# Dimensional Stability of BioFlx Crowns After Sterilization

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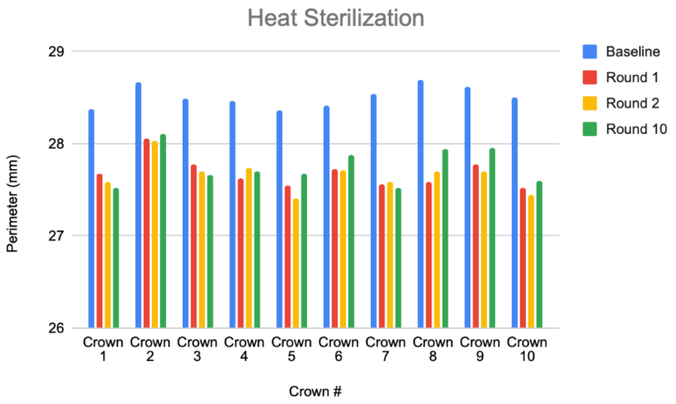
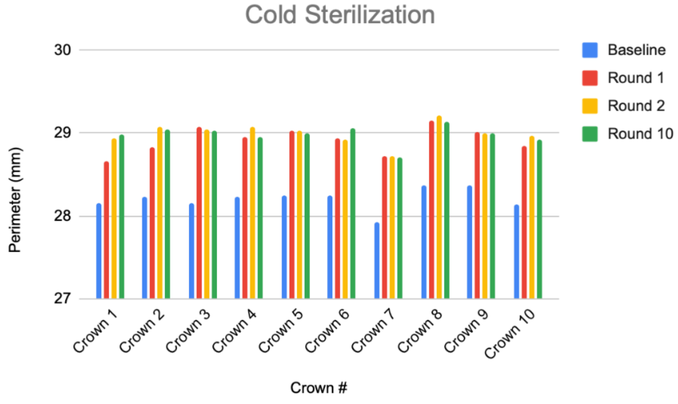
## PURPOSE

Recently, hybrid resin pediatric crowns were introduced that are flexible and esthetic (NuSmile BioFlx). The purpose of this study was to investigate whether sterilization can affect the dimensions of these crowns.

## MATERIALS AND METHODS

Two groups (n=10) of flexible crowns for lower second primary molars were tested. One group was subjected to heat sterilization via autoclave and the other to cold sterilization via Sporox II sterilizing solution. The circumference of the intaglio surface at the cervical margin was measured at baseline and after 1, 2, and 10 rounds of sterilization under an optical microscope using image analysis software. The data was analyzed using a 2-way analysis of variance (ANOVA) for the effect of sterilization method (hot or cold) and the effect of subsequent sterilization cycles at a 0.05 significance level.




## RESULTS

Mean circumference before and after sterilization rounds and the percent changes (mean ± standard deviation) are shown in Table 1. The ANOVA indicated that the circumference was significantly affected by the method of sterilization ($p<0.001$), whereas repeated sterilization had no effect ($p=0.245$). Pairwise comparisons showed that the first round of heat sterilization significantly decreased crown circumference while the first round of cold sterilization caused a significant increase in circumference. The mean change in circumference after the first cycle was -2.90% for the heat sterilization and 2.55% for the cold sterilization. Subsequent sterilization cycles did not cause additional significant changes in circumference.

| Sterilization method | Circumference (mm) | | | | Circumference change compared to baseline (%) | | |
|---|---|---|---|---|---|---|---|
| | Baseline | Cycle 1 | Cycle 2 | Cycle 10 | Cycle 1 | Cycle 2 | Cycle 10 |
| Heat | 28.51±0.12 | 27.68±0.16 | 27.66±0.17 | 27.76±0.20 | -2.90±0.55 A | -2.99±0.49 A | -2.64±0.54 A |
| Cold | 28.20±0.13 | 28.92±0.15 | 29.00±0.13 | 28.98±0.11 | 2.55±0.41 B | 2.82±0.30 B | 2.76±0.24 B |

Same letters indicate perimeter changes that are not significantly different (two-way ANOVA followed by pairwise comparisons, significance level 0.05).

## CONCLUSION

Flexible crowns that are sterilized after try-on are likely to change in size after their first sterilization, where hot sterilization shrunk, and cold sterilization expanded the crowns. Subsequent sterilizations did not change their size anymore.