Esthetic Crowns In Pediatric Dentistry: A review

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ABSTRACT

Early childhood caries remains a significant problem challenging our diagnostic, preventive,and restorative skills. Often, caries in very young children involves the maxillary anterior teeth and the primary molars while the mandibular anterior teeth are generally not involved. 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, therefore, are difficult to treat. However, various treatment options have been described in literature to ensure proper esthetics and retention of restorations for such cases.

Keyword: Esthetic Crowns

INTRODUCTION

A primary objective of placing crown is to achieve an esthetic improvement. A remarkable change is also seen in the patient's self image after correction of the texture, shade and shape along with good physiological form and function which helps in preventing further deterioration of the mouth by prevention of tooth migration, bone loss and arch collapse.

Classification

According to Sahana S et al[1]

a) Crowns that are luted to the tooth
   1) Resin veneered stainless steel crown
   2) Facial cut out crown
   3) Polycarbonate crown
   4) Pedo pearls
b) Crowns that are bonded to the tooth
   1) Strip crowns
   2) Pedo jacket crowns
   3) New millennium crowns
   4) ART glass crowns

Open-faced stainless steel crowns

For incisors, the main indication for stainless steel crowns is following crown fracture, when they are used to retain pulp-protecting dressings, prevent leakage, and to restore form and function, provided the crowns are trimmed and crimped properly, and the edges well-polished, they fulfil the requirements very well. The main drawback is aesthetics, and this problem is overcome by cutting out the labial face of the crown and filling in with a tooth-coloured material, such as composite. With the development of the acid-etch technique, and the improvement in handling, finishing aesthetic considerations of composite materials, these have largely replaced the use of stainless steel crowns for the repair of fractured incisors. However, when the fracture-line extends to below the gingival margin, the stainless steel crown may still be the better choice. Hartmann CR and Helpin ML[2] suggested that in children with rampant carious lesions, open-faced stainless steel crowns can be used. Although some esthetics is sacrificed, increased functional stability is added to these restorations.

Procedure

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. A composite resin is used to restore the facing of the primary incisor.

Roberts C et al[3] 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.

Veneered stainless steel crowns

Baker LH[4] and Waggoner WF[5] described the availability of veneered SSC facing materials like thermoplastic or composite resins. Esthetic veneers are retained on the stainless steel crown by a variety of mechanical and chemical bonding approaches. Four companies are currently marketing stainless steel crowns with pre bonded resin veneer facing that extend to all cosmetically prominent areas. Virtually no metallic structure is evident from usual conversational distance. Some of the crown forms are bonded to a welded meshwork on the crown, and others are simply chemically fused to the metal surface.

Waggoner WF and Cohen H[6] have described pre veneered stainless steel crown forms for primary incisors is an esthetic option for the full coverage restoration of broken down incisors.

Polycarbonate crown

In children, the most common lesion in anterior teeth are due to nursing bottle caries. These lesions begin on the labial

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surface of all anterior and they progress rapidly as diffused demineralization of the entire surface of all existing teeth. The best a dentist can offer at this time is the stabilization of the lesion. Polycarbonate crowns are the temporary crowns which can be given in such situation as a fixed prosthesis to deciduous anterior teeth which will get exfoliated in future. Polycarbonate crowns are aromatic linear polyesters of carbonic acid. According to Nitkin DA et al[7] these crowns 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. Their heat distortion point is about 270°F. Stewart RE et al[8] advocated the use of polycarbonate crown as these are extremely stable dimensionally, as evidenced by +/- 0.001 inch tolerances during molding. Their weakness, as far as dentistry is concerned, is poor abrasion resistance.

Indications

Stewart RE et al[8] summarised the various indications as:

1. Rampant caries involving three surfaces of the tooth.
2. After pulp therapy
3. Tooth malformation
4. Abutment for space maintainers

Contraindications

1. When there is inadequate spacing between teeth.
2. Crowding of anterior
3. Deep impinging bite is present
4. Severe bruxism
5. When there is evidence of abrasion in the anterior teeth.

Strip Crowns

Primary anterior strip crowns were developed as an answer to the esthetic and functional problem of stainless steel crowns. Esthetically, they provide a striking similarity to the original primary tooth. Functionally, they allowed for normal incisal wear of the primary teeth to take place. Use, however, was restricted to primary teeth having sufficient enamel for bonding retention after caries removal. Resin-bonded composite strip crowns are the first choice restoration for many clinicians, mainly because of the superior aesthetics and the ease of repair if the crown subsequently chips or fracture. However, it is the most technique-sensitive option. Moisture contamination with blood or saliva may interfere with the bond, and haemorrhage can alter the shade or colour of the material. Additionally, adequate tooth structure must remain after caries removal to ensure that there is sufficient surface area for bonding. The strip crowns are transparent crown forms which simplify composite work for Pedodontics anterior restoration. These are trimmed and filled with either chemical or light curing composite material. They contour the material and support it while it sets and then strip off easily leaving smooth surface.

