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Review Article

Caries Management in Pediatric Dentistry Using Hall technique. A Review

Lina Ahmed Aljawi[1], Tamara Ahmed Aljawi[2]* and Nedaa Mohammed Ahmed Banaamah[3]

[1]*Dental Department, AlRehab Primary Healthcare, Ministry of Health, Jeddah, KSA*

[2]*Independent Researcher, Jeddah, KSA*

[3]*Private Practice, Jeddah, KSA*

***Corresponding Author**: Tamara Ahmed Aljawi, Independent Researcher, Jeddah, KSA.

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Abstract

The Hall technique (HT) is considered as a conservative caries management procedure for treating caries lesions in primary dentitions. It has become a routine dental treatment at specialist's practices. A Hall crown technique is described as a procedure that requires no tooth preparation, with caries sealed in, as an alternative to restorative treatment procedures. The Hall technique is considered as most cost-effective technique compared to other conventional treatments. The objective of this review was to discuss the clinical efficacy of using Hall technique in comparison to other dental procedures for managing carious lesions in primary molars. The Hall technique seems promising and cost-effective treatment in restoring caries affected primary molars. Moreover, education and training in relevance to clinical implications and benefits of this technique has to be addressed to all dental expertise. Further prospective clinical trials with long term follow-ups are required to improve the quality of evidence.

Keywords: *Hall Technique; Hall Method; Caries Management; Caries Control; Pediatric Patients*

Introduction

The Hall technique (HT) is considered as a conservative caries management procedure for treating caries lesions in primary dentitions. It has become a routine dental treatment at specialist's practices [1]. A Hall crown technique is described as a procedure that requires no tooth preparation, with caries sealed in, as an alternative to restorative treatment procedures [2]. The Hall technique is considered as most cost-effective technique compared to other conventional treatment [3].

A performed metal crown (PMC) is cemented over the carious tooth, without tooth preparation or caries removal using glass ionomer cement (GIC). The concept is to seal the cariogenic biofilm under the crown. Although the Hall technique is recommended for managing dental carious lesions involving two or more surfaces in primary molars. Several studies have reported the high clinical success rates of using Hall technique with results of 98% success rate after 1 year of evaluation, 95% after 23 months and 48 months respectively [4].

Nevertheless, there is available evidence in the literature that depicts the restoration failure in primary dentitions is a common dilemma when conventional carious tissue removal and direct restorations are placed. The Hall Technique has been considered to be a clinically effective treatment option that is more acceptable to parents/carers, children, and dentists [5].

Objective of the Study

The objective of this review was to discuss the clinical efficacy of using Hall technique in comparison to other dental procedures for managing carious lesions in primary molars.

Overview

Several studies have evaluated the clinical effectiveness of using Hall Technique in comparison to the other conventional restorative treatment procedures for managing caries lesion in primary molars. A study by Midani R., *et al.* performed a retrospective study was to assess the clinical efficacy of Hall crowns placed between 2011 and 2017 by dentists with different levels of specializations and experience. Therefore, 181 hall crowns during the time frame with a mean follow-up period of 22 months. The survival rate and clinical efficacy were high and authors concluded that HT is a promising procedure for asymptomatic carious primary molars [1]. Nevertheless, this study also supported that the Hall Technique can be successfully performed by dentists with different levels of expertise in distinctive treatment settings. Authors also recommend it to be frequently considered as a treatment option, especially in cases where a radiographic assessment pre-operatively is not possible [1].

The prospective treatment of dentin caries lesions in primary dentitions depends on the progression depth and surface involved. Studies supported that treated occlusoproximal caries lesions resulted in a higher success rate when the Hall technique is performed. This treatment option was found to be more effective than CRT, with a clinical success rate of 92% over a follow-up period of 5 years. This less invasive management strategy slows down the caries progression via cavity sealing procedures, including the additional benefit regarding the remineralization of caries lesions whilst using the glass ionomer cement [6].

Nevertheless, hall technique requires careful case selection, precise lesion and accurate pulpal status diagnosis, effective patient management, and excellent parental cooperation. It has been declared to be a durable and economical management option for restoring primary molars with carious lesions. It offers the benefit of full coronal coverage thereby reducing the risk of further carious lesion development [7].

Hesse D., *et al*. discussed that HT has shown more favorable clinical results for pulpal health and tooth longevity. Moreover, whether HT is superior to ART or not is still unclear. However, this technique could be useful for clinicians for managing occluso-proximal lesions in clinical settings with constrained resources and limited dental access [4].

Schwendicke F., *et al*. conducted a study to compare the cost-effectiveness of three treatment strategies including the conventional restorative technique, Hall technique and the pulpotomy procedures for treating primary molars with cavitated carious lesions and asymptomatic pulps and vital pulp. Results revealed that conventional treatment was least effective and more expensive in relevance to the Hall technique. Moreover, pulpotomy was found more costly, however, more effective than alternatives [8].

Treatment Strategy	Cost effectiveness	Clinical efficacy
Conventional restorative therapy	Least cost effective	Least clinical predictability
Hall technique	Highly cost effective	High clinical predictability
Pulpotomy	Cost effective to some extent	Clinically predictable

Ludwig KH evaluated the efficacy of stainless steel crowns (SSCs) both clinically and radiographically to restore carious primary molars using traditional technique involving complete caries removal and tooth reduction prior to SSC placement and the Hall technique with no caries removal, no local anesthetic use, and no tooth reduction before placement of the SSC. The authors found that 97% SSCs placed with Hall technique over a mean observation period 15 months; 4 - 37 months while 94% SSCs placed with the traditional technique over a mean follow-up period of 53 months; range 4 - 119 months were found relatively successful [9].

Protocol for placing stainless steel crowns according to traditional preparation versus the Hall technique.

Erdemci., *et al.* conducted a study to investigate marginal discrepancies and microleakage associated with SSCs that were placed using conventional and hall techniques and cemented with three different luting agents. A total no of 78 human maxillary second molars was

Step	Traditional technique	Hall technique
Nitrous oxide use	Yes	Yes
Use of local anesthesia	Yes	None
Tooth Preparation	2-millimeter proximal slice, 1.5- to 2-mm occlusal reduction, recontouring of bulbous anatomy	None; optional 1-mm proximal slice to allow seating in tight contacts
Caries Removal	Complete	None; food and debris removed with air-water syringe
Crown cementation	Resin-modified glass ionomer	Resin-modified glass ionomer

Source: References: Dean JA, Avery DR, McDonald RE. McDonald and Avery's Dentistry for the Child and Adolescent. 9th edition. Maryland Heights, Mo.: Mosby/Elsevier; 2011.

randomly assigned to two groups respectively (N = 39). These two groups were further classified based on the cementation material used for crown placement. Authors found that SSCs placed using the Hall technique displayed higher microleakage scores than those of the conventional technique, irrespective of the cementation material used [10].

The use of the Hall technique is relatively gaining momentum day by day. Nevertheless, specialist use Hall technique as the treatment of choice for all cavitated carious primary molars [11,12,14]. The majority of specialists believe that the Hall technique should be taught to undergraduate students and used in a variety of clinical settings [13].

Conclusion

The Hall technique seems promising and cost-effective treatment in restoring caries affected primary molars. Moreover, education and training in relevance to clinical implications and benefits of this technique has to be addressed in all dental expertise. Further prospective clinical trials with long term follow-ups are required to improve the quality of evidence.

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