

# Sodium Iodide Radiographic Contrast To Distinguish Between Non- and Cavitated Carious Lesions

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## ABSTRACT

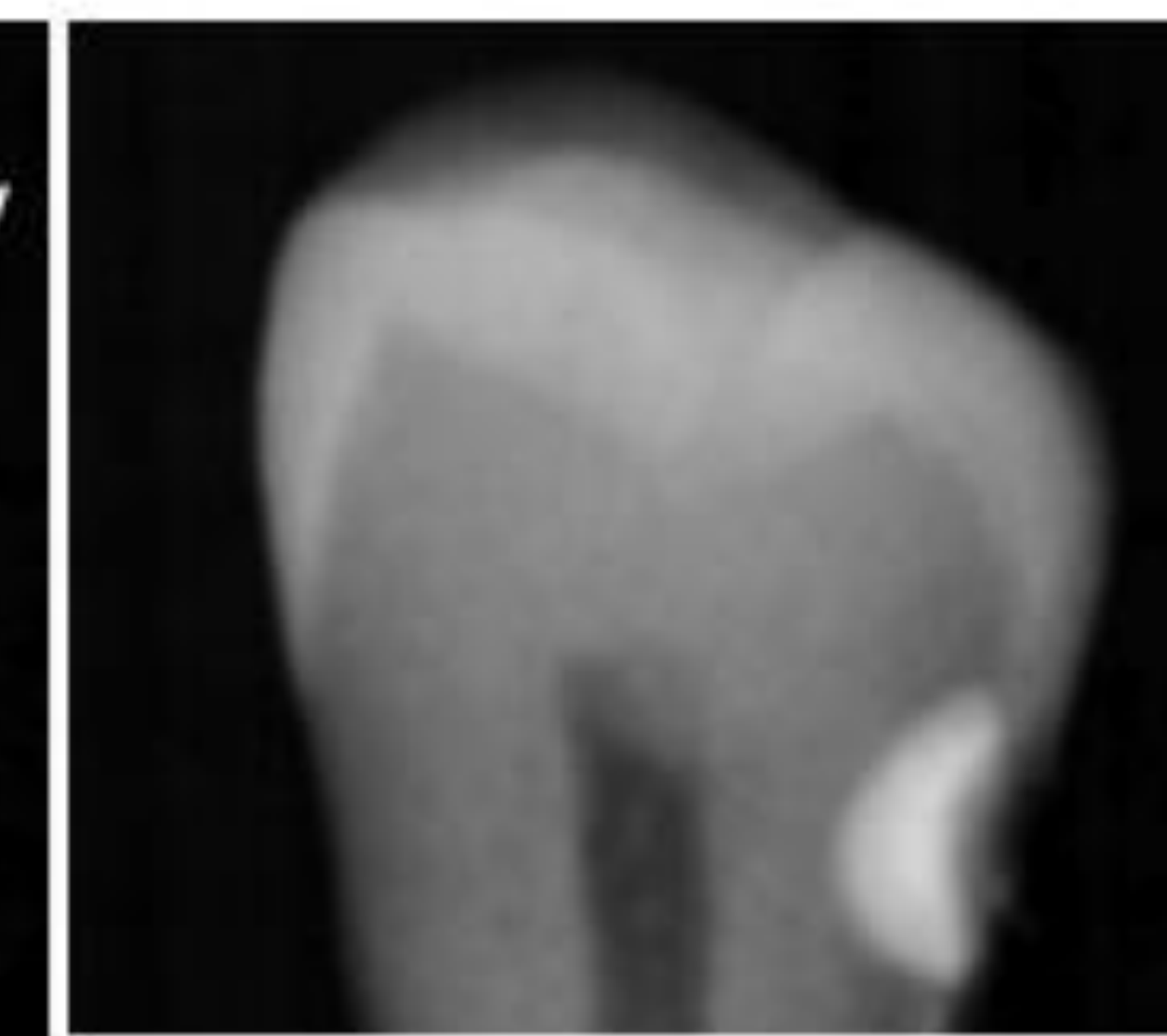
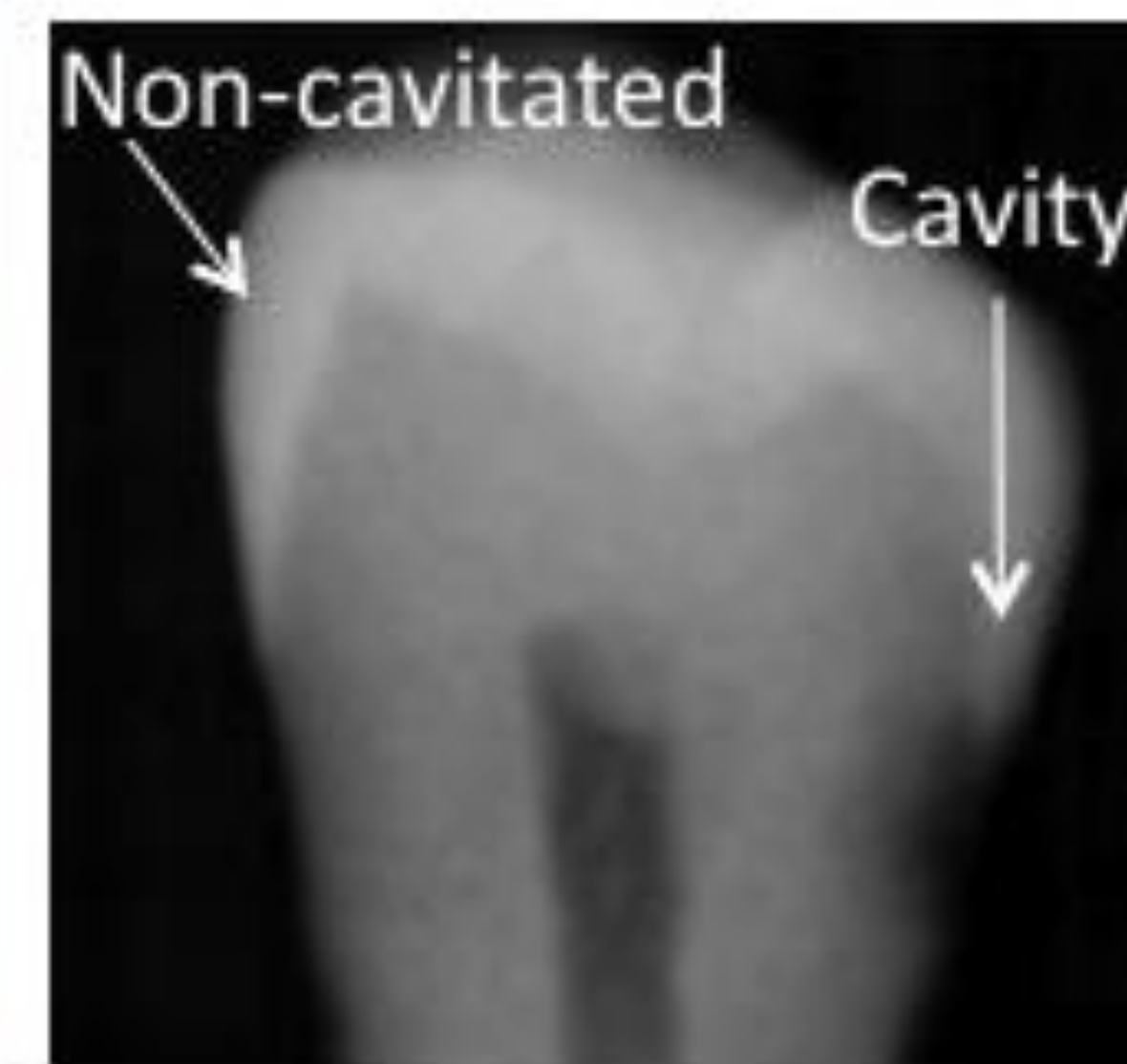
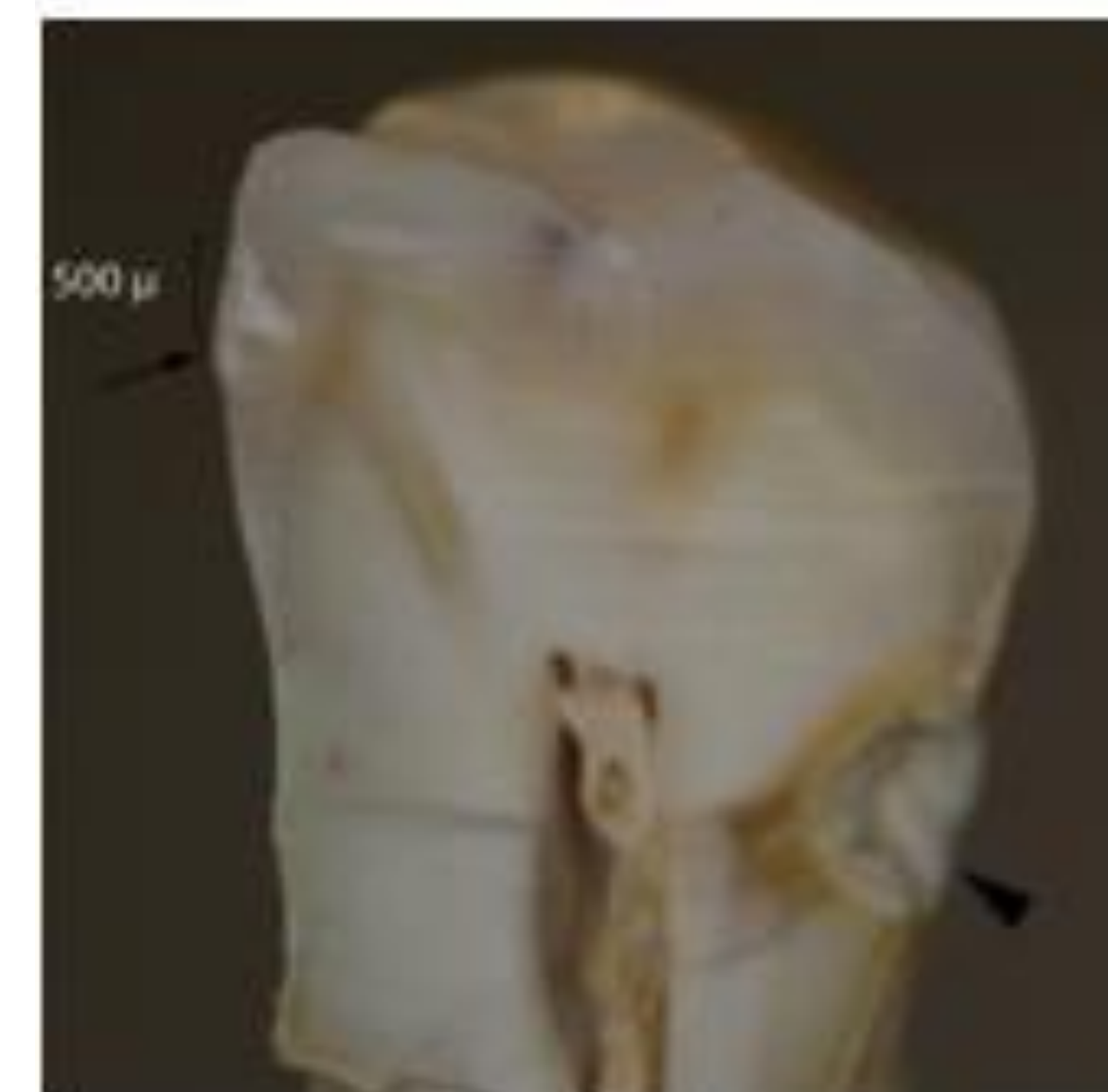
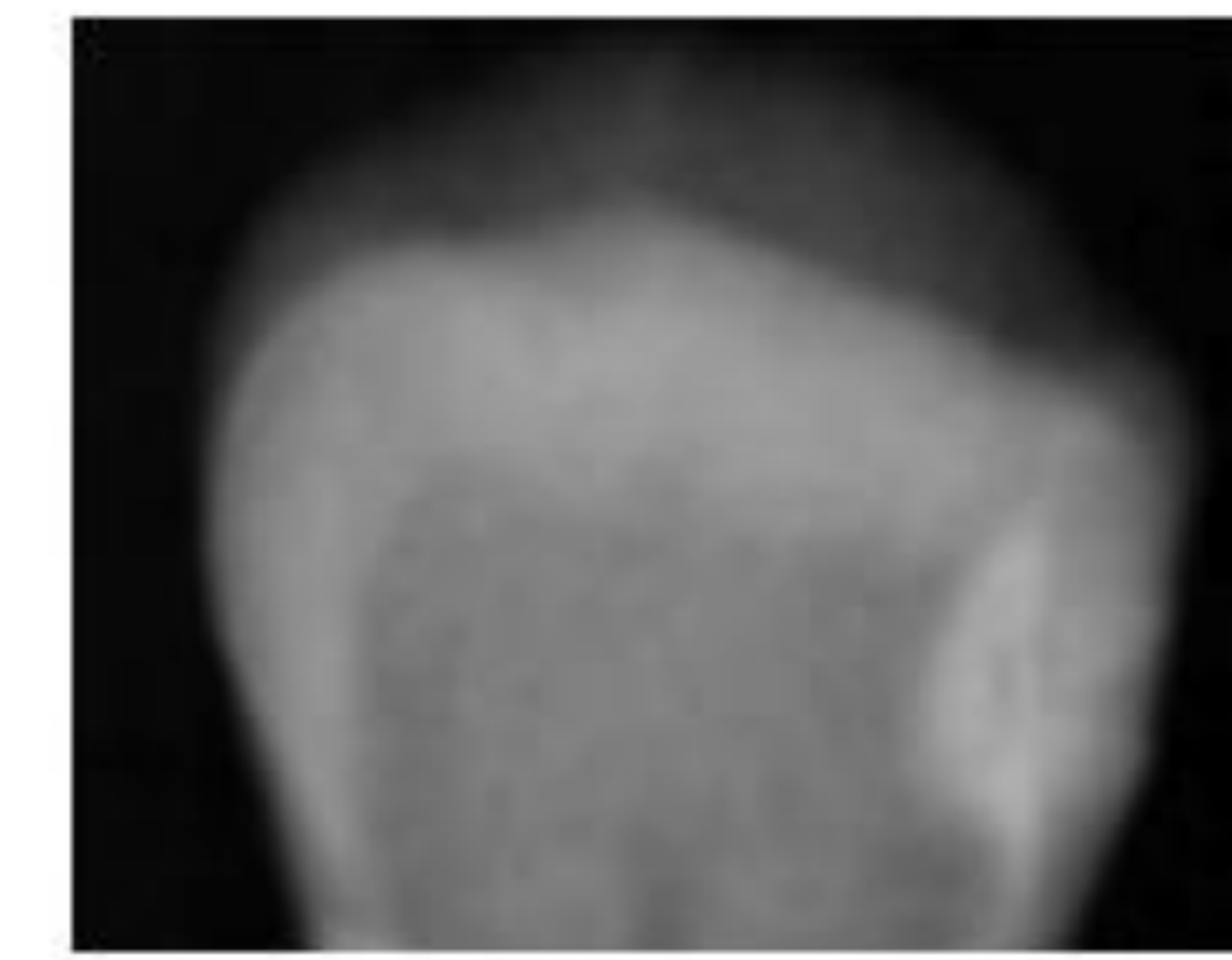
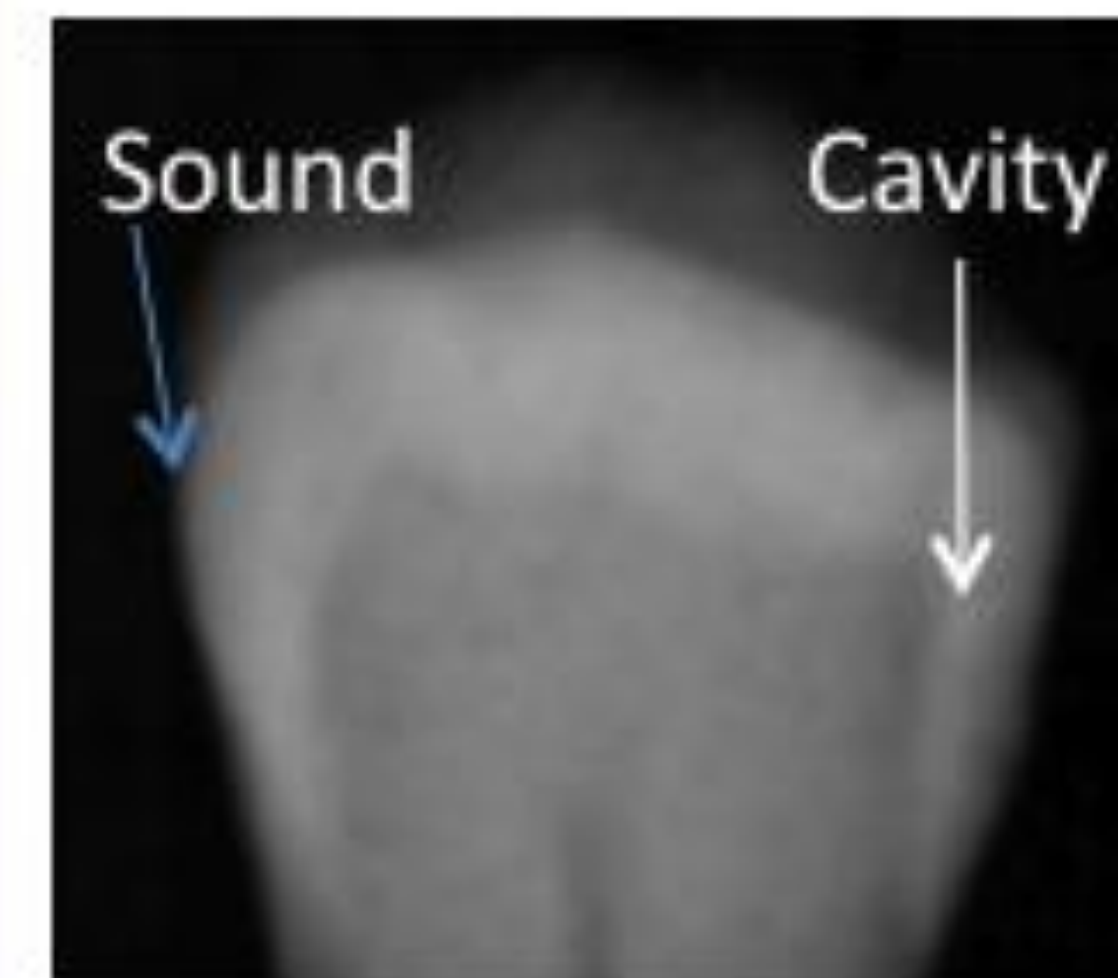
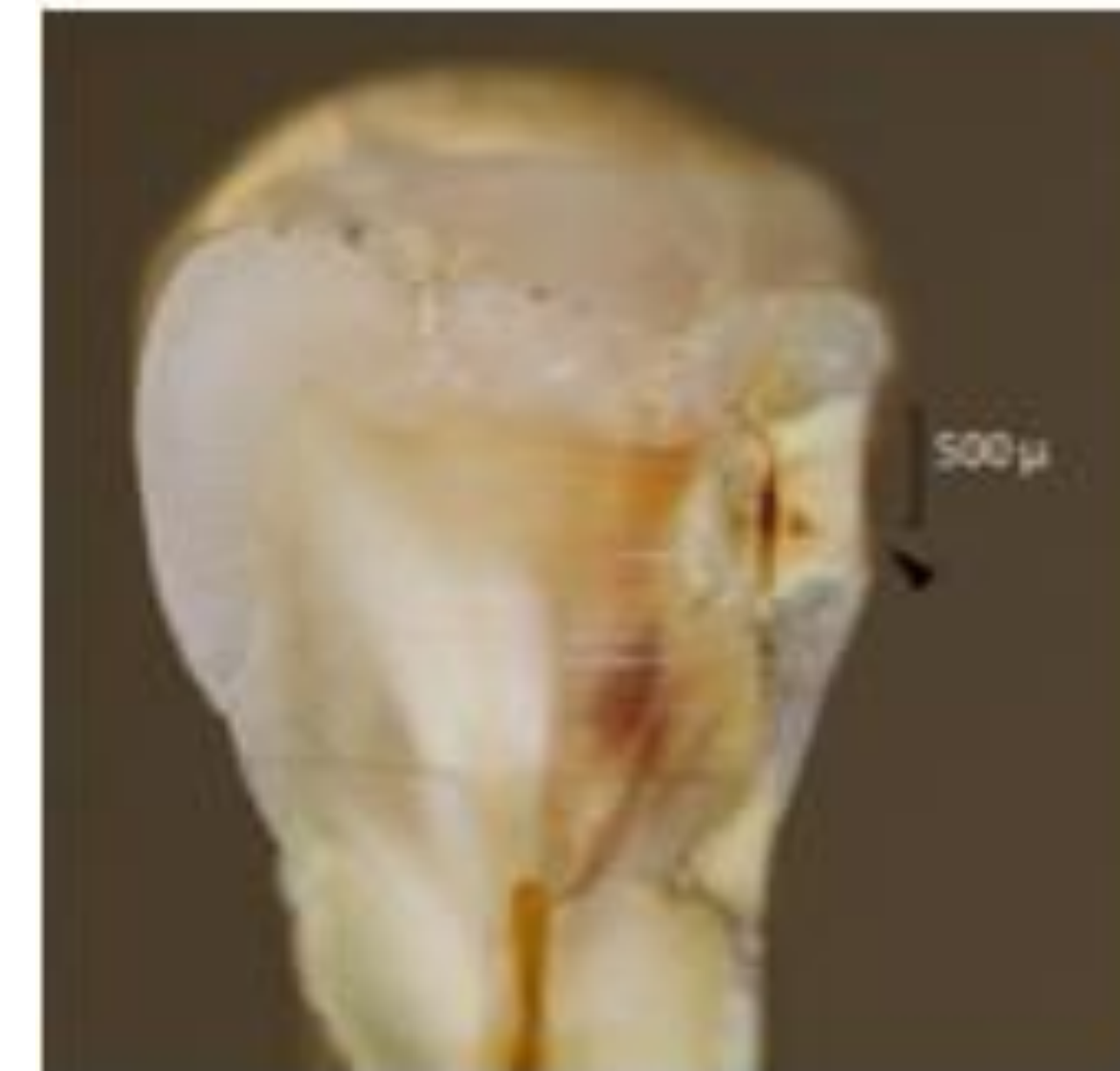
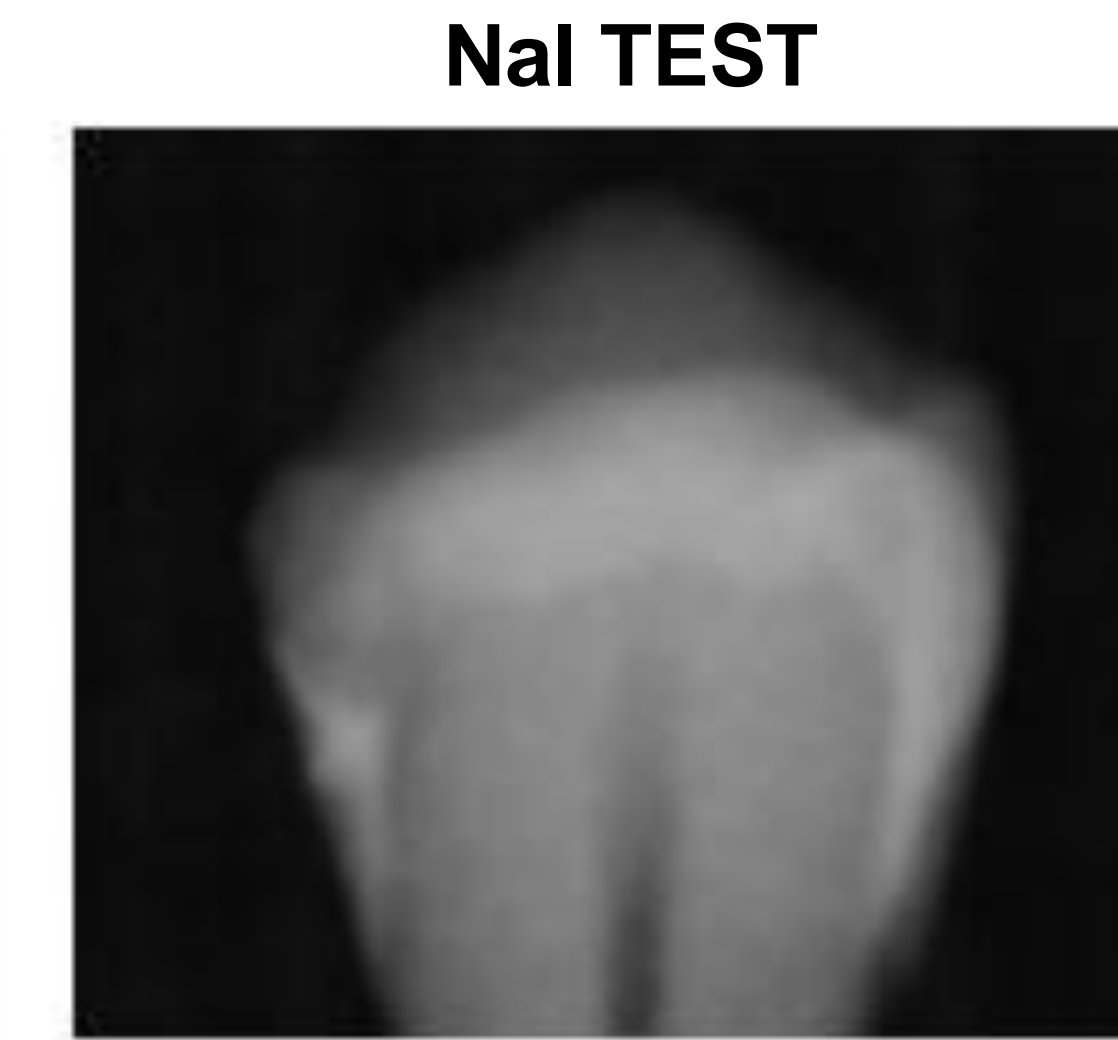
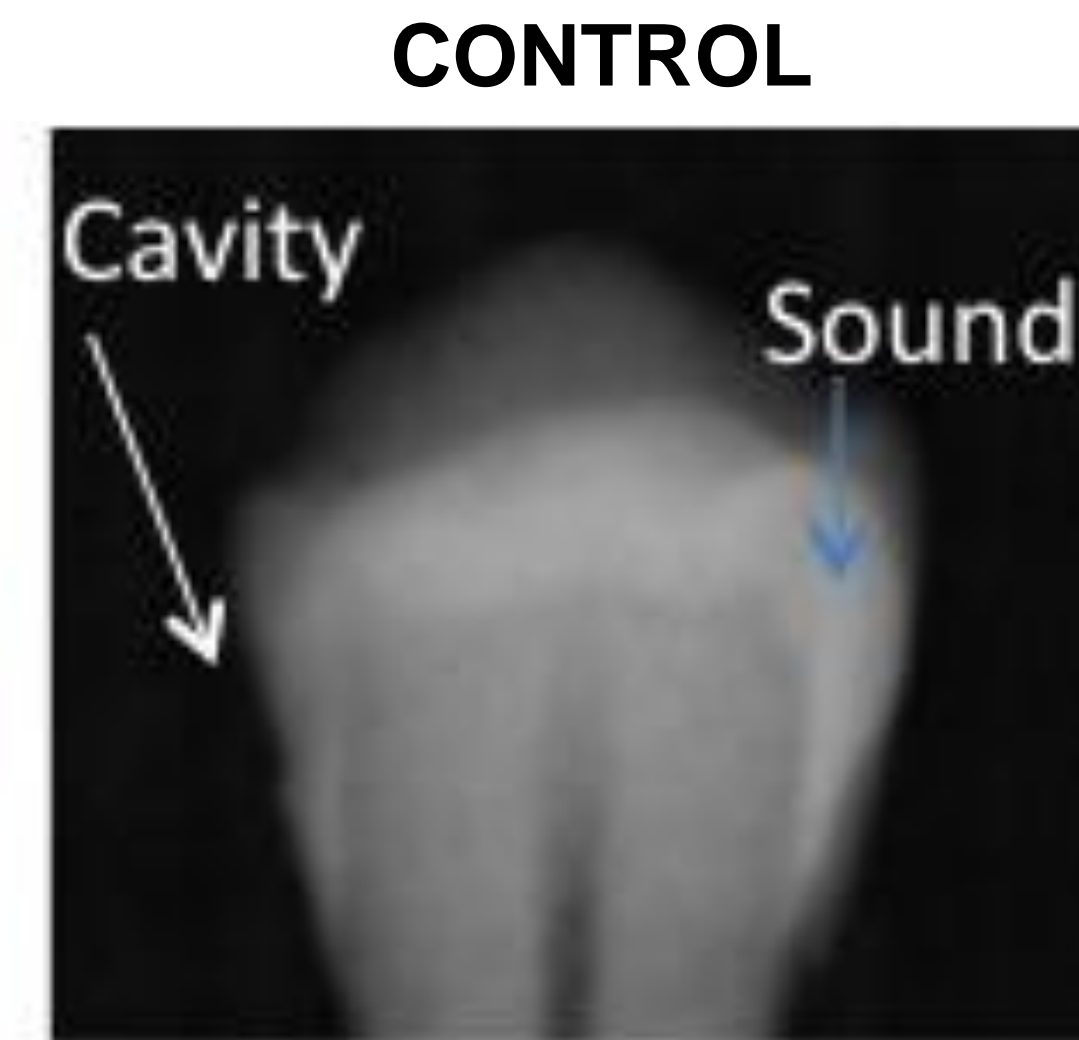
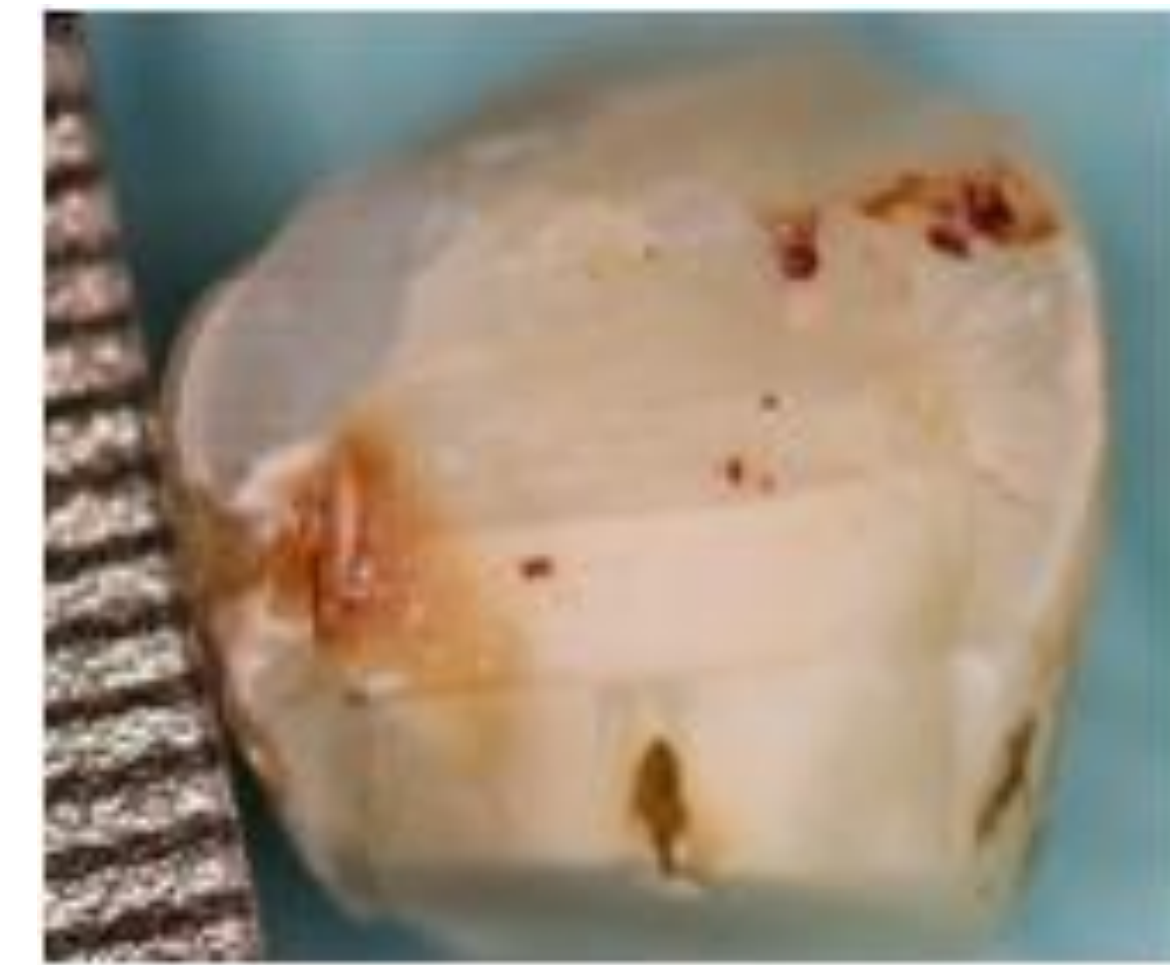
