

The Impact of Frenotomy on Gastroesophageal Reflux in Pediatric Patients with Ankyloglossia: A Systematic Review



Ashaka Patel¹, Katrina Circone¹, Sami Khoury², Edward Madou², Dhandapani Ashok^{1,3}, Julie Strychowsky^{1,2}, M. Elise Graham^{1,2}

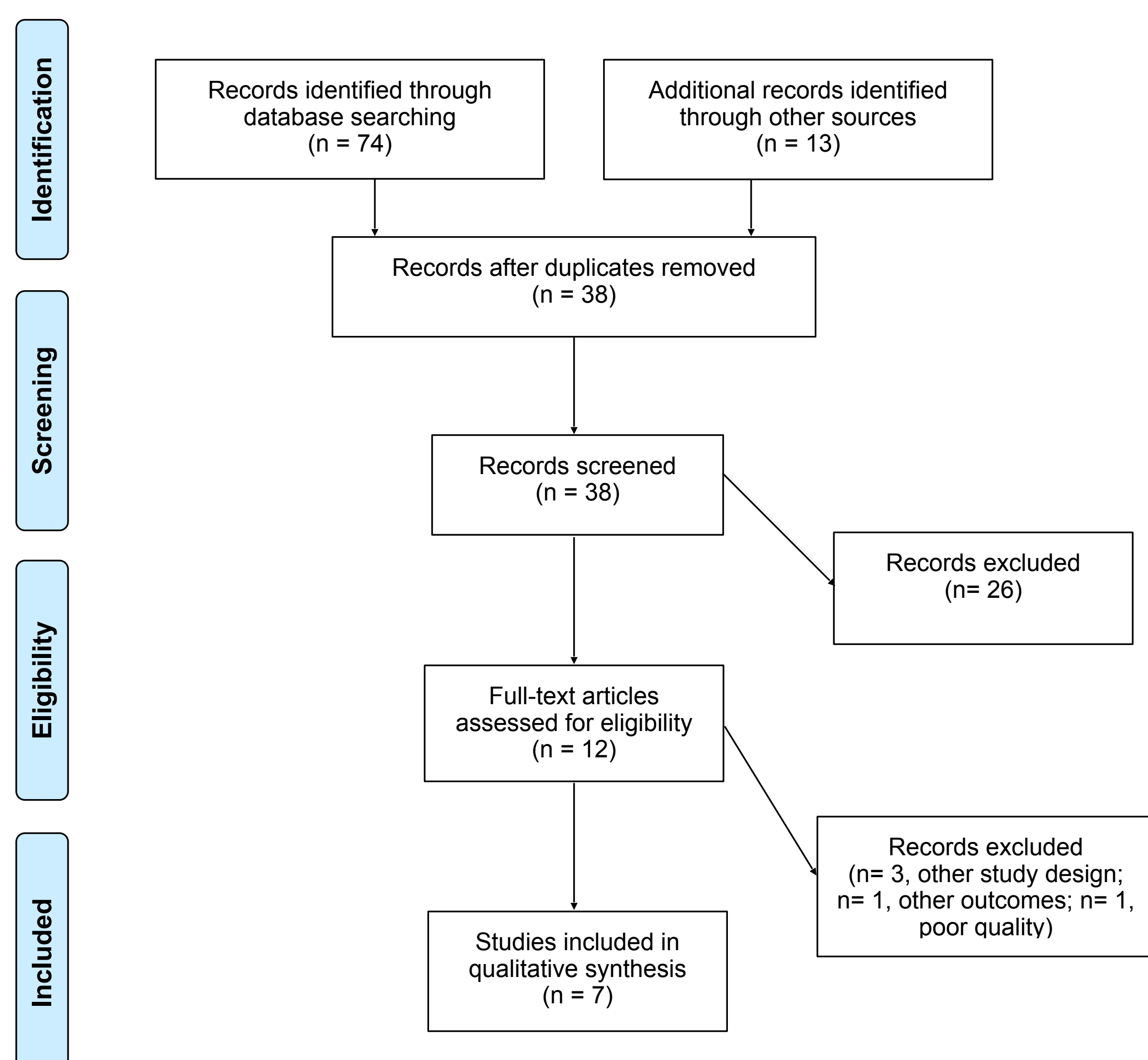


¹Schulich School of Medicine and Dentistry, Western University, London, Ontario, Canada
²Department of Otolaryngology – Head and Neck Surgery, London Health Sciences Centre, London, Ontario, Canada
³Division of Pediatric Gastroenterology - Department of Pediatrics, London Health Sciences Centre, London, Ontario, Canada

Background

- Although social media and published literature increasingly claim that ankyloglossia may contribute to gastroesophageal reflux (GER), this relationship remains uncertain.
- Some theories include the concept of “aerophagia”, the swallowing of air that is believed to be caused by a poor latch in children with ankyloglossia and restrictive maxillary frenula, although this is not an established entity.
- This systematic review was conducted to assess gastroesophageal reflux outcomes after frenotomy in infants with ankyloglossia.

