

## A DATA ANALYSIS ON THE DIAMETER OF PERICERVICAL DENTIN IN UNCROWNED FAILED PRIMARY ROOT CANAL TREATED CASES UNDERGOING EXTRACTION- A RETROSPECTIVE ANALYSIS

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### Abstract

**Introduction:** The width of pericervical dentin is vital in determining the strength of a root canal treated tooth. The principles of endodontics states to remove as less pericervical dentin as possible. In cases of failed root canal treated teeth, it is observed that the width of pericervical dentin is compromised. Hence, the aim of this study is to analyse the pericemental dentin and to see its role in the failure of a RC treated tooth

**Materials and Methods:** This retrospective study was done by analysing the pre operative radiographs of RC treated mandibular molars which failed and were going for extraction. The data included were age, gender and the mesial and distal pericervical dentin measurement(PDM). The measurements were taken using a software which was used to store the radiographs digitally. The results were tabulated and imported to SPSS version 23 for statistical analysis.

**Results:** The mean pericervical dentin measurement(PDM) in the mesial side was  $1.06 \pm 0.04$  mm and the mean pericervical dentin measurement(PDM) in the distal side was  $1.06 \pm 0.38$  mm. No statistical significance was seen between mean PDM and age and gender.

**Conclusion:** Mesial and distal width of pericervical dentin cannot be used to assess rate of success/failure of root canal treated mandibular molars. This model could be repeated in future studies using 3D imaging to accurately gauge the remaining pericemental dentin volume which could yield different results.

**Keywords:** Pericervical dentin, imaging, RCT, innovative, Dental innovation.

### Introduction

Root canal treatment is aimed at removing harmful pathogens from the root canal and to create an environment in which any remaining organism cannot endure. A successful result of an

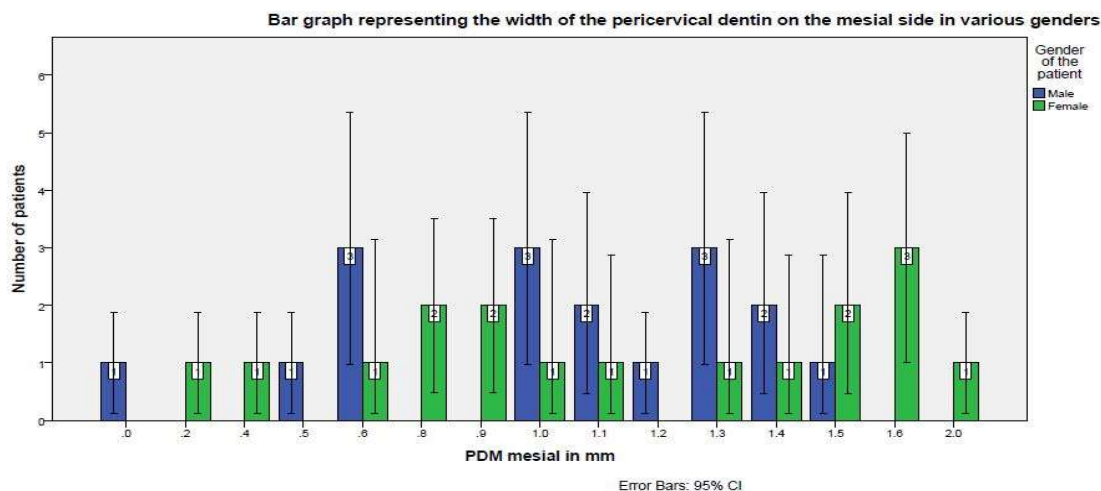
endodontic treatment depends on proper cleaning and shaping, proper irrigation and disinfection, and proper obturation with complete seal of the root canal[1]. Endodontically treated teeth are widely considered to be more susceptible to fracture than are vital teeth.[2] The reasons most reported have been the dehydration of dentin after endodontic therapy, excessive pressure during obturation and most importantly the removal of tooth structure during endodontic treatment[3–5].

With improved understanding of the forces responsible for fracture of teeth, the focus, now-a-days, has shifted from the coronal to the cervical area of the tooth. The dentin in this critical area of tooth called Peri-Cervical Dentin (PCD) is the dentin near the alveolar crest. While the apex of the root can be amputated, and the coronal third of the clinical crown removed and replaced prosthetically, the dentin near the alveolar crest is irreplaceable. This critical zone, roughly 4 mm above the crestal bone and extending 4 mm apical to crestal bone, is sacred. There seems to be a lack of studies analysing the remaining pericervical dentin as a factor for the failure of root canal treatments, hence, the aim of this study is to analyse the pericemental dentin and to see its role in the failure of a RC treated tooth.

