

# Comparison of Parental Satisfaction and Clinical Evaluation of KIDS Strip Crown Versus 3M ESPE Crown in Primary Anterior Teeth-An Invivo Study

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## ABSTRACT

**Introduction:** Restoration of primary anterior teeth is important to preserve and promote the integrity of primary dentition.

**Aim:** The aim of this study is to assess the parental satisfaction and investigate the clinical success of primary anterior teeth restored with 3M ESPE and KIDS strip crowns.

**Materials and Methods:** This study was performed in primary anterior teeth treated with 3M ESPE and KIDS strip crown. Parental satisfaction concerning the aesthetics of the crowns was evaluated by a preformed questionnaire using Likert scale. The clinical success of the crowns was evaluated at recall appointment after one-month interval by using USPHS criteria for retention, marginal adaptation, surface texture, anatomical form and secondary caries formation. Parental satisfaction was

also evaluated after one month. Chi-square test were used to analyse the statistical significant difference between the two groups of restorative materials.

**Results:** The present work studied the overall clinical success for KIDS crown group and 3M ESPE crown group with one month follow-up. There was no statistical significant difference seen between both the groups regarding overall clinical success. ( $p>0.05$ ) Most of the parents felt that the original colour was highly retained in 3M ESPE crown group compared to KIDS crown group ( $p<0.05$ ).

**Conclusion:** The parental satisfaction and the overall clinical success for both the groups were found to be similar. KIDS Strip crown can be used as an alternative restorative option to 3M ESPE crown in primary maxillary anterior teeth.

**Keywords:** Clinical outcome, Esthetic primary tooth, Restoration

## 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 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.

## MATERIALS AND METHODS

This study was conducted in Saveetha Dental College, Ref no: (STP/SDMDS2017PED89). Approval was obtained from Institutional review board. This cross sectional study evaluated the parental satisfaction and clinical performance of two different strip crowns Group 1: KIDS crown; Group 2: 3M ESPE crown immediately after placement and after the period of one month.

**Sample size calculation:** Sample size was calculated with a power of 0.95, alpha error 0.05 and arrived to a sample of 30 using G Power version 3.1. (Department of psychology, University Manheim, Germany). A total of 30 primary anterior teeth, 15 in each group were included in this study. The inclusion criteria was the presence of primary maxillary anterior teeth proximal caries or teeth which has undergone pulpectomy due to early childhood caries. Written consent was obtained from parents or caregivers. All of the restorations were placed using a standardized crown placement protocol [9]. The procedure included restoration of carious maxillary anterior teeth with either 3M ESPE or KIDS strip crown. After placement of the crowns, parents were given a set of questionnaires to assess their satisfaction regarding the restorations done either by using two different strip crowns using Likert scale. Parents were asked to score the criteria such as the crown's colour, size, shape and their overall appearance on a 5-point Likert scale (0-4): 1-very unsatisfied; 2-unsatisfied; 3-neutral; 4-satisfied; and 5-being very satisfied. The clinical success of the crowns were evaluated at recall appointment after one-month interval by using USPHS criteria for retention, marginal adaptation, surface texture, anatomical form and secondary caries formation.

## RESULTS

A total of 45 maxillary anterior teeth which required strip crowns were included in the study. 63.3% males and 36.7% females participated in the study. The demographic distribution of the participants is given in [Table/Fig-1].

	N	Mean age	Male (%)	Female (%)
KIDS Crown	15	5.36±1.23	80	20
3M ESPE Crown	15	5.76±1.34	46.6	53.3
Total	30	5.56±1.35	63.3	36.7

[Table/Fig-1]: Demographic distribution of participants.

**Parental satisfaction:** Independent sample t-test was used to assess the parental satisfaction score for variables such as colour, size, shape and appearance for both the groups [Table/Fig-2]. The average mean score was 4.07 for colour, 4.53 for size, 4.73 for shape 4.67 for appearance in KIDS Crown group. The average mean score was found to be 3.80 for colour, 4.20 for size, 4.47 for shape and 4.73 for appearance in 3M ESPE Crown group. Most of the parents were very satisfied for colour in 3M ESPE crown compared to KIDS crown group at the end of one-month review.

Variables	Groups	N	Mean±SD	p-value
Colour	KIDS Crown	15	4.07±1.10	0.02
	3M ESPE Crown	15	3.80±1.14	
Size	KIDS Crown	15	4.53±0.51	0.08
	3M ESPE Crown	15	4.20±0.77	
Shape	KIDS Crown	15	4.73±0.45	0.31
	3M ESPE Crown	15	4.47±0.64	
Appearance	KIDS Crown	15	4.67±0.48	0.65
	3M ESPE Crown	15	4.73±0.59	

[Table/Fig-2]: Comparison of mean parental satisfaction between the two groups at one month follow up.

[Table/Fig-3,4] depict the clinical success in terms of retention, marginal adaptation, secondary caries, surface texture and anatomic form.

Variables	Intervention Groups				p-value
	KIDS Crown		3M ESPE Crown		
	N	%	N	%	
Retention	15	93.3	15	100	p>0.05
Marginal Adaptation	15	73.3	15	73.3	p>0.05
Secondary Caries	15	100	15	100	p>0.05
Surface Texture	15	86.6	15	80	p>0.05
Anatomic Form	15	100	15	100	p>0.05

[Table/Fig-3]: Clinical success between the two groups.

