Pediatric dental resident education and preferences regarding primary anterior full coverage restorations

Alexis Sandman, DDS | Zachary Houser, DMD
Department of Pediatric Dentistry, University of Nebraska Medical Center, Omaha, NE

Background

- Over time, dentistry has seen advances and changes in the preferences of providers of the best standard of care for their patients' restorative treatment.
- There is little consensus on a standard of care for full coverage primary anterior teeth.
- Orodental trauma and early childhood caries often result in loss of the clinical crown structure in primary maxillary anterior teeth, thus requiring an esthetic, yet strong and long-lasting full coverage restoration.
- Restorative options: resin strip crown, open face zirconia (OFZ), pre-veneered zirconia (PVZ), Nusmile Zirconia, other brands of Zirconia (Cheng and Sprig), and traditional Stainless-Steel Crown (SSC).

Objective/Purpose

The purpose of this study is to discover which full coverage anterior primary tooth restorations residents are taught during residency, how it differs throughout the United States, which restorations residents feel competent placing, and deciding which they plan to use after graduation.

Methods

Study Design: An electronic survey was sent to all current pediatric dental residents who are members of the AAPD (n=791). 118 Responses were received in the 3-week survey period.

Survey Questions: Demographics gathered: residency program district, type of program attended, program year (PGY1 or PGY2), and if they worked as a dentist before residency. Research questions included: which restoration options are taught, feelings of competency with each restoration type, plans to use restoration options after graduation, and ranking the deciding factors on types of restorations. Also, type of restorations most used for tooth types (maxillary and mandibular incisors versus canines) to determine the choice of restorative options. Comparisons were used comparing what is taught at residency programs depending on the regional location and comparing the use of the restoration to if the resident had work experience before residency versus being straight out of dental school.

Statistics: Descriptive statistics which included counts and percentages for categorical responses were used to summarize the data. Fisher's exact test was used to compare all categorical variables between groups. All analyses were conducted using SAS version 9.4. $P < 0.05$ was considered statistically significant.

Results

	In what district is your residency program located?						
	North Central (N=30)	Northeast (N=35)	Southeast (N=22)	Southwest (N=18)	Western (N=13)	Total (N=118)	P-value
Stainless Steel Crown, n (%)							**0.0002**[1]
No	12 (40.0%)	26 (74.3%)	12 (54.5%)	2 (11.1%)	6 (46.2%)	58 (49.2%)	
Yes	18 (60.0%)	9 (25.7%)	10 (45.5%)	16 (88.9%)	7 (53.8%)	60 (50.8%)	
Resin Strip Crown, n (%)							0.44[1]
No	1 (3.3%)	2 (5.7%)	1 (4.5%)	0 (0.0%)	2 (15.4%)	6 (5.1%)	
Yes	29 (96.7%)	33 (94.3%)	21 (95.5%)	18 (100.0%)	11 (84.6%)	112 (94.9%)	
Open Face SSC, n (%)							0.18[1]
No	25 (83.3%)	34 (97.1%)	19 (86.4%)	14 (77.8%)	12 (92.3%)	104 (88.1%)	
Yes	5 (16.7%)	1 (2.9%)	3 (13.6%)	4 (22.2%)	1 (7.7%)	14 (11.9%)	
Pre-Veneered SSC, n (%)							**0.0008**[1]
No	13 (43.3%)	24 (68.6%)	18 (81.8%)	4 (22.2%)	8 (61.5%)	67 (56.8%)	
Yes	17 (56.7%)	11 (31.4%)	4 (18.2%)	14 (77.8%)	5 (38.5%)	51 (43.2%)	
Zirconia - NuSmile, n (%)							**0.001**[1]
No	6 (20.0%)	19 (54.3%)	10 (45.5%)	2 (11.1%)	8 (61.5%)	45 (38.1%)	
Yes	24 (80.0%)	16 (45.7%)	12 (54.5%)	16 (88.9%)	5 (38.5%)	73 (61.9%)	
Zirconia - Sprig, n (%)							**0.003**[1]
No	25 (83.3%)	27 (77.1%)	12 (54.5%)	15 (83.3%)	4 (30.8%)	83 (70.3%)	
Yes	5 (16.7%)	8 (22.9%)	10 (45.5%)	3 (16.7%)	9 (69.2%)	35 (29.7%)	
Zirconia - Cheng, n (%)							0.57[1]
No	27 (90.0%)	32 (91.4%)	18 (81.8%)	15 (83.3%)	10 (76.9%)	102 (86.4%)	
Yes	3 (10.0%)	3 (8.6%)	4 (18.2%)	3 (16.7%)	3 (23.1%)	16 (13.6%)	
Other, n (%)							0.55[1]
No	30 (100.0%)	33 (94.3%)	22 (100.0%)	18 (100.0%)	13 (100.0%)	116 (98.3%)	
Yes	0 (0.0%)	2 (5.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.7%)	

[1]Fisher Exact p-value;

Table 1: Comparison between restorations taught and region.

