

Posterior Esthetic Crowns in Pediatric Dentistry

Jyoti V Tote¹, Alkesh Godhane², Gautam Das³, Smriti Soni⁴, Kritika Jaiswal⁵, Gaurav Vidhale⁶

1- Reader, Dept of Pedodontics & Preventive dentistry, Maitri College of dentistry and research centre, Anjora, Durg (C.G), India. 2- Professor and Head, Dept of Pedodontics & Preventive dentistry, Maitri College of dentistry and research centre, Anjora, Durg (C.G), India. 3- Senior Lecture, Dept. of Pedodontics & Preventive dentistry, Maitri College of dentistry and research centre, Anjora, Durg (C.G), India. 4,5- Post Graduate student, Dept. of Pedodontics & Preventive dentistry, Maitri College of dentistry and research centre, Anjora, Durg (C.G), India.

Correspondence to:
Dr. Jyoti V Tote, Dept of Pedodontics & Preventive dentistry, Maitri College of dentistry and research centre, Anjora, Durg 491001, (C.G), India.

ABSTRACT

Today's market is full with variety of esthetic crowns. Each of them is present with different clinical consideration, advantages and disadvantages. Crowns are indicated in case of mutilated teeth due to any reason. Parents from today's society are with increased awareness for esthetic restorations. This review article acknowledges us with various esthetic options available for full coronal restoration.

KEYWORDS: Esthetic materials, Primary Posterior Crowns, Restorations

INTRODUCTION

Oral health is indeed reflection of a wholesome lifestyle. Dental caries affecting mankind still remained one of the most widespread, multifactorial diseases. Carious destruction of tooth structure in a child leads to various abnormalities which affect esthetics, self-esteem, mastication, speech, maintenance of arch length and development of oral habits which in general causes disorientation of overall health.¹ Hence, the mutilated teeth need to be restored to preserve the integrity of dentition till the eruption of permanent teeth.

Although dental caries has been declining globally in general population among older children still, the caries prevalence with younger one has not shown a significant decline.² ECC and severe ECC are the most common cause of partial or complete loss of coronal tooth structure in primary dentition. Posterior teeth are always given importance as they are vital particularly in the mastication and development of occlusion.³

The approach of pediatric esthetic in dentistry must not be just achieving a beautiful smile and rather it must be achieving a healthy beautiful smile. This review throws light on various options available in the literature on posterior esthetic crown along with their clinical implications.

INDICATIONS FOR PEDIATRIC CROWNS

Indications for pediatric crowns include :

- Large/multi surface caries or lesion.
- Interproximal caries extending beyond line angles.
- Following pulpotomy or pulpectomy.

- High caries risk children.
- Intermediate restoration of fractured tooth.
- Patient of bruxism
- Cervical decalcification
- Developmental defect.
- Use as an abutment for space maintainer.

TYPES OF POSTERIOR CROWN

Over the years there have been many types of full coverage restoration available to restore posterior primary teeth:

1. Stainless steel crown
2. Polycarbonate crowns
3. Pre veneered stainless steel crown
 - a. Nu smile
 - b. Kinder crowns
4. Zirconia crowns
 - a. Nu smile Zr
 - b. Kinder crowns Zr
 - c. EZ Pedo
5. Aluminium veneered with tooth coloured material
 - a. Pedo pearls

1. Stainless Steel Crown (SSC)

In 1950 SSC were introduced by Dr William Humphrey. These were most reliable restoration in terms of full coverage as they were competent for mastication. Traditionally, in the post treatment pulpectomy or pulpotomy SSC were the treatment of due to less microleakage as compare to those restored with amalgam.^{4,5} People from today's society are more conscious to esthetics, which makes SSC to fail (Fig 1). To overcome the drawback of SSC, attention was shifted to various esthetic crowns.

How to cite this article:

Tote JV, Godhane A, Das G, Soni S, Jaiswal K, Vidhale G. Posterior Esthetic Crowns in Pediatric Dentistry. Int J Dent Med Res 2015;1(6):197-201.



Fig.1 Stainless Steel Crown

2. Polycarbonate crowns: It is tooth colored heat cure acrylic resin. Its advantages include esthetic, can be easily trimmed and adjusted. Failure of polycarbonate crowns lies on the fact that they could not resist high abrasive force therefore, are contraindicated in case of bruxism and deep bite.⁶

Pedo natural crowns-are unique flexible polycarbonate crowns. Isolation is not an issue with pedo natural crowns as all materials are hydrophilic in nature(Fig. 2).



