

# Comparison of Articaine Infiltration to Lidocaine IANB in Pediatric Patients

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## INTRODUCTION

- Local anesthesia (LA) provides **inhibition** of **pain** during dental procedures.
- Articaine** can **penetrate** through **dense cortical bone** due to its high lipid solubility, **enabling** its use for anesthetizing **primary mandibular molars via infiltration** technique.
- This can be an **alternative** to inferior alveolar nerve block (IANB) with **lidocaine**, a more **difficult** and **technique-sensitive** procedure associated with increased risk of complications.
- Additional data is needed to evaluate the effectiveness of the two LA agents using their respective techniques in achieving profound anesthesia in primary mandibular molars.



Figure 1. Mandibular infiltration



Figure 2. IANB



Figure 3. 2% Lidocaine with 1:100,000 epinephrine

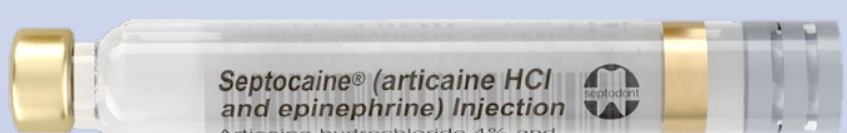


Figure 4. 4% Articaine with 1:100,000 epinephrine

## HYPOTHESIS & OBJECTIVES

### Null Hypothesis:

- There is **no statistical difference** in the clinical or behavioral effectiveness of articaine infiltration versus lidocaine IANB for restorative treatment of primary mandibular molars in pediatric patients.

### Objectives:

- To assess **observed behavior**, **subjective pain perception**, and **physiological signs** (blood pressure and pulse) in pediatric patients undergoing two types of LA administration (articaine infiltration and lidocaine IANB) for treatment of primary mandibular molars.
- To determine if **articaine infiltration** is as **effective as lidocaine IANB** for restorative treatment in **primary mandibular molars**.

## MATERIALS & METHODS

- This study was a **randomized controlled clinical trial** with **parallel design**.
- Participants were recruited from the **post-graduate Pediatric Dental Clinic** at **UIC** according to strict inclusion and exclusion criteria and **randomly assigned** to either the **Lidocaine** or **Articaine** group.
- One designated operator** (experienced pediatric dentist) administered all LA.
- Two types of examiners** (dental assistants & pediatric dental residents), blinded to LA type, assessed observed behavior during LA administration and throughout treatment, respectively, using the **Modified Behavioral Pain Scale (MBPS)**.
- Participants completed the **Wong-Baker FACES® Pain Rating Scale (WBS)** for self-perceived pain of overall appointment.
- Blood pressure** and **pulse** were recorded periodically as quantitative pain evaluation.

	Inclusion Criteria	Exclusion Criteria
<b>Patient</b>	<ul style="list-style-type: none"> <li>Medically healthy (ASA I or II)</li> <li>4 - 10 years old</li> <li>Prior history of dental treatment using LA</li> <li>Cooperative for dental treatment (Frankl 3 or 4)</li> <li>English speaking</li> <li>Child demonstrates understanding of the pain scale</li> </ul>	<ul style="list-style-type: none"> <li>Medically compromised (ASA III - VI)</li> <li>Younger than 4 or older than 10 years old</li> <li>No prior history of dental treatment using LA</li> <li>Uncooperative for dental treatment (Frankl 1 or 2)</li> <li>Poor English literacy</li> <li>Child does not demonstrate understanding of the pain scale</li> </ul>
<b>Tooth</b>	<ul style="list-style-type: none"> <li>Primary mandibular molar requiring restorative dental treatment due to: <ul style="list-style-type: none"> <li>Caries</li> <li>Pulp treatment</li> <li>Developmental defects</li> <li>Tooth surface loss (erosion/attrition)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Tooth other than mandibular primary molar</li> <li>Tooth requiring extraction</li> </ul>

