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Hall Technique in Pediatric Dentistry Across Arab League Countries: Clinical Success, Parental Acceptance, and Pediatric Dentists Adoption – A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - Myself/MBRU.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 January 2026 and was last updated on 9 January 2026.

INTRODUCTION

Review question / Objective Among pediatric patients in Arab League countries: 1. What are the clinical success rates of preformed metal crowns placed using the Hall Technique for carious primary molars? 2. What is the level of parental acceptance and satisfaction with the Hall Technique? 3. What is the extent of knowledge, attitude, and adoption of the Hall Technique among pediatric dentists?

Rationale Background & Rationale
Dental caries in primary teeth is highly prevalent in many Arab League countries, and access to child-friendly, minimally invasive treatments is a major public health need. The Hall Technique (HT) is a minimally invasive method for managing carious primary molars using preformed metal crowns without caries removal, tooth preparation, or local anaesthesia.
Evidence from international studies suggests that the Hall Technique achieves high clinical success, with good acceptance by children and parents, and increasing adoption by pediatric dentists. However, practice patterns, parental expectations, cultural factors, and healthcare system organization differ across Arab League countries, which may influence clinical outcomes, satisfaction, and uptake of the technique.
The Arab League countries represent a diverse region with varying healthcare infrastructure, dental training standards, and clinical practice patterns. Understanding the adoption, effectiveness, and acceptability of the Hall technique across these nations is essential for informing evidence-based clinical practice and policy development.
Several studies from the Arab region (clinical trials, observational cohorts, and questionnaire-based surveys) have investigated:
• Clinical success/failure rates of Hall Technique crowns in children.
• Parental acceptance and satisfaction.
• Knowledge, attitudes, and adoption of the Hall Technique among pediatric dentists.
To date, no comprehensive systematic review and meta-analysis has synthesized this evidence specifically for Arab League countries, nor

compared outcomes across countries or settings. A focused review will support researchers, clinicians, and policymakers in understanding the effectiveness, acceptability, and implementation of the Hall Technique within this region.

The study provided 36 studies, including randomized controlled trials,
cohort studies, retrospective studies, pilot clinical evaluations, parent acceptance assessments,
and pediatric dentist adoption surveys across Arab League region.

These studies include:

– RCTs assessing HT vs conventional pulpotomy, conventional SSC, SDF-modified HT, and
laser-modified HT.
– Parent satisfaction studies from Jeddah and multi-arm acceptability trials.
– Dentist awareness surveys from Arab league countries, and global comparisons.
– Retrospective 24-month PMC survival studies.
– Pilot studies assessing masseter muscle activity, bacterial colonization (CLSM), gingival health, and intra-arch dimensions.
– Systematic reviews and umbrella reviews (used for reference mining).

Condition being studied Primary Objective

To systematically review and, where possible, meta-analyze studies from Arab League countries that evaluate:
1. Clinical success rate of the Hall Technique in managing carious primary molars.
2. Parental acceptance and satisfaction with the Hall Technique.
3. Pediatric Dentist adoption (knowledge, attitudes, and practice) of the Hall Technique.
Secondary Objectives
• To compare clinical success rates of the Hall Technique across different Arab League countries and settings (e.g., primary healthcare, university clinics, hospital-based services).
• To explore factors associated with parental acceptance (e.g., aesthetics, procedure comfort, child behavior, information provided).
• To describe barriers and facilitators for adoption of the Hall Technique among pediatric dentists in the region.
• Compare modified HT versions (SDF-modified, laser-modified, Bioflex) vs classic HT.
• To evaluate post-operative pain and clinical complications associated with Hall technique application.
• To assess gingival health outcomes following Hall technique crown placement.
• To examine the effectiveness of Hall technique modifications, including sliver diamine fluoride (SDF) integration.

METHODS

Search strategy A comprehensive search strategy will combine keywords and controlled vocabulary (e.g., MeSH terms) related to:
(Hall Technique) OR (Hall crown) AND (Pediatric Dentistry[MeSH Terms]) OR (Pediatric Dentistry)
AND (United arab Emirates) OR (saudi arabia) OR (Oman) OR (yemen) OR (qatar) OR (bahrain)
OR (kuwait) OR (Iraq) OR (lebanon)OR (syria) OR (Morroco) OR (algeria) OR (tunisia)
OR (libya) OR (sudan) OR
(somalia)OR (Djibouti) OR (Comoros)OR (palestine)) OR (mauritania) OR (Jordan) OR (egypt)
(Hall Technique) OR (Hall crown).