**Background** In managing dental caries, the ability to distinguish between non-cavitated and cavitated lesions is crucial since the former can be treated by non-surgical methods. Interproximal caries relies mostly on radiographic assessment and current methods are unable to distinguish between non-cavitated and cavitated lesions. **Objectives** To determine by an *in vitro* pilot study if a concentrated aqueous solution of sodium iodide applied topically to the interproximal surfaces of extracted teeth can discriminate radiographically between non-cavitated and cavitated natural carious lesions. **Methods and Materials** Human pre-molars extracted teeth stored in thymol were selected, 12 sound, cavitated, and non-cavitated white spot lesion surfaces were used for the experiment. Control exposures were made using Gendex x-ray machine with a digital intraoral sensor. A 9 molar solution of sodium iodide (NaI) in distilled water was made and placed on the interproximal surfaces of the test teeth. Teeth were radiographed and two authors read the images for the presence or absence of opaque regions after NaI application compared to controls. The non-decalcified teeth were sectioned using a diamond saw and photographed dry. Presence of caries determined visually. **Results** 11 of 12 cavitated lesions had radiopacities but not the non-cavitated or sound surfaces. **Conclusion** Results indicate that a concentrated solution of NaI quickly produces a radiopaque region in cavitated but not in non-cavitated or sound teeth. Further testing is in progress.