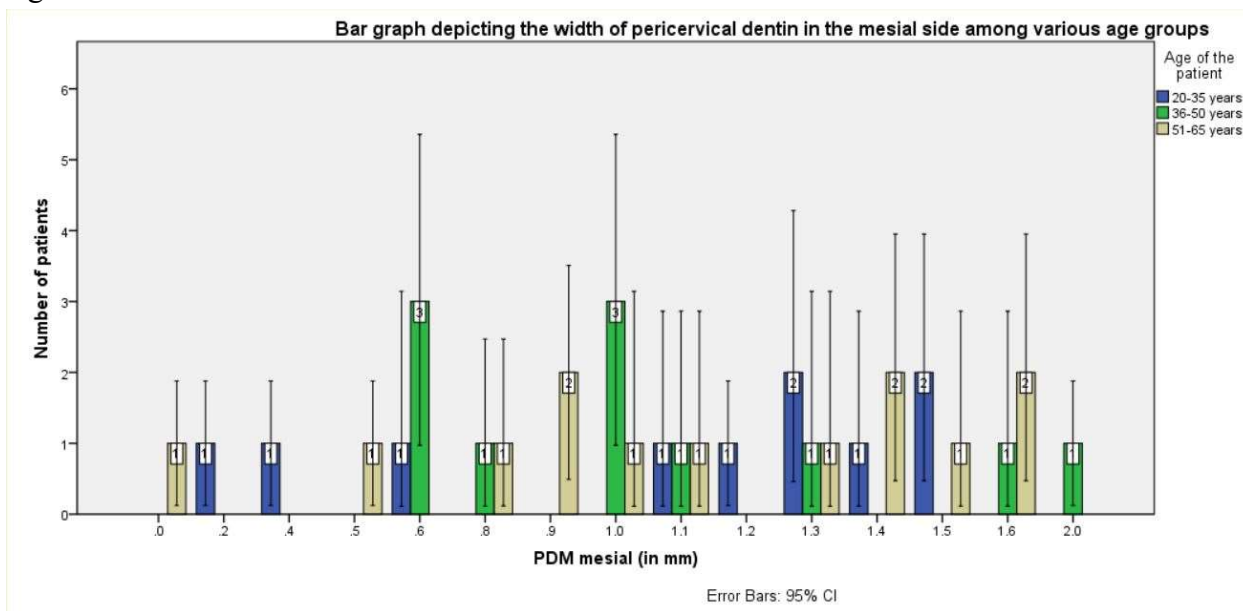
### Materials and methods

This retrospective study was done in a university dental hospital by analysing the digital case sheets of patients who underwent extraction of an RC treated tooth. Patients who underwent extraction of RC treated mandibular molars were included in the study. Other details like age and gender were also included. The data collected was reviewed by an internal reviewer. Incomplete or unclear data were not included in the study. The preoperative radiographs before extractions were used and the mesial and the distal width of pericervical dentin was measured using a software used to store digital copies of radiographs. The data was then tabulated and exported to SPSS version 23 for statistical analysis. Chi square test was done to find association between comparable variables.