Fig. 2 Polycarbonate Crowns

3. Pre-veneered stainless steel crown (PVSSC): All PVSSCs provides strength and durability of conventional SSC with added advantage of esthetically pleasing appearance. PVSSCs show very high parental satisfaction in terms of durability, size, shape and colour.⁷

Materials used for veneering are:

- Thermoplastic materials
- Composite and epoxy resins

Pattern of attachment are:

- Buccal surface only
- Buccal and occlusal surface

PVSSC are available as-

- Nusmile crowns
- Kinder Crowns

a) Nusmile Crown: In these crowns nano composite veneer facing bonded directly to alumina blasted with SSC core. It is available in two shades extra light and

light. It can withstand to high load. Nusmile Crowns are polished instead of glazed to reduce wear on opposite dentition. It is easy to place, has high fracture resistance, increased colour compatibility and stability, higher retention.⁸ They are available as pre-veneered and pre-contoured crowns(Fig. 3).⁹



Fig. 3 Nusmile Crowns (Ref.9)

b) Kinder Crowns: These are composite veneer facing bonded to fenestrated SSC base, offered in two shades pedo1 shade ,which is bleached white shade whereas pedo 2 shade provides with most natural shade. Better mechanical retention is observed with kinder krown because it is designed with incisal lock. This incisal lock also increases surface area which turn increases bonding (Fig. 4- A,B).¹⁰



Fig. 4 (A) Kinder Crowns(Ref.10)

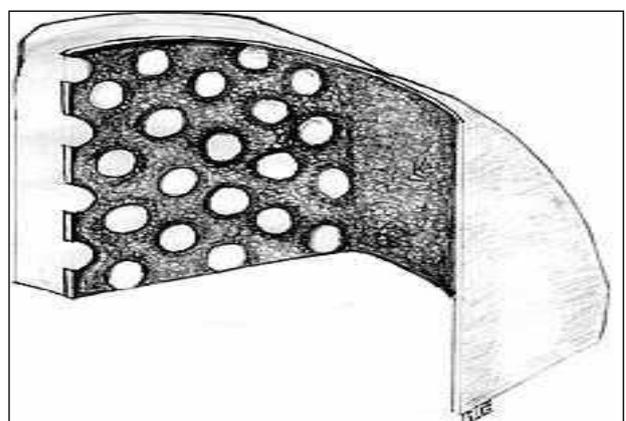


Fig.4(B) Kinder Crown 'Incisal Lock'

Comparison between nusmile and kinder crown has been provided in Table No.1, (Fig. 5-A,B).

	Nusmile crowns	Kinder Crowns
1.	Veneer have equal thickness.	Veneer have thinner facing occlusopalatally. This area was more prone to fracture. ¹¹
2.	Buccal cusp is less prominent.	Buccal cusp is more prominent. This area shows a typical pattern of metal exposure. ¹¹
3.	Proximally, outline is rounder.	Proximally, sharper angulation is present. ¹¹ Causing sometimes a small metal exposure at mesial contact area.

Table:1 Comparison between Nusmile and kinder crown

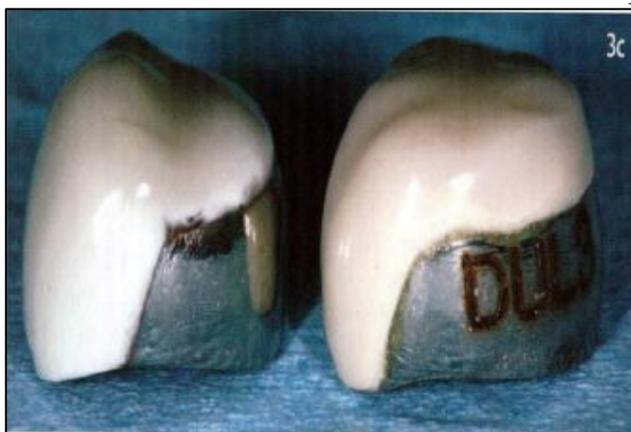


Fig. 5(A) Nusmile PVSSC With Round(Ref.11)

