



الجامعة الإسلامية العالمية ماليزيا  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA  
يُونُسُ بْنُ سَيِّدِي إِسْلَامُ أَبْنَاؤُا بَعْثْنَا مُلْكِيًّا

Garden of Knowledge and Virtue



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NATIONAL DENTAL STUDENTS'  
SCIENTIFIC CONFERENCE



# GuttaFlow Bioseal as Monocone Obturation Technique in Curved Root Canals. A Scanning Electron Microscopy Study.

Presenters :

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# INTRODUCTION

- The obturation with GuttaFlow Bioseal is not clearly investigated due to the newer generation of root filling material.
- GFB has been evaluated for the:
  - i. *sealing ability* [1, 2, 3]
  - ii. *cytotoxicity* [4, 5, 6]
  - iii. *physicochemical properties* [2, 7, 8]
  - iv. *osteogenic activity* [9]
  - v. *retreatability* [10]
  - vi. *fracture strength of root canal treated teeth* [11]
- However, scientific evidence related to other aspects in obturation procedure is not present.

# OBJECTIVES

To evaluate the:

(i) volumetric percentage of the obturated root canals at the apical, middle and coronal root regions

(ii) extrusion of root filling materials beyond the apical foramen

(iii) duration of obturation procedure on mandibular first molars with curved root canals

# METHODOLOGY

## *Selection of samples:*

### *Inclusion criteria:*

1. Lower first molars
2. Intact coronal aspect
3. Fully formed apices
4. Moderate and severe root curvature based on Schneider's method

### *Exclusion criteria:*

1. External and internal resorption
2. Severe attrition
3. Calcified canal
4. Presence of pulp stones
5. Presence of crack lines





## PART 1: Samples selection

20 mandibular first molars



## PART 2: Access cavity

Standard preparation



## PART 3: Determination of root canal curvature

According to Schneider's method

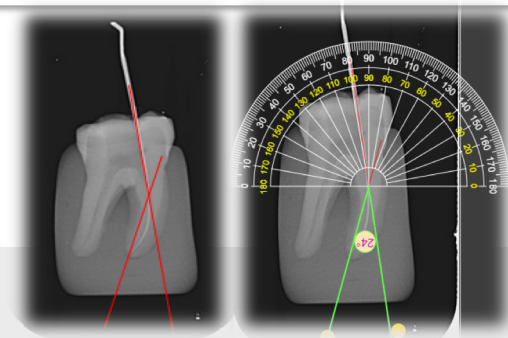
10° to 20° (moderate root canal curvature)

>20° (severe root canal curvature)



## PART 4: Root canal preparation

Hyflex CM rotary files at 500 rpm and 2.5 Ncm



## PART 5: Obturation and restoration

**Group 1 - GP cone and GuttaFlow Bioseal**

**Group 2 - GP cone and RoekoSeal Automix root canal sealer**

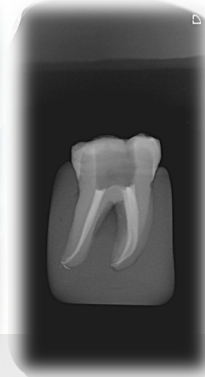
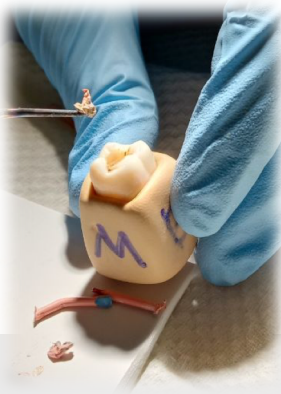
The obturation procedure was timed  
Obturation radiograph was taken  
Restoration with composite resin



