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Hall Technique for Carious Deciduous Molars-A Review

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ABSTRACT

Major public health issues during childhood include the high prevalence of caries in primary teeth and its ineffective treatment. To biologically seal carious lesions in primary molars, one procedure utilised nowadays is the Hall technique. As a result, the bacteria will be shielded from the oral environment and caries will not be present. The goal of this article is to provide an updated search on the Hall technique's description, indication, contraindication, concerns, advantages and disadvantages, successes and failures, cost-effectiveness, acceptability, and preference in paediatric dentistry, as well as to compare the Hall technique with traditional crown preparation and conventional treatment options for carious primary molars. The Hall procedure is a cutting-edge approach to treating carious primary molars that seals cavities using Preformed Metal Crowns without the need for tooth preparation, caries removal, or local anaesthesia. The current literature review offers an understanding of the Hall technique.

KEYWORDS: Hall Technique, Stainless Steel Crowns, Dental Caries, Primary molars

INTRODUCTION -HALL TECHNIQUE

The most prevalent oral condition affecting children's primary teeth is dental caries, which has been researched in numerous nations throughout the world (1). In most developed nations, the prevalence rate of early childhood caries (ECC) ranges from 1% to 12%(2). However, the incidence can approach 70% in less developed nations (3). Traditional treatments for children's carious primary molars include extraction or traditional tooth preparation, followed by restoration with amalgam, composite resin, glass ionomer, and stainless steel crowns (SSCs). Silver diamine fluoride (SDF) has recently gained popularity as a non-invasive therapeutic option (4,5).

The Hall Technique is a unique approach for treating carious primary molars that doesn't require any caries removal, tooth preparation, or local anaesthesia (6).This technique has the name of Dr. Norna Hall, a general dentist from Scotland who invented it and employed it for more than 15 years before quitting dentistry in 2006(7).Preformed Metal Crowns (PMCs) are used to encapsulate decay in this method(5).Glass ionomer cement should be loaded into a Preformed metal crown which is of the right size. The primary molar's crown is then placed over it using either the dentist's fingers or the patient's biting pressure(8).The biological concepts underlying the Hall approach are fairly simple. It can arrest decay and safeguard the primary tooth until it's shedding. The Hall approach preserves and seals the carious lesion along with the superficial plaque layer, the biofilm layer that is most crucial for the evolution of caries. The makeup of the plaque biofilm will change to a less cariogenic flora as a result. Therefore, this method may stop or at least moderate the advancement of caries in primary teeth(9). And the process of fitting the crown is also simplified and entire procedure is non-invasive in this technique (2).As local anaesthetic is removed, this technique aims to promote kid cooperation and operator comfort. A child is anticipated to have a less traumatic dental experience in his early years in addition to caries sealing, and he will likely return for more challenging treatment in the future [16]. It is well known that primary posterior teeth have less pulpal protection than permanent molars because the pulp-to-crown ratio in primary posterior teeth is higher [17]. Therefore, selective caries removal methods like indirect pulp capping, leaving a layer of decayed dentine close to the pulp beneath the restoration, or using the Hall technique, leaving decayed dentine under the crown, all aid in preserving the essential pulp [13,18,19]. The application of the Hall method to carious primary molars is still debatable at this time.Therefore, this review will provide an updated search on hall technique and it's success and failures , preference among dental practitioners.

INDICATIONS

The Hall approach Is not appropriate for every child, dentist, or children with a carious primary molar. Furthermore, the Hall technique is unlikely to achieve the objective of the majority of Pediatric dentists, which is to have carious primary teeth exfoliate with the least amount of risk of infection or discomfort [20], in the absence of a complete preventative programme.Indications of this technique are

- Moderately advanced Class I lesion in which, after partial caries removal, it would be challenging to achieve a good seal with adhesive material due to the size of the cavity.

- If the patient is unwilling to accept partial decay removal or traditional restoration, in teeth with proximal caries, whether cavitated or not.
- If the patient is unable to accept a fissure sealant, partial caries removal, or a conventional restoration in teeth with occlusal caries that are not cavitated might be considered.