Table 1. Inclusion and Exclusion Criteria

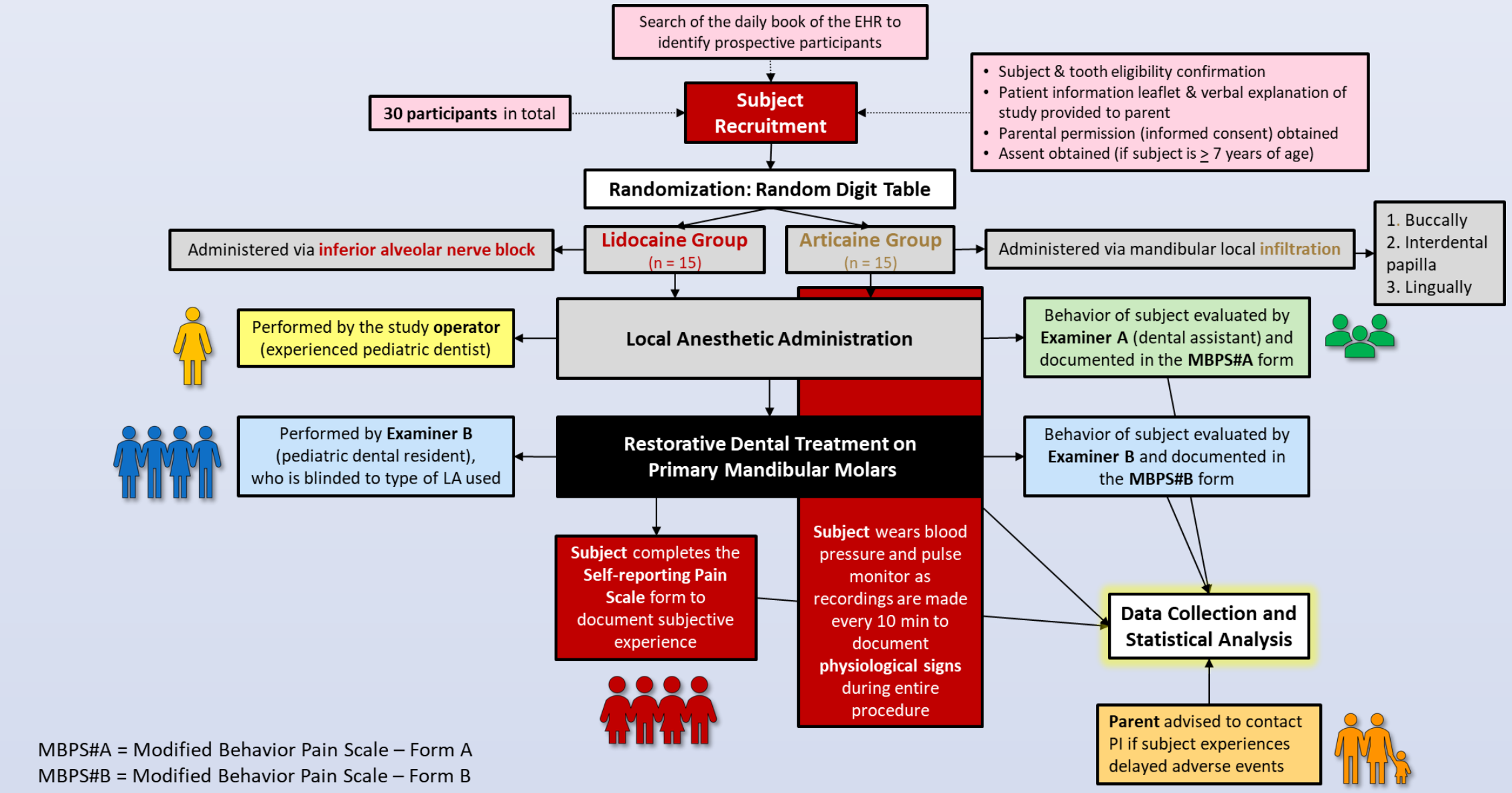


Figure 5. Flow chart of the study.

## RESULTS

- Total of **110 participants** enrolled;
  - 4 - 10 years age range (mean 6.43 years)
  - 60% males, 40% females
- Various types of treatment were completed
  - Including composite restorations, SSC, and **MTA pulpotomy**
- Both **Articaine** and **Lidocaine** exhibited **similar clinical success** without any intraoperative or postoperative adverse outcomes.
- Mean scores for **observed behavioral pain (MBPS; max 10; 0 is "no pain")** were:
  - Significantly lower** for **Articaine (2.24)** than **Lidocaine (3.89)** during LA administration (MBPS #A;  $p=0.000$ ).
  - Significantly lower** for **Articaine (1.69)** than **Lidocaine (2.51)** throughout treatment (MBPS #B;  $p=0.012$ ).
- Mean scores for **subjective pain perception (WBS; max 10; 0 is "no hurt")** were **significantly lower** for **Articaine (0.872)** than **Lidocaine (1.64)** ( $p=0.086$ ).
- All physiologic signs recorded including blood pressure and pulse rates were within the normal physiologic ranges.
- Given the successful completion of treatments, lower observed pain scores, and lower self-reported scores the null hypothesis was accepted.

