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

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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

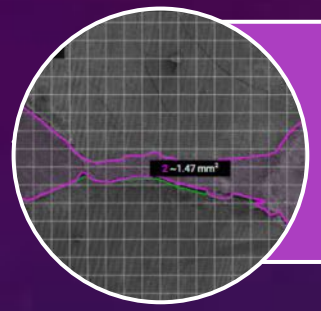
  setting time approximately 12-16 minutes

  expand slightly during setting

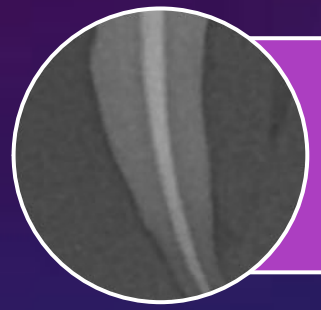
- Obturation with GuttaFlow Bioseal is a promising approach, could provide a better sealed root canal and serve as an alternative to thermoplastic obturation technique.

Li et al., 2014, Pedullà et al., 2019

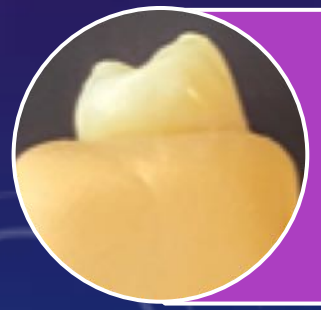
OBJECTIVES



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 2019-203

MATERIALS AND METHODS

PART 1: TOOTH SELECTION

Inclusion criteria

- Single rooted mandibular premolars
- Intact coronal aspect
- Intact roots
- Straight root/minimal curvature

Exclusion criteria

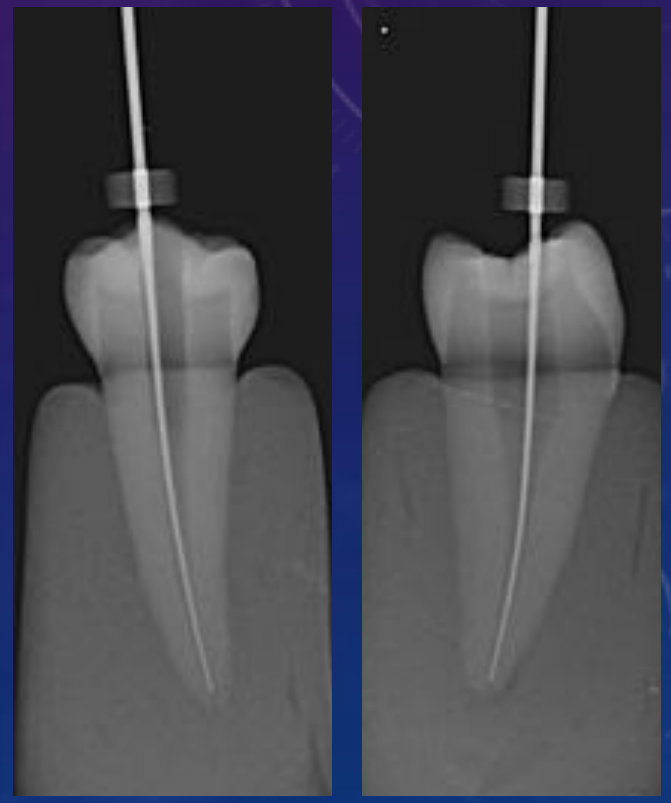
- Dental caries, tooth resorption
- Severe tooth surface loss
- Calcified root canal
- Crack/fracture lines

