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Background

- Micrognathia is often diagnosed in the perinatal period in the setting of airway obstruction and feeding difficulties secondary to glossoptosis.
- The triad of mandibular atresia, glossoptosis, and upper airway obstruction was first described by Pierre Robin in 1923.¹
- Pierre Robin Sequence leads to smaller and recessed mandibular bodies that are rotated superiorly and posteriorly, leading to tongue-base airway obstruction.²
- Mandibular distraction osteogenesis (MDO) elongates the body of the mandible via bilateral osteotomies and incremental traction of vascularized bone segments with adjustable fixation devices.
- Mandibular body elongation brings the attachment of tongue musculature forwards and relieves tongue base airway obstruction.^{3,4}
- **Presented here** is a retrospective chart review analyzing patient-specific variables and outcomes following MDO for tongue-base airway obstruction in patients with micrognathia.

Study Design & Methods

- Twenty-six patients with micrognathia who underwent MDO at a tertiary children's hospital were included in the study.
- Patients who had previously undergone tongue-lip adhesion surgery or tracheostomy were excluded.
- All patients underwent direct laryngoscopy immediately prior to MDO placement and immediately prior to MDO hardware removal.
- A standard transcervical approach was used for MDO placement and distraction began on post-operative day 3 at a rate of 1mm per day.
- Patients were intubated a minimum of 7 days following MDO hardware placement.
- Patients underwent MDO hardware removal surgery at approximately 4 months following placement surgery.
- Perinatal variables included gestational age, APGAR scores, airway resuscitation at time of birth, and birth weight.
- Variables at time of surgery included age, weight, feeding method, genetic diagnosis, PSG findings, intraoperative airway grade view, feeding status, and airway support pre-operatively.
- Post-operative variables included time to respiratory support weaning, time to full oral feeding, PSG findings, and intraoperative airway grade view.
- Statistical analysis of pre-MDO and post-MDO apnea-hypopnea index (AHI) was performed using Wilcoxon matched-pairs signed rank test.

Results

Cormack-Lehane Grade (CLG), Figure 1

- CLG at time of MDO placement was ≥ 3 in 92% of patients.
- At time of MDO removal, 81% of patients had CLG 1 with the remaining 9% demonstrating CLG 2.

Apnea-Hypopnea Index (AHI), Figure 2

- Pre-MDO, mean AHI was 39.5 ± 41.7
- Post-MDO, mean AHI was 2.0 ± 2.2

Respiratory Support Outcomes

- Pre-MDO, 62% of patients were receiving respiratory support.
- Post-MDO, all patients weaned to room air.
- Post-MDO, 81% of patients weaned to room air within 2 weeks.

Feeding Outcomes

- Pre-MDO, 65% of patients were receiving enteral support.
- Post-MDO, all patients achieved exclusive oral feeding.
- Post-MDO, 54% of patients were solely fed orally within 3 weeks.

Discussion & Conclusion

- MDO is an effective surgical treatment for tongue-base airway obstruction in the setting of micrognathia for patients who fail conservative therapy.
- Compared to other surgical airway procedures in this patient population, namely tracheostomy and tongue-lip adhesion surgery, MDO has significantly lower rates of post-operative dysphagia and need for post-operative enteral feeding supplementation.⁵
- Further studies evaluating patient characteristics and outcomes following MDO, tongue-lip adhesion, or tracheostomy for the treatment of tongue-base airway obstruction would be of benefit to identify prognostic factors for time to post-operative oral feeding and respiratory support weaning.⁶⁻⁸
- Additional information regarding MDO versus other surgical airway procedures for tongue-base airway obstruction, while also accounting for patient-specific characteristics, would assist patients, their parents, and surgeons when choosing between different treatment options.

