Hall Crowns as Restoration in Pediatric Patients

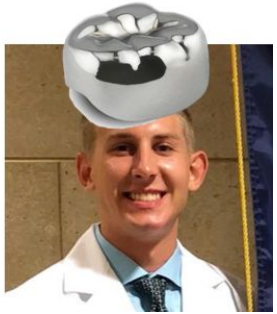
Evidence Based Dentistry Rounds
Pediatrics

Group 8A3

Date 11/18/2020

Rounds Team aka the “Hall” of Fame

- **Group Leader: Dr. Toburen**
- **Specialty Leader: Dr. Gungor**
- **Project Team Leader: Tiffany Huynh**
- **Project Team Participants: Adam Gottschalk, Matthew White, Guillermo Aceves**



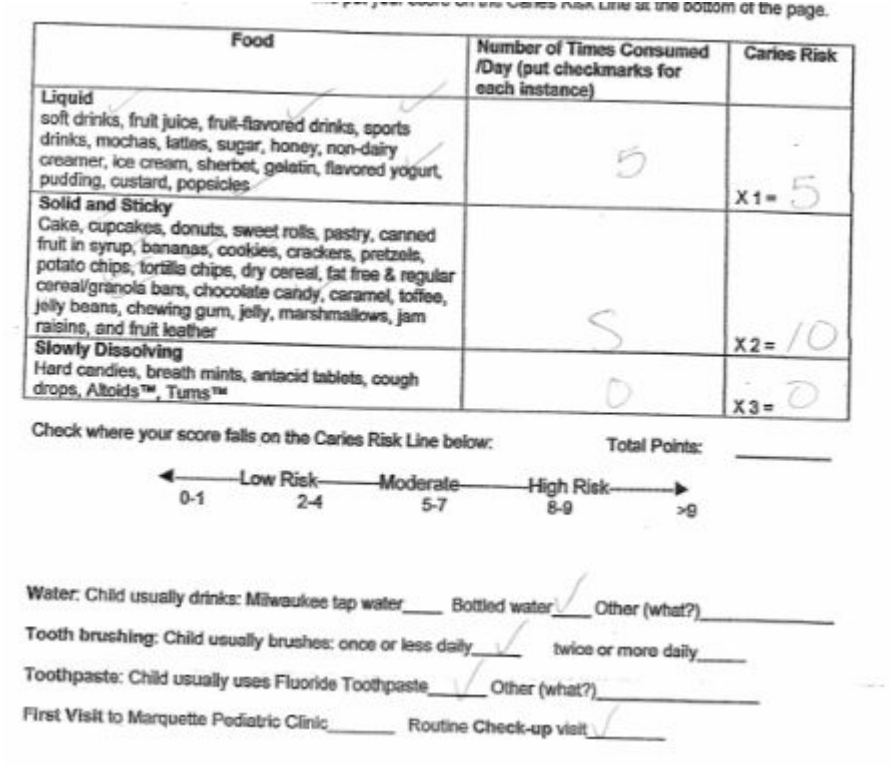
Patient

- 9 year old male, seen in the pediatric department
- African American
- CC: needs front tooth extracted which is causing pain

Patient Background

- High caries risk patient
  - Poor oral hygiene and multiple caries at young age
- Received 2’s and 3’s for Frankl Behavior Scale
  - Intolerant of long appointments, required reminders to stay open, cried, tried to grab handpieces and syringe while giving anesthetic
- Required nitrous oxide for operative appointments

Questionaire for cariogram



...your score on the Caries Risk Line at the bottom of the page.

Food	Number of Times Consumed /Day (put checkmarks for each instance)	Caries Risk
Liquid soft drinks, fruit juice, fruit-flavored drinks, sports drinks, mochas, lattes, sugar, honey, non-dairy creamer, ice cream, sherbet, gelatin, flavored yogurt, pudding, custard, popsicles	5	X 1 = 5
Solid and Sticky Cake, cupcakes, donuts, sweet rolls, pastry, canned fruit in syrup, bananas, cookies, crackers, pretzels, potato chips, tortilla chips, dry cereal, fat free & regular cereal/granola bars, chocolate candy, caramel, toffee, jelly beans, chewing gum, jelly, marshmallows, jam raisins, and fruit leather	5	X 2 = 10
Slowly Dissolving Hard candies, breath mints, antacid tablets, cough drops, Altoids™, Tums™	0	X 3 = 0

