# The Association Between MIH and Early Environmental Exposures

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NATIONWIDE CHILDREN'S *When your child needs a hospital, everything matters.*

## BACKGROUND

Molar Incisor Hypomineralization (MIH) is a qualitative developmental defect of systemic origin that affecting enamel of one or more first permanent molars (FPMs) with or without incisor involvement.

- The prevalence has been shown to range from 4-25%.
- Etiology is multi-factorial, involving both genetic and environmental factors.

## PURPOSE

To determine an etiological association between the presence and severity of MIH and environmental exposures (pre-, peri-, post-natal), early childhood illness, antibiotic use, systemic disease, race/ethnicity, or socioeconomic status.

## METHODS

Routine intraoral examinations: Clinical photographs of affected molars uploaded to Epic

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Initial Screen: Data query from Epic Hyperspace extracted using Oracle SQL Developer software (Oracle)

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Charts reviewed manually to confirm MIH diagnosis, score severity (using European Academy of Pediatric Dentistry scale), and record patient demographics, environmental factors, systemic illness, etc.

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Data query for age-matched controls

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Statistical analysis completed using Excel (Microsoft) data

## RESULTS

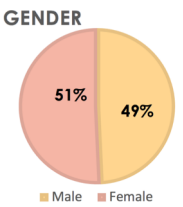


Figure 1 – Gender Distribution

| Patient Level Demographics | |
|---|---|
| Total N = 276 | |
| MIH | Not MIH |
| 92 | 184 |
| Age in months | |
| Mean (SD) | 120.78 (34) |
| Min, Max | 70, 209 |

Table 1 – Patient Demographics

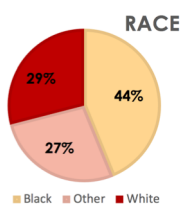


Figure 2 – Race Distribution

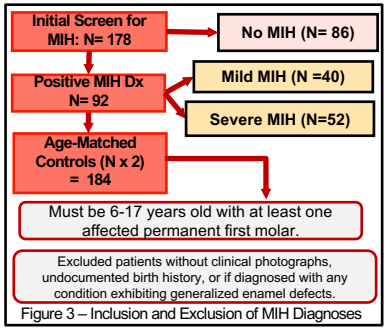


Figure 3 – Inclusion and Exclusion of MIH Diagnoses

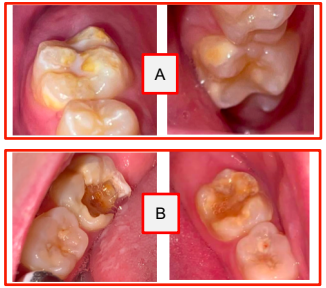


Figure 4 – Molar Incisor Severity (EAPD); photos courtesy of NCH dental practitioners; Mild (A), Severe (B)

Table 2 – Results of data analysis using logistic regression (at right)

- Presence of DTAP Vaccine ($p = 0.01$) positively associated with negative MIH diagnosis
- C-section Delivery potential for negative association with MIH
- Antibiotics, low birthweight, premature birth found to be insignificant

| Variable | Odds Ratio | 95% Confidence Interval | | P-value |
|---|---|---|---|---|
| Asthma | 0.5 | 0.2 | 1.2 | 0.13 |
| Antibiotic | 0.9 | 0.4 | 2.1 | 0.78 |
| DTAP Vaccine | 0.3 | 0.2 | 0.8 | 0.01 |
| Hospitalization | 0.5 | 0.2 | 1.1 | 0.09 |
| C-Section Delivery | 0.3 | 0.1 | 1.1 | 0.06 |
| Low Birthweight | 0.5 | 0.1 | 3.2 | 0.46 |
| Premature Birth | 1.8 | 0.4 | 9.2 | 0.48 |
| Respiratory.Infection | 0.5 | 0.2 | 1.2 | 0.12 |
| Tonsillitis | 2.9 | 0.9 | 9.1 | 0.07 |

## DISCUSSION

- Patients who had DTAP vaccine were less likely to have MIH than patients who did not have DTAP vaccine (Odds Ratio=0.3, P-value=0.01).
- Antibiotic use, premature birth, low birthweight not significantly associated with MIH.
- *Results pending to analyze potential associations between severity of MIH and environmental exposure, systemic disease, and/or demographic variables.*

**Strengths: One of the few prospective studies analyzing MIH etiology with linked dental and medical electronic health record**

**Limitations: Relatively small sample size, intra-rater reliability and potential for bias of internal validity, high number of patients excluded due to lack of intraoral photos**

## CONCLUSIONS

- Molar Incisor Hypomineralization remains to be a multi-dimensional, multifactorial diagnosis with several etiological associations.
- The DTAP vaccine may be a variable of interest for future MIH studies.
- Prospective studies with increased sample size and consistent medical record information are needed to further evaluate the significance of etiological associations.

## REFERENCES