(Hall Technique) OR (Hall crown) OR (Stainless steel crown)OR (SSC)
(Crowns) OR (Hall Technique) OR (hall crown)OR (stainless steel crown) AND
(Pediatric Dentistry[MeSH Terms])
OR (Pediatric Dentistry) AND (United arab Emirates) OR (saudi arabia) OR (Oman) OR (yemen) OR
(qatar) OR (bahrain) OR (kuwait) OR (Iraq) OR (lebanon)OR (syria) OR (Morroco)OR (algeria)
OR (tunisia) OR
(libya)OR (sudan)) OR (somalia)OR (Djibouti) OR (Comoros) OR (palestine) OR (mauritania)
OR (Jordan) OR
(egypt).

(Crowns) OR (Hall Technique) OR (hall crown) OR (stainless steel crown)
(Hall Technique) AND (United arab Emirates) OR (saudi arabia) OR (Oman)OR (yemen) OR (qatar)
OR (bahrain) OR (kuwait) OR (Iraq) OR (lebanon) OR (syria) OR (Morroco) OR (algeria)) OR (tunisia)
OR (libya) OR
(sudan) OR (somalia)OR (Djibouti) OR (Comoros) OR (palestine) OR (mauritania)OR (Jordan) OR
(egypt)
(Hall Technique) AND ((Pediatric Dentistry[MeSH Terms]) OR (Pediatric Dentistry)AND
(United arab Emirates)
OR (saudi arabia) OR (Oman)OR (yemen) OR (qatar) OR (bahrain) OR (kuwait)OR (Iraq)OR
(lebanon)
OR (syria) OR (Morroco)OR (algeria) OR (tunisia)OR (libya)OR (sudan)OR (somalia)OR (Djibouti) OR
(Comoros) OR (palestine)OR (mauritania) OR (Jordan) OR (egypt).

Hall Technique
(Dental Atraumatic Restorative Treatment*[MeSH Terms]) OR (Dental Caries* / Therapy[MeSH Terms]) OR (Dental Caries / Therapy*[MeSH Terms])OR (Crowns*[MeSH Terms]) OR (Hall Technique)) OR (Crowns)
OR (hall crown) OR (stainless steel crown)AND ((Pediatric Dentistry[MeSH Terms]) OR (Pediatric Dentistry)
AND (United arab Emirates) OR (saudi arabia)OR (Oman) OR (yemen) OR (qatar)
OR (bahrain)OR (kuwait)OR (Iraq)OR (lebanon)OR (syria) OR (Morroco)OR (algeria) OR (tunisia)
OR (libya)OR (sudan)OR (somalia)OR (Djibouti)OR (Comoros) OR (palestine)) OR (mauritania)
OR (Jordan)
OR (egypt)

(Pediatric Dentistry[MeSH Terms]) OR (Pediatric Dentistry)
(Dental Atraumatic Restorative Treatment*[MeSH Terms]) OR (Dental Caries* / Therapy[MeSH Terms]) OR (Dental Caries / Therapy*[MeSH Terms])) OR (Crowns*[MeSH Terms])) OR (Hall Technique)
OR (Crowns)
OR (hall crown)) OR (stainless steel crown)
(Hall Technique) AND (Pediatric Dentistry) AND (United arab Emirates) OR (saudi arabia)
OR (Oman) OR (yemen) OR (qatar) OR (bahrain) OR (kuwait) OR (Iraq) OR (lebanon) OR (syria)OR (Morroco)
OR (algeria)OR (tunisia) OR (libya) OR (sudan)) OR (Somalia) OR (Djibouti) OR (Comoros)
OR (palestine)
OR (mauritania) OR (Jordan) OR (egypt).

(Hall Technique) AND (Pediatric Dentistry) AND (Arab league) OR (Middle east)
OR (Arab countries) OR (GCC) OR (United arab Emirates) OR (saudi arabia)OR (Oman) OR (yemen)
OR (qatar) OR (bahrain) OR (kuwait) OR (Iraq) OR (lebanon) OR (syria) OR (Morroco) OR (algeria)
OR (tunisia) OR (libya) OR (sudan) OR (somalia)OR (Djibouti) OR (Comoros) OR (palestine)
OR (mauritania) OR (Jordan)OR (egypt).

AND 'meta analysis'

'united arab emirates'/exp OR 'united arab emirates' OR (united AND ('arab'/exp OR arab) AND emirates) OR 'saudi arabia'/exp OR 'saudi arabia' OR ('saudi'/exp OR saudi) AND ('arabia'/exp OR arabia) OR 'oman'/exp OR oman OR 'yemen'/exp OR yemen OR 'qatar'/exp OR qatar OR 'bahrain'/exp OR bahrain OR 'kuwait'/exp OR kuwait OR 'iraq'/exp OR iraq OR 'lebanon'/exp OR lebanon OR 'syria'/exp OR syria OR morroco OR 'algeria'/exp OR algeria OR 'tunisia'/exp OR tunisia OR 'libya'/exp OR libya OR 'sudan'/exp OR sudan OR 'somalia'/exp OR somalia OR 'djibouti'/exp OR djibouti OR 'comoros'/exp OR comoros OR 'palestine'/exp OR palestine OR 'mauritania'/exp OR mauritania OR 'jordan'/exp OR jordan OR 'egypt'/exp OR Egypt