## INTRODUCTION

In managing dental caries, the ability to distinguish between non-cavitated and cavitated lesions is crucial since the former can be treated by non-surgical methods. Interproximal caries relies mostly on radiographic assessment and current methods are unable to distinguish between non-cavitated and cavitated lesions.

## METHODS & MATERIALS

Human pre-molars extracted teeth stored in thymol were selected, 12 sound, cavitated, and non-cavitated white spot lesion surfaces were used for the experiment. Control exposures were made using Gendex Gx-770 (70 kVp, 0.1 secs, 7 mA) with the digital intraoral sensor, XDR radiology (Cyber Medical Imaging, Los Angeles, CA), 390 mm source to digital sensor, 6 mm center of tooth to sensor. A 9 Molar solution of sodium iodide (NaI) in distilled water was made and placed on the interproximal surfaces of the experimental teeth. Teeth were radiographed and two authors read the images for the presence or absence of opaque regions after NaI application compared to controls. The non-decalcified teeth were sectioned using a diamond saw (Scientific Fabrications, Littleton, CO, USA) and photographed dry (Olympus DP71, 12.5 megapixel camera) mounted on a stereomicroscope. Presence of caries determined visually.



## RESULTS

- 12 sound surfaces and 12 non-cavitated lesions did not show any radiopacities compared to the controls.
- 11 of 12 cavitated lesions showed radiopacities.
- 1 very small cavitated lesion had no radiopacity – approximately 50 microns.
- 5 cavities were 0.24 – 0.85 mm diameter opening. 7 cavities were greater than 1.00 mm

## CONCLUSIONS

Concentrated NaI as a radiographic contrast agent can produce radiopacities in small cavitated interproximal caries. NaI does not opacify sound or non-cavitated lesions. The *In vitro* contrast accuracy was 97% vs 58% *in vivo*. A method for distinguishing non-cavitated from cavitated caries lesions seems possible.

## ACKNOWLEDGEMENTS

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