	Have you worked as licensed dentist before residency?			
	No (N=61)	Yes (N=57)	Total (N=118)	P-value
Stainless Steel Crown, n (%)				0.75[1]
Strongly Agree	38 (62.3%)	36 (67.9%)	74 (64.9%)	
Agree	8 (13.1%)	4 (7.5%)	12 (10.5%)	
Resin Strip Crown, n (%)				**0.01**[1]
Strongly Agree	45 (76.3%)	30 (53.6%)	75 (65.2%)	
Agree	10 (16.9%)	22 (39.3%)	32 (27.8%)	
Open Face SSC, n (%)				0.55[1]
Strongly Agree	3 (5.3%)	1 (2.2%)	4 (3.9%)	
Agree	1 (1.8%)	2 (4.3%)	3 (2.9%)	
Pre-Veneered SSC, n (%)				0.09[1]
Strongly Agree	7 (11.9%)	12 (24.5%)	19 (17.6%)	
Agree	11 (18.6%)	10 (20.4%)	21 (19.4%)	
Zirconia - NuSmile, n (%)				0.57[1]
Strongly Agree	22 (36.1%)	25 (46.3%)	47 (40.9%)	
Agree	16 (26.2%)	16 (29.6%)	32 (27.8%)	
Zirconia - Sprig, n (%)				0.54[1]
Strongly Agree	12 (20.3%)	11 (21.6%)	23 (20.9%)	
Agree	15 (25.4%)	15 (29.4%)	30 (27.3%)	
Zirconia - Cheng, n (%)				0.11[1]
Strongly Agree	8 (13.8%)	8 (16.0%)	16 (14.8%)	
Agree	9 (15.5%)	12 (24.0%)	21 (19.4%)	

Table 2: Comparison between restorations residents plan to use post graduation and work before residency

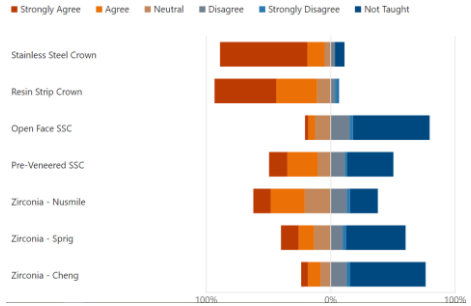

Table 3: Resident competency based on restoration type

Decision-making factors for anterior primary teeth include caries risk assessment, cost, patient age, behavior, technical challenge, and time to exfoliation, and it was noted that patient behavior was the highest-rated factor in treatment planning for these restorations, followed by caries risk assessment, and then time to exfoliation.

Table 1: There is a significant association in the distribution of respondents being taught Stainless Steel Crown restoration between the district of residency program ($p=0.0002$). Rates of being taught this type of restoration are highest in the Southwest (88.9%), followed by North Central (60%), Western (53.8%), Southeast (45.5%), and Northeast (25.7%).

Table 2: There is a significant difference ($p=0.01$) in agreement between those who have work experience before residency and those who do not for Resin Strip Crowns. 76% of individuals with no work experience prior to residency strongly agree with the use of this restoration type, compared to 54% of those with work experience prior to residency. Approx. 39% of those with prior work experience agree with the use of this restoration type compared to only 17% of those without prior work experience.

Table 3: Resident competency % per restoration: resin strip crowns: 95%, zirconia 62%, pre-veneered SSC 43%, and Open-face SSCs 12%.

Discussion

- Important to see how residency programs are teaching, because how residents are taught in their residency will transfer to their practices.
- There's an observable link between what restorative techniques residents were taught, and which they plan to use later in their future planning.
- Statistically significant association between certain regions and restorative options, for example, the use of pre-veneered SSCs no longer being the standard of care in some regions, while 77.8% was taught in the southwest region.
- Regions that favored zirconia Nusmile (north-central and southwest), vs. zirconia Sprig was favored in western programs.
- Prior work experience has an impact on restoration choice.

Conclusion

- Programs in certain regions teach residents differently, which has changed over time and may likely change with advancements in materials and technology.
- There are differing opinions between those residents who had previous work experience compared with residents without work experience.
- With the limited evidence of the best standard practice of primary anterior restorative solutions, having a study confirm residents' experiences is an effective way to look at how programs are shaping future pediatric dentists and their treatment planning.
- Future research project could show how treatment planning changes over time.

References

- Nischal M, Gupta T, Mehra M, et al. Clinical Comparison of Three Tooth-colored Full-coronal Restorations in Primary Maxillary Incisors. Int J Clin Pediatric Dent 2020;13(6):622–629.
- American Academy of Pediatric Dentistry. Overview. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2023:7-9.
- Waggoner, William F, Restoring Primary Anterior Teeth. Conference Paper, Pediatric Dentistry (Pediatric Dent 2015;37(2):163