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ADVANTAGES AND CLINICAL LIMITATIONS OF STAINLESS-STEEL CROWNS IN PEDIATRIC DENTISTRY

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Abstract
Stainless steel crowns (SSCs) have become a cornerstone in pediatric dentistry due to their durability, cost-effectiveness, and ease of placement. These crowns provide full coronal coverage for primary and young permanent teeth, especially in cases of extensive caries or developmental defects. Despite their numerous advantages, SSCs are not without limitations, including aesthetic concerns and potential challenges in clinical application. This article explores the advantages and clinical limitations of SSCs, providing a comprehensive analysis supported by recent literature and clinical studies.

Keywords: Pediatric Dentistry, Stainless Steel Crowns, Restorative Dentistry, Clinical Limitations, Primary Dentition, Dental Caries, Pulp Therapy.

Introduction

Stainless steel crowns (SSCs) were introduced in pediatric dentistry in the 1950s as a durable restorative solution for primary teeth. Over the decades, their utility has been firmly established, particularly in managing teeth with extensive caries, following pulp therapy, or with developmental anomalies such as amelogenesis imperfecta. SSCs are widely recognized for their ability to withstand masticatory forces, making them a preferred choice for full coronal coverage restorations. However, the application of SSCs is not without challenges, such as aesthetic concerns and potential interference with the eruption of permanent teeth. This article aims to evaluate the advantages and clinical limitations of SSCs, highlighting their significance and potential areas for improvement.[1][2]

Importance of the theme. The restoration of primary teeth is critical for maintaining proper function, aesthetics, and arch integrity in pediatric patients. SSCs offer a practical solution to these needs, particularly for children with high caries risk or poor oral hygiene. Their importance is underscored in scenarios where conventional restorations fail to provide adequate longevity or protection. Understanding the strengths and limitations of SSCs is vital for clinicians to optimize patient outcomes and explore alternative materials when necessary.[3]

Materials and methods. This review synthesizes data from clinical studies, systematic reviews, and meta-analyses published in reputable dental journals. The literature search was conducted using databases such as PubMed, Scopus, and Google Scholar, focusing on studies published between 2000 and 2024. Keywords included "stainless steel crowns," "pediatric dentistry," "clinical limitations," and "advantages." Relevant articles were selected based on their contribution

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to understanding SSCs' clinical applications, benefits, and drawbacks. The methodology involved an evaluation of study designs, inclusion criteria, and sample sizes to ensure comprehensive coverage.[4][5][6]

Results

Advantages of Stainless Steel Crowns

1. Durability: SSCs exhibit high resistance to masticatory forces, making them suitable for children with bruxism or other parafunctional habits.
2. Cost-Effectiveness: Compared to alternative restorative materials like zirconia, SSCs are relatively inexpensive.[7]
3. Ease of Placement: SSCs are minimally technique-sensitive and can be placed in a single visit, making them ideal for uncooperative pediatric patients.
4. Coronal Coverage: They provide complete coverage of the tooth, protecting it from further decay and reducing the risk of recurrent caries.
5. Indications for Use: SSCs are preferred after pulp therapy, for developmental dental defects, and in cases of extensive tooth structure loss.[8]

Clinical Limitations

1. Aesthetic Concerns: The metallic appearance of SSCs is a significant drawback, particularly for anterior teeth.
2. Marginal Adaptation: Improper fitting may lead to marginal gaps, increasing the risk of gingival irritation.
3. Interference with Eruption: SSCs may encroach on the space needed for the eruption of permanent teeth if not carefully fitted.
4. Parental Acceptance: Some parents may resist the use of SSCs due to aesthetic reasons.
5. Technique Sensitivity: While relatively simple, SSC placement still requires careful preparation to avoid complications.[9]

Discussion

Stainless steel crowns are unparalleled in their ability to restore primary teeth efficiently and effectively. However, advancements in dental materials have introduced alternatives such as zirconia and composite crowns, which address the aesthetic limitations of SSCs. Zirconia crowns, for example, offer superior aesthetics but are costlier and more technique-sensitive. On the other hand, composite strip crowns balance aesthetics and functionality but lack the durability of SSCs.[10]

While SSCs remain the gold standard for posterior teeth, their use in anterior restorations is limited by their appearance. Research continues to explore modifications, such as veneered SSCs, to bridge the gap between aesthetics and functionality.[10]

Conclusion

Stainless steel crowns are a reliable and cost-effective restorative option in pediatric dentistry. Their ability to provide full coronal coverage and withstand functional forces makes them indispensable for managing primary teeth with extensive caries or structural damage. However, their aesthetic limitations and potential clinical challenges necessitate careful case selection and

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parental consultation. Future advancements may focus on improving their aesthetic appeal without compromising their functional benefits.

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