

## **ESTHETIC CROWN IN PAEDIATRIC DENTISTRY: A REVIEW**

Dr.Veerakumar.R<sup>1</sup> Dr.Pavithra.J<sup>2</sup> Keerthana Sekar.G

Priyadarshini Dental College & Hospital, Thiruvallur.

1) Professor, Head of the Department, Department of Pedodontics & Preventive Dentistry.

Priyadarshini Dental College & Research Institute, Thiruvallur (T.N.), India

2) Senior Lecturer Department of Pedodontics & Preventive Dentistry

Priyadarshini Dental College & Research Institute, Thiruvallur (T.N.), India

Address For Correspondence

Dr. R. Veerakumar, MDS

Professor and Head, Department of Pedodontics & Preventive Dentistry

Priyadarshini Dental College & Research Institute, Thiruvallur (T.N.), India

Email id – [keerthi.dk11@gmail.com](mailto:keerthi.dk11@gmail.com)

### **ABSTRACT:**

Early childhood caries remains a significant problem challenging our diagnostic, preventive, and restorative skills. Carious involvement of the maxillary incisors not only potentially compromises the integrity of the dentition, but can create an undesirable esthetic appearance. The primary maxillary incisors teeth are small and require restorations that are retentive, esthetic and resistant to fracture and wear. A variety of esthetic restorative materials are available for restoring primary incisors. Each has distinct advantages and disadvantages and the clinical conditions of placement may be a strong determining factor so as to which material is utilized. Crowns available for restoration of primary incisors include those that are directly bonded to the tooth which generally are made up of a resin material, and those crowns that are luted onto the tooth and are some type of stainless steel crown. This paper reviews various

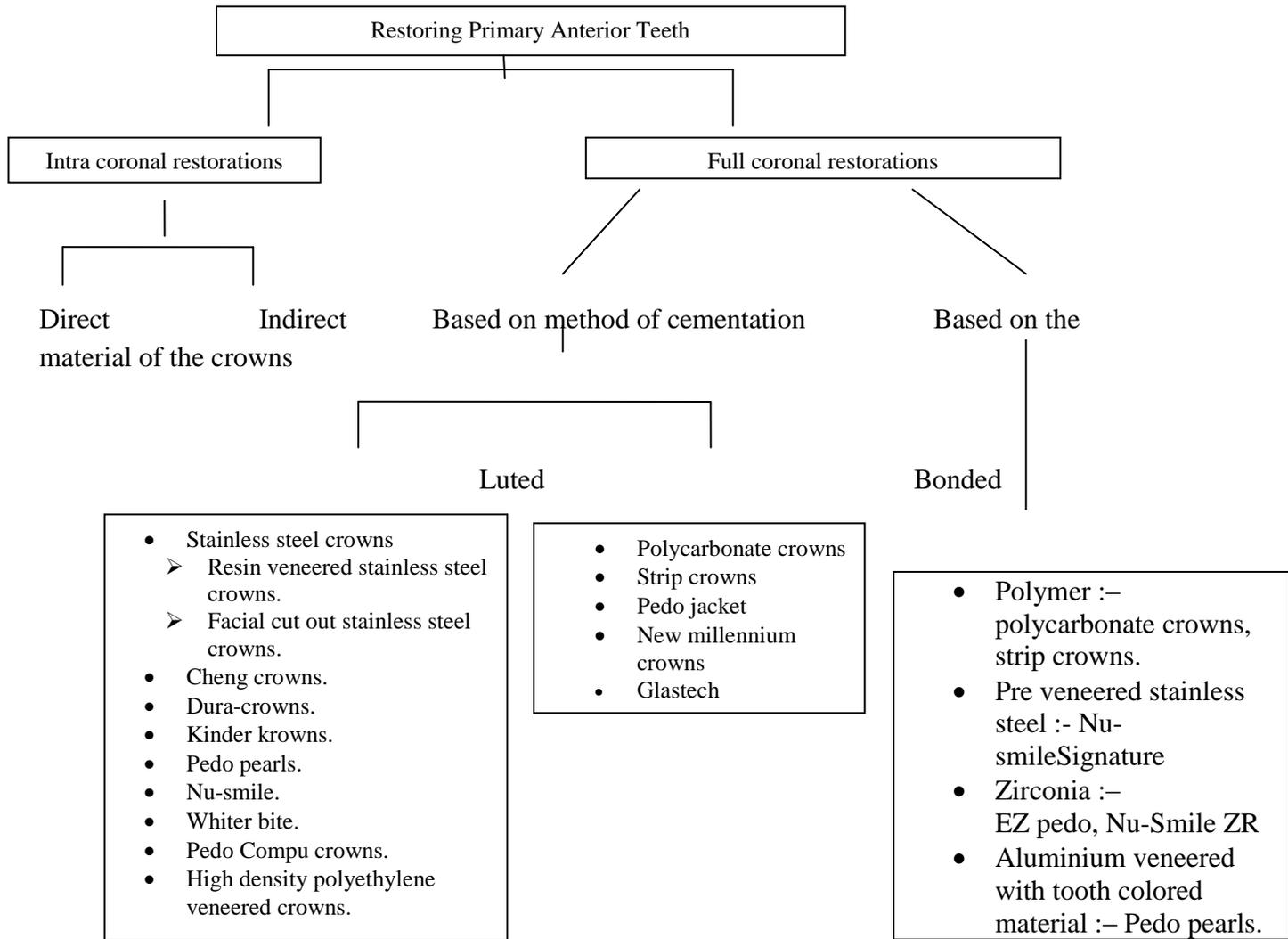
treatment options and various forms of full coronal restorations to ensure esthetics and retention of restoration on primary teeth.

