In Vitro Microbial Leakage of Endodontically Treated Teeth Using New and Standard Obturation Techniques

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Aim
- To evaluate and compare the ability of bacteria to penetrate new and conventional obturation techniques and materials over a 30-day period.

Materials & Methods
- 140 single-rooted teeth were used in this study.
- The crowns were removed & the root length was prepared at 16mm
- Root canals were instrumented up to size #40 or 50 to the WL
- The teeth were randomly divided into 10 groups:
  Group 1: instrumented with profiles & obturated with lateral condensation & no sealer (10 teeth)
  Group 2: as in group 1 + sticky wax covering the root surface and the canal orifice (10 teeth)
  Group 3: Instrumented as group 1 & obturated with lateral condensation + AH26 (15 teeth)
  Group 4: Instrumented as group 1 & obturated with system B + Obtura II + AH26 (15 teeth)
  Group 5: Instrumented as group 1 & obturated with obtura II only + AH26 (15 teeth)
  Group 6: Instrumented with Light-Speed & obturated with SimpliFill apically, backfilled with obtura II + AH26 (15 teeth)
  Group 7: Instrumented as in group 1 + peeso reamers for the coronal preparation & obturated with FibreFill obturating System and FibreFill R.C.S. sealer (15 teeth)
  Group 8: Instrumented as group 1 + apical third prepared with Light Speed instruments & obturated with SimpliFill GP + FibreFill R.C.S. + fiber post from the FibreFill (15 teeth)
  Group 9: as group 3 but FibreFill R.C.S. sealer was used instead of AH26. (15 teeth)
  Group 10: as group 4 but FibreFill R.C.S. sealer was used instead of AH26. (15 teeth)
- A split chamber microbial leakage model was used in which S. mutans placed in the upper chamber could reach the lower chamber only through the obturated canal.
- The specimens were checked for a change in color of the pH indicator from red to yellow, which indicated a positive result every 24 hrs. over a period of 30 days.
- The average rate of leakage of bacteria was compared & statistically analyzed.

Results
- Lateral and vertical condensation of GP + AH26 sealer showed 87% and 73% leakage of specimens.
- Both the SimpliFill and the FibreFill group had 40% leakage by day 30.
- Only one specimen of the SimpliFill-FibreFill group leaked (6%) by day 30.

Conclusion
- Microbial leakage occurred more quickly in lateral and vertical condensation techniques compared to SimpliFill and FibreFill techniques.
- Combination of an apical plug of GP with SimpliFill and a FibreFill coronal seal was the best obturation technique used.

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