Micrognathia
Clinical Pathway Synopsis

Objective of Clinical Pathway

To provide care standards for the neonate or infant admitted to the hospital with suspected micrognathia and associated breathing or feeding difficulties. The Micrognathia Clinical Pathway provides guidance on recommended specialty consultations, diagnostic management, interventions, and follow-up to minimize variation in care.

Background

Micrognathia, characterized by a mandible that is smaller than expected for age and development, occurs either in isolation or as part of more than 700 genetic syndromes.[1,2] It is a hallmark feature of Robin sequence, a condition defined by the triad of micrognathia, glossoptosis, and upper airway obstruction.[2-4] Robin sequence is estimated to occur in approximately 1 in 8,500 to 1 in 14,000 live births annually, with emerging literature suggesting syndromic forms account for up to 60% of cases, underscoring the importance of comprehensive evaluation.[2-4] Advances in prenatal imaging, including ultrasound and fetal magnetic resonance imaging, have improved early detection of micrognathia, with recent evidence supporting standardized measurement approaches to enhance diagnostic accuracy and inform anticipatory care planning.[2,4-6]

Micrognathia has significant functional implications, particularly affecting airway patency, feeding, and sleep.[3] Neonates and infants with micrognathia are at increased risk for obstructive sleep apnea, with severity closely associated with the degree of mandibular hypoplasia.[3] Consequently, airway and feeding difficulties may contribute to faltering weight, disrupted sleep, pulmonary hypertension, and increased morbidity if not promptly recognized and managed.[1-4,6,7]

Management ranges from conservative interventions to surgical approaches; however, considerable variability in care persists, and no universally accepted treatment pathway exists.[2,7-11] Given the heterogeneity in presentation and clinical course, early diagnosis and coordinated interdisciplinary care are essential to optimize clinical and developmental outcomes.[2,7-11] The Micrognathia Clinical Pathway Committee aims to address this variability by implementing a coordinated interdisciplinary care approach that supports the physical and psychosocial well-being of affected children and their families.

Target Users

- Physicians (Pulmonology, Neonatology, Plastic Surgery, Otolaryngology or Ear, Nose and Throat [ENT], Genetics, Primary Care)
- Advanced Practice Providers
- Nurses
- Feeding specialists (Occupational Therapist)
- Respiratory Therapists

Target Population

Inclusion Criteria

- Infants and children admitted with suspected micrognathia and **any** of the following:
  - Stertor, stridor, or increased work of breathing when supine
  - Feeding difficulty

Exclusion Criteria

- Infants and children with suspected micrognathia without breathing or feeding difficulties

Practice Recommendations

In the absence of a clinical practice guideline that fully addresses the management of micrognathia in neonatal and infant patients, guidance from the pediatric micrognathia and Robin sequence literature was used, in conjunction with the expert consensus of the Micrognathia Clinical Pathway Committee, to inform the assessment, acute management, and referral guidance in this pathway.[1-18]

Additional Questions Posed by the Clinical Pathway Committee

- In infants and children with micrognathia, what is the appropriate timing for a three-dimensional maxillofacial CT scan to optimize diagnosis, airway evaluation, and surgical planning?
  - A literature inquiry was conducted on June 8, 2026. See Appendix 1 for search strategy and results. These results were shared with the committee on June 17, 2026. There is no standardized guidance specifying a fixed age or time point for obtaining a three-dimensional CT in infants with micrognathia. The literature supports the use of three-dimensional maxillofacial CT for presurgical planning in micrognathia rather than for diagnostic purposes.[13-18] It is typically obtained once the decision has been made to pursue mandibular distraction osteogenesis following failed conservative management. The lead time is approximately 2 weeks before surgery when virtual surgical planning is used; however, this can vary depending upon the clinical severity of the airway obstruction. The age at the time of the CT scan varies, ranging from approximately 1 week of life to several months. For preterm infants, there are no specific timing modifications, but low-dose protocols are recommended to minimize radiation exposure.

Updates from Previous Versions of the Clinical Pathway

- Included imaging recommendations and associated considerations within the decision support framework
- Clarified that high-flow nasal cannula therapy constitutes a form of noninvasive respiratory support
- Removed the sleep apnea severity table, as it no longer reflects current evidence or practice and could lead to misinterpretation in clinical decision-making
- Clarified decision points regarding mandibular distraction, emphasizing the role of clinical evaluation and sleep study findings in guiding management decisions
- Added a decision point addressing patients who may demonstrate improvement with supplemental oxygen, yet still require mandibular distraction

- Expanded multidisciplinary management for patients with unfavorable factors for mandibular distraction, reflecting evolving practice patterns that emphasize noninvasive support and collaborative decision-making

Measures

- Access of the clinical pathway (website hits)

Value Implications

The following improvements may increase value by reducing healthcare and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families, and by reducing costs and resource utilization for healthcare facilities.