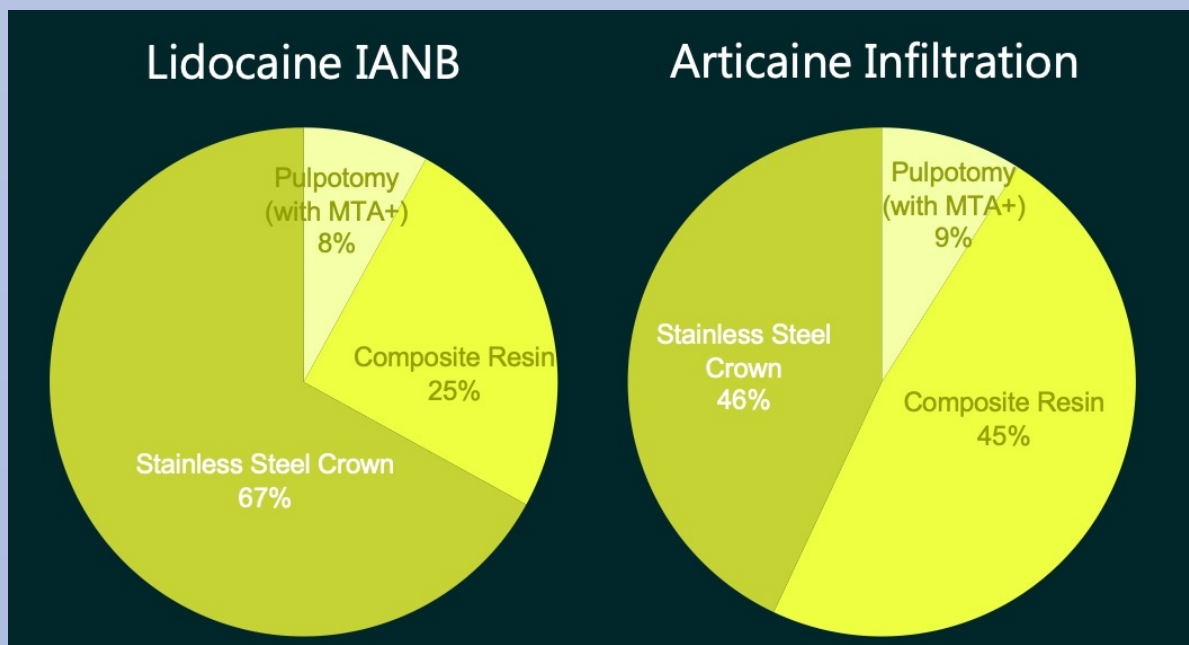


Figure 6. Percentage of Restoration Treatment Types

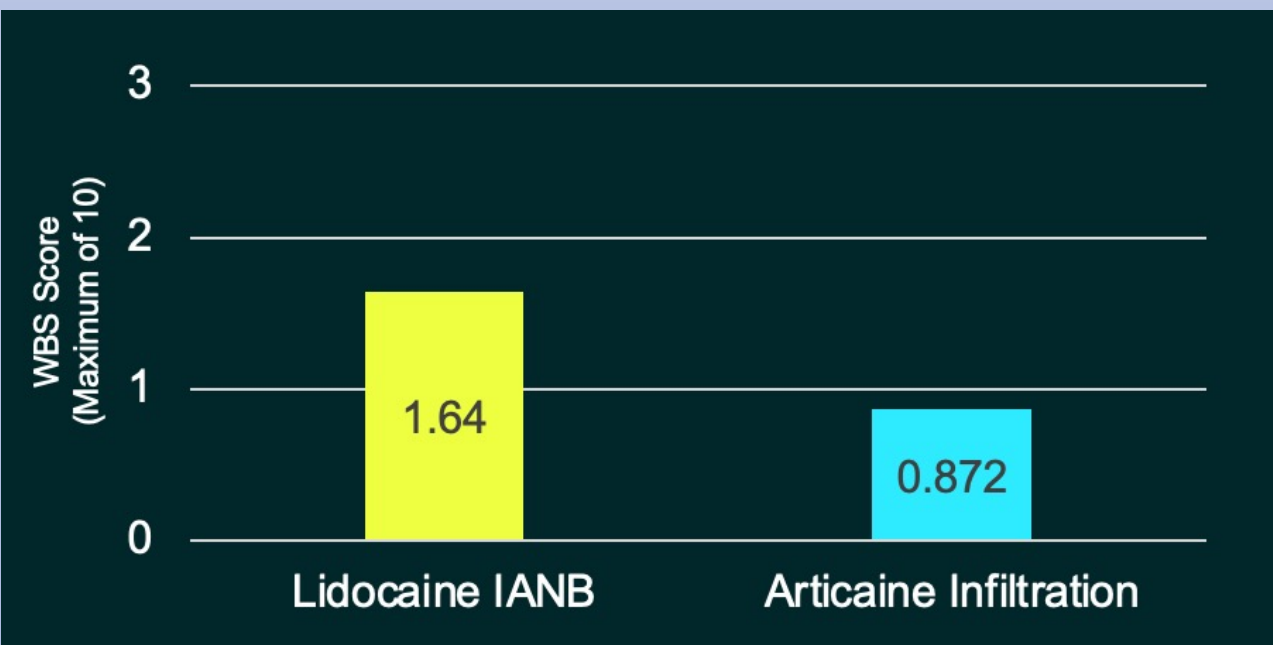


Figure 8. Mean Self-Reported WBS Scores

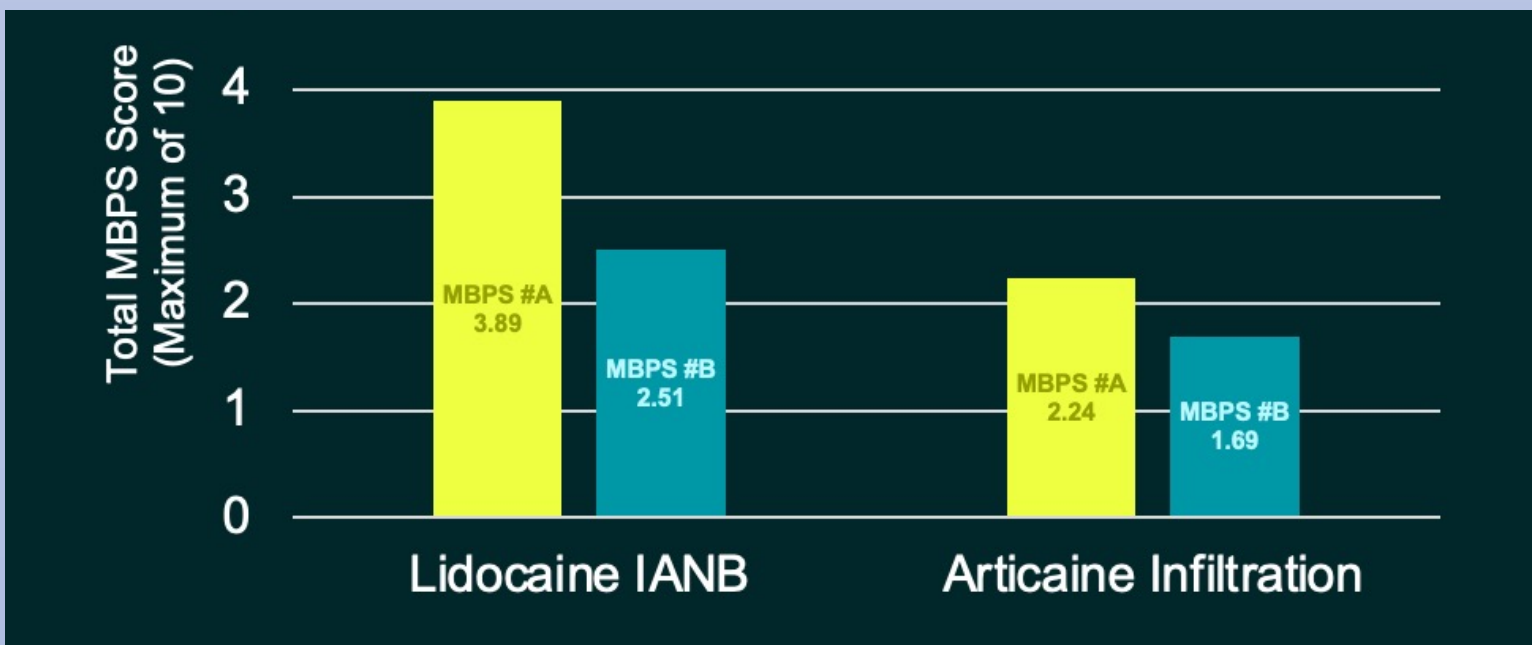


Figure 7. Mean Total MBPS Scores

## CONCLUSIONS

- The **null hypothesis** was **accepted**:
  - Articaine infiltration was as effective as lidocaine IANB for **restorative treatment** of **primary mandibular molars** in pediatric patients.
  - Less observable pain** was noted for articaine infiltration during LA administration and during restorative treatment.
  - Self-reported pain perception** for the entire dental visit was **less** when local anesthesia was administered via articaine infiltration.
- Articaine infiltration** was less painful upon administration and may be considered a safe and effective **alternative** to **lidocaine IANB** for restorative treatment of primary mandibular molars.

## FUTURE CONSIDERATIONS

- Evaluate and compare the **effectiveness** of both LA types on **greater proportion of more invasive procedures** (pulp therapy, zirconia crowns, etc.)
- Introduce **split-mouth design** to reduce inter-subject variability

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