Check where your score falls on the Caries Risk Line below: Total Points: _____

◄——Low Risk——Moderate——High Risk——►
0-1 2-4 5-7 8-9 >9

Water: Child usually drinks: Milwaukee tap water____ Bottled water✓ Other (what?)_____

Tooth brushing: Child usually brushes: once or less daily✓ twice or more daily____

Toothpaste: Child usually uses Fluoride Toothpaste✓ Other (what?)_____

First Visit to Marquette Pediatric Clinic_____ Routine **Check-up** visit✓

Plaque index from January 2016

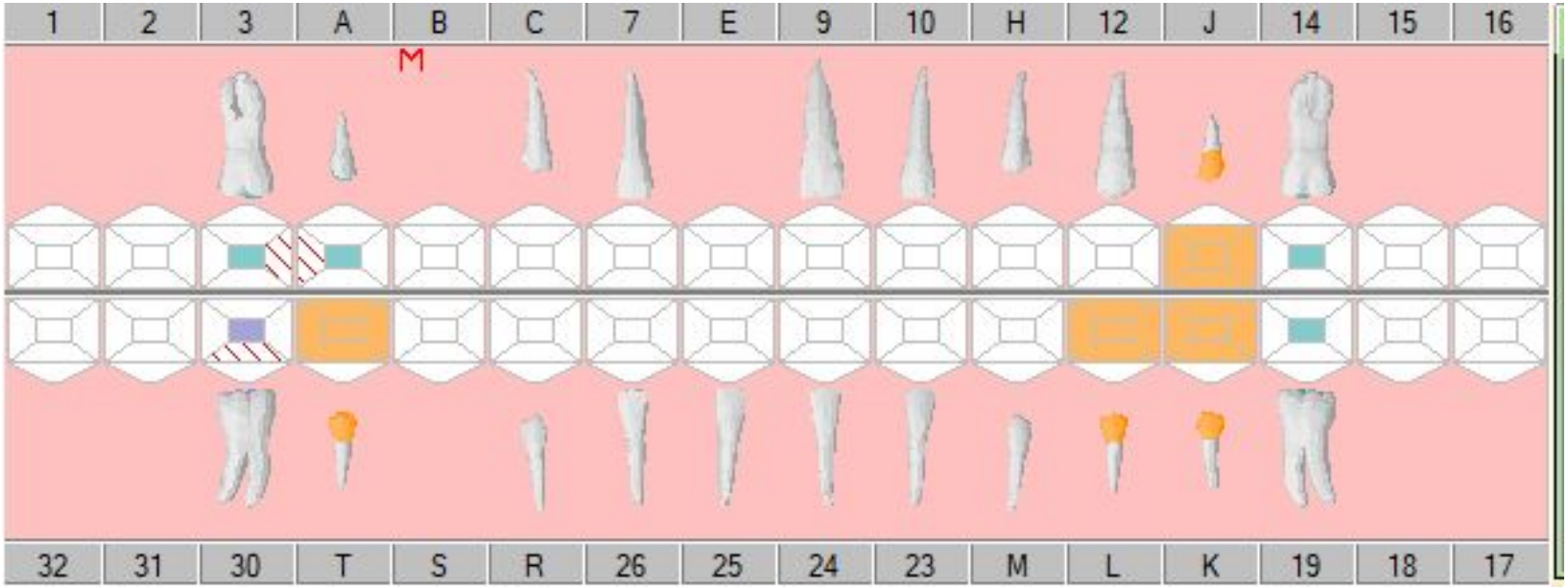
Medical History

- Healthy and non-contributory medical history
- No medications
- No allergies

Dental History

- Existing Hall crowns on J and L
- Sealants on A, B, I, J, K, L, S, T
- Restorative resin on B, E, F, G due to decay

