

1 Ankyloglossia Diagnosis and Treatment in 2 Canada: An Environmental Scan

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38 **Context**

39 Health Canada and the World Health Organization promote breast milk as the primary source of
40 food or drink for the first six months of life.^{1,2} The Canadian Community Health Survey (CCHS)
41 reported that 89% of mothers initiated breastfeeding in 2011/2012; a slight increase from 85% in
42 2003.³ The percentage of mothers who breastfed exclusively for six months (or more) also
43 increased from 17% in 2003 to 26% in 2011/12.⁴ There may be pressure on mothers as
44 professional organizations increasingly endorse breastfeeding as the optimal choice for nutrition
45 in newborns and infants.⁵

46
47 The CCHS reported that one of the most frequently cited reasons for stopping breastfeeding
48 before six months was “difficulty with breastfeeding technique”.⁴ One condition that can affect
49 breastfeeding is ankyloglossia. Ankyloglossia, commonly known as tongue-tie, is characterized
50 by an abnormally short lingual frenulum (mucous membrane on the underside of the tongue).⁶
51 This can result in restricted tongue movement, which may impact an infant’s ability to latch
52 properly to their mother’s breast, as well as other functional, speech-related and oral-hygiene
53 related sequelae.^{7,8} Related to breastfeeding, ankyloglossia can lead to inadequate milk intake,
54 prolonged feeding times, and maternal nipple pain or bleeding.⁷ The Canadian in-hospital rate
55 of diagnosis was 22.6 per 1000 live births;⁹ a potential underestimation as many cases of
56 ankyloglossia are diagnosed in other care settings. US studies documenting prevalence have
57 presented estimates ranging from 4.2% to 10.7% in newborns.⁵

58
59 There is some evidence that performing a lingual frenectomy may improve maternally reported
60 feeding outcomes in newborns.^{5,10,11} A lingual frenectomy — also referred to as tongue-tie
61 release or frenotomy — is the splitting of the frenulum using sterile scissors or a scalpel, and
62 sometimes laser-based techniques.^{7,12} Side effects are rare but can include bleeding or
63 infection, and damage to the tongue or salivary glands.^{5,12} It is also possible that the frenulum
64 may reattach to the base of the tongue, which may require re-surgery.¹² Under certain
65 circumstances, a more extensive procedure called a frenuloplasty may be performed, typically
66 under general anesthesia and using surgical tools.¹² The wound closure is completed in a
67 specific pattern aimed at lengthening the frenulum, whereas a frenectomy is a simple release
68 without suturing.^{12,13} There is disagreement concerning when a frenectomy should be
69 performed, partly stemming from the fact that there is no universally accepted definition of
70 ankyloglossia.^{5,14}

71
72 Canadian jurisdictions have reported a noticeable increase in the conduct of frenectomies,
73 partially attributed to an emphasis on mothers initiating breastfeeding prior to hospital discharge,
74 though further understanding of the factors influencing this trend is needed.¹⁵ It has also been
75 suggested that more detailed clinical practice guidelines are necessary to ensure that infants
76 with breastfeeding problems due to ankyloglossia are treated properly.¹⁵

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79 **Objectives**

80 CADTH conducted an Environmental Scan to gather jurisdictional perspectives on ankyloglossia
81 diagnosis and treatment in Canada. The key objectives of this Environmental Scan were:

- 82 • to describe current practices for the assessment and diagnosis of ankyloglossia in
- 83 Canadian jurisdictions
- 84 • to describe current practices for patient selection for frenectomy (tongue-tie release, also
- 85 referred to as frenotomy) procedures in Canadian jurisdictions

- to describe and compare temporal trends related to the use of frenectomy to treat ankyloglossia across Canadian jurisdictions

Methods

Approach

Information was retrieved from a limited literature search and a survey distributed to key jurisdictional informants and stakeholders, both informed by the components outlined in Table 1. Findings from the literature search were used to supplement the information retrieved from the surveys.