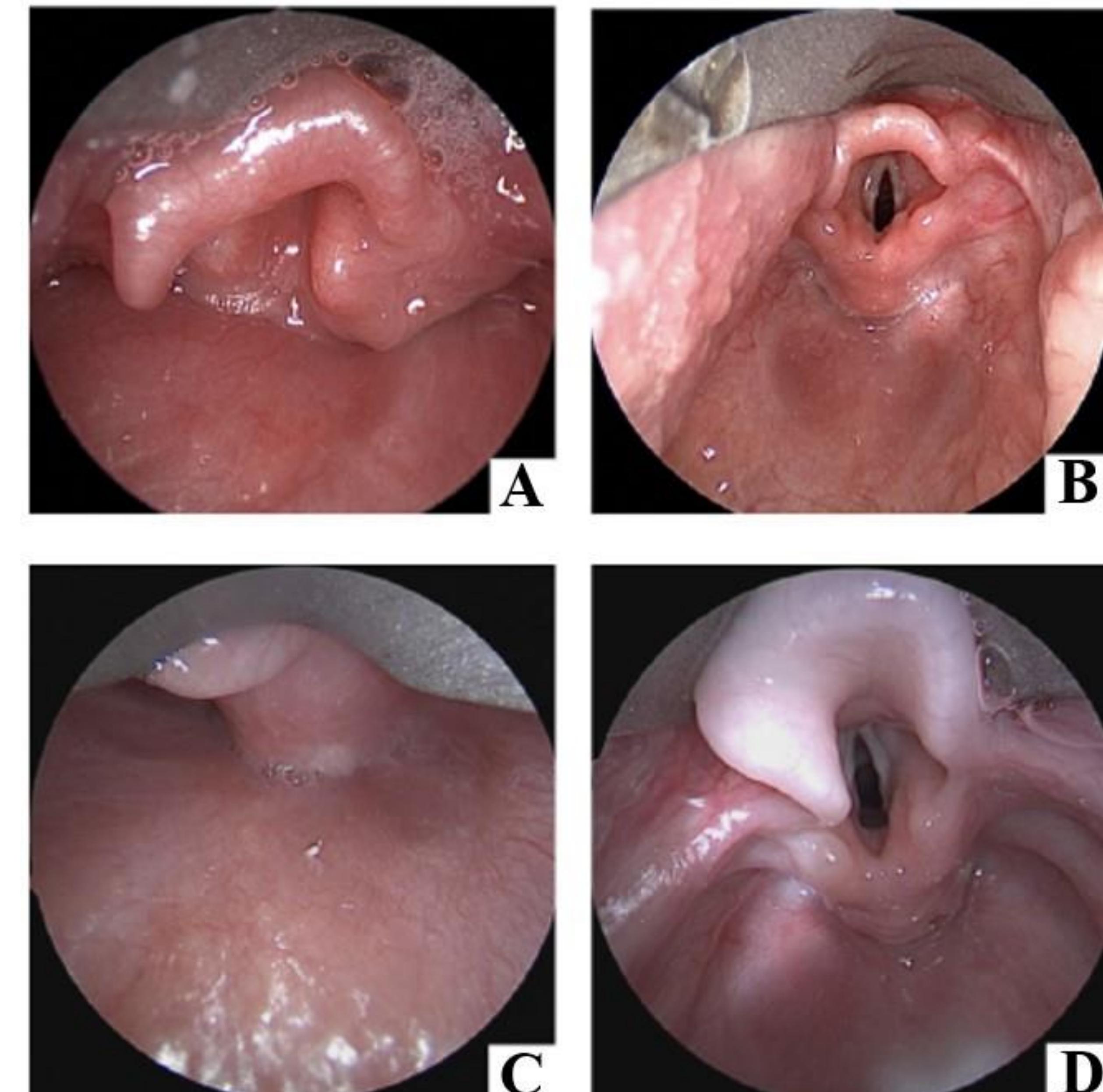


Figure 1. Example of Pre- and Post-MDO Airway Examinations.

A. Patient 1: Pre-MDO direct laryngoscopy (DL) view consistent with a Grade IIb view of the glottis according to the CLGS.
 B. Patient 1: Post-MDO DL view consistent with a Grade I view of the glottis.
 C. Patient 2: Pre-MDO DL view consistent with a Grade IV view of the glottis.
 D. Patient 2: Post-MDO DL view consistent with a Grade I view of the glottis.