Odontogram

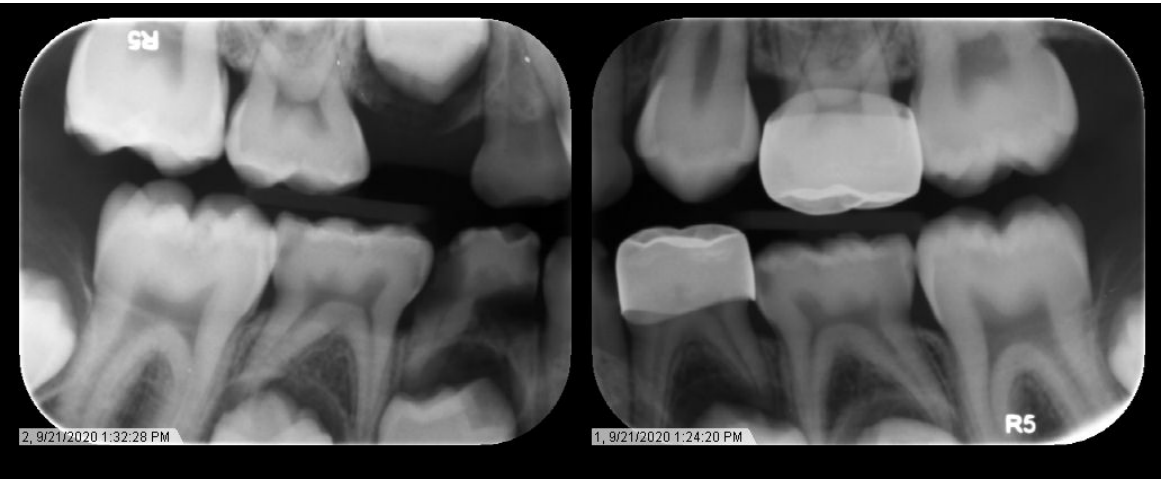


Radiographs

PA for tooth #E

Radiographic Findings

- Primary caries
  - Tooth K: mesial and distal
  - Tooth 19: occlusal



- Incipient watch
  - Tooth 3: mesial
  - Tooth A: distal
- Gross caries
  - Tooth E
  - Tooth S: mesial and distal

Diagnosis

- Extraction of grossly decayed teeth: E and S
- Sealants for 3 and 14
- Resin restorations for 19 and 30 for occlusal and buccal surfaces
- **Hall crown for K and T**

Clinical photo after appointment

Problem List

- Behavior
- Dental anxiety
- Fistula
- Gross caries
- Caries
- Home care
- Pain

D1 Basic Science

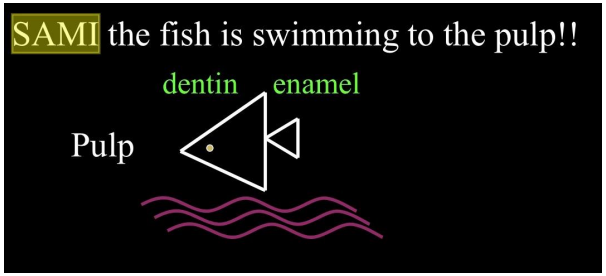
- ***What is a Hall crown?***
- ***A stainless steel crown placed on top of a unprepared primary tooth***
- ***Primarily used for pediatric patients***
- ***Advantage: Can be placed without anesthesia***
- ***Disadvantage: aesthetics***

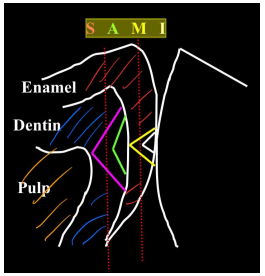
Altoukhi, Doua H. and El-Housseiny, Azza A. Hall Technique for Carious Primary Molars: A Review of the Literature, dentistry journal Published: 17 January 2020

D1 Basic Science

- ***Hall Crowns***
  - ***Function is to arrest caries and protect the primary tooth until shedding***
  - ***Can be used for pediatric patients with a fear of needles and drills***
  - ***No need for anesthetic - can do multiple in one appointment if needed***