**Keywords:** Esthetics, esthetic crown, primary anterior teeth.

## **INTRODUCTION:**

Esthetics, by definition, is the science of beauty: that particular detail of an animate or inanimate object that makes it appealing to the eye.[1] Esthetic restoration of primary anterior teeth can be especially challenging due to the small size of the teeth, close proximity of pulp to tooth surface, relatively thin enamel and surface area for bonding, issues related to child behavior and finally cost of the treatment.[2] With the growing awareness of the esthetic options available, there is a greater demand for solutions to unsightly problems such as nursing bottle caries, malformed and discolored teeth, hypoplastic defects, tooth fractures and bruxism in children. Owing to these problems, it becomes more important to restore the destroyed crowns to preserve the integrity of the primary dentition until its exfoliation and eruption of permanent teeth. Early childhood caries is a chronic disease that is prevalent in children of low socioeconomic status. These lesions can lead to total destruction of crowns. This kind of dental destruction can lead to development of parafunctional habits like tongue thrusting, psychological problems, reduced masticatory efficacy, and loss of vertical dimension occlusion. Therefore it is important to restore crowns of destroyed by early childhood caries to preserve and promote the integrity of primary dentition, its exfoliation and eruption of permanent tooth. Numerous treatment approaches have been proposed to address the esthetics and retention of restorations in primary teeth.[3]

**CLASSIFICATION: [20]**



**Indications for Full coronal restorations :**

- Caries present on multiple surface.
- Extensive cervical decalcification.
- Incisal edge is involved.
- Anteriors that have received pulp therapy.
- Anteriors that have fractured and lost most of the tooth structure.

- Anterior teeth with multiple hypoplastic defects or developmental disturbances.
- Discolored teeth that are aesthetically unpleasing .
- High risk patients where the oral hygiene is poor but caries is minimal.[20]

**Crowns that are luted to the tooth:**

**a. Stainless Steel Crowns:**

Stainless steel crown were introduced to paediatric dentistry by Rocky Mountain company in 1947 and made popular by W.P.Humphrey in 1950, which proved to be boon to clinical pediatric dental practice. Originally it was intended for restoration of posterior primary and young permanent teeth, its use was expanded to badly decayed anterior teeth. Stainless steel crowns are considered to be the most durable, economical and reliable for restoring severely carious and fractured primary incisors. It can be placed quickly and successfully onto very little tooth structure, even in the presence of blood and saliva, and can be easily crimped. However there is a compromise in esthetics due to the unsightly silver metallic appearance.[4] Stainless Steel crowns are preferred among children between 2-6 years.



Modification of stainless steel crown:

**i) Facial cut out Stainless steel crowns:**

To overcome the drawback of esthetics it involves placement of composite material in a labial fenestration of Stainless steel crowns.[4] Facial cut out Stainless steel crowns can be used in children with rampant carious lesions. However, when the fracture-line extends to below the gingival margin, the stainless steel crown may still be the better choice. The esthetics is fair and provides the advantage of the strength of preformed stainless steel crowns. However the placement of crown is time taking as it involves two-step process. It is economical, most durable,

robust, easy to use and is esthetically pleasing since it is well adapted to the tooth surface. Gingival hemorrhage or moisture is present and cannot be controlled. Difficult to manage saliva and blood contamination while composite facing is done. Increased chairside time is required. Metal may show at the gingival margin of the crown.[5]The preparation begins by first the slicing the mesial and distal surface and removing 1.0 to 1.5 mm incisal edge. Little reduction is needed on the lingual surface. The crown is then extended 0.5 to 1.0 mm beneath the gingival crest and a hole is cut in the labial side of the crown. By using No.114 pliers lingual portion of the crown is adapted to the tooth. The crown is polished and cemented with zinc phosphate or glass ionomer cement and when the cement sets, a window is cut using No.58 bur(Fig 1, Fig 2). A composite resin is used to restore the facing of the primary incisor(Fig 3a,3b)and finishing is done using abrasive disk(Fig 4). Repeat the procedure for the remaining teeth.(Fig 5). Roberts C et al conducted the first study on resin-faced stainless steel crowns used for restoring primary anterior teeth and described the clinical performance of these crowns. He concluded that these stainless steel crowns have high rate of retention and there was high prevalence of one third of the facing failure which occurred most commonly at resin-resin and resin-metal interface.[6]



