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Stainless Steel Crowns in Pediatric Dentistry: A Review

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Abstract **Review Article**

Stainless steel crowns (SSCs) have been widely recognized as one of the most durable and reliable full-coverage restorations in pediatric dentistry. Despite the emergence of esthetic alternatives such as zirconia crowns and pre-veneered stainless steel crowns, SSCs remain the gold standard for the management of extensively damaged primary teeth. This review summarizes the indications, advantages, limitations, clinical techniques, and current perspectives on SSCs in pediatric dental practice.

Keywords: pediatric dentistry, stainless steel crowns, zirconia crowns, pulp therapy, restorative dentistry.

INTRODUCTION

Restorative dentistry in children aims to preserve primary teeth until their natural exfoliation, maintaining arch integrity, function, and esthetics. Stainless steel crowns, introduced by Humphrey in 1950, revolutionized pediatric restorative dentistry by offering a predictable and long-lasting solution for severely carious or structurally compromised primary teeth [1]. Although modern dentistry increasingly emphasizes esthetics, SSCs continue to be widely used due to their superior longevity and cost-effectiveness [2].

INDICATIONS FOR STAINLESS STEEL CROWNS

The American Academy of Pediatric Dentistry (AAPD) recommends SSCs in a variety of clinical situations, including [3]:

- **Extensive caries:** when multisurface lesions compromise structural integrity.
- **After pulp therapy:** such as pulpotomy or pulpectomy.
- **Developmental defects:** including amelogenesis imperfecta, dentinogenesis imperfecta, and enamel hypoplasia.
- **Fractured teeth:** where significant coronal tooth structure has been lost.
- **Space maintenance:** serving as abutments for appliances.

Advantages of Stainless Steel Crowns

SSCs provide several clinical benefits, which account for their sustained popularity:

- **Durability:** High success rates, often lasting until natural exfoliation [4].
- **Cost-effectiveness:** Less expensive compared to zirconia and veneered crowns [5].
- **Protection of tooth structure:** Provides full coronal coverage and prevents recurrent caries [6].
- **Technique simplicity:** Less technique-sensitive than esthetic alternatives [7].

Limitations and Disadvantages

Despite their advantages, SSCs present certain drawbacks:

- **Poor esthetics:** Metallic appearance makes them less acceptable to parents and children [8].
- **Gingival irritation:** May occur if crowns are poorly adapted [9].
- **Nickel allergy:** Rare, but a consideration in susceptible patients [10].
- **Full coverage requirement:** Requires significant tooth preparation [11].

Clinical Procedure

Placement of an SSC involves the following steps [12]:

1. **Tooth preparation:** Occlusal reduction (approximately 1–1.5 mm), proximal slicing, and rounding of line angles.
2. **Crown selection:** Choosing the appropriate size based on mesiodistal width.
3. **Crown adaptation:** Trimming and crimping for marginal fit, if necessary.

4. **Cementation:** Typically with glass ionomer cement, ensuring complete seating.
5. **Post-operative care:** Instructions on oral hygiene and monitoring for gingival health.

Recent Advances and Alternatives

To overcome esthetic limitations, alternative crowns have been developed:

- **Pre-veneered stainless steel crowns:** Provide improved esthetics while retaining SSC durability [13].
- **Zirconia crowns:** Offer superior esthetics and biocompatibility but are costlier and more technique-sensitive [14].
- **Resin strip crowns:** Useful for anterior esthetic restoration but less durable than SSCs [15].

EVIDENCE FROM LITERATURE

Multiple studies confirm the longevity and success of SSCs compared with other restorative options. Systematic reviews have shown SSCs to outperform multisurface amalgam and composite restorations in terms of survival rates and resistance to recurrent caries [16]. Success rates exceeding 90% have been consistently reported for SSCs in primary molars, making them the most reliable restorative choice for high caries-risk children [17,18].

CONCLUSION

Stainless steel crowns remain the cornerstone of pediatric full-coverage restorations due to their durability, cost-effectiveness, and ease of placement. While esthetic concerns have driven the development of alternatives such as zirconia crowns, SSCs continue to serve as the most practical option in many clinical scenarios, especially for posterior primary teeth. Future directions may focus on improving esthetic appeal while retaining their proven longevity and clinical success.

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