

THE EFFECTIVENESS OF OBTURATION WITH GUTTAFLOW BIOSEAL IN SINGLE ROOTED MANDIBULAR PREMOLARS: A SCANNING ELECTRON MICROSCOPY STUDY

MUSLIANA MUSTAFFA¹, IMRAN ZAINAL ABIDIN¹, MOHAMAD SHAFIQ MOHD IBRAHIM²

¹ DEPARTMENT OF RESTORATIVE DENTISTRY, KULLIYAH OF DENTISTRY (KOD), INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM), JALAN SULTAN AHMAD SHAH, BANDAR INDERA MAHKOTA, 25200 KUANTAN, PAHANG, MALAYSIA.

² DEPARTMENT OF DENTAL PUBLIC HEALTH, KOD, IIUM, JALAN SULTAN AHMAD SHAH, 25200 KUANTAN, PAHANG, MALAYSIA.

INTRODUCTION

- The use of bioceramic root canal sealers for obturation of the root canal system has been the subject of interest in recent years.
- Advantages include; biocompatible, able to promote hard tissue formation, improved flow properties and less time-consuming procedure.
- Thermoplastic obturation has been the preferred technique because of the ability to seal the root canal effectively (Schilder, 2006), however, this is a technique sensitive procedure.

INTRODUCTION

- GuttaFlow Bioseal

 - gutta-percha, polydimethylsiloxane, platinum catalyzer and zirconium dioxide

 - bioactive substance

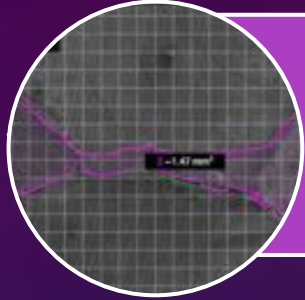
 - improved flow properties

 - setting time approximately 12-16 minutes

 - expand slightly during setting

- Obturation with GuttaFlow Bioseal is a promising approach, could provide a better sealed root canal and serve as an alternative to thermoplastic obturation technique.