'pediatric dentistry'/exp OR 'pediatric dentistry' OR (('pediatric'/exp OR pediatric) AND ('dentistry'/exp OR dentistry)
'hall technique'/exp OR 'hall technique' OR (hall AND ('technique'/exp OR technique) OR 'hall crown' OR (hall AND ('crown'/exp OR crown)
AND ('Article'/it OR 'Review'/it)
(hall AND technique OR hall) AND crown AND pediatric AND dentistry OR pediatric) AND dentistry AND united AND arab AND emirates OR saudi) AND arabia OR oman OR yemen OR qatar OR bahrain OR kuwait OR iraq OR lebanon OR syria OR morroco OR algeria OR tunisia OR libya OR sudan OR somalia OR djibouti OR comoros OR palestine OR mauritania OR jordan OR Egypt.

Participant or population

Participants
• Children (typically ≤12years) receiving dental treatment for carious primary molars using the Hall Technique in Arab League countries such as receiving HT, SDF-modified HT, or laser-modified HT.
• No restrictions on gender, ethnicity, or socioeconomic status.
• Parents/guardians of children treated with hall technique or conventional methods measured through validated questionnaires, interviews, or surveys.
• Pediatric dentists, who are practicing or teaching in Arab League countries and are surveyed or interviewed about the knowledge, attitude, practice patterns, or barriers to adaption of Hall Technique.

Intervention

• Intervention:
o Preformed metal crowns placed using the Hall Technique (classic or modified) without LA on primary molars.

Comparator • Comparators (where applicable):
o Conventional stainless steel crown placement with tooth preparation with LA.
o Conventional restorative techniques (e.g., amalgam, composite, glass ionomer, pulpotomy + SSC).
o Other minimally invasive approaches (e.g., ART, SDF-modified Hall in comparative studies).

o No comparator (single-arm studies, case series, or descriptive surveys).

Study designs to be included Study Selection• All retrieved records will be exported to a reference manager and duplicates removed.• Titles and abstracts will be screened independently by at least two reviewers against the inclusion criteria.• Full texts of potentially eligible articles will be retrieved and assessed independently by the same reviewers.• Disagreements will be resolved by discussion; if necessary, a third reviewer will adjudicate.• Reasons for exclusion at the full-text stage will be recorded.MethodsThis protocol follows the PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Prot.

Eligibility criteria
Included study types: RCTs, non-randomized clinical trials, cohort studies, retrospective analyses, cross-sectional surveys, pilot studies.

Excluded from meta-analysis but included for reference mining: systematic reviews.
Excluded study type: Case report with less than 10 participants, opinion pieces or narrative reviews without primary data, duplicate publication.

Information sources • Electronic databases (to be searched from inception to the search date):
o MEDLINE (via PubMed)
o Scopus
o Embase
o Research gate
o EKB journal management system, oat text, Neuroquantology

• Seed articles from the user's file:
o All relevant Hall Technique–related studies in Arab League countries listed in the provided file will be used as seed references for backward and forward citation tracking.

• Reference-mining from the included systematic reviews in the dataset.

Main outcome(s)
• Primary Outcomes
o Clinical success of Hall Technique crowns, including:
Crown retention and survival rate.
Absence of pain or infection.
Absence of swelling, fistula, abscess.
No pathological mobility.
Radiographic absence of periapical pathology or furcal radiolucency.
Tooth survival until natural exfoliation or end of follow-up.
o Parental acceptance and satisfaction, measured by:
Overall satisfaction with treatment.
Parental anxiety reduction.
Willingness to accept the technique again for their child.
Preference comparison with other treatment options (if given).

o Pediatric Dentist adoption and attitude, including:
Knowledge and awareness of hall technique: (Proportion of pediatric dentists who know about the Hall Technique).
Utilization frequency and adoption rates: (Proportion who have used or currently use the technique).
Confidence in technique implementation:(Attitudes toward safety, effectiveness, ease of use, and barriers).

Additional outcome(s) Secondary Outcomes
o Child behaviour and cooperation during treatment (e.g., Frankl scale)
o Procedure time and need for local anaesthesia.
o Complications or adverse events (e.g., crown loss, symptoms requiring retreatment).
o Implementation-related outcomes (e.g., training received, availability of crowns).
o Gingival health status (bleeding, inflammation, pocket depth).
o Bacterial colonization and caries progression.
o Intra arch dimension changes.
o Complications (crown loosening, tooth fracture, pulpal involvement).

