

Comparison of parental satisfaction with primary anterior zirconia crowns versus strip crowns in children aged 2 to 6 years, over 1 year

¹Dr. Hage Monju , MDS 3rd year, Dept. of Pediatric and Preventive Dentistry, Govt. College of Dentistry Indore, MP India, 452001

²Dr. Anuradha Agrawal, Associate Professor, Dept. of Pediatric and Preventive Dentistry, Govt. College of Dentistry Indore, MP India, 452001.

Corresponding Author: Dr. Hage Monju, MDS 3rd year, Dept. of Pediatric and Preventive Dentistry, Govt. College of Dentistry Indore, MP India, 452001

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: There has been an upsurge in parental engagement in choosing full coronal restorations for their children's primary anterior teeth. There are several choices, including prefabricated zirconia crowns, strip crowns, and anterior cosmetic full coronal restorations.

Aim: Aim of this study is to compare parental satisfaction with strip crowns and preformed primary anterior zirconia crowns over 1 year in 2–6 years old children.

Methodology: 43 zirconia crowns and 43 strip crowns were restored to maxillary primary incisors contralateral in 24 children. Parents gave consent for them to participate in study were called to fill questionnaire over 1 year. Comparison between categorical variables was done using Chi-square test. P value <.05 was considered statistically significant.

Results synthesis: Parents were satisfied with both types of restorations. Statistically significant relationship was found between overall satisfaction, shape, size, color and durability (p value >.05) with strip crowns and zirconia crowns. Parents with lower satisfaction levels with durability of strip crowns and color of the zirconia crowns rated high overall satisfaction.

Conclusion: Respondent's satisfaction with shape, size, colour, durability was more with Zirconia crown as compared to Strip crown. However, the difference was statistically non-significant (p value >.05). Overall satisfaction was equal for both the crowns. Smile satisfaction was more with strip crown as compared to Zirconia crown, however, the difference was statistically non-significant (p value >.05).

Keywords: Strip Crowns, A Zirconia Crown, and Parental Satisfaction.

Introduction

Alterations in oral health of children may interfere with their quality of life. Dental caries is the most common public health problem faced by children [1]. The early diagnosis and management of early childhood caries remains a challenging aspect of dental care for young children [2]. Recently, there is more concern about aesthetics among the

population [3]. The most common problem encountered in primary maxillary anterior teeth is nursing bottle caries or discolourations or fractures [4]. Preserving the primary anterior teeth until exfoliation is important as it acts as a natural space maintainer and prevents speech difficulties and loss of vertical dimension [5]. It is challenging for the dental health care providers to restore anterior teeth. Over the past many years' stainless steel crowns have been used for restoring primary anterior teeth. But, high demand for aesthetics has led to the introduction of various tooth coloured aesthetic crowns like open faced steel crowns, resin (composite) strip crowns like pre-veneered steel crowns and Zirconia crown [5]. Strip crown was introduced by Webber DL et al., in 1979 [6]. Composite resin strip crowns were considered the most aesthetic restorations for anterior primary teeth [7,8]. Each crown has its own advantages and disadvantages. Anterior strip crowns are available in different brands but the most commonly used resin composite strip crowns worldwide is 3M ESPE crown (3M ESPE Dental). Recently, newer resin composite KIDS strip crown has been introduced. There are no studies evaluating the clinical performance of these newer type of crowns. There is a lacunae of research regarding the appearance and performance of KIDS crown. So this study aimed to assess the parental satisfaction and clinical performance of primary anterior teeth restored with stability of the glass ionomer and composite material crown restoration using the preformed strip crown technique in primary maxillary incisors with restricted and extended decay.