Table 1: Components and Information Gathering Approach

		Inclusion
Components	Population	Pediatric patients with suspected ankyloglossia
	Intervention	<ul style="list-style-type: none"> Strategies for the assessment and diagnosis of ankyloglossia Frenectomy as a form of treatment
	Settings	Any Canadian healthcare setting (e.g.,, urban, rural and remote settings, primary and secondary care, private facilities)
	Outcomes	<ul style="list-style-type: none"> Current practices for: <ul style="list-style-type: none"> Assessment and diagnosis of ankyloglossia <u>and</u> Patient selection for frenectomies <u>including</u>: <ul style="list-style-type: none"> Capacity (i.e., eligibility criteria and referral process) Location/setting for delivering care (i.e., province/territory; urban/rural/remote; within a hospital; clinic; home; remotely delivered) Services offered to patient (i.e., types of interventions) Temporal trends related to the use of frenectomy Canadian guidance on the assessment, diagnosis, and treatment of ankyloglossia Barriers to and facilitators of optimal diagnosis and treatment of ankyloglossia
Information gathering approach	Consultation <input type="checkbox"/>	
	Survey <input checked="" type="checkbox"/>	
	Literature search: <input checked="" type="checkbox"/>	

Literature Search

A limited literature search was conducted using the following bibliographic databases: MEDLINE, PubMed, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL) via EBSCO, The Cochrane Library, and University of York Centre for Reviews and Dissemination (CRD) databases. Grey literature was identified by searching relevant sections of the *Grey Matters* checklist (<https://www.cadth.ca/grey-matters>). No methodological filters were applied. The search was also not limited to any language or publication date.

Research Questions

The literature review component of this environmental scan aimed to address the following questions:

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1. What are the Canadian policies, frameworks, guidelines and other guidance documents related to the assessment and diagnosis of ankyloglossia in Canada?
 2. What are the barriers to optimal assessment and diagnosis of ankyloglossia in Canadian jurisdictions?
 3. What are the facilitators of optimal assessment and diagnosis of ankyloglossia in Canadian jurisdictions?
 4. What are the Canadian policies, frameworks, guidelines and other guidance documents related to the patient selection for frenectomy procedures (tongue-tie release, also referred to as frenotomy) in Canada?
 5. What are the barriers to appropriate patient selection for frenectomies in Canadian jurisdictions?
 6. What are the facilitators of appropriate patient selection for frenectomies in Canadian jurisdictions?
 7. What are the temporal trends related to the use of frenectomy to treat ankyloglossia across Canadian jurisdictions?

129 **Screening and Study Selection**

130
131 A single reviewer screened articles identified through the literature search for selection. Those
132 that met the inclusion criteria (Table 1) were summarized in the report. Only English language
133 publications were selected for inclusion.

134 **Survey**

135
136 The survey questionnaire was developed to address the key objectives and included a
137 combination of dichotomous (i.e. yes/no), ordinal and nominal scales, and open-ended
138 questions (Appendix 1). The survey questionnaire was peer-reviewed by eight expert
139 stakeholders involved in the request prior to distribution.

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141 The survey was distributed electronically using Hosted in Canada Surveys¹⁶ to key jurisdictional
142 informants and stakeholders involved in planning, decision making, management, and care
143 provision related to assessing and diagnosing and treating ankyloglossia. Attempts were made
144 to capture responses from each province or territory, including respondents working in rural,
145 remote and urban health care settings. Survey respondents agreed to the reporting of the
146 information they provide by electronically providing their consent.

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148 The survey targeted the following viewpoints:

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- Clinicians (including pediatricians and obstetrician-gynecologists)
 - Ministry-level decision makers
 - Regional health authorities
 - Breastfeeding specialists (including midwives)
 - Lactation consultants
 - Breastfeeding clinics
 - Specialized hospitals, facilities, or clinics with an emphasis on maternal/newborn/children health
 - Speech-language pathologists
 - Dental associations and practitioners (including pediatric dentists)
 - Public health professionals

161 Respondents were identified through CADTH's Implementation Support and Liaison Officer
162 team, existing CADTH networks, and via stakeholder and expert suggestions.

