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STAINLESS STEEL CROWNS VERSUS COMPOSITE RESTORATION IN THE PRIMARY DENTITION- AN OVERVIEW.

Dental Science

Dr. Jitender Kumar Mandyal M.D.S, Dept. of Oral & Maxillofacial Surgery, Himachal Institute of Dental Sciences, Paonta Sahib.

Dr. Harneet Kour B.D.S, Bhojia Dental College and Hospital, India.

ABSTRACT

Dental caries remains the most prevalent chronic disease affecting the paediatric population worldwide affecting 621 million children with primary teeth. Acid-producing bacteria cause it in the presence of fermentable carbohydrates. If left untreated dental caries in children can severely impact the oral health as well as the general well-being of the child. Impaired speech and Difficulty in eating due to pain and infection are among the immediate consequences. It may also cause long-term effects such as compromised growth and development, increased risk of dental caries in permanent teeth and even poor academic performance. It is important to treat and restore severely damaged teeth for the preservation of healthy primary dentition. The This narrative review aims to focus on the restoration done using stainless steel crown and composite resin restoration and their comparison in terms of durability aesthetics and functional success.

KEYWORDS

Stainless Steel Crowns, Crowns, Paediatric Dentistry, Composite Resin Restoration, SSC

INTRODUCTION

In spite of the decrease in caries cases, untreated carious primary teeth remain a global health problem.[1] Water fluoridation, patient education, fluoridated dentifrices, oral rinses and professionally applied topical fluorides have significantly reduced tooth decay; however, the occlusal surface of the teeth remain the most susceptible to caries. Data indicates that more than 80 percent of Treatment provided in a contemporary dental practice is attributed to pit and fissure caries.[2] The prevalence of dental caries among Indian school going children in primary dentition ranges from 64 to 78%, and in permanent dentition, the value ranges from 18 to 67%. Female had higher caries incidence than male. Prevalence of 61.8% noticed in low socioeconomic group and 49.1% in high-socioeconomic status people.[3] The prevalence of dental caries among Indian school-going children was high in primary dentition, when compared with permanent dentition. Also, there is no statistical significant difference in the rate of caries prevalence among rural and urban areas.[3] Research shows that untreated cavities cause pain in children and contribute to dental fear.

Composite Resin Restoration

Composite resins are widely used for anterior or posterior restorations in primary teeth. Mechanical or physical improvement in composite resin properties such as filler content, amount and morphology have allowed for usage in different restoration types.[6] Composite Resin Restoration has superior aesthetic properties. Another significant advantage of Composite resin restoration is their ability to bond to tooth structure. This bonding strengthens the restoration, seals the margins and thereby prevents micro leakages and secondary caries. The conservative nature of composite resin restoration allows for the preservation of more natural tooth structure which is particularly beneficial in paediatric patients.[1] Recent advances have improved its both mechanical properties and wear resistance making it more suitable for the paediatric population.[2] CRR are versatile and can be used for restorations including fillings, small to medium sized cavities. They can also be used for both anterior or posterior teeth providing flexibility in treatment options.[7]

However, CRR have certain drawbacks when used primarily for deciduous molars. As posterior teeth have high occlusal stress, durability is a major concern. Composite resin restoration has high polymerization shrinkage that results in marginal deficiencies, cracked cusps and material fracture, especially in multi-surface restorations after pulp treatment. The fracture of restoration may cause microbial infiltration leading to endodontic treatment failure.[4] CRRS are also highly technique sensitive therefore dentist's technique and quality of the materials used also plays a major role. Moisture control and proper isolation is very important to achieve high bond strength as contamination with saliva can compromise the restoration's longevity. It's also a time-consuming process which may be uncomfortable to many patients.[8]

Composite resin restoration is often more expensive than alternatives such as stainless-steel crowns or amalgam. composite may not be the ideal restorative material for primary posterior teeth requiring large multi surface restorations or high-risk patients with poor oral hygiene, numerous carious teeth, and demineralization.[9]

Composite resin restoration also gets stained generally, all staining agents stained all composite resin materials; tea produce the most severe stain and multivitamin syrup the least.[10]

Indications in Primary Teeth

1. Small pit and fissure caries.
2. Occlusal surface caries extending into dentin.
3. Class 2 restorations in primary teeth that do not extend beyond the proximal lone angles.[2]
4. Class 3, 4, and 5 restorations.[2]

Contraindications

1. Teeth cannot be isolated.
2. Individuals needing large multiple surface restorations in the posterior primary dentition.
3. High risk patients with multiple caries or tooth demineralization.[2]
4. Patient with poor oral hygiene.