Early childhood caries(ECC), which decapitates the deciduous anterior teeth and changes children's physical appearance, most frequently affects infants. A difficult part of dental care for young children continues to be the early detection and management of early childhood caries.[1] Parents routinely supervise the selection of full coronal dental restorations for children with primary anterior carious teeth, and this level of parental engagement in professional decision-making is higher than ever. The primary anterior teeth operate as a natural space maintainer, preventing speech issues and loss of vertical dimension, therefore keeping them in place until exfoliation is crucial. Primary teeth with decay have steadily transitioned from extraction to restoration. Parents typically evaluate the aesthetics, durability, and cost of the therapy before accepting any rehabilitation procedure. For reconstructing main anterior teeth for many years, stainless steel crowns have been employed. However, due to the growing demand for aesthetics, numerous tooth-colored aesthetic crowns have been developed, including open-faced steel crowns, resin (composite) strip crowns, preveneered steel crowns, and Zirconia crowns.[2] The two most popular anterior cosmetic complete coronal restorations are the prefabricated primary anterior zirconia crowns and resin composite strip crowns, both of which were presented by Webber DL et al. in 1979 [3]. Prior to the development of paediatric zirconia crowns that are already built, strip crowns were regarded as the most desirable solution for cracked deciduous anterior teeth. [4,5,] Recently released zirconia crowns in paediatric dentistry have received the highest degree of approval of all the available aesthetic solutions because of their exceptional attractiveness and reasonably high durability. Each crown has unique benefits and drawbacks. Although there are several manufacturers of anterior strip crowns, 3M ESPE crowns are the most often utilised resin composite strip crowns worldwide (3M ESPE Dental). More recent resin composite KIDS strip crowns have just been released. Studies assessing the therapeutic effectiveness of these more modern types of crowns are lacking. Regarding the appearance and performance of KIDS crown, there is a study gap. Therefore, the purpose of this study is to assess parent satisfaction over a 1-year period in children aged 2 to 6 with 3M strip crowns and prefabricated primary anterior zirconia crowns (KidsE).

Materials and Methodology

In this investigation, parents of children between the ages of 2 and 6 were compared to those who had primary anterior zirconia crowns over the course of a year. For their children's main anterior teeth, parents are now more involved in the decision-making process than they were ten years ago. The two most common anterior aesthetic full coronal restorations are the strip crown and the prefabricated zirconia crown. At the Government College of Dentistry in Indore, a questionnaire survey was done in the department of paediatric and preventive dentistry.

Sample Size: 24 kids (86 teeth) (43 strip crown and 43 zirconia crown).

Study Group: Parents who attend the pedodontics and preventive dentistry department and whose kid was treated with a strip crown and a zirconia crown between the ages of 2 and 6 will participate in the study.

Inclusion criteria

1. Participating parents who are parents.
2. Parents of children between the ages of 2 and 6 whose primary maxillary front teeth have received either a strip crown or a zirconia crown.

Exclusion criteria

1. Teeth close to the exfoliation and resorption of the root after it has crossed half of its length.
2. The existence of single-surface caries that do not affect the proximal surfaces
3. Teeth that have experienced trauma are number 3.
4. Lack of cooperation and anxiety that needed to be treated under general anaesthesia.
5. Bruxism.
6. Special healthcare needs

Procedure

- Zirconia and strip crowns were given to 24 kids between the ages of 2 and 6, whose parents agreed to take part in the study, based on the inclusion and exclusion criteria. The parents of the two treated children were surveyed to determine how happy they were with the two full coronal restorations of their children.
- We also inquired about the postoperative child's general happiness and dental health.
- A Likert scale with three points was used.
- Data was entered onto an excel sheet. The data were analysed using SPSS, a statistical software for social sciences, version 21.0.
- Descriptive statistics were employed.
- Numbers and percentages were used to present the data.

The Chi-square test was used to compare categorical variables. A P value of .05 or higher was deemed statistically significant.

Questionnaire Survey

A survey intended to gauge parental satisfaction over the two full coronal restorations of their children involved a total of 24 parents of the treated children. Parents were asked to complete a survey at the end of the first year. The shape,

size, colour, durability, and general contentment of the crown were all factors that parents were asked to rate. In order to gauge the effect of the crown type, questions regarding the postoperative child's dental health and frequency of smiling were also raised. The study was conducted using a 5-point Likert type scale, with response 1 denoting "Highly displeased" and response 5 denoting "Highly satisfied," similar to the scales used in the preceding research. The Visual Analog Scale (VAS), which has equal units from 0 to 10 on a line 10 cm long, was used to ask parents about their child's level of pain and discomfort after restoration over the course of a year 10. Parents might give more commentary regarding their overall experience with the crowns. This survey was developed in light of earlier research by Holsinger et al., Kupieczky and Waggoner, Roberts et al., Salami et al., and Sharma M et al. [6,7,8,9,10]