163
164 **Synthesis Approach**

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166 Only feedback from respondents who provided consent to use their survey information was
167 included in the report. Quantitative survey questionnaire responses were summarized by
168 question and presented according to the objectives of the report. Feedback from open-ended
169 survey questions was also incorporated. Information identified through the literature search was
170 organized by objective and summarized within relevant sections of the report.

171
172 Stakeholder feedback will be solicited by posting a draft version of the report on CADTH's
173 website and by emails to subscribers to CADTH's mailing lists. Survey questionnaire
174 respondents and key informants involved in refining the project will also be asked to provide
175 feedback.

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177 **Findings**

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179 **Quantity of Research and Summary of Study Characteristics**

180 A total of 24 citations were identified in the literature search. No additional articles were
181 retrieved from the grey literature search. Following screening of titles and abstracts, 15 articles
182 were excluded and 9 were selected for full-text review. Of the 9 potentially relevant articles, 3
183 were selected for inclusion in the report.^{9,15,17} This was supplemented by 2 documents identified
184 through additional hand searching.^{5,18} No additional literature was identified during search
185 updates.

186
187 This final 5 studies included three observational studies,^{9,15,17} one position statement,⁵ and one
188 guideline.¹⁸ All studies were conducted in Canada, and guidance and position statements were
189 issued by Canadian organizations.

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191 **Summary of Survey Respondent Characteristics**

192 Overall, 36 individuals responded to the survey questionnaire. At least one response was
193 received from all jurisdictions, excluding New Brunswick, the Northwest Territories, and the
194 Yukon. A range of occupations were represented, including pediatricians and pediatric
195 specialists, pediatric dentists, public health nurses and registered nurses, midwives, clinic
196 directors, dietitians, and lactation consultants. Occupational settings included regional health
197 authorities, general hospitals, standalone facilities, or clinics; specialized hospitals, standalone
198 facilities, or clinics with an emphasis on maternal, newborn or child health, breastfeeding clinics,
199 general or pediatric dental clinics, community care settings, home care settings, midwifery
200 clinics, public health offices, education centers and private practice. Most respondents reported
201 working in urban settings, though 16 of 36 (44%) reported also working in rural settings and a
202 minority (2 of 36 [6%]) of respondents indicated working in remote settings or having remote
203 management capacity. Details about survey respondent characteristics are presented in
204 Appendix 2.

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206 **Current Practices for the Assessment and Diagnosis of Ankyloglossia in** 207 **Canadian Jurisdictions**

208 Guidance for Assessment and Diagnosis of Ankyloglossia

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210 The approach used to diagnose ankyloglossia varies depending on the information source. One
211 guideline from British Columbia (Perinatal Services British Columbia Health Promotion
212 Guideline – Breastfeeding Healthy Term Infants) states that ankyloglossia is present when the
213 infant is unable to adequately extend or elevate their tongue due to a short lingual frenulum
214 attached to the tip of the tongue that restricts movement.¹⁸ The BC guideline¹⁸ recommends that
215 if feeding problems persist, the infant should be referred to a physician for further assessment
216 and possible frenectomy as outlined in the American Academy of Breastfeeding Guidelines
217 (Protocol #11).¹¹ The American Academy of Breastfeeding Guideline Protocol #11¹¹ states that
218 when breastfeeding is difficult and a short/tight sublingual frenulum is noted, the appearance
219 and function of the tongue may be assessed using a scoring system like the Hazelbaker
220 Scale.¹⁹

221
222 The survey questionnaire asked respondents if there are any policies, frameworks, guidelines,
223 or other guidance documents in use in their jurisdiction to guide the assessment and diagnosis
224 of ankyloglossia. Of the respondents, 12 of 36 (33%) said that they use a form of policy,
225 framework, or guideline to diagnose ankyloglossia. The identified guidance documents noted to
226 be in use by survey respondents are summarized in Table 2.

