# CBCT ANALYSIS OF ROOT CANAL MORPHOLOGY OF THE MESIAL ROOTS OF MAXILLARY AND MANDIBULAR FIRST AND SECOND PERMANENT MOLARS IN THE TRINIDADIAN POPULATION (PILOT STUDY)

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## Introduction

Root canal system morphology of maxillary and mandibular molars varies amongst populations, especially the mesial roots. Knowledge of these variations is essential to the outcomes of root canal treatment. CBCT analysis allows a "3-D visualization" of the anatomy.

## Objectives

- To identify the accessory anatomical variations in the mesial roots of maxillary and mandibular first and second permanent molars.
- To determine the prevalence of two canals in the mesial root of maxillary first and second permanent molars.
- To determine the prevalence of mid-mesial canals in the mesial root of mandibular first and second permanent molars.

## Methodology

This study was conducted using extracted permanent maxillary and mandibular 1st and from patients willing to have their extracted teeth used in this study. 2nd molars from a Trinidadian population.

Storage containers consisting of 4% formal saline solution was distributed to various public and private Dental clinics in Trinidad.

Verbal consent was obtained.

The teeth were collected and sorted. Teeth that were badly broken down as a result of dental caries, fractured roots, large restorations and teeth without a mesial root were excluded from the study.

Teeth were mounted onto wax rims according to the type of tooth and high resolution CBCT scans using the Carestream CS 8100 machine were taken.

## Results

- The prevalence of two canals in the mesial roots of all 29 maxillary first molars was 75.86% and presented as 6 types in Vertucci's classification.
- The prevalence of two canals in the mesial roots of all 31 maxillary second molars was 41.94% and presented as 4 types in Vertucci's classification.
- No mid - mesial canals were found in the mandibular first molars.
- The prevalence of mid - mesial canals in the mesial roots of all 30 mandibular second molars was 3.33% and presented as 1 type in Vertucci's classification.
- Multiple apical foramina and inter - canal communications were noticed.

**Figure 1 (A-F) illustrates the canal morphologies present in the maxillary molars which had 2 canals according to Vertucci's classification (Coronal plane)**

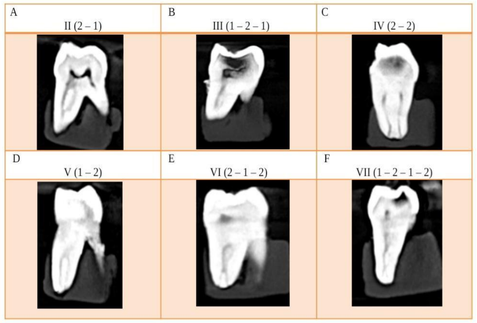



**Figure 2 illustrates canal morphology present in mandibular molars which had mid - mesial canals according to Vertucci's classification (Coronal plane)**

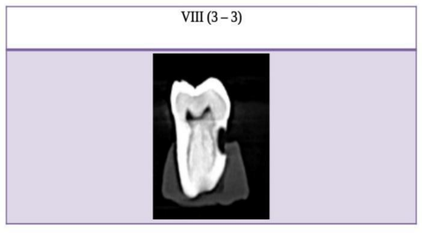
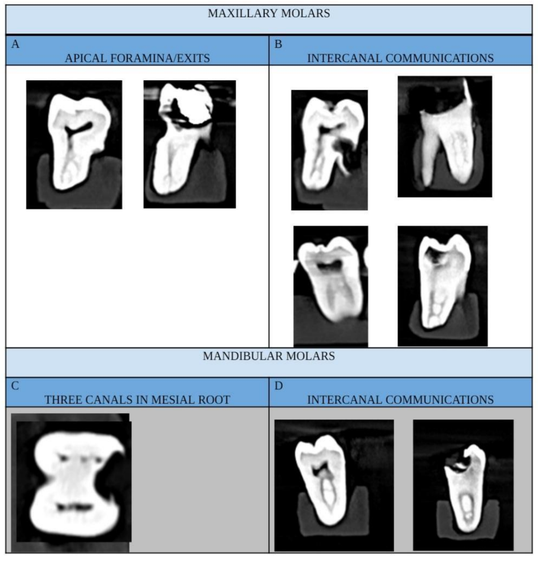



**Figure 3 illustrates anatomical variations found in maxillary molars (A & B) and mandibular molars (C & D)**




## Discussion

- There was a sample size of 113 extracted molars, of which the morphology of the root canal exhibited all eight categories of Vertucci's classification.
- The maxillary 1st molars presented categories II - VII and maxillary 2nd molars presented categories II - V according to the Vertucci classification.
- A difference of 33.9 % was found when two canal prevalence was compared between maxillary 1st and 2nd molars, this shows similarity to Khalid *et al* study done in Saudi Arabia. [1]
- The incidence of mid - mesial canals were minutely noted with a percent prevalence of 3.33 % which accounted for one mandibular 2nd molar tooth from the whole sample. The finding was notably similar to a turkish study evaluating canal morphology in mandibular 2nd molars. [2]
- Multiple apical foramina/ exits and inter-canal communications were of the anatomical variations noted in both maxillary and mandibular molars.

## Conclusion

According to the findings, the Trinidadian population exhibited anatomical variation in the mesial root canal system of maxillary and mandibular first and second permanent molars. Inter-canal communications, multiple apical foramina, accessory canals and apical delta were noted. 75.86% of maxillary first molars had two canals. 41.94% of maxillary second molars had two canals. Mid-mesial canals had a prevalence of 3.33% in mandibular second molars and absent in mandibular first molars.

## References

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