CONTRAINDICATIONS

- An irreversible pulpitis,pulp involvement or pulp polyp or infection-related sign or symptom on a tooth (14)
- Tooth that have significant caries and are thought to be irreparable (20)
- Very young kids who are incapable of understanding the operation or who cannot handle biting the crown without local anaesthesia(23)

HALL TECHNIQUE PROCEDURE – STEPS

Case selection: It consists of identifying radiographically and clinically asymptomatic early enamel and dentine caries in a primary molar (using bitewings usually or a periapical). Bitewings or periapical may frequently exhibit approximal lesions that are radiographically diagnosed even though they are not clinically apparent. Pulpal pathosis shouldn't exhibit any symptoms or indicators, and the lesion should be found before symptoms start to appear (10).

Identify the tooth's shape:

Tight contacts: If there is tight contact, the teeth should be separated through mesial and distal contacts using orthodontic elastic separators. 3–5 days after acquiring space, call the patient back for the implantation of the crown.

Crown morphology: One molar's marginal ridge often breaks down, and the adjacent molar may move into the cavitated area. This presents challenges for the Hall approach of placing a crown without modifying the tooth or crown. Rebuild the marginal ridge in such circumstances and permit the separators to be placed.Use pliers to form the band to adjust the crown. Check the buccal relationship of the tooth that will be capped with its opposite number and the occlusion in relation to anterior overbite(6).

Protection of airway:

Before the crown is implemented, it is crucial to make sure that the youngster won't be in danger of swallowing or inhaling something. The child is placed upright to accomplish this. If not, a square of gauze can be inserted between the tongue and the tooth where the crown will be fixed. It ought to wrap around the back of the mouth and the palate in front of the faces. As an alternative, you might secure the crown with some micropore tape (15,17).

Crown Selection:

The operator chooses the appropriate SSC in terms of teeth number and size while the patient is lying supine. Once the proper SSC has been chosen, it is passively tested on the tooth to ensure that it fits. Light pressure is applied to the SSC over the contact points but not all the way through. The SSC shouldn't be too tight or too loose. When fitting the crown to the tooth at this stage, it should "spring back" from the contact sites(12,18)

Crown Placement:

With a cotton roll, dry the inside of the crown. Avoid air blows and voids by filling the crown with GIC luting cement. Apply finger pressure to the crown as you place it over the tooth. Until the cement hardens, maintain strong finger pressure. Make sure the finger's crown is not coming off as you remove it. Before the cement sets, ask the kid to bite on the crown. Clean off the excess cement, inspect the fit, and use an explorer to remove extra cement from the crown edge after cementation (6,10).

Follow up:

Teeth treated using the Hall technique should get the same clinical and radiological monitoring as teeth treated using more traditional methods. It is important to examine the tooth for indicators of discomfort, sinus pressure, swelling, and radiographic indications of interradicular radiolucency or root resorption (11)

ADVANTAGES (2,9,5)

- Crown fitting more quickly
- A less invasive procedure than the standard SSC procedure
- There is no requirement to remove caries or prepare the teeth.

- Crown pushed onto the first molar
- Patient demands are lower
- Dentistry is less demanding
- No need for Local anaesthesia
- Rubber dam not necessary

DISADVANTAGES (6,8,13)

- Unacceptable aesthetics
- Temporary bite opening
- Neither clinical nor radiographic evaluations of the progression of caries are reliable.

CONCERNS OF HALL TECHNIQUE

There are some issues with using the Hall approach. The process takes time since orthodontic separators are required, which means a second appointment. Before the crown is cemented, occlusal preparation is not included. Premature contacts after crown cementation and an increase in occlusal vertical dimensions could result from this (OVDs). At the recall appointment after a year, appropriate occlusal connections are re-established, however [23]. Children must also endure biting a strong metal crown into place over rather small contact points without the use of local anaesthetic [14]. Additionally, neither the child nor the parents find metal crowns to be aesthetically pleasing [12,27].The occlusion may Be momentarily opened because PMCs are fitted without occlusal tooth preparation.

The Hall approach Would be linked to early contacts following the cementation of crowns and elevations in occlusal vertical dimensions(OVD's) according to a prospective clinical trial conducted in a general dentistry office by Innes et al. When applying the Hall technique on second primary teeth, OVDs may rise a little bit more than they may with first primary molars. Results indicated that even occlusal contacts were restored in every patient at one-year recall (22).According to Innes et al,the use of the Hall approach,has been demonstrated that no kids returned to the clinic one or two years later with symptoms of TMJ dysfunction, occlusal issues, or trouble chewing (21). Additionally, OVDs were naturally rectified almost 30 days after Hall method crown insertion (28).

