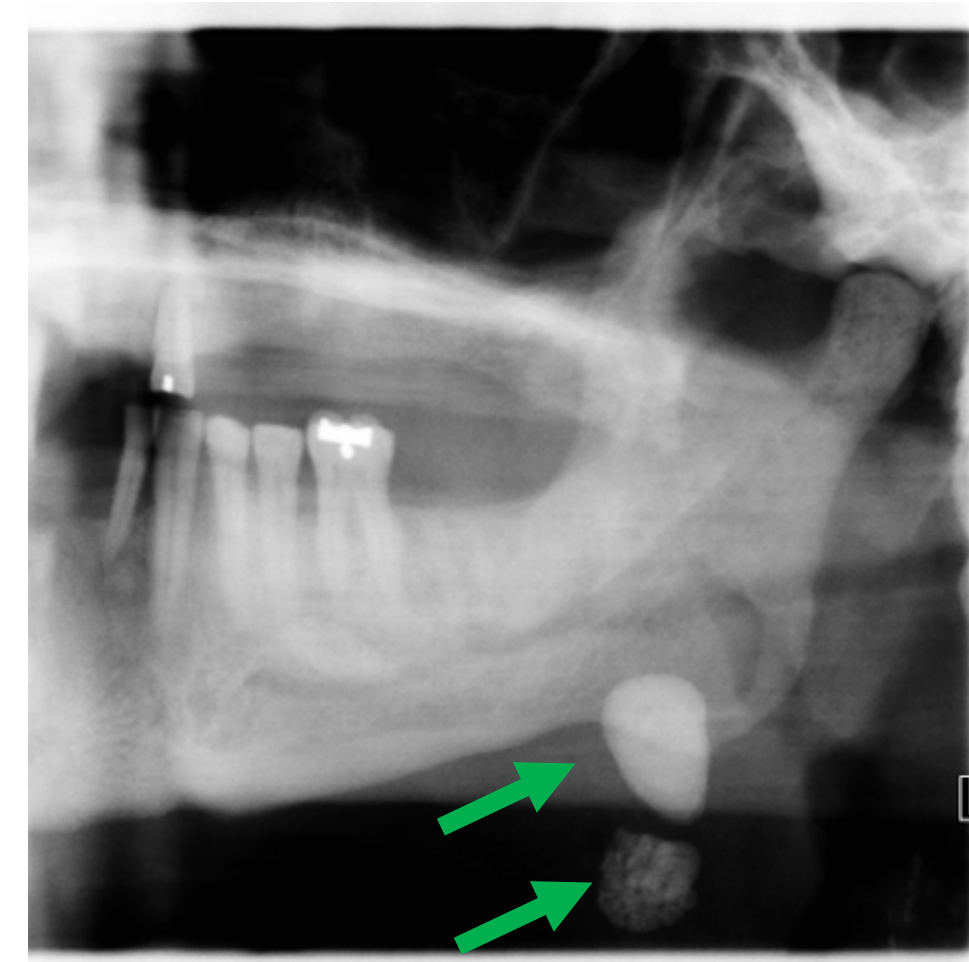
IMAGES
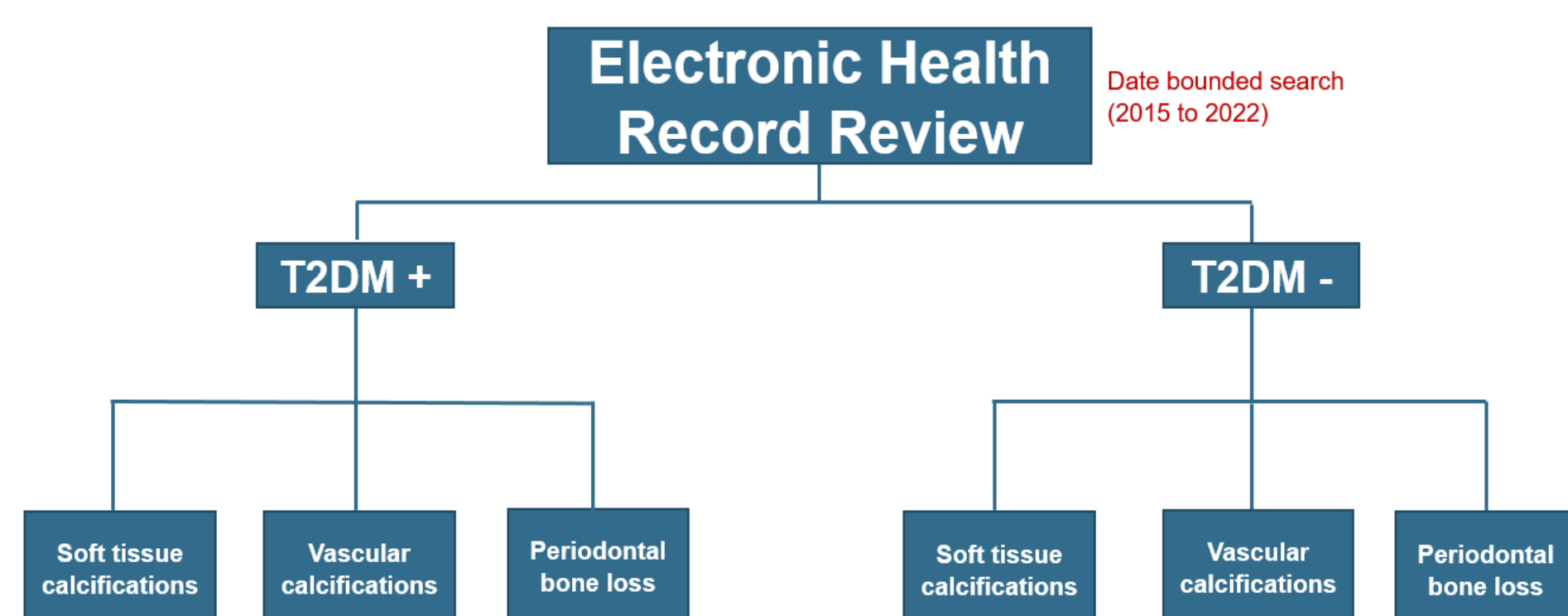
Schema for Methods