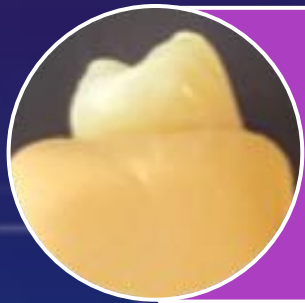
OBJECTIVES



The material adaptation in the root canal space



The presence of excess material beyond the root tip



The duration of time required to seal the root canal of mandibular premolars

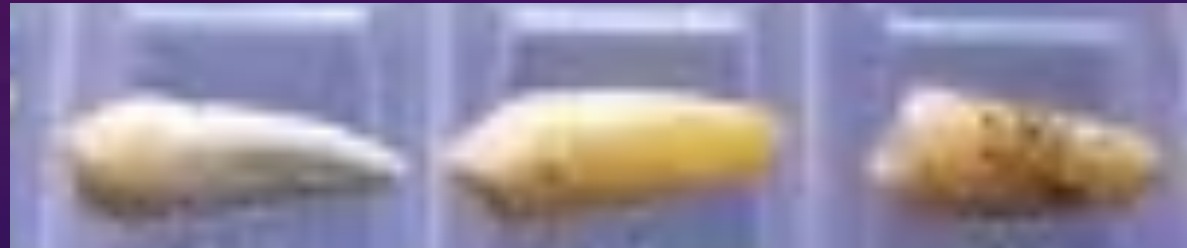
MATERIALS AND METHODS

Ethical
approval

IIUM RESEARCH
ETHICS
COMMITTEE
2019-2023

MATERIALS AND METHODS

PART 1: TOOTH SELECTION



Inclusion criteria

Single rooted mandibular premolars

Intact coronal aspect

Intact roots

Straight root/minimal curvature

Exclusion criteria

Dental caries, tooth resorption

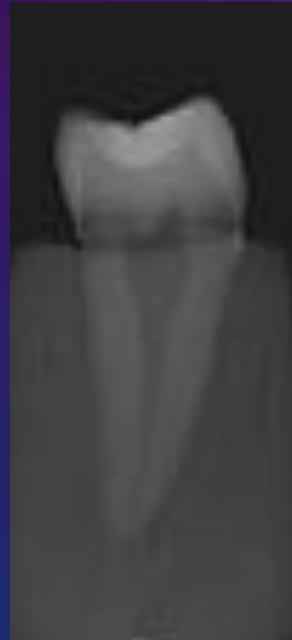
Severe tooth surface loss

Calcified root canal