D2 Pathology





- ***How do Caries develop?***
  - ***Dental caries: the progressive loss of the apatite composition of the enamel and dentin, or cementum and dentin.***
  - ***Necessary: tooth structure, acidogenic and aciduric bacteria, and fermentable carbohydrates***
  - ***Acidogenic bacteria produce acid in the presence of fermentable carbohydrates, creating a solution that dissolves the tooth structure***
    - ***This process is dynamic and reversible in early stages***
  - ***Radiographs are especially useful for detecting interproximal caries, and the progression can appear as a "SAMI the fish" pattern.***

Bryan, L. Caries Risk Assessment and Management [PDF document]. Retrieved from lecture notes website.
Koenig, L. Radiographic Interpretation of Caries [PDF document]. Retrieved from lecture notes website.
Anil, Sukumaran, and Pradeep S Anand. "Early Childhood Caries: Prevalence, Risk Factors, and Prevention." *Frontiers in Pediatrics*, Frontiers Media S.A., 18 July 2017, www.ncbi.nlm.nih.gov/pmc/articles/PMC5514393/.
Caries Risk Assessment and Management, American Dental Association, 2018, www.ada.org/en/member-center/oral-health-topics/caries-risk-assessment-and-management.

D2 Pathology

- *There are several different risk factors for caries development, some of the most notable for children being diet, oral hygine, fluoride use, having a dental home, socioeconomic status, and parental oral education.*
- *Higher risk: high sugar diet, low oral hygiene, little to no fluoride use, not having a dental home, low socioeconomic status, and low parental oral education.*
- *Many of these risk factors can be reasonably alleviated by educating patients and instructing them on proper dieting and oral hygiene.*

Bryan, L. Caries Risk Assessment and Management [PDF document]. Retrieved from lecture notes website.
Koenig, L. Radiographic Interpretation of Caries [PDF document]. Retrieved from lecture notes website.
Anil, Sukumaran, and Pradeep S Anand. "Early Childhood Caries: Prevalence, Risk Factors, and Prevention." *Frontiers in Pediatrics*, Frontiers Media S.A., 18 July 2017, www.ncbi.nlm.nih.gov/pmc/articles/PMC5514393/.
Caries Risk Assessment and Management, American Dental Association, 2018, www.ada.org/en/member-center/oral-health-topics/caries-risk-assessment-and-management.

D3 PICO

- **Clinical Question: What are ways to manage molar caries in pediatric patients?**

PICO Format

P: Pediatric patients with caries

I: Hall crowns

C: Other restorative techniques

O: Managing molar caries

PICO Formatted Question

In a population of pediatric patients with molar caries, how effective are Hall crowns compared to other restorative techniques for managing molar caries?

Clinical Bottom Line

Systematic reviews and meta-analyses support the use of Hall crown when indicated to manage molar caries in the pediatric population. Compared to directly placed dental restorations like dental amalgams, composite resins, compomers, and RMGIs, Hall crowns are a promising restorative option with high acceptability, increased longevity, lower failure rates, and are less technique sensitive.

Search Background

- **Date(s) of Search: 11/08/2020**
- **Database(s) Used: PubMed**
- **Search Strategy/Keywords:**
  - Limited to systematic reviews and meta-analyses
  - Article publication primarily within last 10 years
  - Article suggestions from specialist (Dr. Gungor)

Search Background

- **MESH terms used: Hall crowns, primary molars, child**

Article 1 Citation

- Badar SB, Tabassum S, Khan FR, Ghafoor R. Effectiveness of hall technique for primary carious molars: A systematic review and meta-analysis. *Int J Pediatr Dent.* 2019 Sept-Oct;12(5):445-452.

- Study Design: Systematic Review and Meta-Analysis

Article 1 Synopsis

- Goal of study was to assess outcome of Hall technique (HT) on primary carious molars and compare results with conventional dental restorations
- 5 studies and 1775 teeth were assessed in the qualitative systematic review and 3 studies were included in the quantitative meta-analysis

Article 1 Synopsis

- Qualitative Results
  - HT is equally effective compared to alternative treatment options that are more aggressive and depend on patient cooperation
  - Hall crowns exhibited considerably higher survival rate and success rate compared to directly placed restorations
- Quantitative Results
  - HT is far more successful than comparative treatment modalities (RR: 5.5, p-value <0.001)
- Limitations
  - Unable to evaluate attitude of patients and clinicians over HT