Fig 1



Fig 2



Fig 3a



Fig 3b



Fig 4



Fig 5

**ii)Resin Veneered Stainless steel crowns:**

Baker LH and Waggoner WF, described that the composite resins and thermoplastics are bonded to the metal. This type of preveneered crown was developed to serve as a convenient, durable, reliable, and esthetic solution to the difficult challenge of restoring severely carious primary incisors.[7] The resistance to fracture and attrition is good in preveneered stainless steel crowns. The main disadvantage is the resin shades which give an artificial look.[8] Placement of PVSSC is also technique sensitive as they rely on luting of the cement and crimping of gingival margins. Crimping is generally done only on lingual side to avoid damage to resin on the facial side.[9]The tooth preparation begins by first with the mesial and distal surface and removing 1.0 to 1.5 mm incisal edge. Small amount of reduction is needed on the lingual surface.(Fig 1, Fig 2) The crown fit is then checked and extended 0.5 to 1.0 mm beneath the gingival crest (Fig 3).By using No.114 pliers lingual portion of the crown is adapted to the tooth(Fig 4)The crown is polished and cemented with zinc phosphate or glass ionomer cement and excess cement is removed(Fig 5)Incisal edges are countered and finished(Fig 6) The first study on resin-faced stainless steel crowns used for restoring primary anterior teeth and described the clinical performance of these crowns.[10]



Fig 1



Fig 2



Fig 3



Fig 4



Fig 5



Fig 6

**b.Cheng Crowns:**

These are Stainless steel pediatric anterior crowns faced with a superior quality composite mesh based with a light cured composite. It was developed by Peter Cheng in 1982. It presents a unique solution for natural-looking Stainless Crowns. They can undergo heat sterilization without significant effect on their bond strength and color.[7] It is available in upper and lower – right & left central and lateral as well as cuspids with 6 sizes. It is economical, technique sensitive, stain resistant, and can be autoclaved. It does not cause any wearing of the opposing tooth. They are most accepted crown which can be done in one visit procedure. Their main disadvantage is veneer may fracture while crimping.[11] Baker et al conducted a study to evaluate the amount of sheer force necessary to fracture, dislodge or deform the esthetic veneer facing of commercially available veneered primary crowns. They concluded that Cheng crowns showed statistically significant results compared to all the other available crowns.[7]

### CHENG CROWNS



### **c.Dura crowns:**

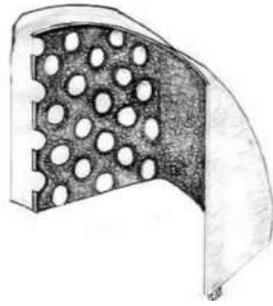
Dura crowns are high density polyethylene veneered crowns. They can be crimped both on the gingival facial margin as well as the lingual margin. They can be easily festooned and easily trimmed with crown scissors. It has got a full-knife edge. These crowns are available in a single shade. Though these crowns provide better esthetics, but they have a few disadvantages to mention. Crimping of the metal portion will weaken the aesthetic facing and may lead to premature failure. Instead care must be taken to have as much as close fit possible in order to reduce the need for crimping and to minimize the dependence on the strength of the cement. Also it requires a lot of tooth reduction prior to the placement of the crown. Guelmann et al reported that Dura Crown, Kinder Krown, and NuSmile crowns were significantly more retentive when crimping and cement were combined than the non veneered crowns.[12]

**DURA CROWN**



**d.Kinder crowns:**

Kinder Crowns are designed with Incisal lock. It provides better retention and more space for composite, which makes it strong without the need for sacrificing much of tooth structure.[7] Kinder crowns have the most natural shades and contour existing for the pediatric patient. The great intensity and vitality from the lifelike composite divulge a natural smile without the bulky "Chicklet" look of other restorations. It comes in two aesthetically pleasing shades, Pedo 1 and Pedo 2. Pedo 2 shade is the most natural shade While Pedo1 is lighter bleached shade than pedo2. Kinder Crowns can be used in fixed bridge fabrication for replacing lost primary central incisors. Zirconia Kinder Crowns have an internal retention system in the form of retention bands.[5] In an article comparison between 3 different types of crown ESSC (NuSmile) and 2 types of primary full ceramic crowns (Kinder Crown and EZ Pedo). Kinder Crown crowns had a significantly lower force required to fracture than the EZ Pedo and NuSmile crowns. The force to fracture the EZ Pedo and NuSmile crowns was not significantly different between these two.[13]