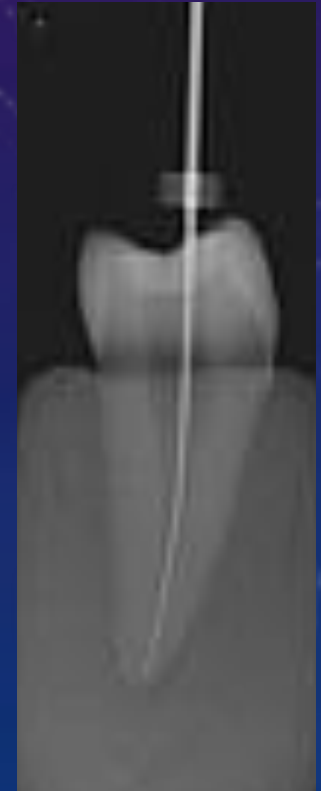
Crack/fracture lines

MATERIALS AND METHODS

PART 2: ACCESS CAVITY PREPARATION



Access cavity



Preoperative radiograph

Working length radiograph

MATERIALS AND METHODS

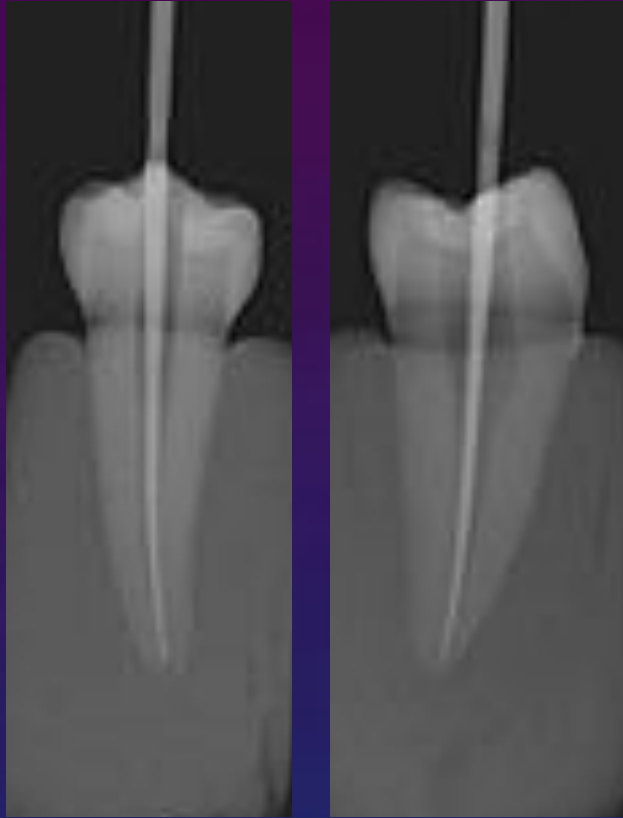
PART 4: ROOT CANAL PREPARATION



Hyflex CM rotary files at
500 rpm and 2.5 Ncm

MATERIALS AND METHODS

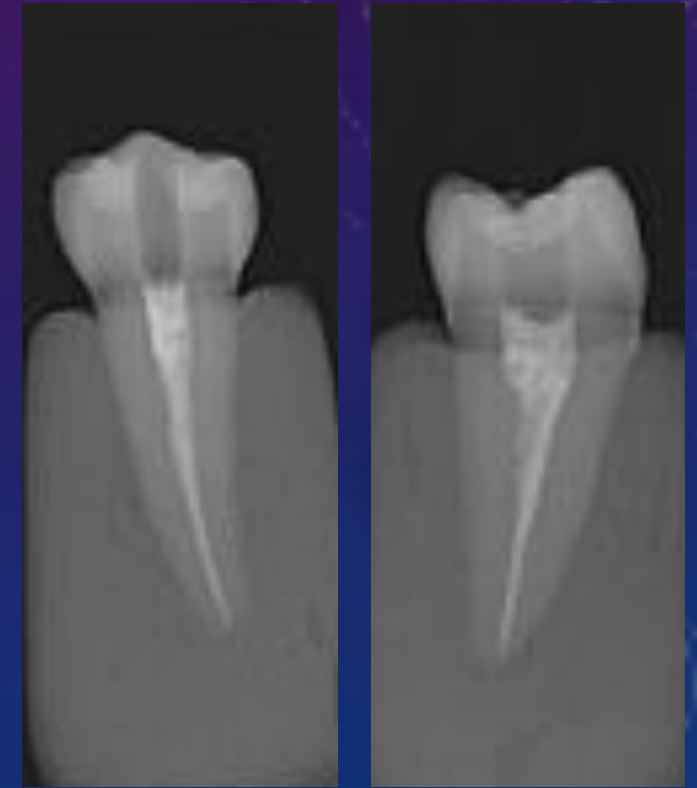
PART 6: OBTURATION



Master gutta-percha radiograph



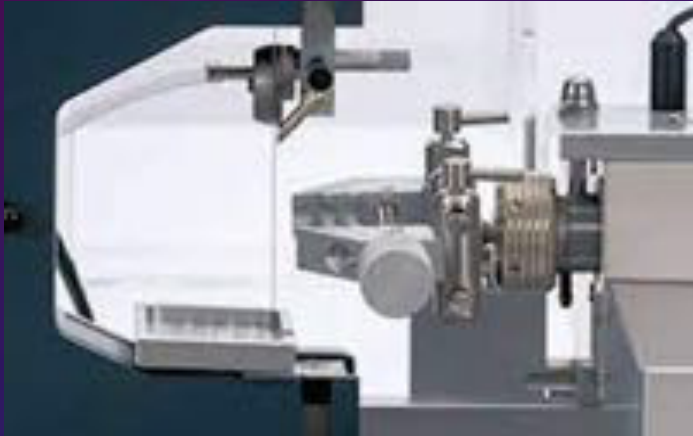
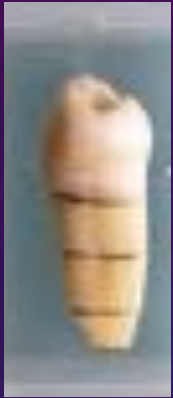
- Group 1 – Continuous backfill (n=10)
- Group 2 – Interrupted backfill (n=10)
- Group 3 – Injectable technique (n=10)