HALL TECHNIQUE VERSUS OTHER RESTORATIONS-SUCCESS AND FAILURE

Given that there is not even a small amount of caries excavated before placing Hall crowns, the similarity in survival rates between numerous standard restorations and crowns set using the Hall procedure merits special consideration(5)

A split mouth randomised controlled clinical trial evaluated the clinical efficacy of Hall technique crowns placed on the contralateral primary molars (matched radiographically and clinically) versus conventional restorations (control) in decayed primary molars,With a minimum recall period of 23 months. Amalgam, composite, compomer, glass ionomer, and fissure sealant were among the traditional restorations employed.This clinical trial's findings demonstrated that the PMCs placed using the Hall Technique had higher success rates than the control restorations. 15% of control restorations showed serious failure criteria. Only 2% of Hall crowns had them visible, though.Additionally, just 5% of Hall crowns met the threshold for mild failures, compared to 46% of control restorations. In comparison to 2% of Hall crowns, 11% of control restorations showed signs of pain from the restored tooth.(33)

As a follow-up to their earlier study from 2007 (22), Innes et al conducted a second split-mouth, randomised control trial in 2011. however, this time, recalls were done at urgent care visits once a year for five years. Out of 132 patients, 91 had a minimum follow-up of 48 months or both teeth had attained their goal (exfoliated, extracted). This study's main finding was that Hall crowns performed significantly better as long-term restorations than conventional restorations used by dental practitioners. The outcomes demonstrated that leaving caries unrepaired and sealing it with Hall crowns were statistically significantly superior to typical restorations (22,23).According to the criteria outlined by Innes et al., they discovered that 92% of the Hall technique group and 52% of the control arm were effective. There were no Hall method teeth that experienced both "minor" and "serious" failures. Eight control group teeth first had "small" failures and then went on to have "major" failures, but only one control group tooth showed signs of both a "major" failure (treated with pulp treatment or had an abscess) and a second "minor" failure (loss of the restorations) _ {A pulpitis that cannot be reversed and necessitates extraction or pulpotomy is a major failure,other major failures include If the crown or restoration was lost, the tooth was unsalvageable, or there was an internal root resorption or inter-radicular radiolucency. Minor failures include Secondary caries, or new radiographic or clinical caries,Restoration fracture or wear that needs treatment, Restoration or crown loss, even though the tooth was thought to be restorable, pulpitis that can be treated without pulpotomy or extraction}(18)

PREFERENCE AND ACCEPTABILITY OF THE HALL TECHNIQUE

It can be difficult to treat primary molars with several surfaces involved in decay in children. Pediatric dentists should examine various characteristics, including as the patient's cognitive development, age, treatment options, and pain perception, in comparison to treatments for adults. These elements play crucial roles in deciding on dental treatment (35,15,36). A study examined the treatments' tolerability to dentists and parents, as well as children's behaviour throughout the process and their perception of discomfort. Patients treated with either Hall technique had less negative behaviour using the Frankl scale than those treated using conventional restorations. However, all treatment groups' patients reported experiencing pain similarly. The three treatment alternatives were also equally acceptable to parents. Comparing the Hall approach to conventional restorations, dentists said it was "simple" or "very easy" (41).

In Scottish general dentistry practice, the preference for and usage of the Hall procedure as a treatment option for primary posterior teeth were evaluated. Dentists who were still not employing the procedure had their awareness and preferences for additional training techniques evaluated as well. 95% of respondents who treated children said they had heard of the Hall approach, and 48% of respondents said they had actually used it. From "very frequently" (n = 25) to "never" (n = 340), the frequency of employing the approach varied. Lack of expertise and confidence were the biggest deterrents to using the approach for general practitioners who had never done because a Lack of stock(25%) and a desire for alternative therapies(8%)_(40).

CONCLUSION

The Hall method can be a useful addition to the clinician's skills of the carious primary molar treatment options. In comparison to conventional treatment options frequently used in primary care settings, it is strongly suggested that crowns placed using the Hall Technique treatment option have promising results, showing high acceptability and longevity as well as a low failure rate for managing carious primary molars. Furthermore, whether employing the Halltechnique or standard preparation by a paediatric dentist, the survival rate of SSCs is great. When possible, the Hall approach should be used. Due to several drawbacks of the Hall technique, dentists must use regular crown preparation when placing SSCs rather than the Hall technique.

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