MATERIALS AND METHODS

PART 2: ACCESS CAVITY PREPARATION

Preoperative radiograph

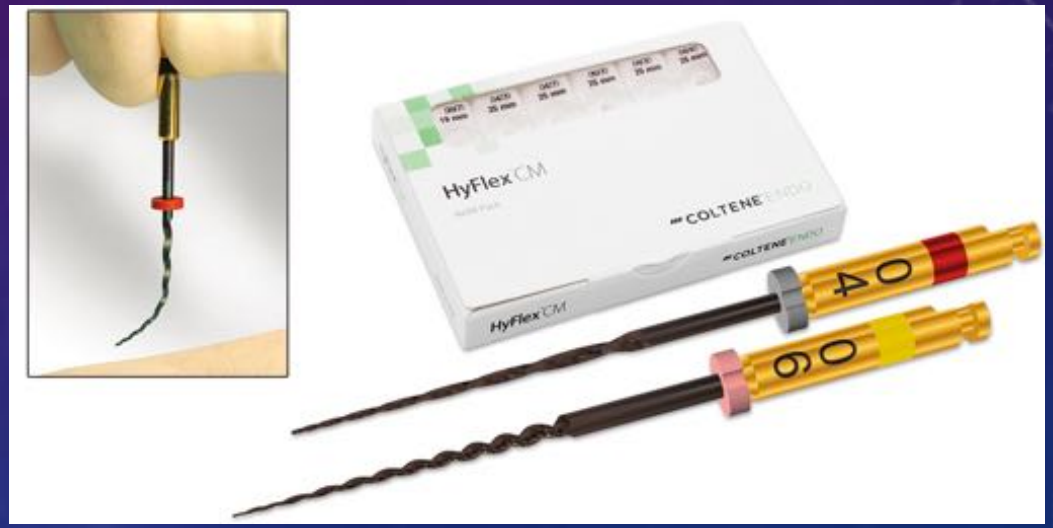
Access cavity



Working length radiograph

MATERIALS AND METHODS

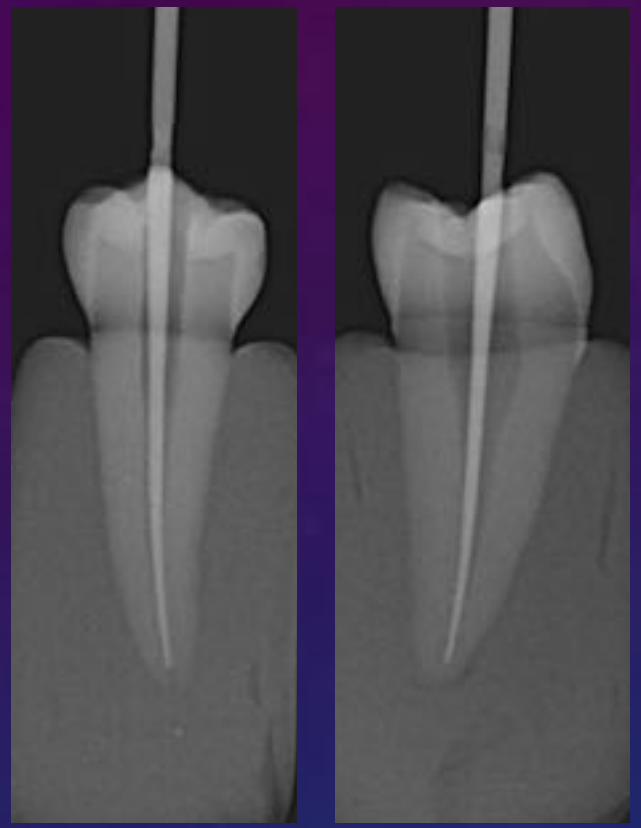
PART 4: ROOT CANAL PREPARATION



Hyflex CM rotary files at 500 rpm and 2.5 Ncm

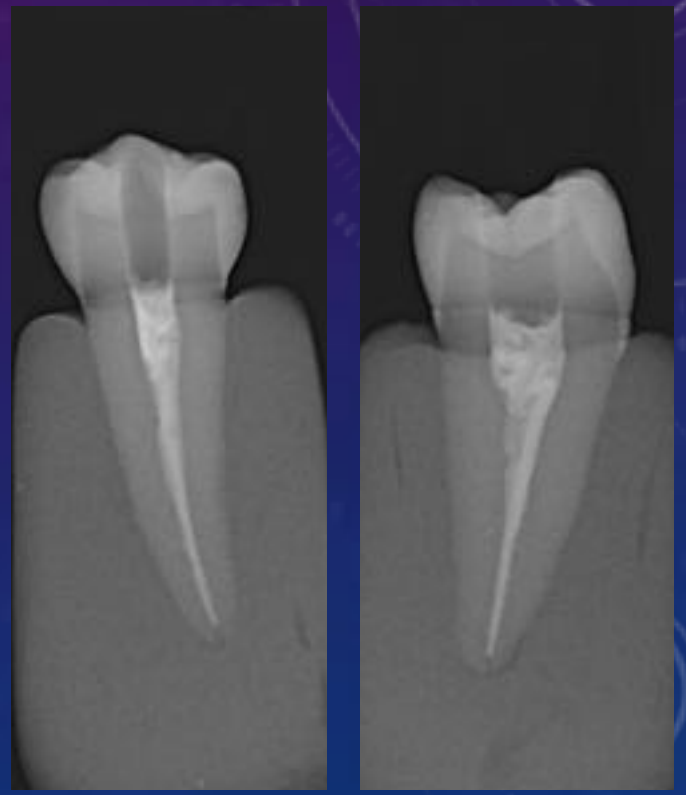
MATERIALS AND METHODS

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)