Statistical Analysis

Descriptive analysis was done for the data, which includes mean and percentages. Data were analyzed using the t-test and Chi-square test. P < 0.05 considered statistically significant. Analyses were performed using the IBM SPSS Statistics for Windows, Versions 20.0. Armonk, NY(New York, USA): IBM Corp

Table 1: Parental satisfaction results for shape, size, color, durability, and overall satisfaction Sample data follow-up at 1 year

Responses	Strip crowns			Zirconia crown		
	Dissatisfied	Neutral	Satisfied	Dissatisfied	Neutral	Satisfied
Shape						
Size						
Color						
Durability						
Overall satisfaction						

Results

Table 2: Comparison of satisfaction towards shape of crowns

		Type of crown		Total	Chi-square value	Df	P value	
		Strip	Zirconia					
Shape	Dissatisfied	Count	0	0	.949	1	.330	
		Percentage	0.0%	0.0%				0.0%
	Neutral	Count	8	5				13
		Percentage	33.3%	20.8%				27.1%
	Satisfied	Count	16	19				35
		Percentage	66.7%	79.2%				72.9%
Total	Count	24	24	48	Chi-square test			
	Percentage	100.0%	100.0%	100.0%				

Majority of the respondents were satisfied with shape of Strip crown (66.7%) as well as Zirconia crown (79.2%). None of them were dissatisfied. The number of participants having different satisfaction level was non-significantly different pertaining to the two crown types (p value >.05).

Table 3: Comparison of satisfaction towards size of crowns

			Type Of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Size	Dissatisfied	Count	1	0	1	1.540	2	.463
		Percentage	4.2%	0.0%	2.1%			
	Neutral	Count	9	7	16			
		Percentage	37.5%	29.2%	33.3%			
	Satisfied	Count	14	17	31			
		Percentage	58.3%	70.8%	64.6%			
Total		Count	24	24	48	Chi-Square Test		
		Percentage	100.0%	100.0%	100.0%			

Majority of the respondents were satisfied with size of Strip crown (58.3%) as well as Zirconia crown (70.8%). A few of them were dissatisfied with strip crown (4.2%) whereas none were dissatisfied with Zirconia crown (0.0%). The number of participants having different level of satisfaction was non-significantly different pertaining to the two crown types (p value >.05).

Table 4: Comparison of satisfaction towards colour of crowns

			Type Of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Colour	Dissatisfied	Count	1	0	1	1.034	2	.596
		Percentage	4.2%	0.0%	2.1%			
	Neutral	Count	9	9	18			
		Percentage	37.5%	37.5%	37.5%			
	Satisfied	Count	14	15	29			
		Percentage	58.3%	62.5%	60.4%			
Total		Count	24	24	48	Chi-Square Test		
		Percentage	100.0%	100.0%	100.0%			

Most of the respondents were satisfied with the colour of Strip crown (58.3%) as well as Zirconia crown (62.5%). A few of them were dissatisfied with colour of strip crown (4.2%) whereas none were dissatisfied with Zirconia crown (0.0%). The number of participants having different level of satisfaction was non-significantly different pertaining to the two crown types (p value >.05).

Table 5: Comparison of satisfaction towards durability of crowns.

			Type of crown		Total	Chi-square value	Df	P value
			Strip	Zirconia				
Durability	Dissatisfied	Count	2	0	2	2.087	2	.352
		Percentage	8.3%	0.0%	4.2%			
	Neutral	Count	11	12	23			
		Percentage	45.8%	50.0%	47.9%			
	Satisfied	Count	11	12	23			
		Percentage	45.8%	50.0%	47.9%			
Total		Count	24	24	48	Chi-square test		
		Percentage	100.0%	100.0%	100.0%			

The percentage of respondents who were satisfied with the durability of Strip crown was 45.8% and that with Zirconia crown was slightly more (50.0%). Similarly, percentage of respondents who were neutral with the durability of Strip crown was 45.8% and that with Zirconia crown was 50.0%. Few (8.3%) participants were dissatisfied with durability of Strip crown whereas none of the participants was dissatisfied (0.0%). The number of participants having different level of satisfaction was non-significantly different pertaining to the two crown types (p value >.05).

