

Mini review

## The Hall Technique: A Mini Review

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### ABSTRACT

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In pediatric dentistry, the development of techniques that are both effective and minimally invasive has become a priority. These approaches not only reduce the level of discomfort experienced by young patients but also facilitate cooperation during dental visits, thereby decreasing the need for extensive behavior management. Moreover, such techniques allow clinicians to provide care more efficiently, saving time and effort while improving the overall treatment experience. This is particularly important for younger children, who often face challenges in tolerating conventional restorative procedures. The present study aims to examine one of these innovative techniques and its role in enhancing the management of dental caries in primary teeth.

### Introduction

Dental caries in primary teeth has become a major controversial issue, especially among people in lower socioeconomic strata [1]. In many such cases, extraction may be their only alternative treatment because it is relatively inexpensive. Dental caries affects almost 100% of the population in most industrialized countries and up to 60% of school-aged children [2].

Over the years, several approaches have been proposed to reduce the invasiveness and cost of treatment in primary dentition, including techniques that involve partial or no removal of carious tissue. Such approaches minimize the need for expensive equipment and local anesthesia [3]. Among these, the atraumatic restorative treatment (ART) technique has gained recognition as an effective minimally invasive method [4]. In ART, carious tissue is removed manually with an excavator, followed by restoration with glass ionomer cement [4].

Since the 1950s, preformed metal crowns (PMCs) have been widely employed for the management of extensively carious primary molars and have long been regarded as the treatment of choice for multi-surface lesions [5]. Nevertheless, the use of conventional crowns in pediatric patients remains limited in the United Kingdom, accounting for less than 1% of all restorations [6]. In response to the growing burden of untreated dental disease in primary teeth in Scotland, particularly among young children, Dr. Hall, a general dental practitioner, introduced the Hall Technique [1]. She utilized this method for over 15 years until her retirement in 2006, after which the technique was formally published in the British Dental Journal as a retrospective analysis. Findings demonstrated that the Hall Technique produced outcomes comparable to conventional restorative methods.

Traditional teaching has long emphasized the complete removal of carious tissue, whether soft or hard, before restoration [7]. In contrast, the Hall Technique involves sealing all caries within the tooth without removal. This raises an important clinical question: how can the intentional retention of carious tissue, particularly soft caries, be considered an acceptable practice?

### Description of the Hall Technique

The most susceptible areas for dental caries are the occlusal fissures and proximal contacts, which provide a favorable environment for plaque biofilm [8]. Marsh has described dental plaque as a “city of slime.” Initially, plaque is a homogeneous material; however, it can become more complex with channels and pores due to bacterial proliferation [8]. Consequently, alterations in the availability of carbohydrates, oxygen, or pH can modify the cariogenic potential of dental plaque [8].

The Hall technique is a non-invasive approach that modifies the plaque’s environment by depriving it of essential nutrients [1]. However, plaque may still obtain limited nutrients through the dentinal tubules [6–9]. The biological rationale of this technique is that the preformed metal crown (PMC), together with the cement, effectively seals the carious lesion from the oral environment; as a result, the bacterial activity shifts to a less cariogenic state, and the lesion does not progress [1–6]. Nevertheless, the evidence supporting the mechanism by which the Hall technique converts a soft dentinal lesion from active to arrested caries remains limited.

### ***The difference between the Hall Technique and the conventional crowns for primary molars***

Certain studies have found that the Hall technique is effective and has similar results to the conventional method, with the advantages of less pulp exposure, no vital dentine is being removed, no local anaesthesia is used, and therefore results in less children's discomfort [16-9-10-11].

Despite being considered a successful technique, there are only a few articles demonstrating the effectiveness of the Hall technique, and the available evidence remains insufficient. Moreover, radiographs were not performed on all patients as a routine procedure. In these studies, a full history and comprehensive clinical examination, including bitewing radiography, should be performed as an essential part of case selection. Therefore, the Hall technique may not be an ideal solution for managing carious primary molars. Innes et al. (2007) reported a statistically significant difference in the levels of discomfort experienced between the Hall technique and the conventional technique. The Hall technique was associated with no to mild discomfort in 89% of cases, whereas the conventional technique achieved this outcome in only 78% of cases. Moreover, the majority of dentists and children, along with their parents, preferred the Hall technique over the conventional approach [10].

Since the Hall crown is applied without occlusal reduction, it may lead to premature contact and an associated increase in the occlusal vertical dimension [1]. Nevertheless, Innes et al. (2006–2007) reported that such premature contact tends to self-correct, with occlusion returning to normal within a few weeks [1]. Conversely, Zee and Amerongen (2010) observed the development of an open bite following placement of Hall crowns, which returned to normal within 15–30 days. The authors did not clarify whether this transient occlusal imbalance had any effect on the temporomandibular joint (TMJ).