Strip crown placement technique

1. Local anaesthesia is administered and teeth is isolated.
2. The teeth is prepared as for a crown to allow for the bulk of the resin in the final crown form. The length of the crown is reduced incisally using a high speed tapered diamond or tungsten carbide bur. Mesial and distal slices are cut tapering to a knife edge at the gingival margins.
3. Proper shade of the composite resin is now chosen. This is mandatory to achieve good esthetic results.
4. Celluloid strip-crown forms are selected of right size.
5. Vent holes at the incisal-edge corners of the crown form allow air to escape when it is filled with composite resin.
6. The crown form(s) with composite resins are firmly seated on to the prepared teeth.
7. The composite resin is cured and using an excavator or probe is the celluloid and the crown form is stripped off.
8. The cured crown is smoothened and polished.

Kupietzky A et al[9] stated following advantages of strip crowns:

i. They are simple to fit and trim.
ii. The removal is fast and easy.
iii. Easily matches natural dentition.
iv. They leave smooth shiny surface.
v. They have easy shade control with composite.
vi. They are superior esthetically, functionally and economically.
vii. They are crystal clear and thin.
viii. They are easy to repair.

Ram D et al[10] in their study described the disadvantage of strip crowns as most technique sensitive option, moisture contamination with blood or saliva interferes with the bond and haemorrhage can alter the shade or colour of the material.

OTHER NEWER CROWNS

Pedo Jacket Crown

Pedo Jacket crown 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 from celluloid crown form after curing of luting resin cement[1]

New Millennium Crown

They were introduced in market by the Success Essentials, Space Maintain Laboratory. These crowns are made up of composite resin material that is laboratory enhanced. They are similar to Pedo jacket crown and strip crown. The advantage being that they can be finished and reshaped with a high-speed finishing bur. However disadvantages include that they are very brittle and more expensive than other crown forms and cannot be crimped.[1]

Pedo Pearl

It is a new type of crown in the process of being developed and field tested. It is a metal crown form similar to a stainless steel crown, but it has been completely coated with tooth-coloured epoxy paint. These crowns are made of aluminium instead of stainless steel as the epoxy coating adheres much better to the aluminium. They serve as ultimate permanent crown in the primary dentition.

According to Sahana S et al[1], the various advantages are they are easy to cut and crimp without chipping and the composite can be added afterwards also. However they have less durability and are relatively soft.

Artglass crowns

Artglass crown commonly known as Glastech, is made up of artglass which is a polymer glass used for restoration of anterior primary teeth. It is a new multifunctional methacrylate with the ability of forming three dimensional molecular net-

works with highly cross linked structure. They have the micro glass and silica as filler materials which provide greater durability and esthetics than strip crown. It gives dual advantages which provides the bondability and feel of composites and longevity and esthetics of porcelains.[1]

CONCLUSION

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.

REFERENCES

1. Sahana S, Vasa AAK, Sk Ravichandra. Esthetic Crowns For Anterior Teeth: A Review. Annals and Essence of Dentistry. 2010-2:87-93.
2. Hartmann CR. The open-faced stainless steel crowns: An esthetic technique. ASDC J. Dent. Child. 1983;50:31-3.
3. Robert C, Lee JY, Wright JT. Clinical Evaluation Of and Parental Satisfaction With Resin-Faced Stainless Steel Crown. Pediatr Dent. 2001;23:28-31.
4. Baker LH, Moon P, Mourino AP. Retention of esthetic veneers on primary stainless steel crowns. J Dent Child. 1996;63:185-9.
5. Waggoner WF. Restoring Primary Anterior Teeth. Pediatr Dent. 2002;24:511-6.
6. Waggoner WF, Cohen H. Failure strength of four veneered primary stainless steel crowns. Pediatr Dent. 1995;36-40.
7. Nitkin DA, Rosenberg Hm Yaari AM. An Improved Technique for the Retention of Polycarbonate Crowns. J Dent Child. 1977;44:08-10.
8. Stewart RE, Luke LS, Pike AR. Performed Polycarbonate Crowns For The Restoration Of Anterior Teeth J Am Dent Assoc.1974;88:103-7.
9. Kupietzky A Bonded Resin Composite Strip Crowns For Primary Incisors: Clinical Tips For Successful Outcome. Pediatr Dent. 2002;24:145-8.
10. Ram D, Fuks AB, Eidelman E, et al. Long-Term Clinical Performance of Esthetic Primary Molar Crowns. Pediatr Dent. 2003;25:582-4.

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