Table 6: Comparison of oral hygiene

			Type Of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Oral Hygiene	Dissatisfied	Count	0	0	0	.907	1	.755
		Percentage	0.0%	0.0%	0.0%			
	Neutral	Count	8	7	15			
		Percentage	33.3%	29.2%	31.3%			
	Satisfied	Count	16	17	33			
		Percentage	66.7%	70.8%	68.8%			
Total		Count	24	24	48	Chi-Square Test		
		Percentage	100.0%	100.0%	100.0%			

None of the respondents was dissatisfied with the oral hygiene after placement of either of the crown. Most of the respondents were satisfied with oral hygiene after placement of Strip crown (66.7%) and Zirconia crown (70.8%).

Table 7: Comparison of avoidance of smiling before restoration

			Type Of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Smile Avoided Before Restoration	Dissatisfied	Count	14	15	29	.177	2	.915
		Percentage	58.3%	62.5%	60.4%			
	Neutral	Count	6	6	12			
		Percentage	25.0%	25.0%	25.0%			
	Satisfied	Count	4	3	7			
		Percentage	16.7%	12.5%	14.6%			
Total		Count	24	24	48	Chi-Square Test		
		Percentage	100.0%	100.0%	100.0%			

The number of participants who were dissatisfied with the smile before the restoration with strip crown was 58.3% and those with Zirconia crown was 62.5%. The number of participants was found not to differ significantly between both the crown types (p value >.05).

Table 8: Comparison of smile after restoration

			Type of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Smile After Restoration	Dissatisfied	Count	0	0	0	.105	1	.745
		Percentage	0.0%	0.0%	0.0%			
	Neutral	Count	6	7	13			
		Percentage	25.0%	29.2%	27.1%			
	Satisfied	Count	18	17	35			
		Percentage	75.0%	70.8%	72.9%			
Total		Count	24	24	48	Chi-Square Test		
		Percentage	100.0%	100.0%	100.0%			

None of the participants were dissatisfied with the smile after the strip crown or Zirconia crown restoration. The number of participants satisfied with smile after Strip crown was greater (75.0%) that that after Zirconia crown (70.8%), however, the difference was statistically non-significant.

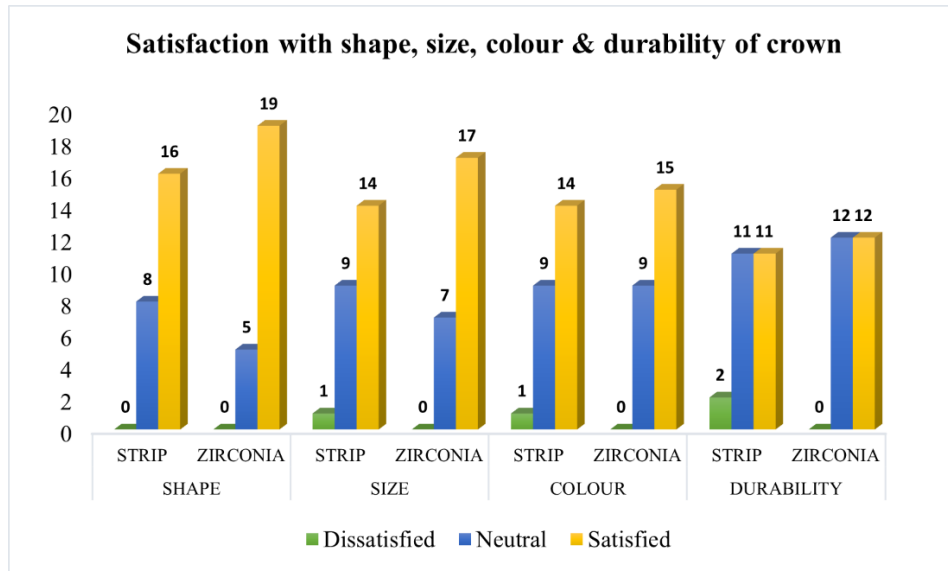


Figure 1: Comparison of satisfaction with shape, size, colour and durability of Strip crown and Zirconia crown.