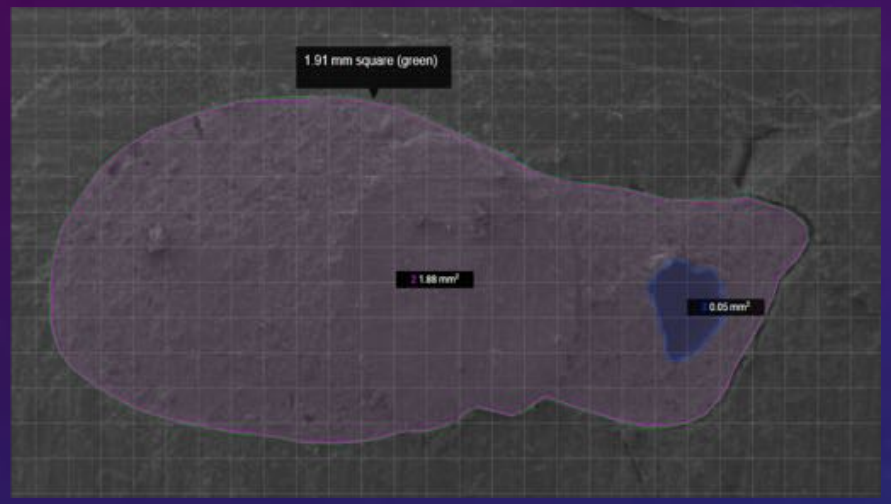
Obturation radiograph

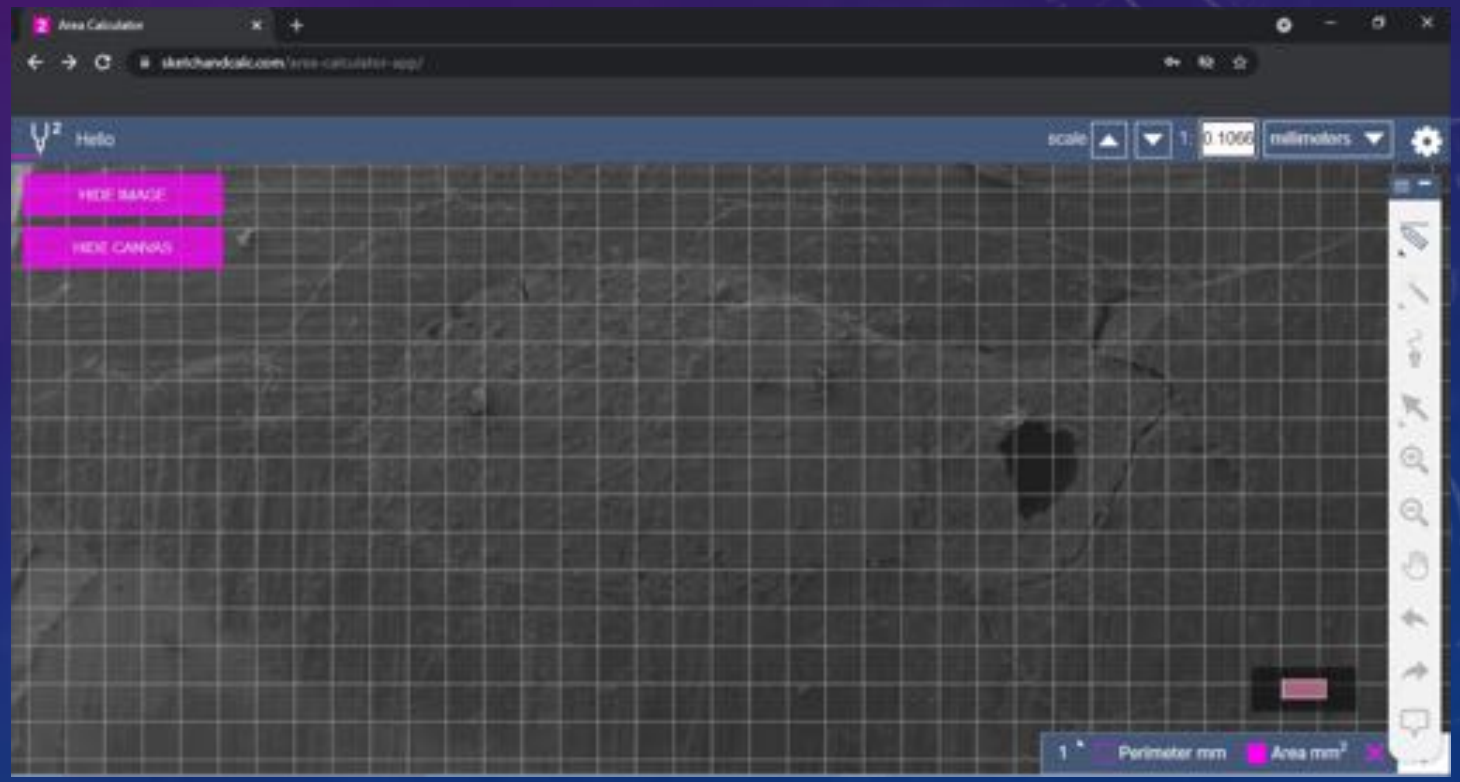
MATERIALS AND METHODS