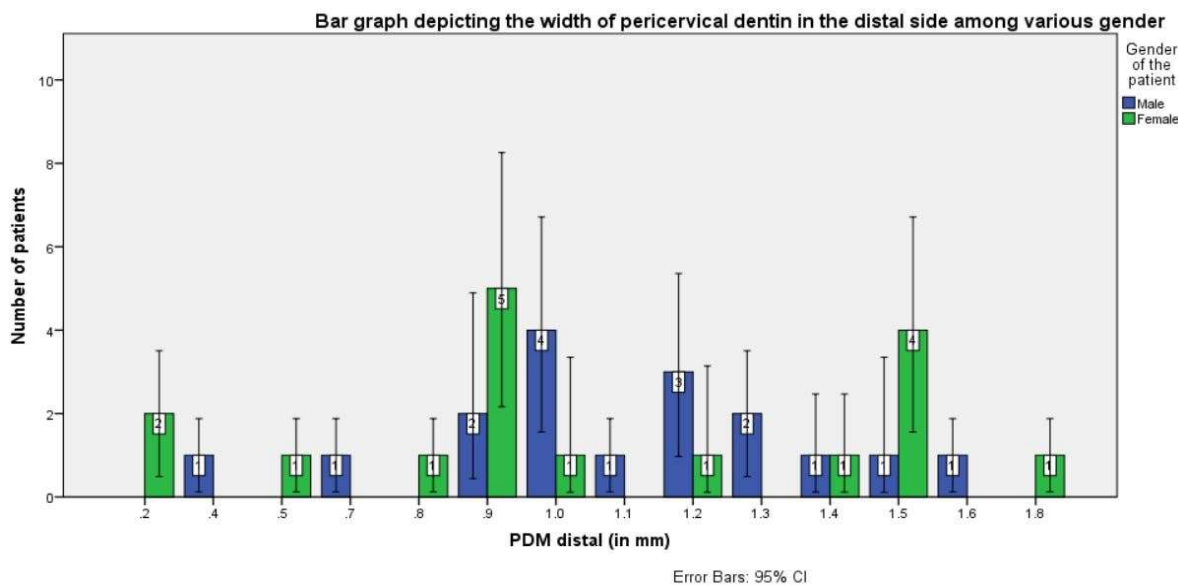
### Results



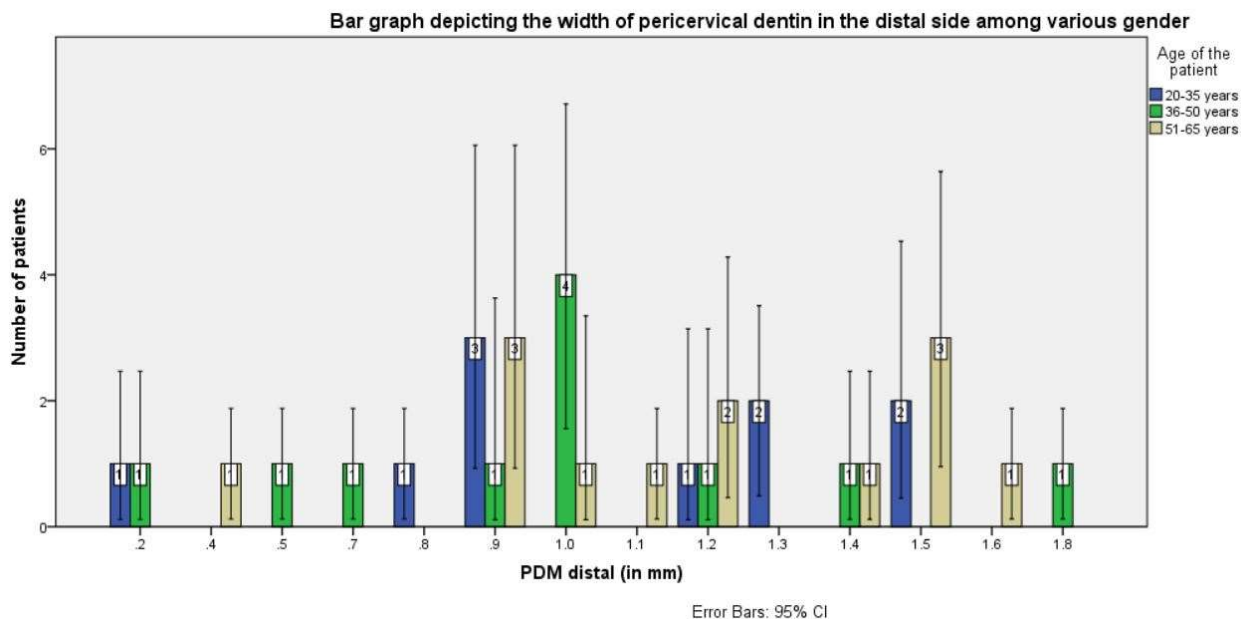
**Figure 1:** Bar graph representing the width of the pericervical dentin on the mesial side on various genders. The X axis represents the pericervical diameter on the mesial aspect in mm and the Y axis represents the number of patients. Blue represents male patients and green represents female patients. P value was found to be 0.25( $p > 0.05$ ), which is not statistically significant.



**Figure 2:** Bar graph representing the width of the pericervical dentin on the mesial side on various age groups. The X axis represents the pericervical diameter on the mesial aspect in mm and the Y axis represents the number of patients. Blue represents male patients and green represents female patients. P value was found to be 0.34( $p > 0.05$ ), which is not statistically significant.



**Figure 3:** Bar graph representing the width of the pericervical dentin on the distal side on various gender. The X axis represents the pericervical diameter on the distal aspect in mm and the Y axis represents the number of patients. Blue represents male patients and green represents female patients. P value was found to be 0.20(p>0.05), which is not statistically significant.



**Figure 4:** Bar graph representing the width of the pericervical dentin on the distal side on various age groups. The X axis represents the pericervical diameter on the distal aspect in mm and the Y axis represents the number of patients. Blue represents male patients and green represents female patients. P value was found to be 0.28(p>0.05), which is not statistically significant.

### Discussion

Our team has extensive knowledge and research experience that has translate into high quality publications[6–15],[16–19],[20–24],[25]

The present study focuses on pericervical dentin and if the width of remaining pericervical dentin plays a role in determining the rate of success/failure of a root canal treatment.

It is generally accepted that the removal of excessive amounts of dentin compromises the survival of root-filled teeth and that the strength of endodontically treated teeth is directly related to the amount of remaining sound tooth structure[26,27]. More recently, the focus is shifting toward the preservation of tooth structure in a cervical portion of the tooth as this portion is considered to be most susceptible to fracture from occlusal forces. The dentin in this critical portion has been called pericervical dentin (PCD) which extends 4 mm above and below the level of alveolar bone.

In the current study, the mean pericervical dentin measurement(PDM) in the mesial side was 1.06±0.04 mm and the mean pericervical dentin measurement(PDM) in the distal side was 1.06±0.38 mm. A study by Zinge et al showed that the mean PCM for premolars in which cleaning and shaping was done using rotary files was 1.2mm[28].

## Conclusion

There was no association between remaining mesial and distal pericervical dentin width and rate of failure of root canal treatments in mandibular molars. There was no association found between width of pericervical dentin and age and gender.

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