## PART 6: Preparation for observation under SEM

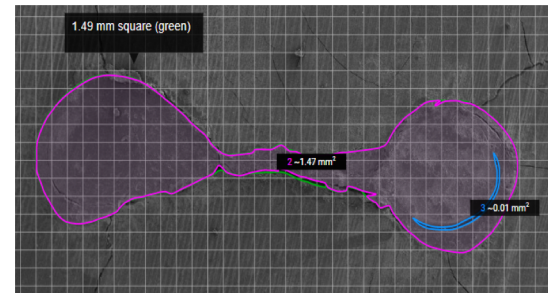
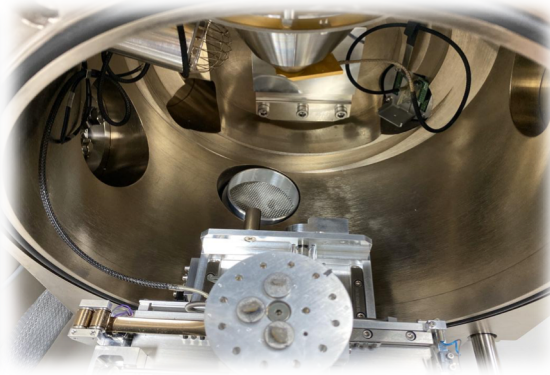
Vertical sectioning to divide mesial and distal roots

Horizontal sectioning of mesial root to obtain the apical, middle and coronal root regions



## PART 7: Observation under SEM

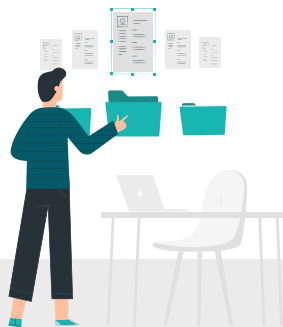
70x magnification



## PART 8: SketchAndCalc Area Calculator software

Evaluation of the  
obtured root canals

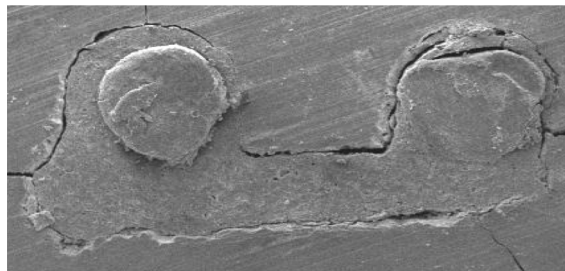
## PART 9: Data analysis SPSS version 25.0



# RESULTS



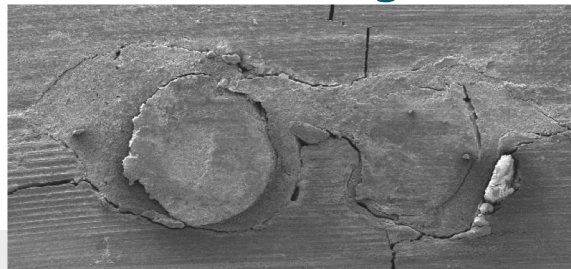
**Group 1**



**Figure 1: Apical root region**

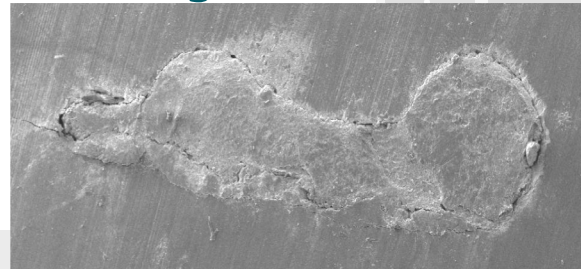
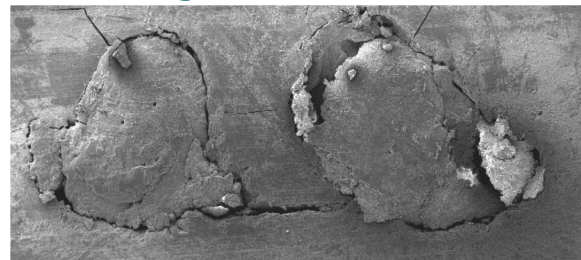
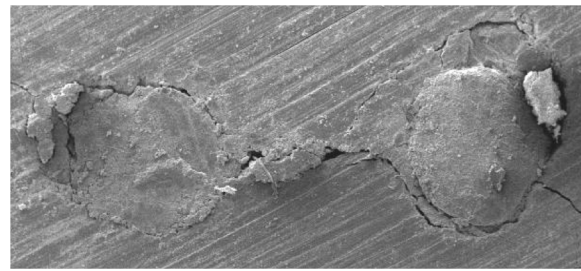