PART 7: OBSERVATION UNDER SCANNING ELECTRON MICROSCOPE

MATERIALS AND METHODS

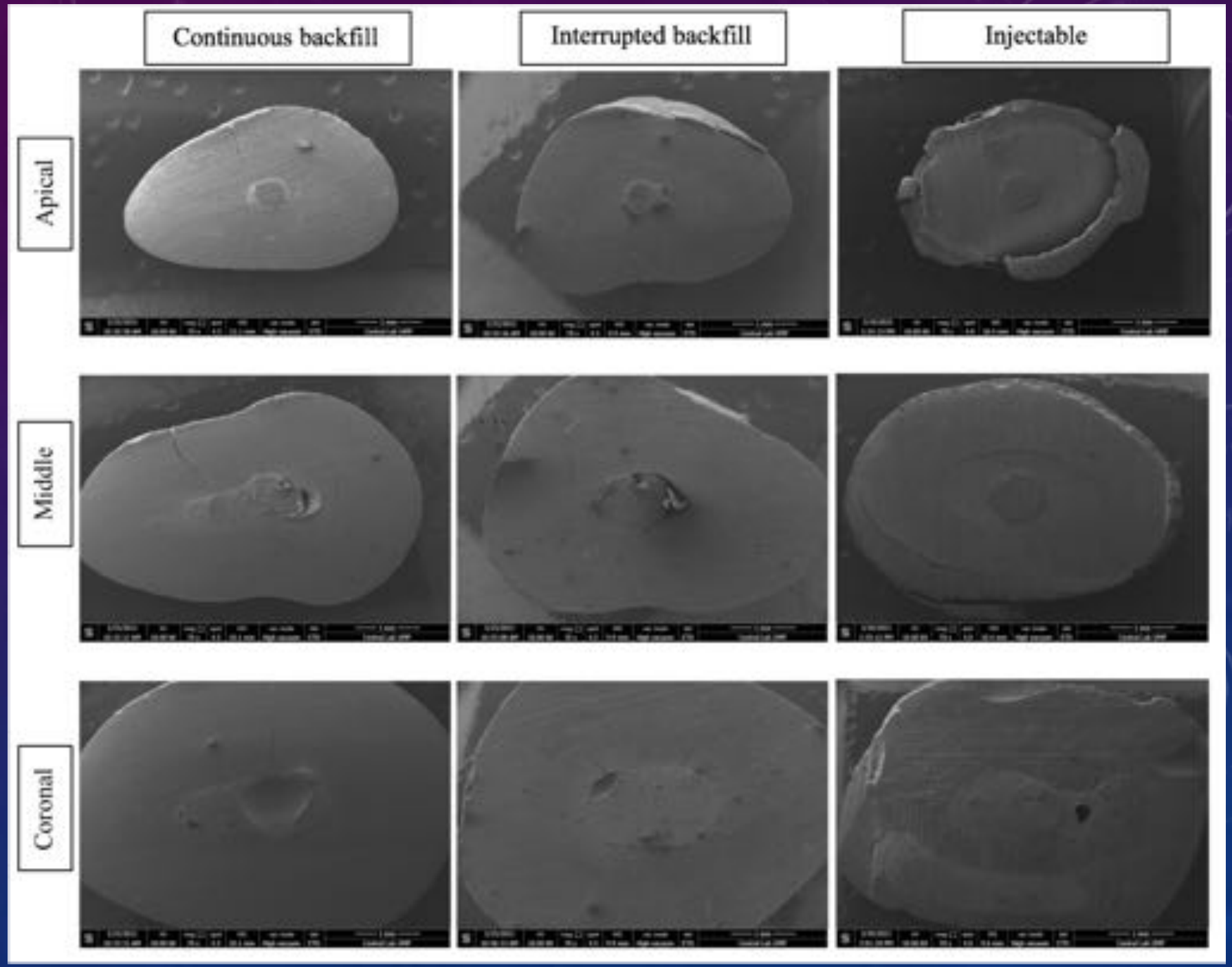