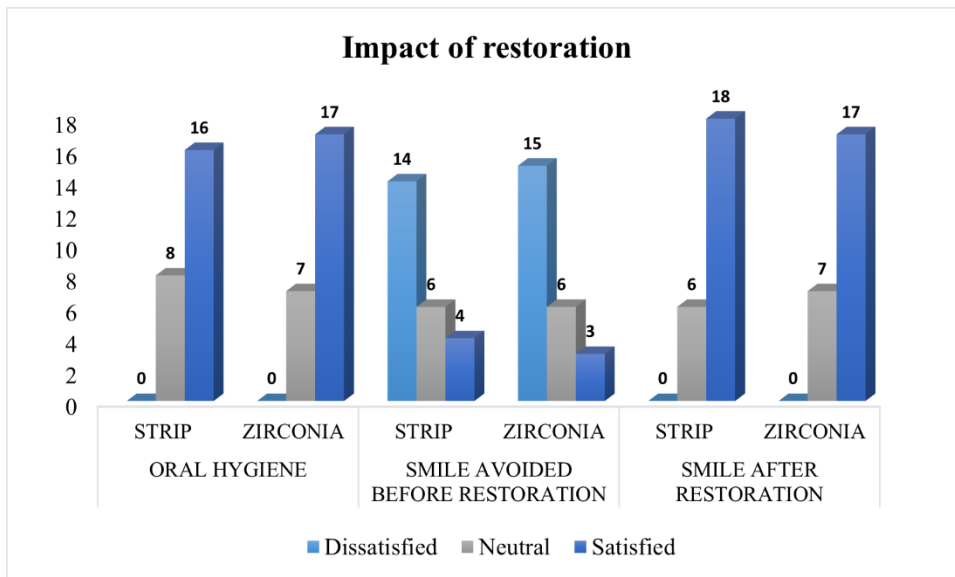


Figure 2: Comparison of impact of aesthetic treatment with Strip crown and Zirconia crown.

Table 9: Comparison of overall satisfaction

			Type Of Crown		Total	Chi-Square Value	Df	P Value
			Strip	Zirconia				
Overall Satisfaction	Dissatisfied	Count	0	0	0	.000	1	1.000
		Percentage	0.0%	0.0%	0.0%			
	Neutral	Count	4	4	8			
		Percentage	16.7%	16.7%	16.7%			
	Satisfied	Count	20	20	40			

		Percentage	83.3%	83.3%	83.3%			
Total	Count		24	24	48	Chi-Square Test		
	Percentage		100.0%	100.0%	100.0%			

Overall, none of the respondent was dissatisfied with either of the crown types. Majority of the participants were satisfied (83.3%) with both the crown types. Few participants (16.7%) were neutral for both the crowns. Thus, there was no significant difference in the level of satisfaction of the participants towards Strip crown and Zirconia crown (p value >.05).