227
228 **Table 2: Guidance Documents for Assessment and Diagnosis of Ankyloglossia**

Guidance Document	Description
Frenotomy Decision Tool for Breastfeeding Dyads developed by Carole Dobrich^{20a}	<ul style="list-style-type: none"> • This decision tool is split into two main parts: <ul style="list-style-type: none"> ○ Part one includes five questions regarding breastfeeding outcomes ○ Part two includes four questions related to examination of the anatomy and function of the infant's tongue and frenulum • The two parts are then reviewed and, if a certain score is achieved, a frenectomy is recommended • The tool also includes other indicators of ankyloglossia
The Hazelbaker Assessment Tool for Lingual Frenulum Function (HATLFF)^{19b}	<ul style="list-style-type: none"> • This tool includes two main assessment domains – appearance items and function items • Appearance items include appearance of tongue when lifted, elasticity of frenulum, length of lingual frenulum when tongue lifted, attachment of lingual frenulum to tongue, and attachment of lingual frenulum to inferior alveolar ridge • Function items include lateralization, lift of tongue, extension of tongue, spread of anterior tongue, cupping, peristalsis, snapback • Post-assessment, a score is tallied and ankyloglossia status is determined based on the score assigned by the tool
The Canadian Paediatric Society position statement on ankyloglossia and breastfeeding^{5c}	<ul style="list-style-type: none"> • The position statement includes a definition of ankyloglossia, <i>“There is neither a universally accepted definition of ankyloglossia nor practical objective criteria for diagnosing this condition. Historically, definitions have been based on either anatomical characteristics of the lingual frenulum (ie, the degree of fusion between the child’s tongue and the floor of the mouth) or on functional impairment (ie, an inability to protrude the tongue past the incisal edge of the lower gingiva and other signs of decreased tongue mobility).”⁵</i> • The statement also presents information on the prevalence,

	pathophysiology, how to manage ankyloglossia, the frenectomy procedure, and recommendations on examination, diagnosis, and treatment
The Goldfarb Breastfeeding Clinic patient handout from the Herzl Family Practice Centre^{21d}	<ul style="list-style-type: none"> • The patient handout contains a brief explanation of ankyloglossia and a detailed explanation of the frenectomy procedure • It also provides significant detail on how to care for the infant post-procedure

229 ^a2 respondents from Ontario; 1 respondent from Nova Scotia, 2 respondents from Quebec

230 ^b3 respondents from Ontario

231 ^c1 respondent from Nunavut; 1 respondent from Ontario

232 ^d1 respondent from Quebec

233

234 Two of 36 (6%) survey respondents reported the use of custom assessment tools developed
 235 and created based on existing tools, local expertise, and incorporating existing information from
 236 resources such as the Kotlow classification,²² Martinelli developed 'Lingual Frenulum Protocol
 237 with Scores for Infants'²³ and the The Hazelbaker Assessment Tool for Lingual Frenulum
 238 Function (HATLFF).¹⁹ One (3%) respondent of 36 noted the use of a patient-oriented resource¹⁹
 239 available on the International Breastfeeding Centre website.

240

241 Criteria for Eligibility for Ankyloglossia Assessment and Diagnosis

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243 The majority (25 of 36 [69%]) of respondents said there are specific criteria that a patient should
 244 meet in order to be assessed and diagnosed for ankyloglossia. Examples provided included:

- 245 • The infant should be assessed by a public health professional, family physician, and/or
 246 lactation consultant either at birth or shortly thereafter; the assessment may be required
 247 for referral (responses from Nova Scotia, Prince Edward Island, and Ontario)
- 248 • The infant should be examined to see if there is a physical or functional deficit caused by
 249 a restrictive lingual frenulum (responses from Quebec and Ontario)
- 250 • The infant and mother require a full breastfeeding assessment, especially if and to
 251 assess if there are persistent breastfeeding difficulties (e.g., poor transfer, decreased
 252 supply, risk of discontinuing, pain) and the infant is experiencing a slow weight gain
 253 (responses from Quebec and Ontario)
- 254 • There is an established family history of ankyloglossia (response from Newfoundland)

255

256 It was noted that The HATLFF and the Frenotomy Decision Tool for Breastfeeding Dyads
 257 (developed by Carole Dobrich) might be used to inform specific criteria for eligibility. Several
 258 respondents (4 of 36 [11%]) suggested that every infant should be assessed for ankyloglossia,
 259 regardless of symptoms. One respondent indicated that assessment should be up to clinician
 260 discretion.

