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Retention of Bioflx crowns, Zirconia Crowns Compared to Stainless Steel Crowns: In Vitro

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Introduction

For Primary teeth with large, multi-surface carious lesions, the American Academy of Pediatric Dentistry recommends the use of a full-coverage restoration.Nu Smile Bioflx is the latest pediatric crown material introduced in 2022. They offer properties of both stainless steel and zirconia crowns. Retention of the crown is an important clinical factor for success. A previous in vitro study found that stainless steel crowns exhibit higher retention over zirconia crowns on extracted primary mandibular second molars. However, there is no evidence in the literature of the mechanical properties of Bioflx crowns compared with other materials. So, Further studies on this material are needed.

Aim

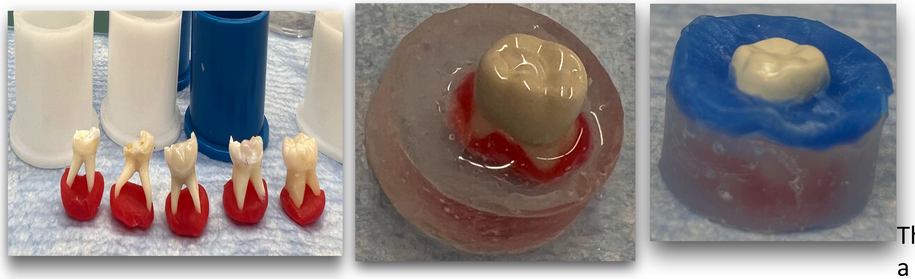
The purpose of this pilot study was to compare in vitro the retention of Nu smile Bioflx crowns, 3M stainless steel crowns™ (SSCs), and EZ sprig Crowns on extracted primary mandibular second molars and to calculate the total required sample size for the main study.

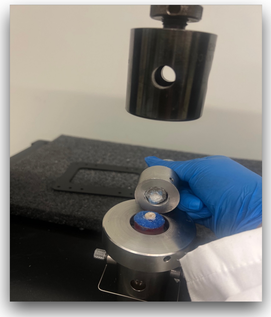
Methods

- A pilot study was conducted with a total of **15 extracted primary mandibular second molars** and was allocated randomly to one of the three groups (5 teeth per group). All teeth were mounted in Dentsply acrylic molds and prepared for crown cementation. Crowns were cemented with glass ionomer cement. Retention testing was performed using **Instron 68TM-10.**

Statistical Analysis:
The comparison between the three study groups was performed using the Kruskal Wallis H test. Significance was set at p value <0.05. Data were analyzed using IBM SPSS for Windows (Version 29.0).

Methods





Results

Fig 1: Side-by-side box plots comparing the force required for failure (N) between Bioflx crown, Stainless Steel Crowns (SSC), and EZ Sprig Crowns (n = 5 per group)

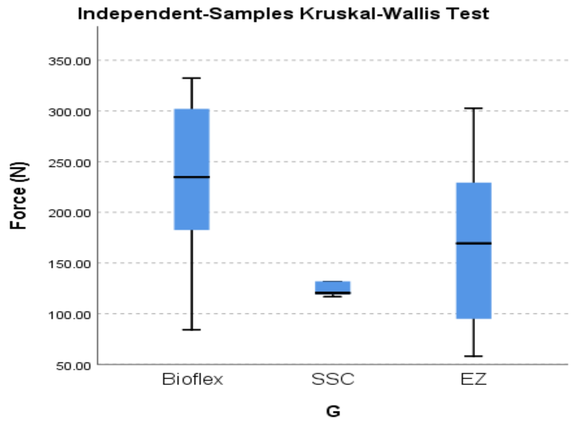


Table 1 Comparison of the force (N) between the three study groups

Group	Mean	SD	P
Bioflx	227.18	±98.97	P =0.31
SSC	133.60	±26.49	KWH=2.34
EZ Sprig	170.84	±99.07	

SD: Standard deviation, KWH: Kruskal Wallis H test was used.

The highest mean force in Newtons was found for the Bioflx group with a mean force of **227.0** with a standard deviation of **98.97**, followed by the EZ Sprig group with a mean force of **170.84** with a standard deviation of **99.07** and then the SSC group with a mean force of **133.60** with a standard deviation of **26.49.** The comparison of groups via the Kruskal Wallis H test showed no significant difference **(p = 0.31).** Finally, with respect to the examination of the failure mode, all crowns were found to have separated in the same manner, in which the failure occurred at the level of the cement and tooth.

Conclusion

The pilot study revealed no significant difference in retention among Bioflx crowns, Stainless steel crowns, and EZ Sprig Zirconia crowns. To further assess the retention of Bioflx crowns compared to Zirconia and SSC. A sample size of 45 samples (n=15 per group) has been determined for the main study.

This research seeks to provide evidence based information about retention strength of different pediatric crowns. Particularly the Bioflx crown, a new addition to pediatric restorative options to guide clinicians in decision-making when selecting crowns for primary posterior teeth.

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