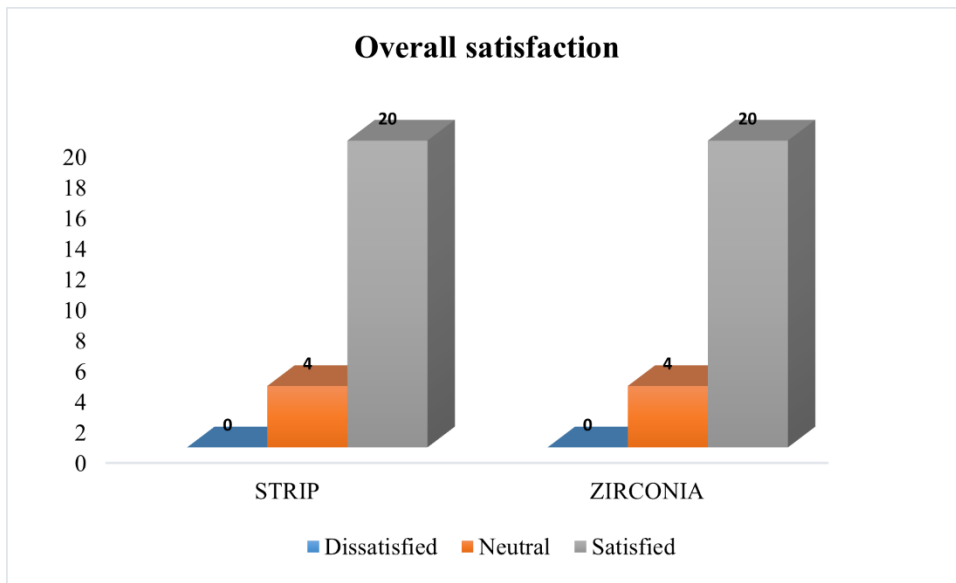


Figure 3: Comparison of overall satisfaction with Strip crown and Zirconia crown.

Discussion

Dentistry has already stepped into a new awareness area where young children want to look even better and their parents look to the paediatric dentists as they can help by offering the best solution, not only for managing caries, maintaining space, repairing broken teeth, but also for managing aesthetics. The loss of anterior teeth may also cause psychological issues, poor masticatory efficiency, and loss of the vertical component of occlusion in addition to the development of parafunctional behaviours such tongue pushing and speech issues. 8 Conditions including ECC, enamel hypoplasia, discolouration, tooth fractures, and bruxism, which impairs children's aesthetics, can all be treated in a variety of ways. Although numerous cutting-edge techniques are used to restore decaying teeth, it is still challenging to satisfy patients, particularly the parents of young children who value superior aesthetics. Silicate cements, resin composite restoration using various acid etching processes, open face stainless steel crowns, polycarbonate crowns, strip crowns, and preformed zirconia crowns are among the alternatives. 12 The strip crown was chosen among the aforementioned treatment options for anterior aesthetics because it is easy to fit and trim, quick and simple to remove, easily matches with natural teeth, provides a smooth shiny surface, is easy to control the shade with composite, and is superior aesthetically, economically, and functionally. The paediatric preformed zirconia crown was another alternative considered for this study because it offers superior aesthetics, complete coverage of the treated tooth, and is less technique sensitive.

This study made a number of observations about how parents perceived the beauty and health of maxillary incisors. An essential step in enhancing communication between the dentist and the parent is comprehending similarities and differences.^[11] The paediatric dentist may be able to provide the best dental care and options for the aesthetic and longevity of the various complete coronal restorations by better understanding parental needs with regard to complete coronal restoration of their child's carious deciduous anterior teeth.^[7] The parent may not always value the same things that the therapist does. The dentist may place the highest value on the patient's comfort and aesthetic appeal, while the parent may be more worried about the patient's longevity and expense of treatment. Therefore, even though the clinician's trained eyes do not find the crowns to be as aesthetically pleasing, the parent may still react favourably because they are pleased that their child's teeth have been preserved and given a more natural appearance after initially believing that the teeth would be extracted.^[8] There is no similar measure of parental satisfaction for these aesthetic complete coverage crowns for deciduous maxillary incisors, despite the fact that the vast bulk of the research examined parental satisfaction with zirconia or resin composite strip crowns on an individual basis. In our study, a nearly equal number of parents reported being "pleased" with zirconia and strip crowns. In the prospective clinical study by Salami et al.,^[6] almost the same number of parents was satisfied for both the zirconia and strip crowns at one year follow up, supported the findings of our study, and in a retrospective study for strip crowns by Kupietzky and Wa,^[7] maximum parents were "very much satisfied" for the shape and size at an average 20.8 months follow up, supported the findings of our study. In our study, a same proportion of parents reported being "Satisfied" with both crowns, and only one parent reported being "Dissatisfied" with the zirconia crowns' colour after a year. The majority of parents were "very satisfied" with the colour of the crowns in the retrospective study for zirconia crowns by Holsinger et al.^[7] at 20.8 months follow up, and Salami et al.^[6] found almost all parents "satisfied" for the colour of both crowns at 1 year follow up, supporting the findings of our study. In contrast to our study, Kupietzky and Waggoner's^[8] retrospective analysis for the strip crowns discovered that, at the 18-month follow-up, more than half of the parents were "extremely satisfied" with the colour of the strip crowns. Durability was defined as the crown's capacity to remain in place on the tooth without breaking and its functional capacity. Zirconia crowns were deemed to be highly durable by parents in this study when parental satisfaction was measured for durability at 1 year, followed by resin composite strip crowns. Kupietzky and Waggoner's^[8] retrospective analysis for strip crowns revealed poor durability with bonded composite strip crowns at an average of 18 months, which had a negative impact on parental satisfaction and Salami et al.^[6] prospective clinical study discovered that, at 12 months, zirconia crowns were more durable than strip crowns, which corroborated the findings of our investigation. At the one-year follow-up, it was discovered that zirconia crowns were more appreciated by the parents overall than resin composite strip crowns. Parental satisfaction results in the prospective clinical study were comparable to our findings; they found 84% and 100% of parents to be "satisfied" with the strip crowns and zirconia crowns, respectively. In contrast, Kupietzky and Waggoner's^[8] retrospective study for the strip crowns found 78% of parents to be "very satisfied" with the strip crowns at an average follow-up of 18 months. According to Kupietzky and Waggoner^[8], the most important aspect influencing overall satisfaction was the durability or retention of resin strip restoration. According to the aforementioned findings, it was also found that zirconia crowns were more popular due to their aesthetics and durability. It is clear that, aside from dental aesthetics, parents in the present day are