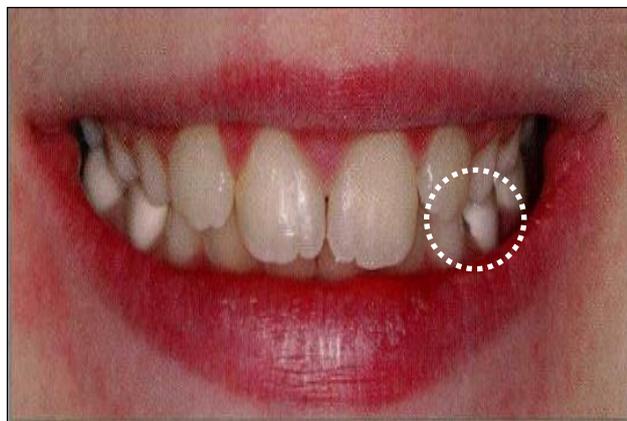


Fig. 5(B) Metal Exposure At Mesial contact area due to sharper angulation present with Kinder Crowns.(ref.11)

Advantages of PVSCCs-

- Esthetic
- Single appointment
- Easy placement
- Less technique sensitivity

Disadvantages of PVSCC's-

- Staining (Fig.6)
- Wear of crown veneer.(Fig.7)
- Poor gingival health than SSCs.¹²
- Veneer facing fracture leading to reduced esthetics after few years.¹³(Fig.8)



Fig.6 Staining With PVSSC's (ref .8)

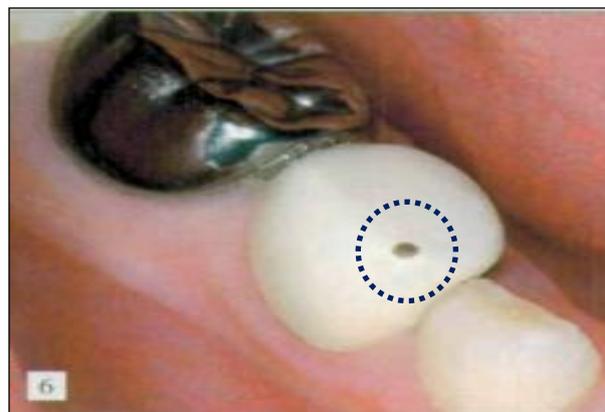


Fig.7 Wear Of Crown Veneer.(Ref.8)



Fig.8 Fracture Of Crown Veneer(Ref.8)

4. Zirconia: This are polycrystalline ceramic without glass component. It is polymorph that occurs in three from:

- Monoclinic - pure zirconia stable at 1107 °C
- Tetraclonic – above 1107 °C
- Cubic face – at 2370 °C

The volume expansion caused by different forms of zirconia induces large stress which leads Zirconia to crack. By adding small amount of yttria these phase changes are eliminated and the resulting material has high compressive strength, high fracture resistance, corrosion

resistance, durability and biocompatibility.¹⁴ These are metal free crowns. The only disadvantage it carries is high cost.

These are available as:

- Nusmile Zr
- Kinder Zr
- EZ-Pedo

a) **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 prevent the problem of dark tooth show through pulpally treated teeth.(Fig. 9)

It is also provided with nusmile try-in crown to check fitting prior to final cementation. This feature not only save clinician's chairside time but also eliminate extra steps and disinfection of crown.



Fig. 9 Nusmile Zr Crowns (Ref.9)

b) **Kinder crowns Zr:** It is based on nano technology, produces most consistent, high quality zirconia. It has polished surface to reduce opposite enamel wear. It has internal retention system which locks the restoration after cementation. This retention bands also provide with additional surface are for bonding. Fine feathered margin of zirconia kinder crown makes the emergence profile for the crown as natural as possible. It is available in two sizes mid size and regular size. Mid-sizes are designed for first and second primary molars to alleviate seating issues in situations when you are placing crowns back to back or when your patients have experienced major space loss. The mid-sized crowns hold their buccal-lingual width, at the same time as the mesial-distal has been reduced to allow for easier position placement(Fig. 10).



Fig.10 Kinder Krowns Zr (Ref.10)

c) **EZ Pedo Crowns:**It comes with the patented retention technology 'zir -lock ultra' i.e. retentive grooves which extent all the way to the crown margins, preventing cement washout. It also prevents entry of harmful bacteria, moreover it provides two times more surface area for bonding. Additional retention is provided through blasting with aluminium oxide(Fig. 11a,B).