261 **Current Practices for Patient Selection for Frenectomy Procedures in Canadian**
262 **Jurisdictions**

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264 Guidance for Patient Selection for Frenectomy
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266 Several Canadian guidance documents for patient selection were identified. The Canadian
267 Paediatric Society position statement states that when ankyloglossia contributes to substantial
268 breastfeeding difficulties, frenectomy should be performed by an experienced clinician.⁵ A
269 guideline established by perinatal services in BC¹⁸ states that treatment is not necessary if
270 breastfeeding proceeds successfully; however if feeding problems persist, the infant should be
271 referred to a physician for further assessment and possible treatment as outlined in Academy of
272 Breastfeeding Guideline Protocol #11¹¹ and in Lawrence and Lawrence²⁴ (a guide for the
273 management of breastfeeding for medical professionals) to improve breastfeeding
274 effectiveness.

275
276 The survey respondents were asked if there are any policies, frameworks, guidelines, or other
277 guidance documents in use in their jurisdiction to guide the patient selection for frenectomy
278 procedures. In the survey, 7 of 36 (19%) respondents (from Ontario, Quebec, and
279 Newfoundland) indicated they use a form of policy, framework, guideline, or another guidance
280 document for the selection of patients for frenectomies. The guidance documents referenced
281 were exclusively the same ones used for ankyloglossia diagnosis, including the Canadian
282 Paediatric Society position statement,⁵ the Frenotomy Decision Tool for Breastfeeding Dyads
283 developed by Carole Dobrich,²⁰ and the HATLFF.¹⁹

284
285 Eligibility Criteria for Frenectomy
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287 The majority of the survey respondents (26 of 36 [72%]) reported that there are specific criteria
288 that a patient must meet in order to be referred for a frenectomy. Eight responses (22%) stated
289 that the infant must be seen by either a primary care physician, midwife, public health nurse, or
290 lactation consultant to obtain a referral to a specialist for the procedure. It was noted that some
291 dentists self-refer and that this may be the case for other practitioners, while other dentists
292 require a physician referral. Three (8%) responses indicated that to be eligible for frenectomy,
293 the mother must be attempting to breastfeed. Specific physical criteria considered by assessors
294 for referring a patient for frenectomy include a restrictive lingual frenulum causing restricted
295 tongue mobility that interferes with feeding causing feeding issues (including nipple pain,
296 inability to maintain latch, inadequate milk transfer, inability to main milk supply, and/or digestive
297 problems). Two (6%) respondents indicated that the patient must be formally diagnosed with
298 ankyloglossia to be eligible for the procedure.

299
300 Criteria that Exclude Patients from Frenectomy
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302 Most of the survey respondents (23 of 36 [64%]) reported that there are criteria that would
303 exclude patients from receiving a frenectomy procedure in their jurisdiction. One respondent
304 indicated that procedures are not typically conducted until the infant has had feeding issues for
305 four months. On the contrary, other respondents (6 of 36 [17%]) explained if the child is older
306 than a few months, local physicians may be hesitant to perform a frenectomy. These patients
307 may receive a subsequent referral to a specialized physician, which may involve longer wait
308 times. Objective conditions such as the risk of bleeding, poor infant development, medical
309 instability, health conditions preventing the conduct of the procedure, and certain types of
310 malocclusion (e.g., retrognathia) may be incompatible with the conduct of frenectomy. Further

311 considerations that may preclude frenectomy include an inability to understand the conduct or
312 outcomes of the procedure, previous frenectomy, the absence of an assessment score or
313 outcome indicative of ankyloglossia, and the determination of an underlying cause of
314 breastfeeding issues not related to ankyloglossia.