**e.Pedo pearls:**

Pedo Pearls are beautiful heavy gauge aluminum crowns coated with epoxy resin, which serve as permanent crowns for primary teeth. Available in universal size and can be used on any side. This was first introduced in 1980. Advantages are they are easy to cut and crimp without chipping and the composite can be added afterwards also. Disadvantages include less durability and the crowns are relatively soft. In areas of heavy occlusion, the white coating will wear off. Less durable.[14]



**f.Nu-smile:**

NuSmile crowns are introduced in the year 1991. They are made up of stainless steel with even more natural appearing tooth colour coating. They come in two styles NuSmile Signature and NuSmile ZR. The anterior crowns are fabricated with both point angles slightly square, to round off the angles to make left or right sided crown.[15] They can undergo heat sterilization without any significant effect on the bond strength and color. Available in 2 sizes i.e regular and

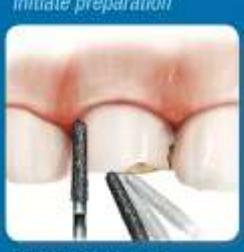
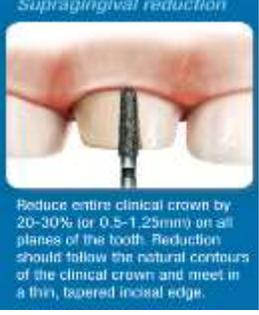
large for centrals, laterals and canines. They have facing only on the labial side, allowing crimping possible only on the lingual side.[9] Their main advantage includes less chairside time, increased longevity, patients-parents satisfaction, it will not discolour, can be autoclaved and improved esthetics. It is costly, bulky, poor gingival health, and crimping may lead to fracture.

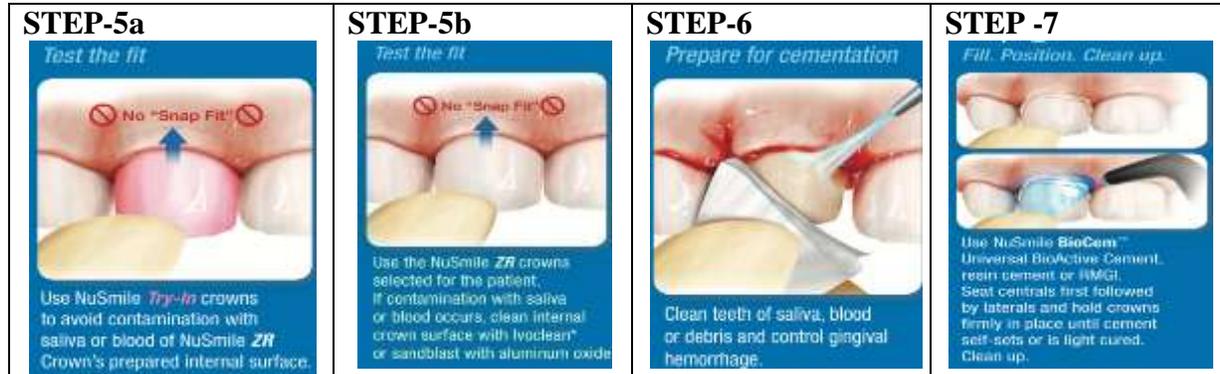


**NuSmile Zirconia crowns on maxillary incisors**

**Nusmile Zr:** It is made up of high grade monolith Zr ceramic. It has increased durability with strength more than enamel. Translucency of Zr ceramic provides excellent esthetics and prevents the problem of dark tooth show through pulpally treated teeth. It is also provided with Nusmile try-in crown to check fitting prior to final cementation. This feature saves clinician's chair side time.

**Nu Smile Zirconia preparation:[16]**

<p><b>STEP-1</b></p> <p><i>Pick the right size</i></p>  <p>Choose the appropriately sized crown for the space and evaluate occlusal relationship. Crown size can be determined using NuSmile <i>Try-in</i> crowns and should be done prior to tooth preparation.</p>	<p><b>STEP-2</b></p> <p><i>Initiate preparation</i></p>  <p>Remove 1.5-2mm from the incisal edge and open interproximal contacts.</p>	<p><b>STEP-3</b></p> <p><i>Supragingival reduction</i></p>  <p>Reduce entire clinical crown by 20-30% (or 0.5-1.25mm) on all planes of the tooth. Reduction should follow the natural contours of the clinical crown and meet in a thin, tapered incisal edge.</p>	<p><b>STEP-4</b></p> <p><i>Create margin and refine</i></p>  <p>Carefully extend and refine the preparation margin to a feather edge approximately 1-2mm subgingivally with a thin, tapered diamond. Check that no subgingival ledges remain. Round all line angles and point angles of prepared tooth.</p>
---	--	--	--



**g. Whiter Biter crowns:**

Whiter Biter crowns are preveneered stainless steel crowns which have a polymeric coating with a polyester/epoxy hybrid composition.[11]The coating is very thin but it does not peel or chip under normal use and mastication. Roberts et al[6]found that 32% of the crowns lose some of the esthetic white facing.