Methods



• The databases CINAHL, Cochrane, EMBASE, Pubmed, and Scopus were searched from inception to May 20, 2023.

Inclusion Criteria:

- all study designs
- infants ≤ 12 months of age
- Preoperative and postoperative quantitative GER measures
 - pH manometry or multi-channel intraluminal impedance, and/or patient-reported symptom scores

Discussion/Conclusion

- The lack of high-quality studies and control comparison precludes the ability to ascertain if clinical improvement after frenotomy can be attributed to the intervention, as GER symptoms are known to improve with time.
- Meta-analysis was not possible due to the high risk of bias as included studies had limited sample sizes, poor methodology, and lacked adequate control groups.
- Future studies require more rigorous design with control groups and gold-standard diagnostic tools.

Results

- Of the 38 articles independently screened by two reviewers, seven met inclusion criteria
 - six prospective cohort studies and one RCT
- Patients with ankyloglossia ranged from 8-237 infants
- The included RCT used a crossover design to compare infants undergoing frenotomy (n=23) to an observational group (n=24)
- No studies utilized the gold-standard diagnostic tools (pH manometry) for reflux disease
- Qualitative analysis included all seven studies, using the GIGER, I-GERQ-R, and GSQ-I scales

Author	Country	Year	Study Type	Total Participants	Mean Age (SD, Range)	Sex (% Female)	Reflux Outcome
Ghaheri	USA	2022	RCT - Frenotomy	23	39.6 (25.2, NR) days	55.2%	GSQ-I
			RCT - Control	24	47.4 (25.4, NR) days	44.8%	
Ghaheri	USA	2018	Prospective Cohort	54	8.3 (8.9, 1-37) weeks	48%	I-GERQ-R
Ghaheri	USA	2017	Prospective Cohort	237	4.4 (3.6, 0-12) weeks	44%	I-GERQ-R
Hand	Italy	2023	Prospective Cohort	40	46.8 (24.6, 8-84) days	37.5%	I-GERQ-R
Hand	Italy	2020	Prospective Cohort	132	43 (NR, NR) days	49%	I-GERQ-R
Hill	USA	2023	Prospective Cohort	84	6.3 (6.4, 0.4-29.4) weeks	44.0%	GIGER
Slagter	Netherlands	2020	Longitudinal Cohort	175	NR (NR, 0-3) months	46.9%	I-GERQ-R

- The majority of studies used the Coryllos tongue tie classification and the Kotlow lip tie classification
- Studies conducted by Ghaheri 2018, Ghaheri 2017, Hand 2023, Hand 2020, and Slagter 2020 reported in the respective percentage reductions in I-GERQ scores at 1 week postoperatively compared to pre-operatively as 23%, 19%, 9%, 15%, and 20%.
- The Newcastle Ottawa Scale was used to assess risk of bias. The 5 cohort studies ranged from a total score of 4-5, indicating a high risk of bias. The randomized control trial also had an overall high risk of bias
- Hill 2023 and Ghaheri 2022 did not use I-GERQ-R to measure reflux

Author, Year	Preoperative I-GERQ-R (SD)	Postoperative I-GERQ-R (SD): 1 Week	Postoperative I-GERQ-R (SD): 1 Month	Postoperative I-GERQ-R (SD): 6 Months
Ghaheri, 2018	17.3 (6.1)	13.3 (5.1)	11.8 (5.8)	NA
Ghaheri, 2017	15.4 (5.4)	12.4 (4.4)	11.1 (5.5)	NA
Hand, 2023	14.6 (3.2)	13.3 (4.1)	9.8 (3.4)	NA
Hand, 2020	15.6 (5.5)	13.3 (4.7)	10.1 (3.6)	NA
Slagter, 2020	21.8 (4.9)	17.5 (4.8)	15.8 (5.8)	13.6 (3.9)

Selected References

1. Rosen R. Gastroesophageal reflux in infants: more than just a phenomenon. *JAMA Pediatr.* 2014 Jan;168(1):83-9.
2. Gold BD. Is Gastroesophageal Reflux Disease Really a Life-Long Disease: Do Babies Who Regurgitate Grow up to Be Adults with GERD Complications? *Official journal of the American College of Gastroenterology | ACG.* 2006 Mar;101(3):641.
3. Haham A, Marom R, Mangel L, Botzer E, Dollberg S. Prevalence of breastfeeding difficulties in newborns with a lingual frenulum: a prospective cohort series. *Breastfeed Med.* 2014 Nov;9(9):438-41.