Evaluation of success and parental satisfaction of Resin Polymer compared to Stainless Steel Crowns for restoration of primary molar teeth: a randomized controlled trial

Kulsum Iqbal BDS, DMD; Jayaraman Jayakumar, BDS, MDS, FDSRCS, MS, Ph.D; Caroline K Carrico, Ph.D; Tiffany Williams DDS, MSD, FACD; Sreekanth Mallineni BDS,MDS

Department of Pediatric Dentistry, School of Dentistry, Virginia Commonwealth University, Richmond, VA

Abstract

- Objective: This randomized controlled clinical trial evaluated the clinical success of Bioflx resin polymer (RP) crowns in primary molars compared to stainless steel crowns (SSCs) at a 2-week follow-up.
- Secondary objectives included assessing parental and child satisfaction using a Likert scale and evaluating baseline Oral Health-Related Quality of Life (OHRQOL).
- Method: Children aged 3 to 9 years requiring restoration of primary molars under general anesthesia. 28 crowns were analyzed. RP and SSCs crowns were randomly assigned. Clinical success was assessed and child and parent reported quality of life was assessed using the Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire. Statistical analysis included McNemar's chi-square tests.
- Conclusion: Bioflx crowns had superior esthetic appeal, they showed increased surface roughness and wear compared to SSCs. Parental satisfaction was higher with Bioflx crowns regarding esthetics but was comparable for strength and durability

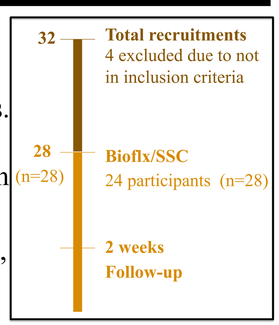
Introduction

- Dental decay is a prevalent global public health issue, particularly among young children, leading to hospitalization, increased treatment costs, and a decline in OHRQOL[1].
- Stainless steel crowns are widely used for full-coverage restorations in pediatric dentistry due to their durability and cost-effectiveness [2].
- However, esthetic concerns have led to the development of alternative materials such as Bioflx resin polymer crowns.
- This study explores the clinical effectiveness and parental satisfaction of Bioflx crowns compared to SSCs.

Bioflx Resin Polymer *Stainless Steel Crowns*

Methods and Materials

- **Study Design:** Randomized controlled trial
- **Participants:** Children aged 3-9 years requiring full-coverage crowns for primary molars.
- **Inclusion Criteria:** Multi-surface caries in primary molars, ASA status I or II, parent/guardian consent.
- **Exclusion Criteria:** Severe medical conditions, history of bruxism, or extensive root resorption.



Results

- **Intervention:** Patients received either Bioflx or SSCs. OHRQOL was assessed using the ECOHIS. Clinical evaluations were conducted at a 2-week follow-up, including assessments of contour, gingival health, staining, wear, marginal fit, and color match. Parental satisfaction was measured using a Likert scale.

➢ Baseline Characteristics:

- A total of 28 crowns were analyzed, involving 13 male and 11 female patients with an average age of 4.3 years (range 3-9 years).
- The baseline ECOHIS score averaged 10.6 out of a possible 52, with scores ranging from 0-32.
- The Child Impact Section (CIS) Averaged 7.6 out of 36 (range 0-23), and the Family Impact Section (FIS) averaged 3.1 out of 16 range(0-10), indicating reduced OHRQOL at baseline.

	n	%	
Patient Sex (n, %)			
Male	13	54	
Female	11	46	
	Mean	SD	Range
Age	4.3	1.2	3-7
ECOHIS (Possible 52)	10.6	8.5	0-32
CIS (Possible 36)	7.6	6.1	0-23
FIS (Possible 16)	3.1	3	0-10

Table 1:Baseline Characteristics of Study Participants

➢ Clinical Outcomes:

- No significant issues were noted with SSCs. Bioflx crowns exhibited increased surface roughness and wear (57% vs. 0% in SSCs, p=0.0002).
- Staining was observed in two Bioflx crowns but was not statistically significant (p=0.4795).

	Stainless Steel Crown		Resin Polymer		
	Optimal	Suboptimal	Optimal	Suboptimal	P
Contour of Crown	27 (96%)	1 (4%)	27 (96%)	1 (4%)	>0.999
Gingival Health	27 (96%)	1 (4%)	27 (96%)	1 (4%)	>0.999
Staining of Crown	28 (100%)	0 (0%)	26 (93%)	2 (7%)	0.4795
Surface roughness of crown	28 (100%)	0 (0%)	12 (43%)	16 (57%)	0.0002
Opposing tooth wear	28 (100%)	0 (0%)	23 (82%)	5 (18%)	0.0736
Marginal fit	27 (100%)	0 (0%)	28 (100%)	0 (0%)	N/A
Color match of crown	N/A		18 (67%)	9 (33%)	N/A
Marginal discoloration			27 (96%)	1 (4%)	N/A

Table 2:Summary of Clinical Outcomes at 2-Week Follow-Up

➢ Parental Satisfaction:

- 79% of parents were dissatisfied with SSC esthetics, while none were dissatisfied with Bioflx esthetics (p=0.0313).
- Satisfaction with size and shape was comparable between the two groups.

	SSC	Bioflx	P-value
Size	28 (100%)	26 (93%)	0.5000
Shape	28 (100%)	26 (93%)	0.5000
Color	22 (79%)	28 (100%)	0.0313
Strength	28 (100%)	28 (100%)	N/A
Overall	28 (100%)	28 (100%)	N/A

Table 3:Summary of Guardian Satisfaction with Crowns at 2-Week Follow-up

Results (continued)

➢ OHRQOL Scores:

- Baseline scores suggested reduced OHRQOL, with the Child Impact Section (CIS) averaging 7.6 out of 36 and the Family Impact Section (FIS) averaging 3.1 out of 16.

➢ Crown Placement based on Locations:

- Of the 28 crowns placed, each child received at least two crowns (one Bioflx and one SSC) on contralateral teeth for direct comparison.

Tooth Location	Stainless Steel Crowns	Resin Polymer Crowns
A	2 (7%)	3 (11%)
B	3 (11%)	1 (4%)
I	1 (4%)	1 (4%)
J	2 (7%)	3 (11%)
K	4 (14%)	6 (21%)
L	4 (14%)	6 (21%)
S	5 (18%)	4 (14%)
T	7 (25%)	4 (14%)
Total	28	28

Table 4:Summary of Crown Placement based on Location

Discussion

- Bioflx resin polymer crowns demonstrated superior esthetics but had notable surface roughness and wear concerns.
- The increased parental preference for Bioflx crowns highlights a shift towards esthetic considerations in pediatric dentistry. However, SSCs remain the gold standard for durability.
- The study emphasizes the need for longer follow-ups to establish Bioflx as a durable alternative.

Conclusion

- Both Bioflx and SSCs demonstrated satisfactory clinical outcomes, with Bioflx excelling in esthetics and SSCs in durability.
- Longer follow-up periods and increased sample sizes are required to validate Bioflx's long-term success. Future studies should include radiographic evaluations and 6-month ECOHIS comparisons. Further long-term evaluation is necessary to establish Bioflx as a viable alternative to SSCs in pediatric restorative dentistry.

Acknowledgments

Virginia Commonwealth University Pediatric Dentistry Department, Faculty, Residents, and Family.

References

1. Policy on Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies. Pediatr Dent. 2016;38(6):52-54.

2. Seale NS, Randall R. The use of stainless steel crowns: a systematic literature review. Pediatr Dent. 2015;37(2):145-160.