extremely concerned about the longevity of nearly any restoration. The dislodgment of the crowns had an impact on their overall satisfaction despite their agreement to make accommodations for the shape, colour, and appearance of these restorations. This bonding restriction was obviously not a factor in the retention of zirconia crowns.^[6] Sharma M et al.^[10] 2021 conducted a recent study to assess parent satisfaction with strip crowns and preformed primary anterior zirconia crowns over a 1-year period in children ages 3-5. They contained 24 children's zirconia or strip-restored restorations of forty maxillary primary incisors. and found that both forms of restorations were well-liked by parents. With strip crowns, there was a statistically significant correlation between overall happiness and durability ($P = 0.004$) and with colour ($P = 0.043$) in zirconia crowns. The parents who expressed less pleasure with the strip crowns' longevity and the colour of zirconia crowns did so overall, though. All crowns have been used for free in our research. Despite having the highest level of parental approval, zirconia main crowns are more expensive than the other option, which may influence their choice. With composite strip crowns, postoperative pain and discomfort were only sometimes experienced, and this could be because the repair itself came loose. The recommendation rate for strip crowns to other parents for decaying primary incisors was discovered to be much higher despite the minor discomfort. In primary zirconia crowns, there was reduced pain and discomfort. The durability and the parents' overall unhappiness were shown to be significantly correlated ($P >.05$). First, despite the fact that composite materials rely heavily on the remaining tooth surface for bonding, the restoration's ability to remain in place depends on how much clinical tooth surface remains after cavities have been excavated and the crown has been prepared. Second, since children's lack of cooperation may damage their bonding, resin composites are moisture-sensitive.^[6] A significant link between the colour of the restoration and general unhappiness for zirconia crowns was also discovered ($P >.05$). While zirconia crowns only come in one shade, there are several colours of composite materials that perfectly match the colour and chroma of natural enamel and dentin.^[12] According to the Indian population, children of the A1 shade, from which crowns are made, are more common, but our enrolled children were from a localised area, i.e., the Indore city region of central India, and not all the children had A1 shade of their primary teeth. This may be the reason why some parents thought it was whiter than the neighbouring teeth and gave it a lower satisfaction score.^[13] The majority of parents concurred that their kids' overall hygiene and attractiveness were improved by the crowns. The kid didn't smile before the crowns were put on, which contributed to the poor average score. Few parents in the sample group experienced grin avoidance prior to repair installation. The fact that the kids were too young and too immature to be self-conscious about their presentation could be one explanation for this observation. A recent study, however, found that youngsters (ages 4-5) exhibited unfavourable social expectancies of altered aesthetics in the primary maxillary dentition. Even though the kids couldn't help but smile before the restorations, 50% of the parents chose the highest response on the Likert scale, indicating that they were highly concerned about how their kids' teeth looked.^[7] It is significant to note that in our study, Zirconia crowns received higher respondent ratings for shape, size, colour, and durability than Strip crowns. The strip crown increased smile satisfaction more than the Zirconia crown, although the difference was statistically insignificant (p value $>.05$). Parents take into account numerous aspects of care that might not be covered in the clinical assessment when they express their overall satisfaction with the treatment received. There are three main ways that parents can intellectually expand their experience of their child's treatment:

