

Success Rates of Hall Crowns vs Conventional Stainless-Steel Crowns

Raso MT, Williams LN, Frank K, Malik G

Geisinger Medical Center (Danville, PA)

Background

Early childhood caries is one of the most prevalent diseases in children worldwide.¹ The stainless-steel crown (SSC) is considered the gold standard restoration for multiple surface lesions in posterior primary teeth.

There is a growing disparity across the world in terms of access to care for many medical professions, and the Hall technique has been shown to be an effective alternative in situations where access to electricity and/or general anesthesia are limited.² The Hall technique allows for a minimally invasive approach to definitively treat a carious lesion, before it progresses to the need for pulpal medicaments/surgical intervention.³

Practical Implications: Hall crowns allow for a noninvasive alternative to stainless steel crowns for the young and pre-cooperative patient.

Objectives

To compare the clinical and radiographic success of Hall crowns to that of stainless-steel crowns at: 6-, 12-, 18-, and 24-months post-placement.

Methods

This retrospective study examined data from patients seen at Geisinger's pediatric dental clinic for crown placements between the dates of January 2019 and November 2021.

Inclusion Criteria

- Patients 2-12 yrs
- Patient with traditional SSC or Hall crown placed
- Diagnosis without irreversible pulpitis (IP); applicable for Hall crown
- No clinical or radiographic evidence of IP, pulp necrosis/abscess
- Follow up at least 6 months or until failure occurred with SSC technique

Exclusion Criteria

- Clinical or radiographic evidence of pulpal pathology at initial visit
- SSCs placed after pulpotomy or pulpectomy
- SSCs placed after failure of resin restoration
- Primary molars within 6 months of exfoliation

195 teeth were reviewed. Metrics of interest included:

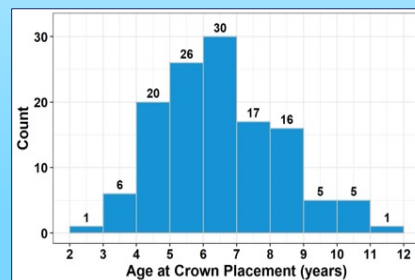
- Maxillary vs mandibular primary molar success
- First vs second primary molar success
- Training level of the provider placing the SSC and success

We employed a Kaplan-Meier curve analysis to compare the group

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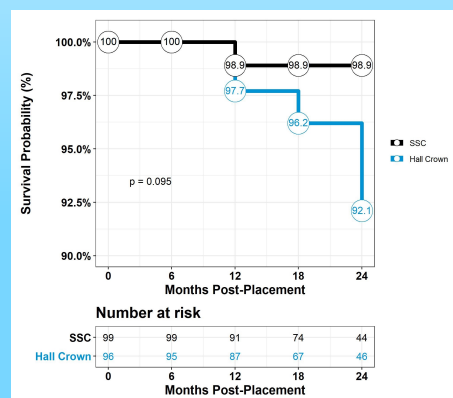
Results

This study found that the Hall technique is as successful as the traditional SSC technique with appropriate pulpal diagnosis. The statistical analysis found that mandibular first primary molars were the most frequently Hall crowned primary molar. The maxillary first primary molars were the most frequently observed to receive conventional SSCs. PGY-2s were the most common to have placed the crowns. The Kaplan-Meier survival curve found no statistically significant difference in the survival of the Hall vs traditional SSCs up to 24 months post placement.



Histogram of age at crown placement (N=127) for patient

- The median age of crown placement was 6.2 years old
- Most patients had only one crown placed (~65 percent)
- 22% of patients had 2 crowns placed
- 8% each had 3 and 4 crowns placed respectively.
- PGY-2's placed approximately 53% of the crowns.



Kaplan Meier Survival Curve

Observed Crown Failures

Observation	Method	Tooth	Provider Level	Patient Age at Placement	Sex of Patient	Time to Failure (months)	Description of Failure
1	Hall	L	Attending	6.0	F	12	Clinical: crown fell off
2	Hall	J	PGY-2	6.3	F	12	Radiographic: 2° caries
3	SSC	B	PGY-1	7.5	F	12	Clinical: early tooth loss
4	Hall	K	PGY-1	8.6	M	18	Clinical: crown loss
5	Hall	S	PGY-2	5.4	F	24	Radiographic: open margin, 2° caries
6	Hall	S	Attending	3.6	F	24	Clinical: crown fell out

Discussion

This study showed that of the 198 teeth the survival rate for the stainless-steel crowns and the Hall crowns were the same, no statistical difference could be discerned. It has been found in previous studies that crowns fitted using the Hall technique are less likely to cause pain and abscess than traditional restorations.⁴

The caries arresting mechanism of the fluoride cement in conjunction with a sealing restoration allows for incomplete caries removal, in comparison to composite in which caries removal is critical. A critical aspect to success with the Hall technique is triaging dental carious progression and pulpal involvement. The use of the Hall crown is that it allows for treatment of lesions in young pre-cooperative patients that may otherwise have had the caries progress to an irreversible point. Often very young patients must receive their definitive treatment in the operating room, which come with the risks of general anesthesia. With the Hall technique we may be able to subvert this. Thus, if proper case selection criteria are controlled for, Hall crowns and traditional stainless-steel crowns have comparable success rates.

Primary Molar Crown Placement

Characteristic	Overall (N=195)	Hall Crown (N=96)	SSC (N=99)
Maxillary First Primary Molar	47 (24%)	20 (21%)	27 (27%)
Mandibular First Primary Molar	63 (33%)	42 (42%)	22 (22%)
Maxillary Second Primary Molar	40 (21%)	14 (15%)	26 (26%)
Mandibular Second Primary Molar	44 (23%)	20 (21%)	24 (24%)

Conclusions

The survival probability for the traditional SSC's 24 months post placement was 98.9%, and for the Hall crowns it was 92.1%. The Hall technique is equally successful to the traditional SSC. It can be a useful treatment modality in pre-cooperative younger patients.

References

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