- Decreased unwarranted variation in care

Organizational Barriers and Facilitators

Potential Barriers

- Variability of the acceptable level of risk among providers
- Variability in experience among clinicians
- Challenges with access to healthcare and health literacy faced by some families

Potential Facilitators

- Collaborative engagement across the continuum of clinical care settings and healthcare disciplines during clinical pathway development

Bias Awareness

Our goal is to recognize the social determinants of health and minimize healthcare disparities, while acknowledging that unconscious biases can contribute to them.

Order Sets

- The Micrognathia Clinical Pathway does not have any directly associated order sets

Order Panels

- The Micrognathia Clinical Pathway does not have any directly associated order panels

Educational Materials

- The Micrognathia Clinical Pathway does not have any associated educational materials

Clinical Pathway Preparation

This pathway was prepared by the EBP Department in collaboration with the Micrognathia Clinical Pathway Committee, composed of content experts at Children's Mercy. Literature analysis in response to additional questions posed by the Micrognathia Clinical Pathway Committee was conducted by the EBP department.

Clinical Pathway Representation

This clinical pathway was originally created with representation from Pulmonary and Sleep Medicine, Clinical Genetics, ENT, Plastic and Reconstructive Surgery, Neonatology, and Evidence Based Practice.

Micrognathia Clinical Pathway Revision Representation

- Zarmina Ehsan, MD | Pulmonary and Sleep Medicine | Committee Chair
- Baha Al-Shawwa, MD | Pulmonary and Sleep Medicine | Committee Member
- Bonnie Sullivan, MD | Clinical Genetics | Committee Member
- Daniel Jensen, MD | Ear, Nose, Throat | Committee Member
- John Dahl, MD, PhD, MBA | Ear, Nose, Throat | Committee Member
- Adam Goodreau, MD | Plastic and Reconstructive Surgery | Committee Member
- Arhana Chattopadhyay, MD | Plastic and Reconstructive Surgery | Committee Member
- Julie Weiner, DO | Neonatology | Committee Member
- Karishma Rao, MD | Neonatology | Committee Member

EBP Committee Members

- Todd Glenski, MD, MSHA, FASA | Anesthesiology, Evidence Based Practice
- Kelli Ott, OTD, OTR/L | Evidence Based Practice

Clinical Pathway Development Funding

The development of this clinical pathway was underwritten by the following departments/divisions: Pulmonology (Sleep Center), Clinical Genetics, Otolaryngology, Plastic and Reconstructive Surgery, Neonatology, and Evidence Based Practice

Conflict of Interest

The contributors to the Micrognathia Clinical Pathway have no conflicts of interest to disclose related to the subject matter or materials discussed

Approval Process

- This pathway was reviewed and approved by the EBP Department and the Micrognathia Clinical Pathway Committee after committee members garnered feedback from their respective divisions/departments.

Review Requested

Department/Unit	Date
Pulmonary and Sleep Medicine	September 2026
Clinical Genetics	September 2026
ENT	September 2026
Plastics and Reconstructive Surgery	September 2026
Neonatology	September 2026
Evidence Based Practice	August 2026

Version History

Date	Comments
August 2020	Version one – Algorithm developed
May 2023	Version two – Algorithm revised, synopsis developed
September 2026	Version three – Algorithm and synopsis revised

Date for Next Review

- September 2030

Implementation & Follow-Up

- Once approved, the pathway was implemented and presented to the appropriate care teams.
- Care measurements may be assessed and shared with appropriate care teams to determine whether changes are needed.
- Pathways are reviewed every 4 years (or sooner) and updated as necessary within the EBP Department at Children's Mercy. Pathway committees are involved with every review and update.

Disclaimer

When evidence is lacking or inconclusive, care options are provided in the supporting documents and in the order set(s) and/or order panel(s) that accompany the clinical pathway.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those involved in providing health care are expected to use their judgment to determine what is in the patient's best interests based on the circumstances at the time.

It is impossible to anticipate all possible situations and ~~to~~ prepare clinical pathways for each. Accordingly, these clinical pathways should guide care, with the understanding that departures may be required at times.

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Appendix

Appendix 1. Search Strategy and Results for Maxillofacial CT Scan Timing

PubMed

(micrognathia OR retrognathia OR mandibular hypoplasia OR "Pierre Robin Sequence") AND ("3D CT" OR "three-dimensional CT" OR computed tomography OR maxillofacial CT OR craniofacial imaging) AND (airway obstruction OR upper airway obstruction OR airway compromise OR glossoptosis OR obstructive sleep apnea OR OSA OR sleep-disordered breathing OR hypoxia OR respiratory distress) AND (indication* OR timing OR evaluation OR assessment OR management OR workup OR surgical planning)

Search Dates: 2016-Current
Records identified through PubMed database searching, *n* = 4
Additional records identified through other sources, *n* = 2