

An In Vitro Evaluation of Microleakage Between Two Sealant Materials

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Introduction

- 58% of adolescents (12-19) experience caries in permanent teeth.¹
- About 14% of those aged 6-19 years old have untreated caries of the permanent dentition.²
- The permanent teeth most susceptible to decay are mandibular and maxillary molars in their pits and fissures.³
- Dental sealants are an effective approach for protecting pits and fissures from dental caries.²
- Sealants remain a relatively under-utilized therapeutic measure.
- Only about 50% of children aged 9-11 had at least one dental sealant on a permanent tooth. Even fewer children in the 6-8 range have had a dental sealant with only 31% receiving a dental sealant on at least one permanent tooth.¹

Objectives

- To determine the presence of microleakage associated with two different dental materials used for pit and fissure sealants placed on extracted human third molars.
- Draw conclusions about the two products available for use as pit and fissure sealants in the UNMC Pediatric Dentistry Clinic

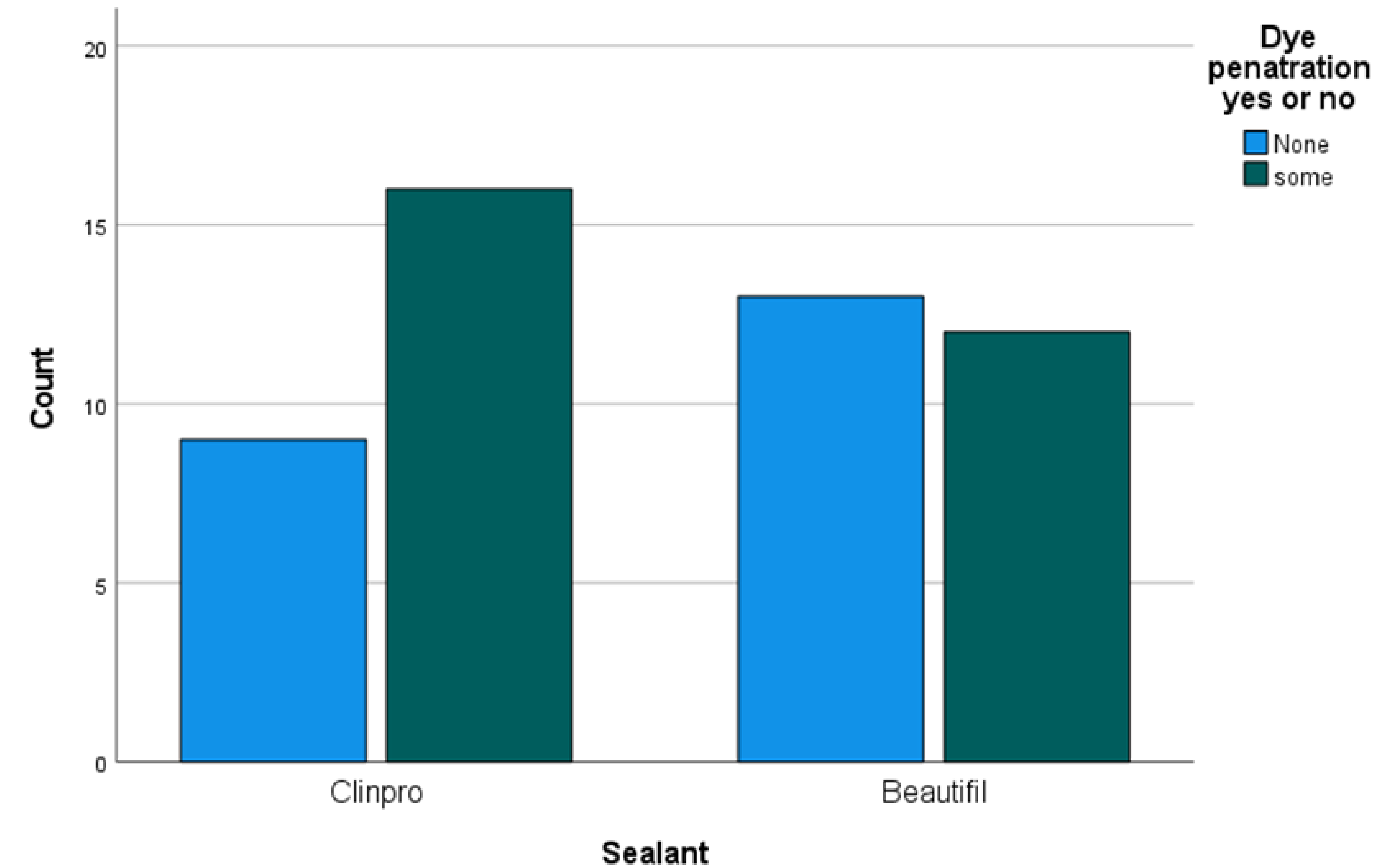
Methods

- 50 extracted human third molars
 - Selected from a collection from routine exodontia.
 - Inclusion criteria: free from caries or damage
- The teeth were curetted then cleaned with a manual toothbrush.
- The teeth were separated into two groups (n=25 per group).
 - Group (A): Clinpro [3M ESPE]
 - Group (B): Beautifil Flow Plus (blue) [SHOFU Dental ASIA-Pacific Pte. Ltd.]
- Sealants placed according to manufacturer's instructions
- Thermocycled for 500 cycles between 5 degrees centigrade and 55 degrees centigrade with 60 seconds in each water bath per cycle
- 1% Crystal Violet dye for 4 hours at room temperature.
- Sectioned longitudinally in a buccolingual direction with a water-cooled diamond saw
 - Yielded 2 sections per tooth. Each section per tooth was randomly assigned to either an "A" or a "B" section. Only the A sections were analyzed.
- Sections examined using a stereomicroscope with 50X magnification (Nikon Measurescope MM-11, Tokyo, Japan).
 - Microleakage evaluated and given a score of 1=dye penetration, or 0=no dye penetration.