A 5-year randomized controlled trial provided strong evidence in support of the Hall technique [11]. However, this trial was subsequently criticized by Nainar (2012), who argued that two-thirds of the control lesions were Class II and that the glass ionomer cement restorations failed primarily because most were multisurface restorations. He also noted that few or no radiographs had been taken, despite the importance of radiographic assessment of teeth both before and after the placement of preformed metal crowns (PMCs).

#### ***The Conventional technique***

In this technique, all carious tissue is removed, and the tooth is prepared mesially, distally, and occlusally to receive a preformed metal crown (PMC). The procedure is performed under local anaesthesia to ensure patient comfort during tooth preparation [7]. However, one of the main disadvantages of this technique is the considerable risk of damaging the adjacent first permanent molar while preparing a second primary molar for PMC placement [6].

#### ***The Hall technique***

The Hall technique involves placing a preformed metal crown over the treated tooth without prior caries removal or tooth reduction; consequently, the use of local anaesthesia is not required [6–9]. This method is associated with several clinical advantages, including a lower incidence of pulp exposures, preservation of tooth vitality, and reduced discomfort in paediatric patients, particularly those who are uncooperative [6–12].

#### ***Procedure of the Hall technique***

Both the Hall technique and the conventional approach employ preformed metal crowns (PMCs); however, the Hall technique follows a fundamentally different protocol, as outlined below. Prior to the procedure, it is essential to explain the steps clearly to both the parent and the child [6]. Ideally, the child should also be shown an actual crown to increase their comfort and acceptance of the treatment [6].

Two key checkpoints must be assessed before fitting a Hall crown: the anterior overbite and the relationship of the tooth with its opposing buccal [6]. For airway protection, the use of a rubber dam is recommended. Alternatively, a gauze swab placed between the tongue and the tooth, combined with seating the child in an upright position, can provide adequate protection [6]. Select the appropriate crown size by trialing different crowns until an optimal fit is achieved. The selected crown should extend to the contact points, cover all cusps, and exhibit a slight “spring-back” sensation upon placement [6].

When loading the crown with glass ionomer cement, begin by filling from the base and ensure that sufficient cement is distributed along the internal walls. Care should be taken to avoid air bubbles and voids. The crown should be filled to at least two-thirds of its height before placement [9].

Then the dentist seats the crown by either putting pressure with the finger, or asking the child to bite on the crown so it can be seated by the child's occlusal force; however, clinicians prefer to use a combination of these two methods. Remove the excess cement, then ask the child to bite down a second time and remove the excess cement and floss the contact point [9].

Immediately after fitting the crown, it is essential to verify its orientation relative to the tooth to ensure correct positioning [6]. If the crown cannot be properly seated, it must be removed before the cement sets.

Regular follow-up is crucial after placement of a Hall crown, especially in maxillary second primary molars (Es), before the eruption of the permanent first molars (6s), since the 6s may become impacted against the crown margin [6].

Possible difficulties when fitting the Hall crown will include unusual morphology of Primary molars, and Teeth that have lost mesiodistal dimensions can complicate crown fitting.

Strategies to overcome difficulties in fitting Hall crowns, including rebuilding the tooth with a temporary restorative material, followed by the placement of a separator, adjust the crown using orthodontic pliers to achieve a better fit, consider alternative crown options, such as using a mandibular primary molar crown for a maxillary first primary molar, and as a last resort, perform minimal tooth preparation under local anesthesia to facilitate crown placement [6].

### **Case Selection for the Hall Technique**

Several studies have demonstrated that the Hall Technique is both effective and acceptable [6, 9, 13]. However, it is not a simple or universally applicable solution. As with any clinical intervention, its success depends on appropriate case selection, a high level of clinical skill, effective patient management, and long-term monitoring [6]. Moreover, treatment should always be provided in conjunction with a comprehensive caries-preventive program.

Careful and proper case selection is critical for achieving favorable outcomes with the Hall Technique [6]. It is not suitable for the treatment of all carious primary molars. A thorough history, clinical examination, and bitewing radiographs should be obtained to assess pulpal status prior to treatment [6].

Although the Hall Technique can be highly effective in restoring carious primary molars, it is not appropriate for every tooth, every child, or every practitioner [13, 14].

### **Conclusion**

The available literature provides evidence supporting the success of the Hall technique; however, current studies remain limited, and further research, particularly well-designed randomized controlled trials, is required to strengthen the evidence base. At present, the use of glass ionomer materials continues to be the treatment of choice for managing carious primary molars.

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