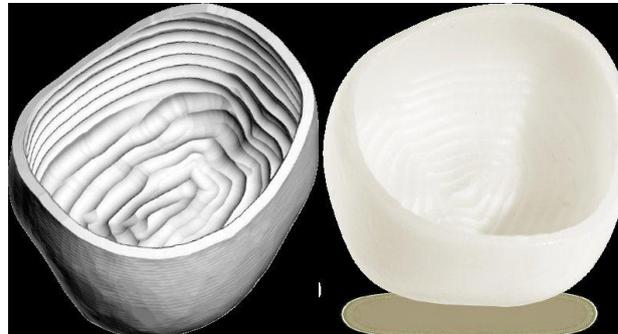


Fig.11(A,B) Zir- Ultra Retention System Of EZ Crowns

Advantage of zirconia crowns:

- High strength and toughness
- Can withstand wear and tear
- Translucent sufficient to be comparable to natural teeth
- Less tooth removal
- No metal fuse
- Modifiable size, shape and color
- Biocompatible

Disadvantages of zirconia:

- Abrasive effect on tooth
- High cost

5. Aluminum veneered with tooth coloured material:

These crowns are thinner and light in weight than stainless steel crowns. Tooth preparation is similar to that of stainless steel. There is ease for trimming and crimping.

DISINFECTION OF CROWN

Autoclave sterilization is not recommended for PVSSCs as their lies the risk of discoloration of facing material. Therefore chemical sterilization is recommended for these crowns.^{1,9} Zirconium crowns are autoclavable. Also chemical disinfectants from various brands are available in market(Fig.12).



Fig.10 Kinder Krowns Zr (Ref.10)

CEMENTATION OF CROWN

- SSCs, PVSCCs, polycarbonate crown are cemented with normal glass inomer luting cements.
- Zirconium crowns are cemented with resin luting cements.

CONCLUSION

Esthetics has become a respectable concept in dentistry today.^{15,16} In the past, the importance of esthetics was discounted in favour of concepts such as function, structure and biology. But impact of esthetics should always be considered in treatment plan as it has vital role in child's overall general health and psychological well being. Current wide ranges of available esthetic crowns help us to meet the parental satisfaction and acceptance in terms of esthetics.

REFERENCES

1. Attari N, Robert JF. Restoration of primary teeth with crowns-a systemic review of the literature. *Eur Arch Pediatr Dent*. 2006 Jan;7(2):58-62.
2. AAPD. American Academy of Pediatric dentistry reference manual 2011-2012. *Pediatric Dentistry*. 2011:331-349.
3. Usha M, Deepak V, Venkat S, Gargi M. Treatment of severely mutilated incisors: a challenge to the pedodontist. *J Indian Soc Pedo Prev Dent* 2007;25 Suppl:S34-6.
4. Randall RC. Preformed metal crowns for primary and permanent molar teeth: review of the literature. *Pediatr Dent* 2002;24:489-500.
5. Croll TP, Helpin ML. Preformed resin-veneered stainless steel crowns for restoration of primary incisors. *Quintessence Int* 1996;27:309-13.
6. Mathew RA. Esthetics in primary teeth. *Int. Res. J. Pharm.* 2013,4(8).
7. Champagne C, Waggoner W, Ditmyer M, Casamassimo PS, MacLean J. Parental satisfaction with preveneered stainless steel crowns for primary anterior teeth. *Pediatr Dent* 2007;29:465-98.
8. Leith R, O'Connell AC. A clinical study evaluating success of 2 commercially available preveneered primary molar stainless steel crowns. *Pediatr Dent* 2011;33:300-6.
9. NuSmile Pediatric Crowns. Clinician's #1 choice for esthetic crowns. Available at: "http://www.webcitation.org/query?url=http%3A%2F%2Fwww.nusmilecrowns.com%2F&date=2014-05-05". Accessed November 12, 2014.
10. Kinder Krowns Esthetic Pediatric Crowns. Raising the standard in esthetic pediatric dental restorations. Available at "http://www.webcitation.org/query?url=http%3A%2F%2Fwww.kinderkrowns.com%2F&date=2014-05-05". Accessed November 12, 2014.
11. Kratunova E, O'Connell AC. A randomized clinical trial investigating the performance of two commercially available pediatric preveneered stainless steel crowns. *Pediatr Dent*. 2014; V 36.
12. Fuks AB, Ram D, Eidelman E. Clinical performance of esthetic posterior crowns in primary molars: a pilot study. *Pediatr Dent* 1999;21:445-8.
13. Ram D, Fuks AB, Eidelman E. Long-term Clinical Performance of Esthetic Primary Molar Crowns. *Pediatr Dent*. 2003;25:582-584.
14. Ritzberger C, Apel E, Höland W, Peschke A and Rheinberger VM. Properties and Clinical Application of Three Types of Dental Glass-Ceramics and Ceramics for CAD-CAM Technologies. *Materials* 2010, 3, 3700-3713.
15. Arens D. The Role of Bleaching in Esthetics. *Dent Clin N Am* 1989; 33:319-36.

Source of Support: Nil
Conflict of Interest: Nil