PART 8: SKETCHANDCALC AREA CALCULATOR SOFTWARE

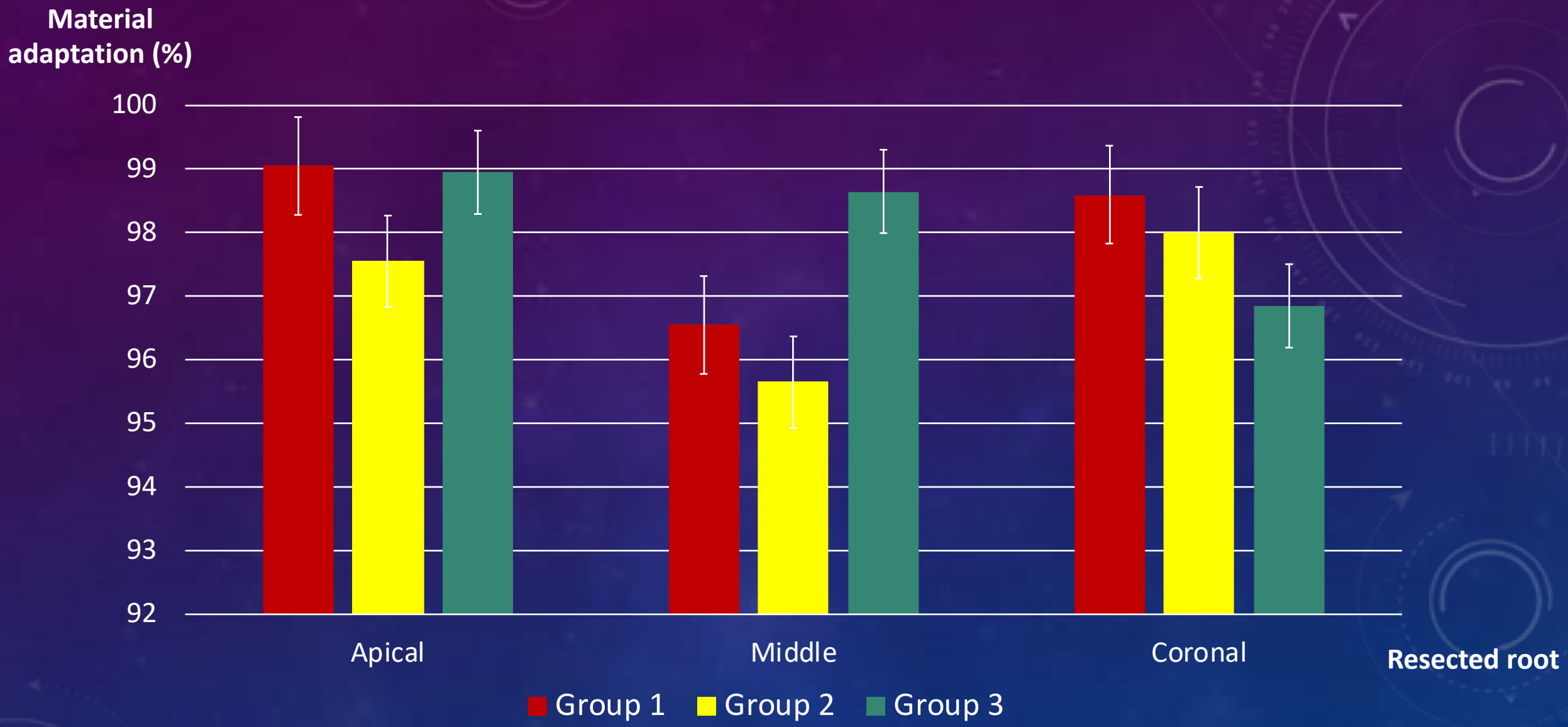