Stainless Steel Crowns

Stainless steel crowns are widely regarded as the standard choice for restoring extensively decayed or damaged primary molars.[11] Placement of a stainless-steel crown is the most commonly recommended restoration following endodontic treatment of primary molars as it provides a coronal seal, preventing microbial infiltration or restoration failure over time.[4] The primary advantage of SSCs is their exceptional resistance to wear i.e they are durable also provide longevity, efficiency, cost effectiveness and reliability making them a suitable choice for the paediatric population.[11] Apart from SSC's no restorative material available offers the advantages of affordability, low cost and durability when interim full coronal coverage is needed.[11] They are particularly indicated in patients with conditions like hypophosphatemia, heritable dental defects (e.g. amelogenesis imperfecta, dentinogenesis imperfecta) and enamel hypoplasia. SSCs should be carefully placed, especially in patients where gingibal inflammation is a risk factor. Proper adaptation of crown margins can minimise irritation and periodontal problems.[5]

SSCs are extremely helpful in regaining lost tooth structure. At present, the primary purpose of using SSCs is to facilitate ideal chewing activity and vertical size continuity for a child. SSCs provide satisfactory adhesion and chewing function. They are durable i.e they have high survival rates. In addition, no technical precision is required. Therefore, SSCs are commonly used for restorations in the posterior primary teeth.[12]

The crown is fitted and cemented quickly reducing the chair time and patient discomfort. This ease of application is advantageous in the paediatric population as reducing treatment time can improve patient

compliance and comfort.[4] Although SSCs are less adaptable to specific aesthetic and individual needs compared to tooth coloured restorations like CRRs their effectiveness in preventing further caries and their long-term durability often can lead to a patient and parent satisfaction.[4]

Indications

1. Following pulp therapy.
2. Multi Surface caries restorations.
3. Patients at high risk of caries.
4. Deciduous teeth with developmental defects, such as amelogenesis imperfecta, dentinogenesis imperfecta, enamel hypoplasia.
5. Teeth with extensive wear.
6. Where it is likely that the restoration will fail, e.g., the proximal box formed is extended beyond the anatomic line angles.
7. Fractured teeth.
8. Abutment for space maintainer.[11]
9. Patients who are unlikely to attend follow up appointments.

Contraindications

1. Primary teeth that exhibit more than a half of root resorption.
2. Primary tooth approaching exfoliation (6 to 12 months).
3. The tooth is with excessive mobility.
4. Patients with nickel allergies and sensitivity.
5. Inability to fit the crown due to lack of cooperation by the patient.[11]

Composite Resin Restoration VS Stainless Steel Crowns

Various factors should be considered while choosing between stainless steel crowns and composite resin restorations including caries prevention, indications, aesthetics, allergic reactions, failure rate and cost among others.

Decision making in clinical practice involves several critical factors such as:

1. Extent of decay [5]
2. Patient Behaviour [8]
3. Aesthetic concerns
4. Long term prognosis. [13]

The decision-making process should also involve a discussion with the parent or a guardian explaining to them about the advantages and disadvantages of both the restorations considering their preferences. When dealing with paediatric patients, age and behaviour are factors to be observed. A collaborative approach is required for carrying out the restoration in a short span of time.[8] All these factors should be considered before placing an appropriate restoration.

CONCLUSION

In conclusion, both composite resin restorations and stainless-steel crowns have specific roles in the management of primary dentition that are discussed above. Both the types of restorative material have their own specific advantages and disadvantages. The American academy of paediatric dentistry recommends the use of SSCS for primary molars with extensive caries, require pulp therapy or are at high risk if future caries while CRRS are recommended for teeth with less extensive caries particularly in aesthetically sensitive areas. Deciding on which of these restorative options is most appropriate depending upon the amount of tooth decay present, patient habits, aesthetics, patient behaviour and long-term prognosis. By adhering to these clinical guidelines and involving parents in the decision-making process, dental practitioners can offer treatment that is personalised to each individual patient keeping in mind their specific needs. This approach ensures both functional efficacy and aesthetic satisfaction in primary dentition. Educating parents and making informed decisions based on the condition of the tooth and patient factors contribute to achieving optimal outcomes for paediatric patients.

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