**h. Pedo Compu crowns:**

Pedo Compu crowns are stainless steel anterior crowns with high quality composite facing and mesh based with a light cured composite crown. They are color stable and plaque resistant.[5,11]It has a natural appearance ,colour stable and does not wear the opposing tooth.

**i. High density Polyethylene veneered crowns:**

Esthetic preformed crowns which are veneered with high density polyethylene that is thermoformed over a preformed stainless steel crown. It has high elasticity, great flexure strength, and can withstand shear force. High density polyethylene adapts to tooth by mechanical retention and does not disengage easily and has greater density over composite facing that is commonly used. Chipping, crazing and splitting does not occur

**Crowns that are bonded to the tooth:**

**a.Polycarbonate Crowns:**

Polycarbonate crowns are aromatic linear polyesters of carbonic acid. They exhibit high impact strength and rigidity and are termed thermoplastic resins since they can be molded as solids by heat and pressure into desired form. It is available in a universal color i.e translucent cement shade. Stewart RE et al summarised the various uses of polycarbonate crowns in rampant caries involving three surfaces of the tooth, after pulp therapy, tooth malformation, and abutment for space maintainers. It is contraindicated when there is inadequate spacing between teeth, crowding of anterior, deep impinging bite, severe bruxism and evidence of abrasion in the anterior teeth.[17]