**Figure 2: Middle root region**



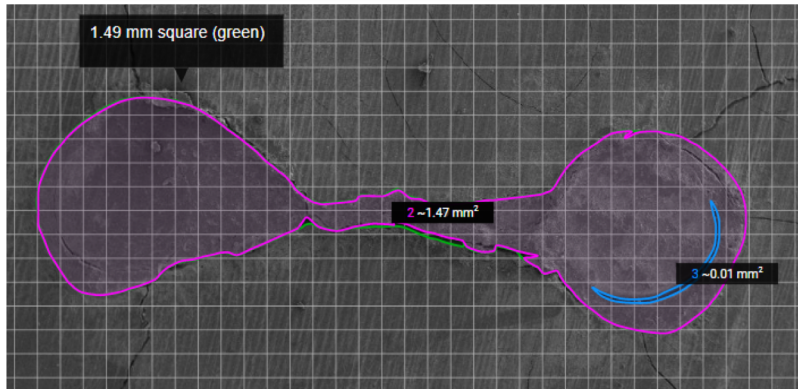
**Figure 3: Coronal root region**

**Group 2**





## Group 1



## Group 2

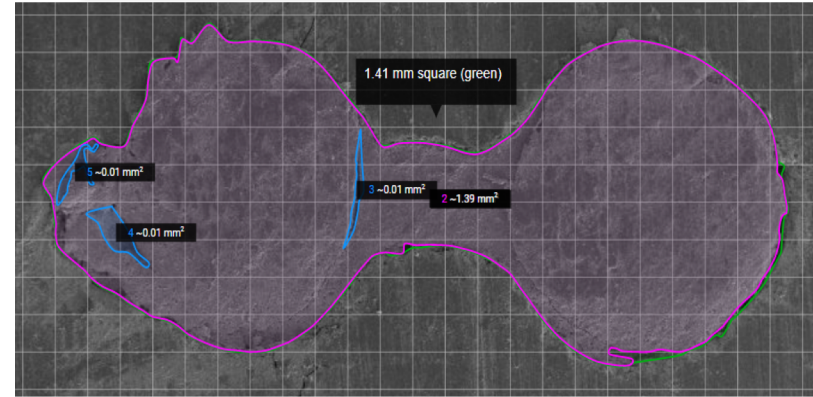


Figure 4: Evaluation of the obturated root canals



Outline of the root canal wall



Obturated surface area



Voids within obturation

$$\text{VPORC} = \frac{\text{Pink Square} - \text{Blue Square}}{\text{Green Square}} \times 100 \text{ (\%)}$$