Article 1 Selection

- Strong level of evidence (Systematic review,Meta-Analysis)
- Addressed PICO “Intervention”

Article 2 Citation

- Altoukhi DH, El-Housseiny AA. Hall technique for primary molars: A review of the literature. *Dent J.* 2020 Jan 17;8(1):11
- Study Design: Systematic Review

Article 2 Synopsis

- Goal to provide updated search on Hall technique (HT) indications and contraindications, advantages and concerns, successes and failures, cost effectiveness, and compare technique to conventional treatment options
- Electronic Databases of “Cochrane Database”, “PubMed”, “Science Direct”, and “Google Scholar” were searched to find relevant studies between 1991 and 2018.

Article 2 Synopsis

- Results:
  - Two year survival rate of HT and conventional crown technique were 94.5% and 96%, respectively, with no significant difference
  - Success rate of HT was 94.5% after 1 year and 67.6% after five years compared to three year survival rate of 78% and 65% for composite restorations and glass ionomer restorations, respectively
  - Compared to conventional restorations, HT is most cost effective treatment approach
  - HT is more acceptable and preferable by parents and dentists than more invasive caries treatment options

Article 2 Selection

- Strong level of evidence (Systematic Review)
- Addressed PICO “Intervention”

Levels of Evidence

- [x] **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
- [ ] **1b** – Individual RCT
- [ ] **2a** – Systematic Review of Cohort Studies
- [ ] **2b** – Individual Cohort Study
- [ ] **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
- [ ] **4a** – Systematic Review of Case Control Studies
- [ ] **4b** – Individual Case Control Study
- [ ] **5** – Case Series, Case Reports
- [ ] **6** – Expert Opinion without explicit critical appraisal, Narrative Review
- [ ] **7** – Animal Research
- [ ] **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT)

☒	**A** – Consistent, good quality patient oriented evidence
☐	**B** – Inconsistent or limited quality patient oriented evidence
☐	**C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusions: D3

- Based on the results of the literature search and the indications of the Hall technique, I would recommend our patient be treated with the Hall technique. Children tolerate this non-invasive technique very well, and the treatment has a high success and survival rate.

Conclusions: D4

Advised the usage of Hall crowns for teeth that otherwise would have required MOD resin restorations.

This is beneficial for the patient because it slows the progression of the caries, isolates the tooth from the rest of the oral cavity, and serves to retain the space for the permanent tooth. Hall crowns are a great choice for the patient especially because of the quick and simple placement. Anesthetic and preparation of the tooth is not required.

Discussion Questions

- How long does it take for high occlusion to adjust in the pediatric population post Hall crown placement?
- What are the consequences on the permanent dentition if caries on the deciduous dentition are left untreated?
- Why did Hall crowns initially become the primary treatment for pediatric molar caries as opposed to other methods?
- Have other materials been used in a similar fashion to fabricate the Hall crown? Or has any attempt been made to make Hall crowns more aesthetic?
- Are there any situations where a Hall crown would be contraindicated?
- How technique sensitive is the placement of a hall crown?
- How does the Hall technique affect the TMJ over time?
- Due to the recent success of the Hall technique, are there any specific indications for a traditional stainless steel crown placement, or should the Hall technique become the new standard?
- At what point o you consider dentistry in a general anesthesia setting for children versus solutions like h all crowns?
- Does SDF treatment of molar teeth provide adequate long term treatment for pediatric molars?
- What is the best way to detect dental caries?
- At what point would the Hall technique be indicated over a traditional restoration such as resin fillings?
- Does the effectiveness of the Hall technique compared to other restorative methods change if the primary tooth also received some form of endodontic treatment such as a pulpotomy, etc?
- Does the hall crown work for any age or is it more successful at a younger age vs. older age?
- What are some of the potential negative effects of the hall technique can produce? What is the cost difference between hall crowns and SCCs?
- What are the benefits of Hall crowns in pediatric patients opposed to other restorative techniques?
- In a pediatric patient with rampant caries, are there any contraindications for using Hall crowns on multiple adjacent posterior teeth?

THANK YOU

What did the tooth say when his neighbor got crowned?

HALL-o