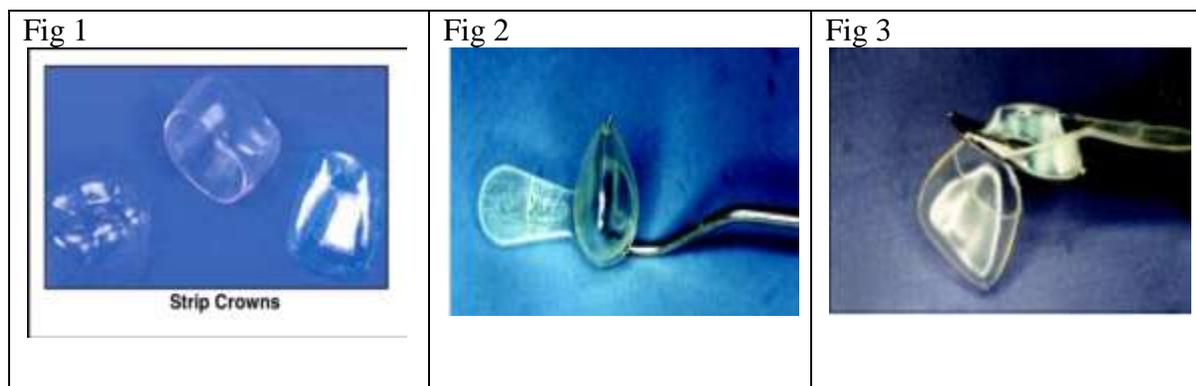
### **b.Strip crowns :**

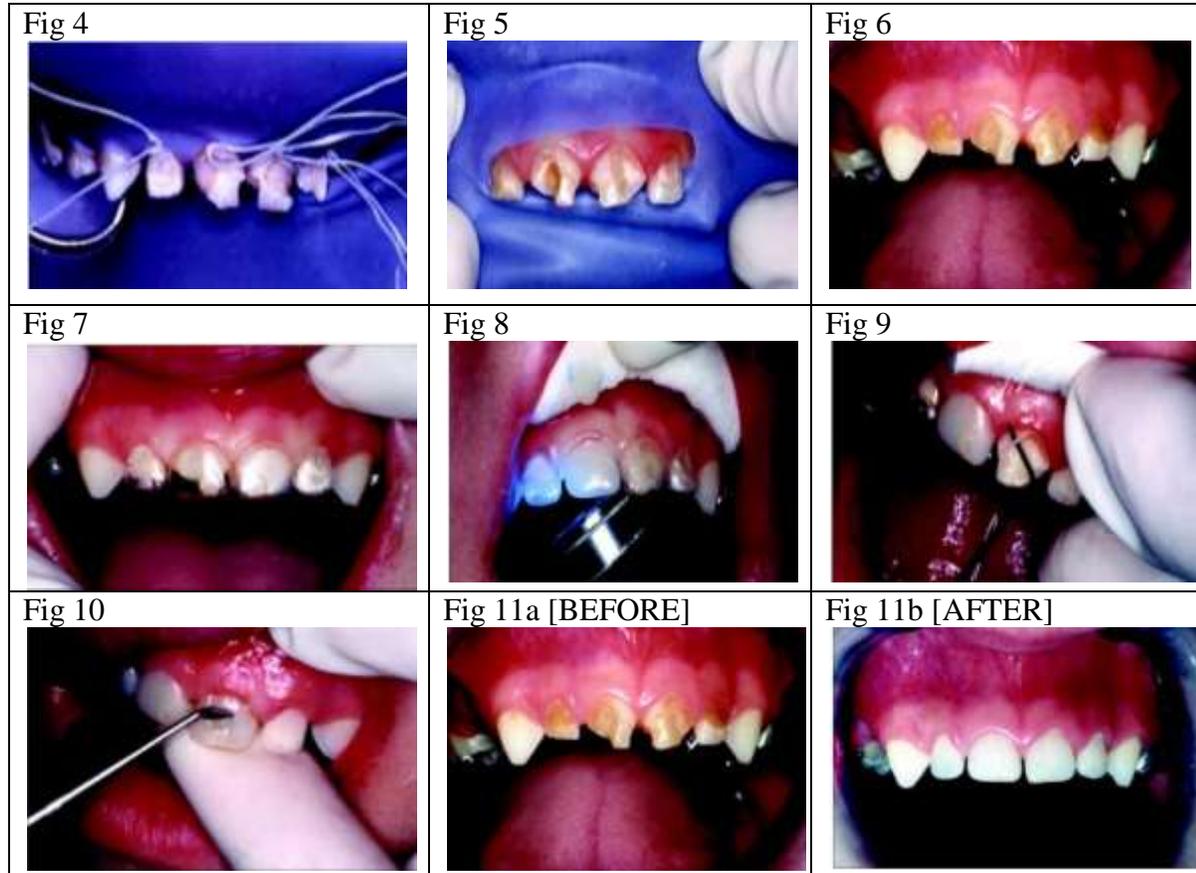
Strip crowns are first introduced by Webber et al and are the most commonly used Crown forms filled with composite & bonded on the tooth. It is the most esthetic of all the restorations available to the clinician for the treatment of severely decayed primary incisors. Composite strip crowns rely on dentin and enamel adhesion for retention. Therefore the lack of tooth structure, the presence of moisture or hemorrhage contributes to compromised retention .They are less resistant to wear and fracture more readily than other anterior full coverage restorations.Kupietzky A et al summarised that strip crowns are simple to fit and trim, removal is fast and easy,matches natural dentition, leaves smooth shiny surface, have easy shade control with composite, are superior esthetically, functionally and economically, crystal clear, thin and are easy to repair.[18] They are technique sensitive . Moisture contamination with blood or saliva interferes with the bond. Haemorrhage can alter the shade or colour of the material. Adequate tooth structure is needed for bonding.[5]

### **Strip crown preparation:**

Preparation of the strip crown may be accomplished prior to the treatment visit(Fig 1).The crown is pierced with a sharp explorer at the mesial or distal incisal angle to create a core vent

for the escape of any air bubbles entrapped in the crown(Fig 2).Following vent preparation, sharp, curved scissors should be used to trim the crown gingival margins (Fig 3).Rubber dam is retained in place by use of ligature ties to deflect gingival tissue.(Fig 4).It is suggested to use the slit-dam-method only in severe subgingival carious incisors (Fig 5).A stainless steel, round, medium-to-large-sized bur should be used in a low- speed handpiece for caries excavation and tooth reduction.(Fig 6).Following the application of a resin-modified glass ionomer liner/base for dentin protection, all crowns should be fitted and placed (Fig 7). It is suggested to fill and cure each crown individually with unfilled crown forms in place on their respective teeth to ensure proper spacing between restorations (Fig 8). Special care should be taken to carefully remove (prior to filled crown placement) a collar of cured bonding agent, which will interfere with proper seating of the crown form if it is left in place (Fig 9)Minimal filling is highly recommended. Instead of using a rotary instrument to remove the crown ,A sharp hand-held instrument such as a cleoid/discoid carver is recommended to peel off the strip crown shell (Fig 10). This results in only minimal damage to the cured restoration. An excellent result was obtained following the use of the above-described method and is presented in (Figs 11a and 11b).[18]Kupietzky & Waggoner assessed parental satisfaction for composite strip crowns and concluded that parents were satisfied with the crowns regardless of the color, size or overall appearance. However they were not satisfied when asked about the durability of strip crowns. Though these crowns are widely accepted by patients, the chances of its failure are more. The reasons for this maybe due to technique sensitive procedure, adequate tooth structure is required and any lapse in patient selection, moisture and blood loss control, tooth preparation and placement of resin.[18]