Data management Extracted data will be entered into standardized data extraction form and securely stored. data will be cross checked for accuracy by 2 reviewers, with disagreement resolved by a third reviewer.

Quality assessment / Risk of bias analysis ;
Risk of bias will be assessed independently by two reviewers using tools appropriate to study design:
• Randomized controlled trials: Cochrane Risk of Bias 2 (RoB 2) tool.
• Non-randomized clinical studies (cohort, case–control): ROBINS-I or relevant JBI critical appraisal checklists.
• Case series: JBI checklist for case series.
• Cross-sectional surveys (Pediatric dentist adoption/attitude studies): JBI checklist for analytical cross-sectional studies.
• Piolt studies: BI.
Each domain will be judged as low, moderate, high, or unclear risk of bias, and an overall risk of

bias rating will be assigned. Discrepancies will be resolved by discussion or a third reviewer.
Assessment of Publication Bias
• If ≥10 studies are available for a given outcome, funnel plots will be generated to visually assess publication bias.
• Egger's test or similar will be performed where appropriate.
Assessment of evidence certainty
The GRADE approach will be used to assess the certainty of evidence for key outcomes (clinical success, parental acceptance, and pediatric dentist adoption). Evidence will be graded as high, moderate, low, or very low based on risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Strategy of data synthesis Data Synthesis
Narrative Synthesis
All included studies will first be summarized in tables and narratively:
• By outcome (clinical success, parental acceptance, adoption/attitude)
• By country and setting
• By study design
Quantitative Synthesis (Meta-analysis)
Where data are sufficiently homogeneous in terms of participants, interventions, outcomes, and follow-up periods, a meta-analysis will be conducted.

• Effect measures:
o For clinical success:
Pooled proportion of successful crowns with 95% confidence intervals (CIs).
For comparative studies (Hall vs conventional): risk ratio (RR) or odds ratio (OR) of success or failure.
o For parental acceptance:
Mean difference (MD) or standardized mean difference (SMD) of satisfaction scores, where comparable.
Pooled proportions of parents who "agree/ strongly agree" with accepting the technique.
o For pediatric dentist adoption:
Pooled proportions of pediatric dentists who: know the Hall Technique, have used it, or currently use it.

• Statistical model:
o A random-effects model will be used, as heterogeneity between studies is expected (different countries, settings, and populations).
• Heterogeneity:
o Statistical heterogeneity will be assessed using the I^2 statistic and Chi-square test.
o I^2 values of 25%, 50%, and 75% will be considered low, moderate, and high heterogeneity, respectively.

Subgroup analysis Subgroup Analyses (if data allow) • By country or sub-region (e.g., Gulf countries vs Levant vs North
Africa). • By setting (primary healthcare vs university clinics vs
hospital). • By study design (RCTs vs observational studies). • By follow-up duration (≤12 months vs >12
months). • For adoption studies (pediatric dentists, years of experience, and level oftraining).

Sensitivity analyses
• Excluding studies at high risk of bias.
• Using alternative statistical models (fixed-effect vs random-effects) for robustness checks.

Country(ies) involved United Arab Emirates - MBRU Mohammed Bin Rashid University.

Other relevant information Ethics and Dissemination
This study will use data from previously published articles and does not require ethical approval.
Findings will be disseminated through:
• Submission to a peer-reviewed, indexed journal (preferably Q1/Q2 in dentistry or pediatric dentistry).

Keywords hall technique/hall crown/pediatric dentist/stainless steel crown/pediatric dentistry/ performed metal crowns/primary molars/ssc/dental caries/minimally invasive dentistry/parental accepetance /Arab leaque/middle east/GCC.

Dissemination plans
The findings of this systematic review will be disseminated through publication in a peer reviewed scientific journal and presentation at relevant national and international dental pediatric conferences.

Contributions of each author
Author 1 - shahad alsari - author 1 lead author/ corresponding author: Develop the research question PICO. Register the protocol. Design the search strategy with databases. coordinate the review process. Write the final manuscript draft. Submit the paper and handles journal communication.
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Author 2 - Noura Juma -independent reviewer screens titles, abstracts, and full texts perform extraction in parallel with author 1. Assess the risk of bias then review and edits the manuscript.

Email: noura.juma@ehs.gov.ae
Author 3 - Mawlood Kowash - conflict -resolution and oversight role. Resolve disagreement between author 1 and 2. Validate study inclusion and exclusion. Review final data tables and synthesis. Provide methodological or clinical expertise. Approve final manuscript. The author provided statistical expertise.
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Author 4 - Moahammad Pasha - research writing support: contributed to manuscript writing and language editing. Assisted in structuring the introduction, methods and discussion. improved clarity, coherence and academic style. ensured consistent with Prisma 2020 report guideline. reviewed and revised manuscript for intellectual content.
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