Obturation radiograph

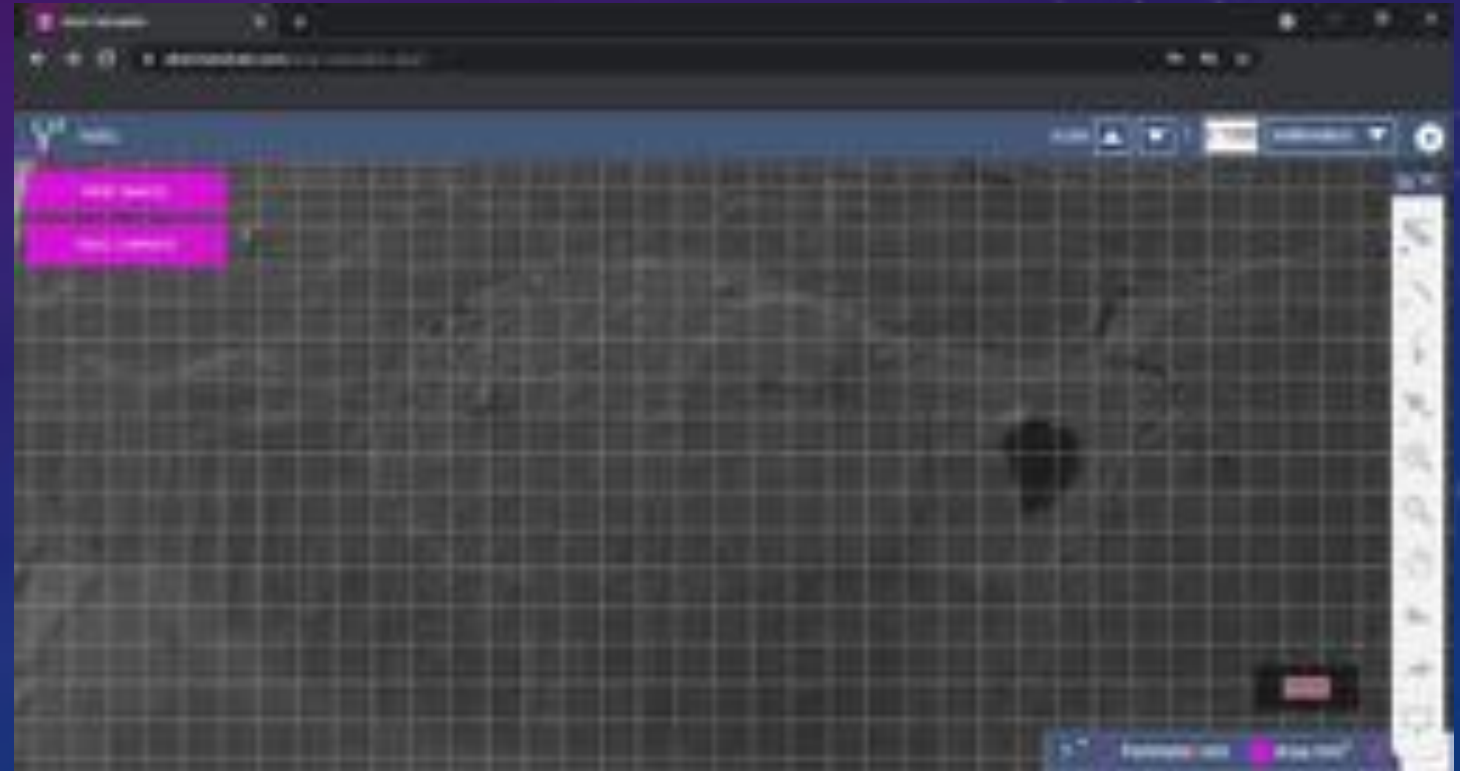
MATERIALS AND METHODS

PART 7: OBSERVATION UNDER SCANNING ELECTRON MICROSCOPE



MATERIALS AND METHODS

PART 8: SKETCHANDCALC AREA CALCULATOR SOFTWARE



Outline of the root canal wall

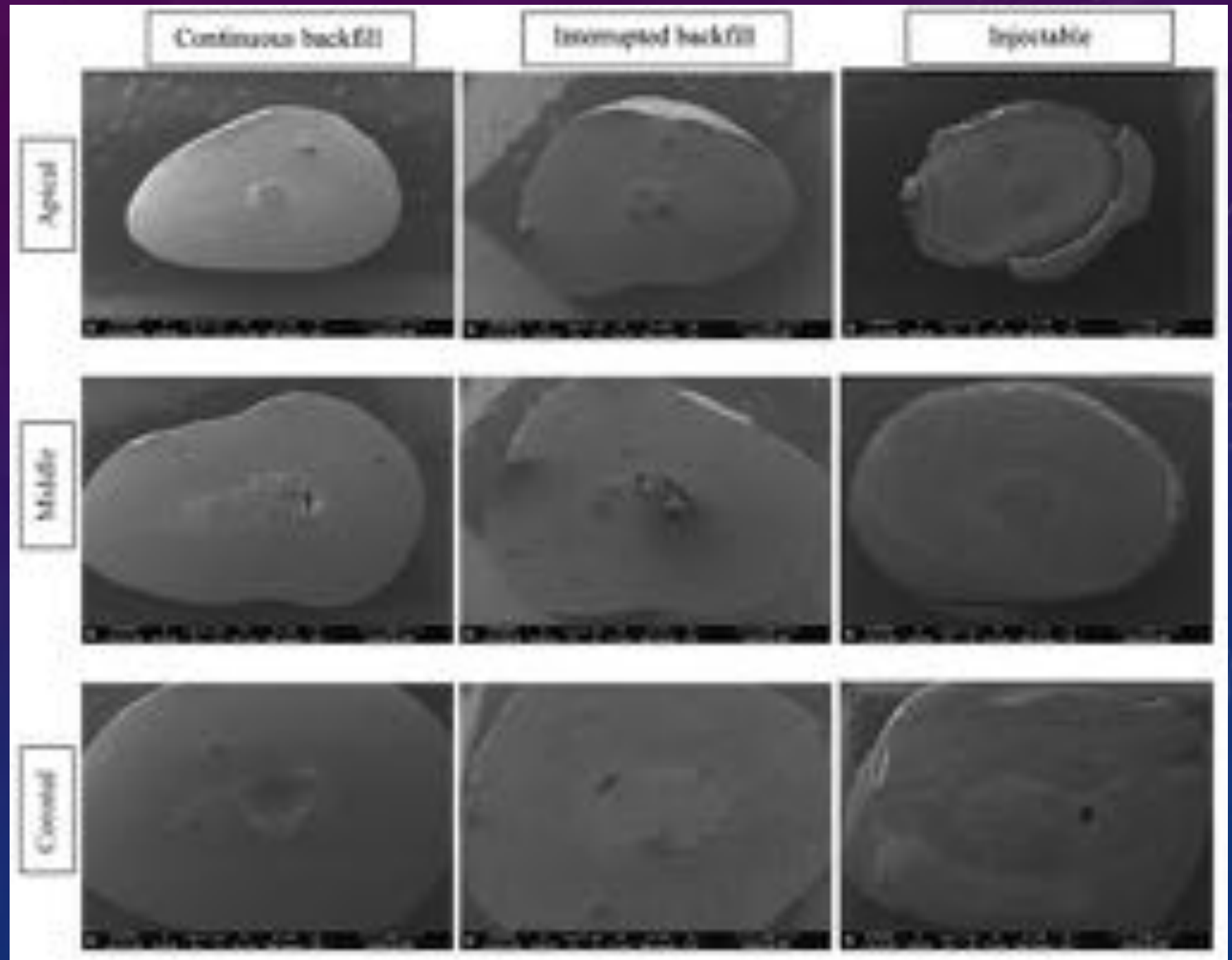


Material adaptation

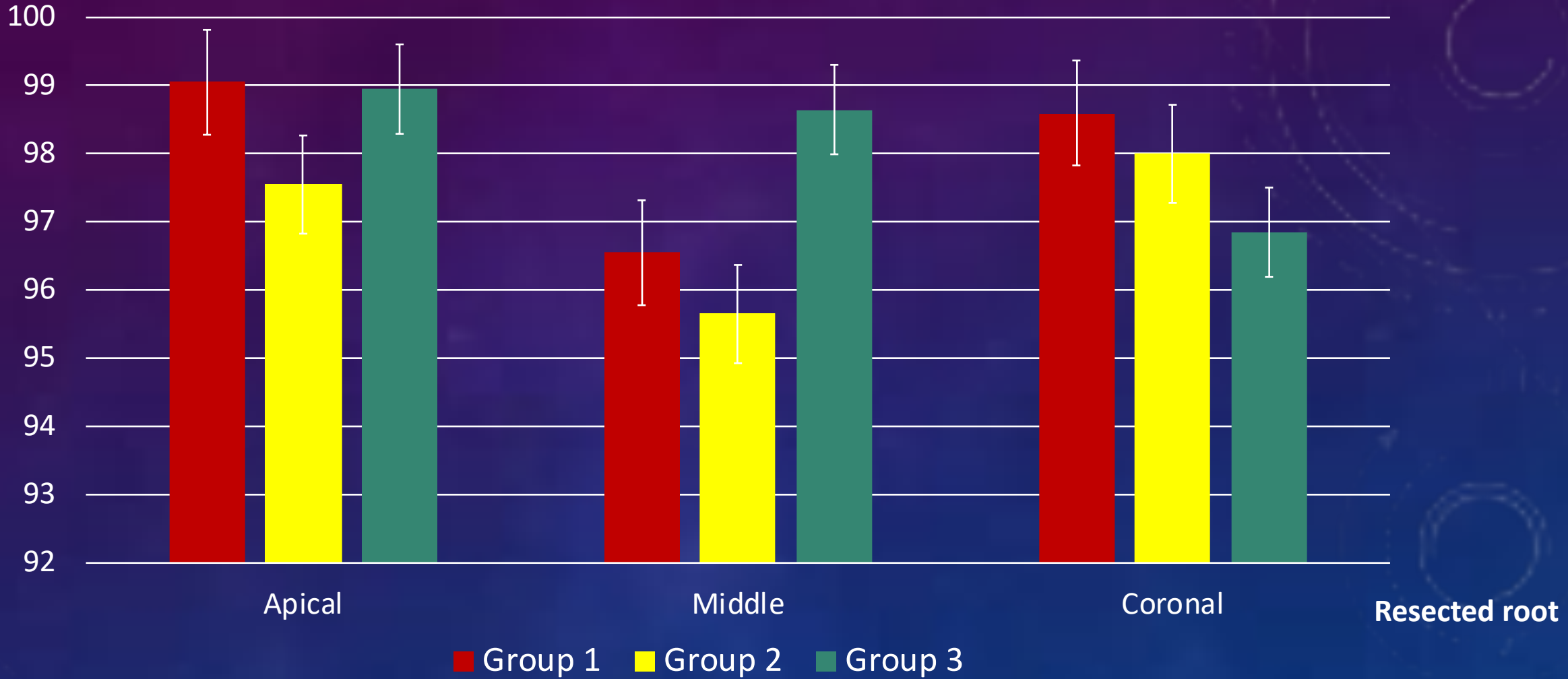


Voids within obturation material