In recent times, bis-acryl composite-based temporization material has become the material of choice for temporization purposes owing to its improved mechanical properties. One such bis-acryl composite temporary material is available as Luxatemp Star (DMG, Germany). It is available as two-component material, which are mixed just prior to its use, using the automix syringe that dispenses the material in the ratio of 10:1. It is available in different shades, and thus helps to achieve customized esthetics suiting the patient's needs. Following steps were followed for this novel approach of restoring the tooth with custom-fabricated crowns with temporization material, Caries excavation and composite core build-up (if required): Initially, caries was excavated and composite core-build-up was done, to block the undercuts. (Fig. A) Tooth preparation: Crown cutting was done, reducing the tooth ~1.5 mm from all sides (Fig. B) Selection of appropriate-sized strip crowns: An appropriate-sized strip crown was selected to fabricate the crown. This is done similar to the strip-composite technique (Fig. C). Strip crown loading: Shade matching was done in accordance with the adjacent teeth, and strip crown was loaded with temporization material using automix syringe. Loaded strip crowns were then placed

on the prepared tooth within 45 seconds and removed while the material is still in elastic stage (1.30-2.20 minutes after start of mixing) (Fig. D). Tearing of the strip crown: Material was then allowed to set extraorally, and strip crown was peeled off (Fig. E). Crown cementation: The finished crown was cemented over the prepared crown using Perma-cem™ (DMG, Germany). Good immediate esthetic results were achieved along with the good satisfaction among parents

(Fig. F) Moreover, in contrast to using strip crown with composite, a crown fabricated with temporization material is not dependent on the direct bonding of composite to the tooth material and thus, may have better retention properties even in cases where remaining tooth structure is less. This bis-acrylate-based temporization material (Luxatemp Star) is available in different shades and claims to have good flexural strength, better color stability, and dimensional stability. All these properties make it a suitable choice for esthetic restoration of primary carious teeth. Conclusively, chair-side custom fabrication of full-coronal restoration in primary anterior teeth using a temporization material might be a cost-effective alternative; however, randomized clinical trials are required to evaluate color stability and longevity of these restorations.[19]



**c.Pedo jacket crown:**

Pedo Jacket crowns were introduced by Space Maintainers Laboratory ,USA. It is made up of tooth coloured polyester material and is filled with resin material. It is left on the tooth after

polymerization apart from being removed as in strip crown after curing of luting resin cement.[5] Crown placement can be completed in a single sitting and is cost effective .Multiple adjacent restorations with minimal tooth reduction .Crown will not split, stain or crack and can be trimmed with scissors. Available in a single color so shade selection is difficult and cannot be reduced by using high speed finishing bur.



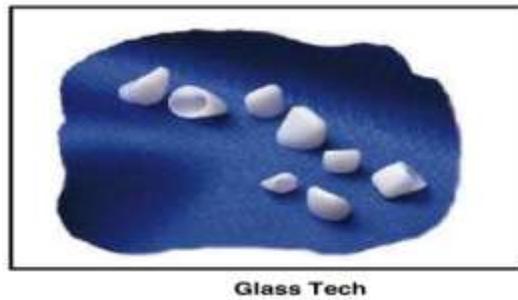
**Pedo Jacket**

**d.New Millennium Crown:**

These crowns are made up of Lab enhanced composite resin material. Their main advantage is they can be finished and reshaped with a high-speed finishing bur. Enhanced esthetics but they are very brittle, more expensive than other crown and cannot be crimped. Technique sensitive as for proper retention they need adequate bonding area and moisture control.[5]

**e.Glastech:**

It is made of Artglass, which is a polymer glass used for restoration of anterior primary teeth. It contains bifunctional and new multifunctional methacrylates forming a cross-linked, threedimensional polymer. Due to such structural nature of the crown they are also known as “organic crowns”. It consists of 55% microglass and 20% silica filler The unique filler materials of microglass and silica are proposed to provide greater durability and esthetics than strip crowns. They are available in one shade and in 6 sizes for primary central, lateral and cuspid teeth. They are very expensive.[5] Esthetics same as natural dentition, durable and wear is similar to enamel. Inorganic filler particles provide color stability and make them plaque resistant. Flexural strength is over 50% higher than porcelain and can be easily adjusted or repaired intraorally .Ease and bondability of a composite ans requires minimum chairside work .