- 1) Psychological and social feedback;
- 2) Clinical results; and
- 3) The actual treatment process.

As a result, psychosocial benefits and longevity outweighed the apparent clinical response. ^[10]

Conclusion

The shape, size, and colour of both the strip crowns and the zirconia crowns were rated as satisfactory by almost the same number of parents. Comparing zirconia crowns to strip crowns, it was discovered that zirconia crowns had higher levels of parental satisfaction with durability. The durability of strip crowns and the colour of zirconia crowns received the lowest marks from parents for their satisfaction. However, it had no bearing on the parents' overall pleasure with the Zirconia crowns. Smile satisfaction was higher with the strip crown than with the Zirconia crown. The distinction was, however, not statistically significant (p value $>.05$).

Abbreviation: ECC-Early Childhood Caries, VAS- Visual Analog Scale,

Reference

1. Divya Subramanyam and Ganesh Jeevanandan, Parental Satisfaction and Clinical Evaluation of Kids versus 3M ESPE Strip Crown www.jcdr.net 10 Journal of Clinical and Diagnostic Research. 2018 Aug, Vol-12(8): ZC09-ZC11 Secondary caries: Secondary caries
2. Sahana S, Vasa AA, Shekhar R. Esthetic crown for primary teeth: A review. *Ann Essences Dent.* 2010;2(2):87-93
3. Webber DL, Epstein NB, Wong JW, Tsamtsouris A. A method of restoring primary anterior teeth with the aid of a celluloid crown form and composite resins. *Pediatr Dent.* 1979;1(4):244-46.
4. Garg V, Panda A, Shah J, Panchal P. Crowns in pediatric dentistry: A review. *J Adv Med Dent Scie Res* 2016;4(2):41-46.
5. Kupietzky A. Bonded resin composite strip crowns for primary incisors: clinical tips for a successful outcome. *Pediatr Dent.* 2002;24(2):145-48.
6. Salami A, Walia T, Bashiri R. Comparison of parental satisfaction with three tooth-colored full-coronal restorations in primary maxillary incisors. *J Clin Pediatr Dent* 2015;39:423-8.
7. Holsinger DM, Wells MH, Scarbecz M, Donaldson M. Clinical evaluation and parental satisfaction with pediatric zirconia anterior crowns. *Pediatr Dent* 2016;38:192-7.
8. Kupietzky A, Waggoner WF. Parental satisfaction with bonded resin composite strip crowns for primary incisors. *Pediatr Dent* 2004;26:337-40
9. Roberts C, Lee JY, Wright JT. Clinical evaluation of and parental satisfaction with resin-faced stainless steel crowns. *Pediatr Dent* 2001;23:28-31.
10. Sharma M, Khatri A, Kalra N, Tyagi R. Comparison of parental satisfaction with strip crowns and primary anterior zirconia crowns in 3–5 years old children over 1 year. *J Indian Soc Pedod Prev Dent* 2021;39:423-8.
11. Woo D, Sheller B, Williams B, Mancl L, Grembowski D. Dentists' and parents' perceptions of health, esthetics, and treatment of maxillary primary incisors. *J Pediatr Dent* 2005;27:19-23

12. Hajira NS, Mehta D, Ashwini P, Meena N, Usha HL. Influence of different enamel shades and thickness on chroma and value of dentin vita shade: An in vitro comparative assessment study. *J Contemp Dent Pract* 2015;16:304-9
13. Meera R, Shieh J, Muthu MS. In vivo evaluation of the color of anterior primary teeth. *J Dent Child (Chic)* 2011;78:154-8.