RESULTS

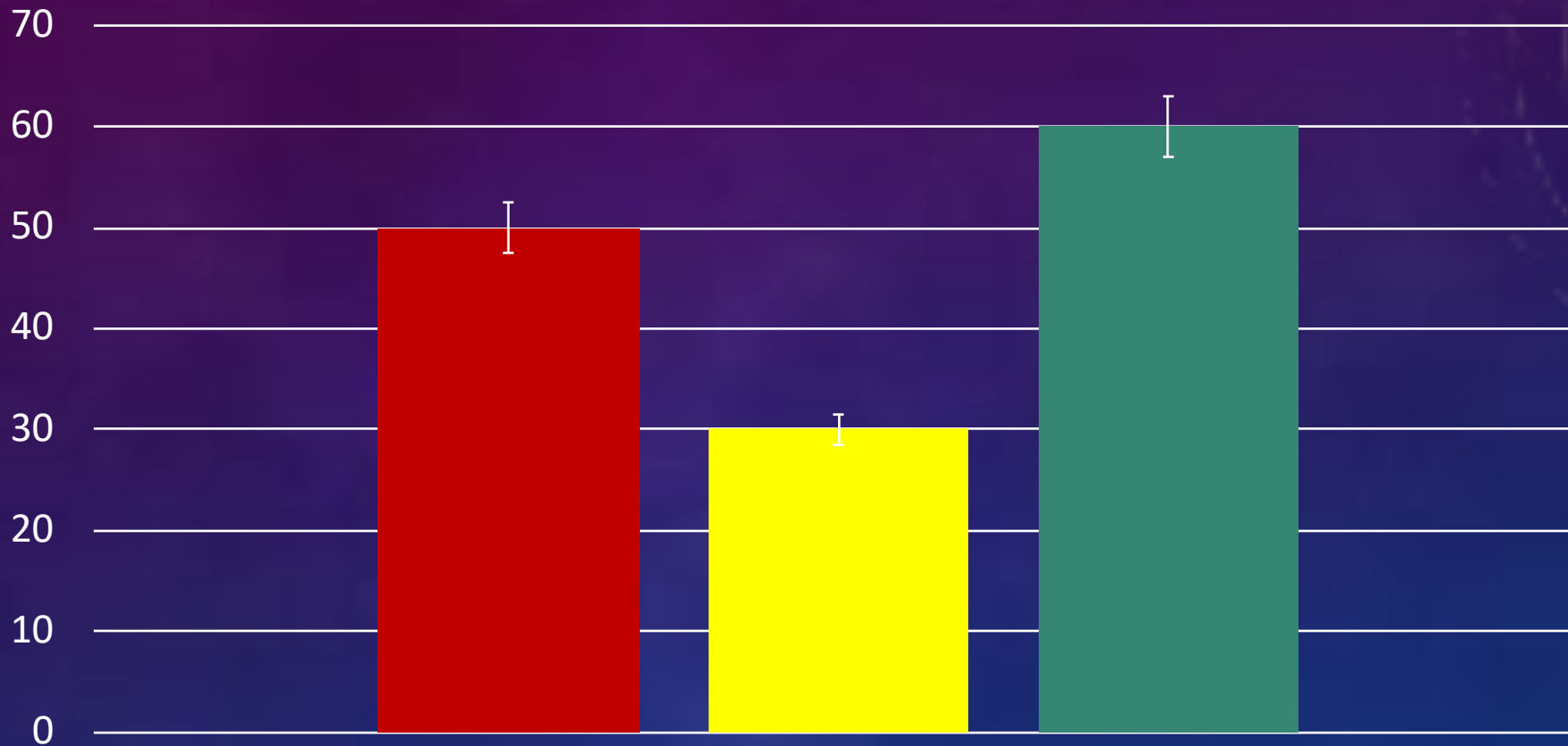


**Material
adaptation (%)**



Volumetric percentage of the material adaptation in the root canal space

**Material
extrusion (%)**

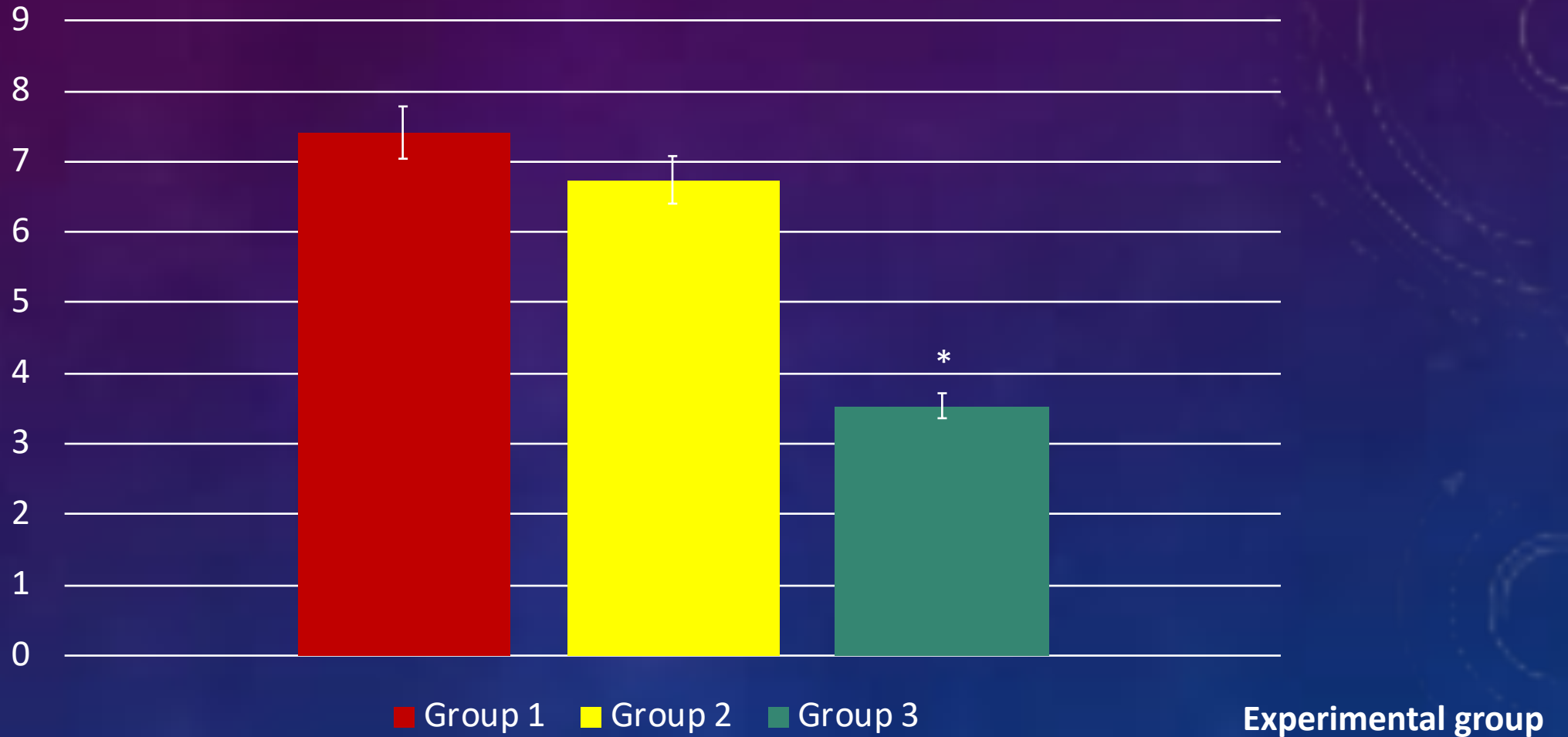


■ Group 1 ■ Group 2 ■ Group 3

Experimental group

Presence of excess material beyond the root tip

Duration (mins)



Duration of obturation procedure

DISCUSSION

- Volumetric percentage of the material adaptation in the root canal space between three obturation techniques were comparable at any level of evaluation.
- Presence of excess material beyond the root tip between three types of obturation techniques were also equivalent.

DISCUSSION

- This could be attributed to the careful handling of the material, effective control of the working length, performed under dental operating microscope by the trained clinicians.
- Duration of obturation using the injectable technique was slightly shorter than the other techniques, could be related to simpler method resulting in a less time-consuming procedure.

CONCLUSIONS

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

- The material adaptation in the root canal space and the presence of excess material beyond the root tip were comparable irrespective of the obturation techniques.
- The duration of time required to seal the root canals using the injectable technique was slightly shorter than the other techniques.
- Obturation with GuttaFlow Bioseal is effective.

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