### **CONCLUSION:**

Many restorative options exist for treating primary anterior teeth. Several modifications and newer esthetic crowns have been presented to overcome the disadvantages of stainless steel crowns. These crowns were introduced to meet the increasing esthetic demands of patient as well as their parents. These modifications include open faced and veneered stainless steel crowns. Open faced stainless steel crowns have a facial window cut wherein composite resin is bonded onto the tooth whereas in pre-veneered crowns (NuSmile primary crowns, kinder crowns), esthetic composite veneers are retained onto stainless steel using variety of mechanical and chemical bonding approaches. Both these crowns have superior esthetics than conventional stainless steel crowns. However, their durability is compromised because of limited crimping. These crowns are also bulky, very expensive and lack natural appearance. Finally the choice of restorative technique depends upon the clinicians preferences, skill, esthetic and functional demands by the parents and child's behavior that affect the ultimate outcome of whichever restorative material chosen.

### **REFERENCES:**

1. Arens D. The Role of Bleaching in Esthetics. *Dent Clin N Am* 1989; 33:319-36.
2. Shah PV, Lee JY, Wright JT. Clinical success and parental satisfaction with anterior preveneered primary stainless steel crowns. *Pediatr Dent* 2004;26:391-5
3. Snawder KD, Gonzalez WE. Management of severely diseased primary anterior teeth. *J Dent Child* 1975;42:181-185

4. Lee JK. Restoration of primary anterior teeth: review of the literature. *Pediatr Dent* 2002;24:506-10.
5. Sahana S, Vasa AAK, Sk Ravichandra. Esthetic Crowns For Anterior Teeth: A Review. *Annals and Essence of Dentistry*. 2010-2:87-93.
6. Robert C, Lee JY, Wright JT. Clinical Evaluation Of and Parental Satisfaction With Resin-Faced Stainless Steel Crown. *Pediatr Dent*. 2001;23:28-31
7. Baker LH, Moon P, Mourino AP. Retention of esthetic veneers on primary stainless steel crowns. *ASDC J Dent Child* 1996;63:185-9.
8. T. Walia, A. A Salami, R. Bashiri, O. M Hamoodi, F. Rashid: A randomised controlled trial of three aesthetic full-coronal restorations in primary maxillary teeth. *European Journal of paediatric dentistry* vol. 15/2-2014.
9. Veerakumar R. et al, Caution! We are erupting as twins”, *Journal of Clinical & Diagnostic Research*, Vol 5, Issue 5, Pg . 1123-1124, October 2011.
10. Gaurav Kumar Mittal, Aviral Verma, Hansika Pahuja, ShashankAgarwal, Himani Tomar: esthetic crowns in paediatric dentistry: a review. *International Journal of Contemporary Medical Research*, Volume 3 | Issue 5 | May 2016 | ICV: 50.43 |
11. Prashant Babaji. *Crowns in Pediatric Dentistry*. 1st edition. Jaypee Publishers. 2015.
12. Guelmann M, Gehring DF, Turner C. Retention of veneered stainless steel crowns on replicated typodont primary incisors: an in vitro study. *Pediatr Dent* 2003;25:275-8.
13. Vinson LA, McCrea MC, Platt JA, Sanders BJ, Jones JE, et al. (2016) Fracture Resistance of Full Ceramic Primary Crowns. *J Dent Oral Health Cosmesis* 1: 005.
14. Yilmaz Y, Guler C. Evaluation of different sterilization and disinfection methods on commercially made preformed crowns *J Indian Soc Pedod Prev Dent* 2008;26:162-7.
15. NuSmile ZR ZirconiumMilk Front Tooth Crown Extralight;2016.
16. [https://www.nusmilecrowns.com/Plugins/Widgets.FAQ.Vinformatix/Content/FAQ/FAQ\\_CategoryFiles/IFU%2001%20Signature%20Technical%20Guide%20\(Eng\)%20Rev5.pdf](https://www.nusmilecrowns.com/Plugins/Widgets.FAQ.Vinformatix/Content/FAQ/FAQ_CategoryFiles/IFU%2001%20Signature%20Technical%20Guide%20(Eng)%20Rev5.pdf).
17. Stewart RE, Luke LS, Pike AR. Performed Polycarbonate Crowns For The Restoration Of Anterior Teeth *J Am Dent Assoc*.1974;88:103-7
18. Kupietzky A Bonded Resin Composite Strip Crowns For Primary Incisors: Clinical Tips For Successful Outcome. *Pediatr Dent*. 2002;24:145-8.

19. Gugnani N, Pandit IK, Gupta M, Nagpal J. Esthetic Rehabilitation of Primary Anterior Teeth using Temporization Material: A Novel Approach. *Int J Clin Pediatr Dent* 2017;10(1):111-114.
20. Sahana Suzan ,Vasa Aron Arun Kumar, Sekhar Ravichandra.Esthetic crowns for primary teeth:a review *Annals and Essences of Dentistry*.2010 Apr-June; 2(2): 87-91.