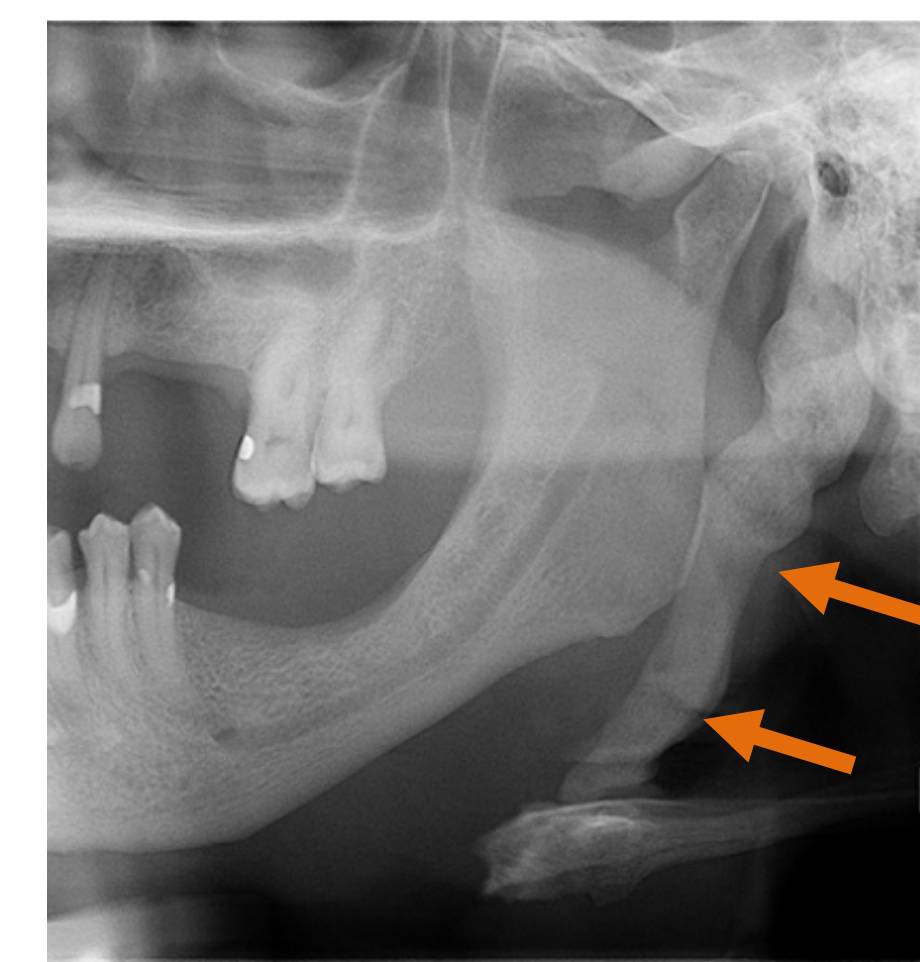Full mouth intraoral radiograph showing generalized periodontal bone loss