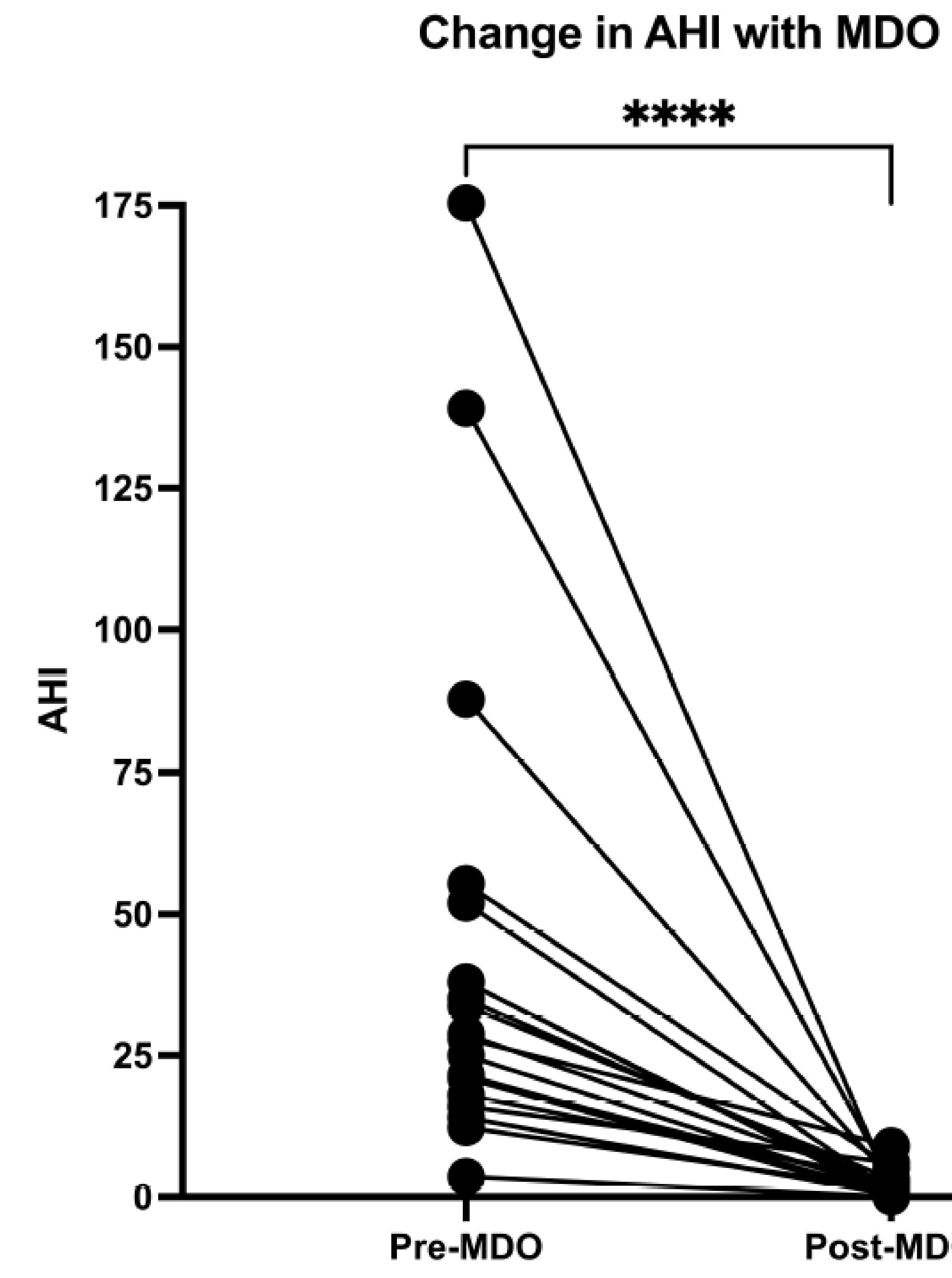


Figure 2. Change in AHI with MDO.

Legend: ****: $p < 0.0001$

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