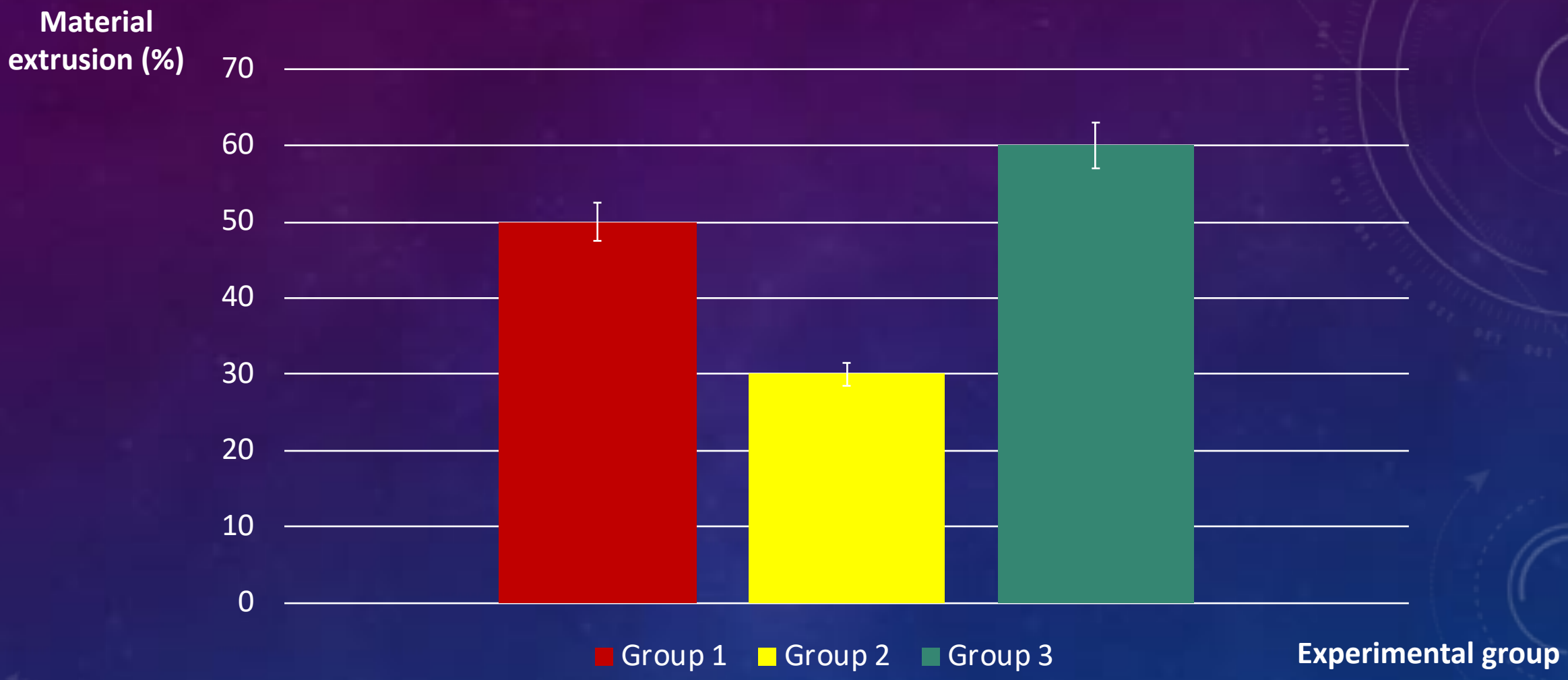
- Outline of the root canal wall
- Material adaptation
- Voids within obturation material