CBCT parasagittal section showing medial arterial calcification of the internal carotid artery in area of the sella turcica (green arrows)

IMAGES

Cropped panoramic radiograph left side of mandible showing a sialolith (green arrow)

Cropped panoramic radiograph left side of mandible showing ossification of the stylohyoid ligament (orange arrow)

RESULTS

Calcification Type	Known Diabetics	Matched Subjects	p-value
Presence of pulp stones	6 (13%)	7 (15%)	1.0
Presence of ≥ 1 pulp calcification	28 (61%)	22 (48%)	0.30
Mean # of pulps calcified (s.d.)	2.8 (3.3)	3.1 (4.5)	0.71
> 8 teeth missing	30 (65%)	26 (57%)	0.52
Mean # teeth missing (s.d.)	15.0 (16.3)	13.3 (9.5)	0.61

Tooth related calcifications

Calcification Type	Known Diabetics	Matched Subjects	p-value
Pineal gland calcification present	3 (7%)	11 (24%)	0.04
Dystrophic calcification present	2 (4%)	9 (20%)	0.05

Calcifications with statistically significant associations among controls

RESULTS

Calcification Type	Prevalence
Ossification of stylo-hyoid ligament	11%
Presence of pulp stones	14%
Presence of tonsilloliths	34%
Petroclinal ligament calcification	11%
Presence of sialoliths	2%
Presence of ≥ 1 pulp calcification	54%
Pineal gland calcification	15%
Calcification of triticeous cartilage	7%
Thyroid cartilage calcification	11%
Dystrophic calcification	12%
Calcification of the internal carotid artery (cervical segment)	29%
Calcification of the internal carotid artery (all other segments)	41%

DISCUSSION

Diabetes mellitus is a chronic metabolic condition resulting in hyperglycemia. Complications such as cardiovascular disease, impaired vison, kidney disease and diabetic angiopathy are associated with diabetes. The more the information we have about diabetics, the more efficient and precise the evidence based medical care they can be offered. In our study, we discovered a high prevalence of vascular calcifications, tonsiloliths and pulp calcifications. Further analysis to identify the association and cause of such calcifications is needed.

CONCLUSION

Detecting radiographic biomarkers for diabetes will aid in early institution of preventive measures to reduce morbidity and mortality and ultimately reduce the global burden of the condition.

REFERENCES

1.Khojastepour, L., Haghnegahdar, A., & Sayar, H. (2017). Prevalence of Soft Tissue Calcifications in CBCT Images of Mandibular Region. Journal of dentistry (Shiraz, Iran), 18(2), 88–94.
2.Çağlayan F, Sümbüllü MA, Miloğlu Ö, Akgül HM. Are all soft tissue calcifications detected by cone-beam computed tomography in the submandibular region sialoliths? J Oral Maxillofac Surg. 2014; 72: 1531.e1–e6.