Overall Clinical Success	Intervention Groups		p-value
	KIDS Crown	3M ESPE Crown	
Yes	66.6%	73.3%	p>0.05
No	33.3%	26.7%	
Total	100%	100%	

[Table/Fig-4]: Overall clinical success between the two groups.

**Retention:** 3M ESPE (100%) and KIDS crown (93.3%) showed no loss of restorative material. No statistical significance difference was found between both the groups (p>0.05). A 3M ESPE was found to have better retention compared to KIDS Crown at the end of one-month review.

**Marginal adaptation:** KIDS crown (73.3%) and 3M ESPE crown (73.3%) showed similar marginal adaptation at the end of one-month review but it was not statistically significant (p>0.05).

**Secondary caries:** Secondary caries formation was not present in any of the groups studied at the end of one-month review.

**Surface texture:** KIDS crown (86.6%) was found to have more enamel like surface when compared to 3M ESPE Crown (80%) at the end of one-month review. But there was no statistical significant difference between the groups studied (p>0.05).

**Anatomic form:** Both KIDS crown and 3M ESPE crown showed no chips and cracks in the restoration at the end of one-month review.

**Overall clinical success:** The overall clinical success of 3M ESPE crown was found to be 73.3% and for KIDS crown group it showed 66.6% [Table/Fig-4].

## DISCUSSION

Recently, there is increasing demand for aesthetics among parents [9]. Aesthetics and durability and cost-effectiveness are the important factors taken into consideration by the parents seeking the dental treatment of their children [10]. Children also prefer to have more aesthetic restorations. Restoration of severely decayed teeth is always a challenge to the clinician. An ideal full coronal restoration for primary maxillary incisors should be durable, easily placed, aesthetic and inexpensive [11]. Strip crown placement is quite technique sensitive and requires cooperation of the child. Children who are lacking cooperative ability, it is difficult for placement of strip crowns and might affect the longevity of the restorations [12]. Contamination of the tooth with oral tissue fluids and moisture results in failure of the restoration [13]. So utmost care should be taken to prevent moisture contamination to achieve excellent retention. The tooth structure should be adequate enough for effective bonding of strip crowns [14]. Restoring carious primary anterior teeth often leads to pulp exposure. Many anterior aesthetic crowns are available in the dental market. In the last few decades aesthetic restoration was found to replace the conventional stainless steel crown which has poor aesthetic appearance [15]. In this regard, various open-faced stainless steel crowns, pre-veneered crowns and resin bonded composite facings were introduced.

Over past many years, 3M ESPE crown were used popularly for primary anterior teeth. Earlier many studies have compared different anterior restorations such as glass ionomer restorations, composite restorations and pre veneered crowns [16]. There are less evidence of randomized controlled trials assessing the clinical success of the restorations in primary incisors. In a study by Tate AR et al., reported that the success rate of strip crowns was 50% [17]. Another study done by Kupietzky A et al., showed 88% success rate with bonded composite resin [18]. This study is the first of its kind to evaluate and compare the mean parental satisfaction and clinical success of two commercially available composite strip crowns in primary maxillary anterior teeth in children. Parental satisfaction of both the groups was assessed by using Likert scale in questionnaire format. The clinical variables were assessed using modified USPHS criteria as it is the standard method for evaluation of anterior restorations in primary teeth.

Parental satisfaction was assessed in this study, since parents are more concerned for aesthetics of the children [19]. In this study, most of the parents were very satisfied for colour in 3M ESPE Crown compared to KIDS crown group at the end of one-month review. It was statistically significant. This was in accordance to a study done by Kupietzky A et al., who reported that the parental satisfaction with bonded resin composite strip crowns for the treatment of primary incisors with multisurface carious lesion was higher [20]. Overall, the parents were more satisfied with 3M ESPE Crown. This could be due to natural tooth like appearance of the crowns due to increased thickness of 3M ESPE crown compared to KIDS crown. Generally, a child with restored anterior teeth will look more pleasing to the parents as compared to unrestored teeth [21].

Retention is extremely important for the restoration because the loss of it will lead to loss in marginal integrity, which leads to fracture of the restoration [22].

At the end of one month follow up, there was 100% retention in 3M ESPE crown group and 93.3% success in the retention rate for KIDS crown. But it was not significant. Study done by Walia T et al., showed that the composite strip crowns were 78% retentive [23]. The overall clinical success of 3M ESPE crown was found to be slightly higher (73.3%) and for KIDS crown group it was 66.6%. This could be due to the well contoured cervical constriction in 3M ESPE crown compared to straight cervical margins in KIDS crown, which could have resulted in less retention. It is necessary for further trimming and polishing of the restoration when KIDS Crown is used, which increases operator's fatigue and is time consuming. There was no difference in the marginal adaptation, anatomic form, surface texture between both the restoration. Overall, there was no significant difference between clinical success between both the groups.

## LIMITATION

The limitations of this present study can be due to the less time period for recall evaluation for clinical success which was not sufficient enough to indicate the superiority of the crowns and operators bias can result if the training was not adequate enough.

Further long term randomized controlled clinical trials are needed to substantiate the high clinical success rate of these new strip crowns.

## CONCLUSION

Parental satisfaction with treatment of both KIDS strip crown and 3M ESPE crown were found to be satisfactory with no significant difference. Both the crowns had similar clinical success rate at the end of one month follow up. KIDS strip crowns can be cost effective restorative option to be used in the primary maxillary anterior teeth.

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