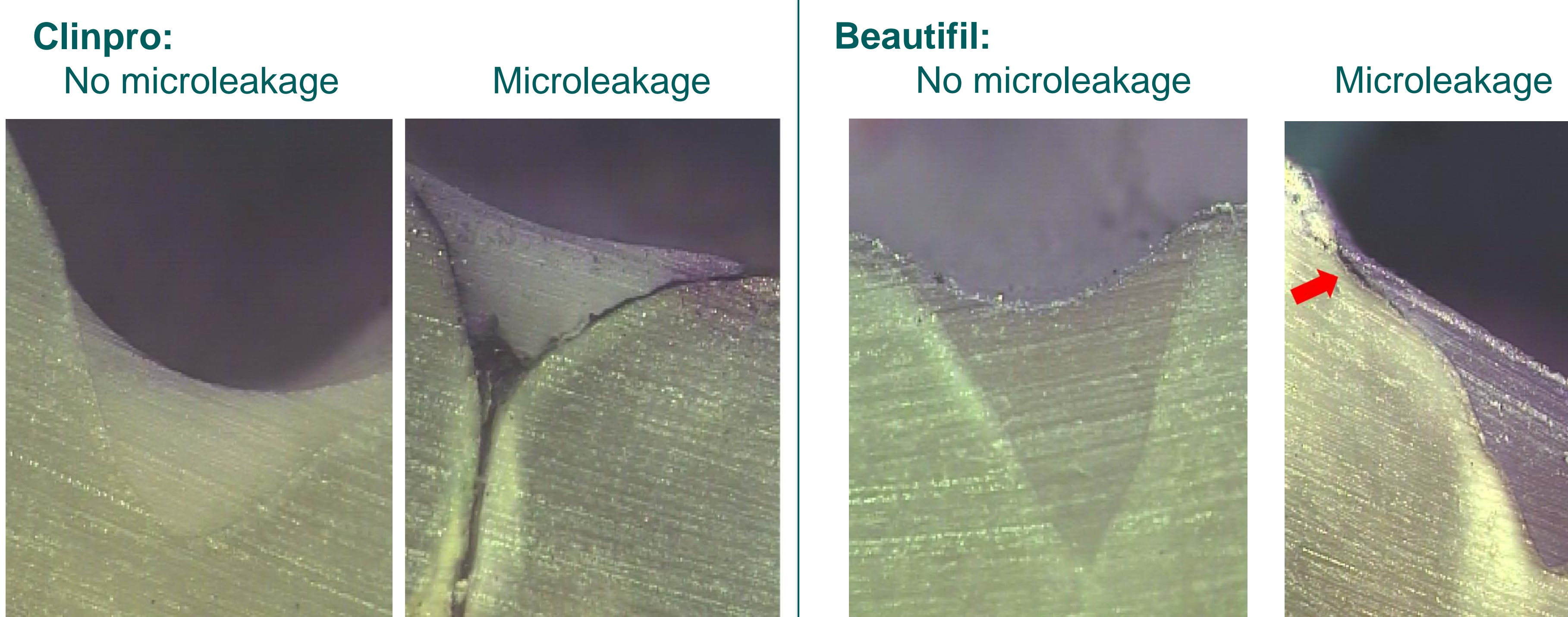
Data Analysis

- **Chi-square Test** revealed that there was not a significant relationship between sealant type and microleakage penetrability
 - $\chi^2 (1) = 1.30$; $p > .05$

Results



- 58% Both groups showed some dye penetration
- More subjects in the Clinpro group exhibiting some level of microleakage



Discussion

- No significant differences between the two materials
 - Fewer teeth with no microleakage in the Beautifil group
 - More significant extent of microleakage in the Clinpro group (not evaluated in this study)
- Use of epoxy resin to encase teeth prior to sectioning
- Bias
 - One examiner
 - Tooth section chosen for microscopy exam
- Different types of materials
 - Giomer vs. unfilled sealant
 - Beautifil is a filled material
 - Different handling properties
- Following manufacturer's instructions
 - No adhesive used with Clinpro
 - Studies have suggested ok to not use adhesive with unfilled sealants
- Fluoride release
 - Both materials claim the release of fluoride; no studies comparing the amount released or recharge
 - OptiBond (Kerr): also has fluoride release
- Consistent with other literature suggesting no significant difference in success of materials used in pit and fissure sealants

Conclusions

- Clinpro and Beautifil Flow Plus show some levels of microleakage, but of unknown clinical impact
- Need to consider various factors when choosing treatment materials for an individual patient; e.g. caries risk, age
- Regardless of material, sealants continue to be an effect tool to prevent caries in children and adolescents
- AAPD encourages continued research regarding different materials used in pit and fissure sealants.

Acknowledgements

McKenzie Brown: Lab Work
Bobby Simetich: Lab work
Logan Sardzinski: Collection of third molars

Select References

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