# Volumetric percentage of the obturated root canals

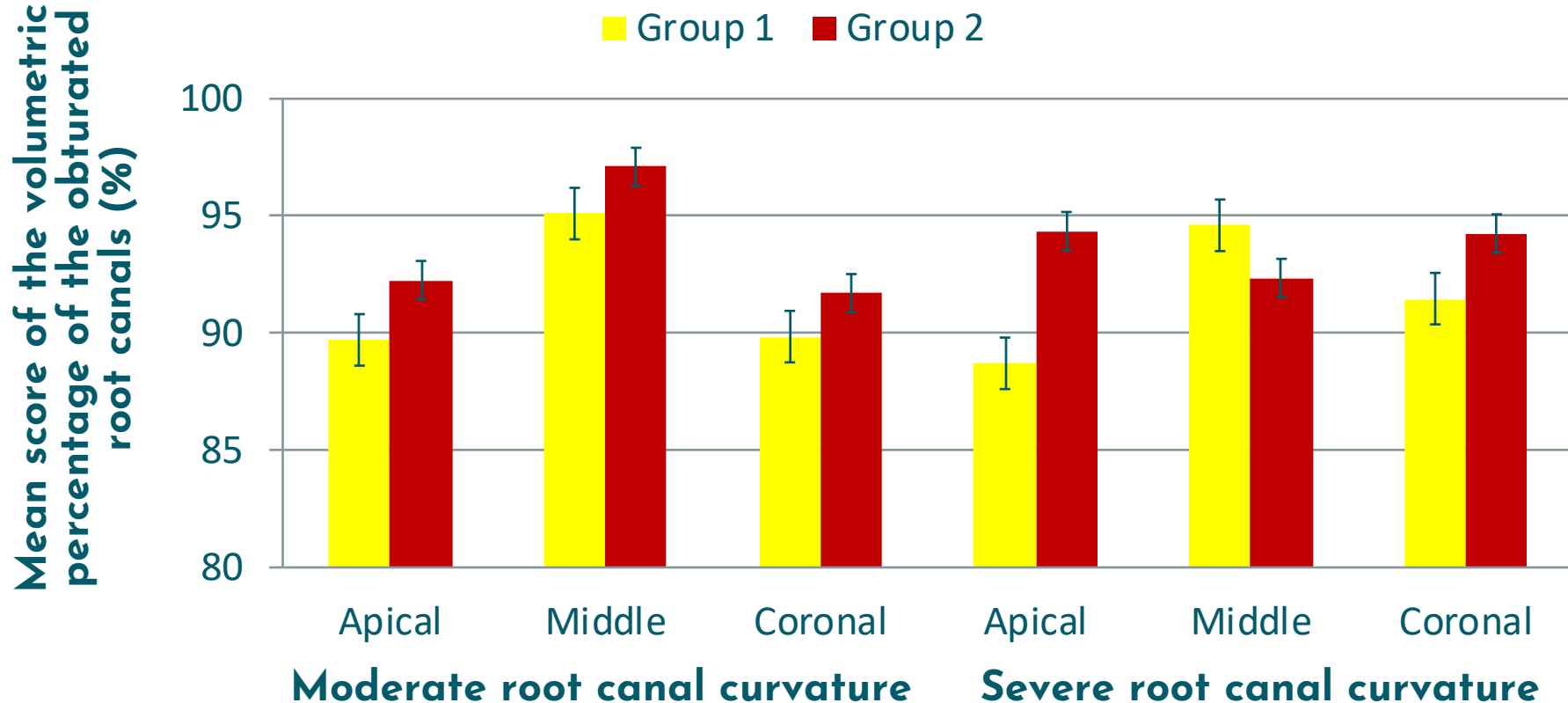


Figure 5: Volumetric percentage of the obturated root canals

## Extrusion of root filling material beyond the apical foramen

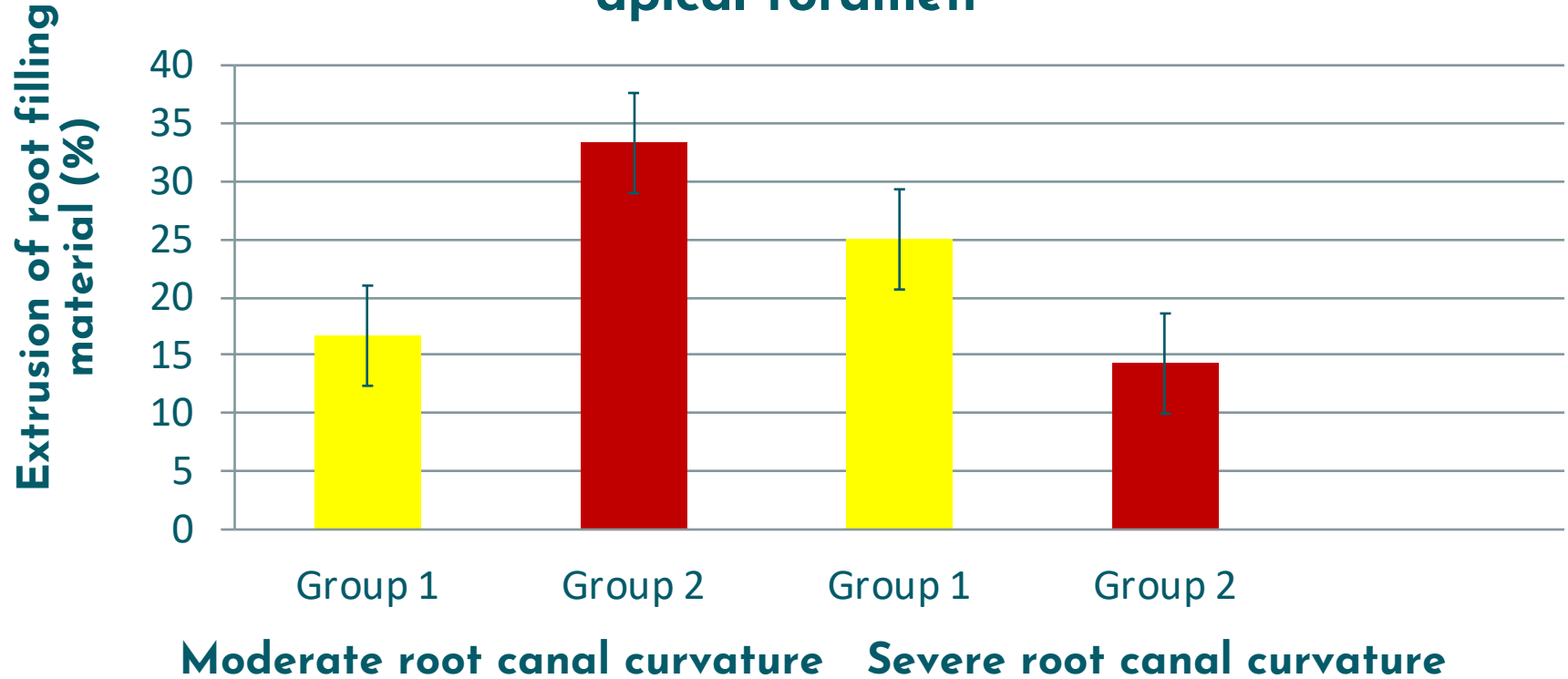


Figure 6: Extrusion of root filling material beyond the apical foramen

## Duration of obturation procedure

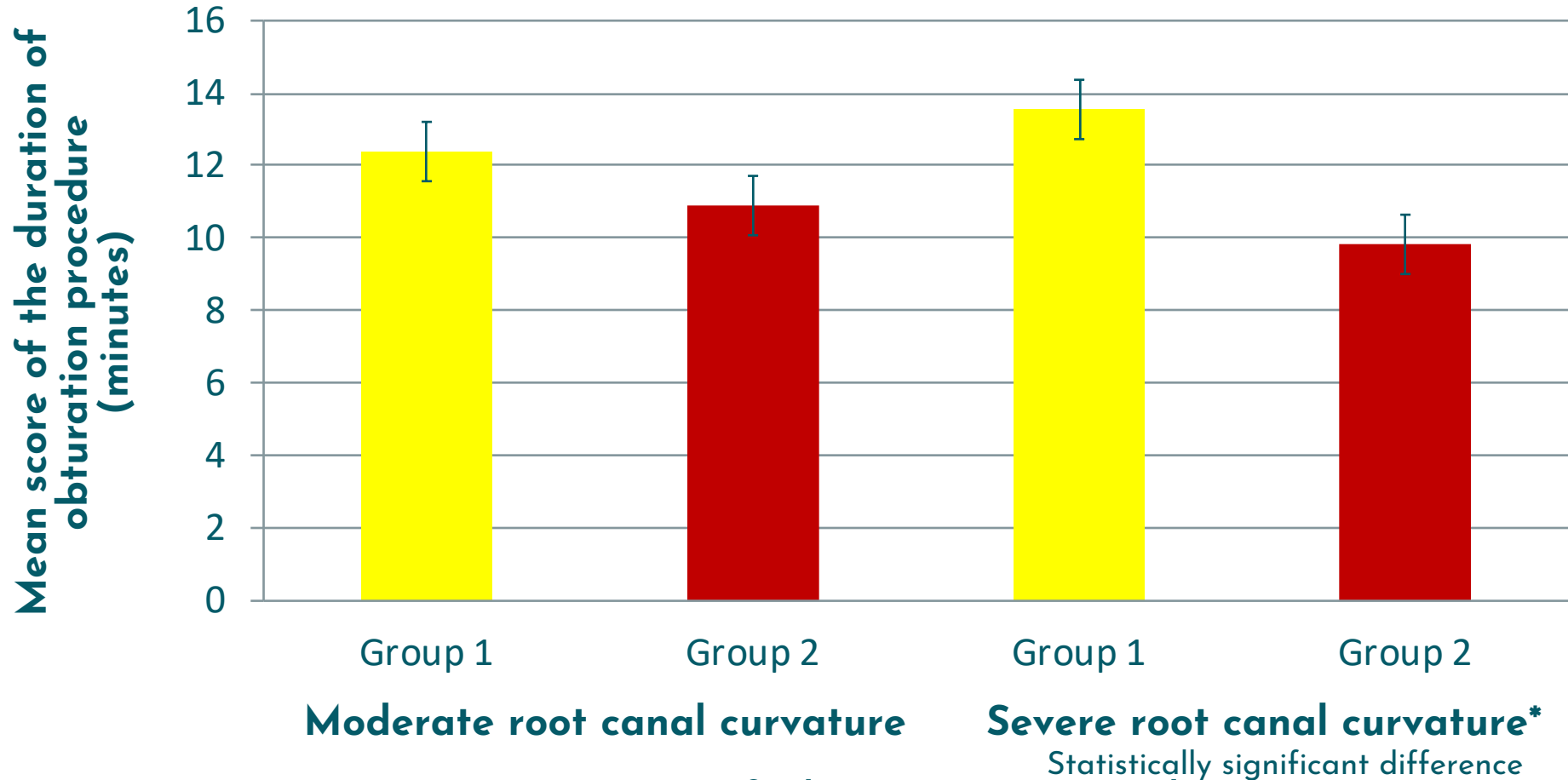


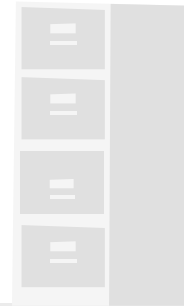
Figure 7: Duration of obturation procedure



# DISCUSSIONS

The present study is the first research evaluating other aspects in obturation using GFB on curved mandibular molars.

Obtured root canals in moderate and severe root canal curvatures between GFB and silicone-based root filling material were equivalent at any level of evaluation.



The extrusion of root filling material beyond the apical foramen in moderate and severe root canal curvatures between GFB and silicone-based root filling material were comparable.



These findings could be attributed to the similar obturation technique and material viscosity but the later was not possible to confirm because of beyond the scope of the present study. Perhaps, future research can be done to validate these findings.



Duration of obturation procedure using GFB in severe root canal curvature was slightly longer than the obturation procedure using silicone-based root filling material.

This might not be associated with the status of root canal curvature directly, but rather the amount of GP mass from the combination of GP cone and GFB.

Within the limitation of the present study, the conclusions were:

- i. The volumetric percentage at the apical, middle and coronal root regions, as well as the extrusion of root filling material beyond the apical foramen between GFB and silicone-based root filling material were comparable irrespective of the status of root canal curvature.
- ii. The duration of obturation procedure using GFB in severe root canal curvature was 27.5% longer than the obturation using silicone-based root filling material.

## CONCLUSIONS

# CONCLUSIONS

Neither root filling material was able to seal the curved root canal of mandibular molars completely. The root filling materials in the present study can be opted depending on the clinical cases, material availability and clinician preference.

It is hoped that research in this field will point towards improving the limitations in various obturation techniques for future clinical practice.



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# THANK YOU!