RESULTS

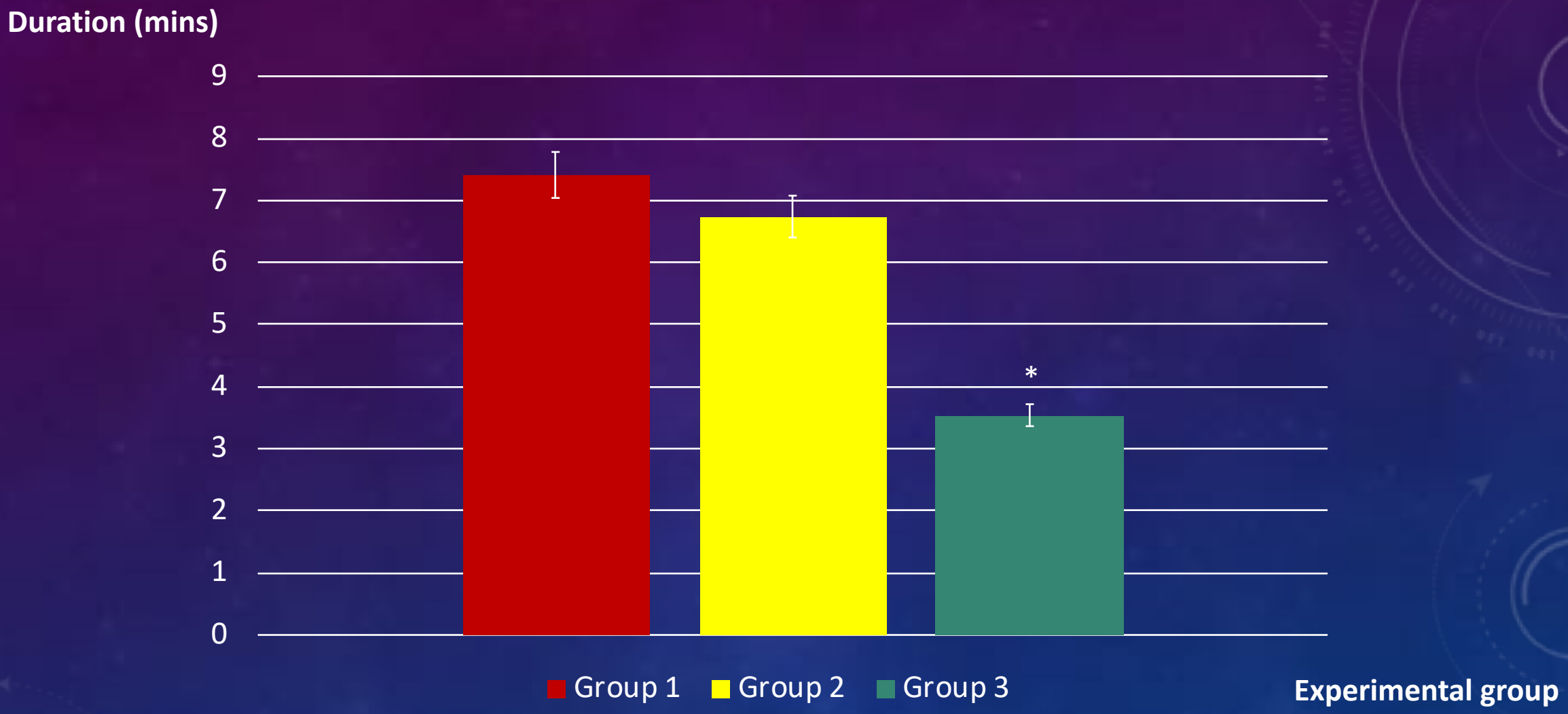

Continuous backfill
Interrupted backfill
Injectable
Apical
Middle
Coronal



Volumetric percentage of the material adaptation in the root canal space



Presence of excess material beyond the root tip



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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