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316 Qualifications Required to Perform Frenectomy

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318 In Canada, physicians (including dentists) perform frenectomy procedures. The Canadian
319 Paediatric Society position statement notes that a referral to an ear, nose, and throat specialist
320 or physician with experience performing frenotomies should be made.⁵ One study from Nova
321 Scotia reported that the most common surgical procedure performed by a dentist is a
322 frenectomy (29.4% of dentists reported they performed this procedure).¹⁷ No literature was
323 identified on the involvement of other health care practitioners in conducting frenectomies. Two
324 (6%) respondents indicated a desire to allow non-physicians to conduct the procedure, but no
325 information was shared regarding current involvement of other types of practitioners in
326 performing frenectomies, though one respondent indicated that lactation consultants may assist.

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328 Perceived Barriers to and Facilitators of Optimal Diagnosis and Treatment of 329 Ankyloglossia

330 No literature on barriers or facilitators to the optimal assessment and diagnosis of ankyloglossia
331 or appropriate patient selection for frenectomy was identified. Survey questionnaire responses
332 are summarized by barriers and facilitators below, with factors impacting assessment and
333 diagnosis, as well as treatment presented together.

334 Barriers

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337 Survey respondents were asked what barriers to the optimal diagnosis and treatment of
338 ankyloglossia were present in their jurisdiction. Table 3 summarizes the responses. A
339 substantial proportion of respondents (44 to 83%) indicated that each of the pre-specified
340 factors were considered to be relevant barriers in their jurisdictions.

341
342 **Table 3. Barriers to the Optimal Diagnosis and Treatment of Ankyloglossia**

Barrier	Proportion of "Yes" Responses ^a (%)
No consensus across clinical specialties regarding how to manage patients with ankyloglossia	30/36 (83%)
Lack of guidelines on how to assess and diagnose ankyloglossia	29/36 (81%)
Lack of guidelines on the treatment of ankyloglossia	28/36 (78%)
Lack of funding	25/36 (69%)
Lack of access to medical expertise (e.g., breastfeeding specialists; lactation consultants)	25/36 (69%)
Lack of dedicated facilities for newborn and pediatric care, and breastfeeding care	18/36 (50%)
Lack of rural and/or remote care	16/36 (44%)

343 ^aTo survey question "What are the barriers to the optimal diagnosis and treatment of ankyloglossia?"

344
345 Additional barriers noted by respondents included the perception that some practitioners may
346 consider tongue-tie as clinically irrelevant, resulting in lack of access to care. Lack of awareness
347 among practitioners about ankyloglossia, regarding how to diagnose it, and regarding how to
348 provide breastfeeding support and follow-up lactation care (to support continuity of care) were
349 also highlighted. Lack of collaboration among practitioners assessing patients and those
350 performing the procedure, and a general lack of interdisciplinary care for ankyloglossia were
351 also perceived barriers. Survey respondents also noted that many families do not have a regular
352 family doctor and must visit a walk-in clinic to get a referral, which may take extra time and
353 delay treatment. For patients in rural and remote areas, they may have to travel to an urban
354 area to receive treatment. According to one survey respondent, some patients are being
355 referred out of province for care. If the patient cannot afford the cost of travel, they may not have
356 access to optimal treatment. Further, in some jurisdictions, frenectomies may be primarily
357 performed by dentists and must be paid for out of pocket, unless the patient has private
358 insurance coverage. Another barrier noted by respondents is potentially prohibitive wait times
359 associated with seeking specialist care. Lack of education on breastfeeding for health care
360 practitioners was also a noted obstacle to optimal care.

361 Facilitators

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364 In contrast to barriers, survey respondents were asked what facilitators of the optimal diagnosis
365 and treatment of ankyloglossia were present in their jurisdiction. The responses are summarized
366 in Table 4. A substantial proportion of respondents (47 to 86%) indicated that each of the pre-

367 specified factors were considered to be relevant facilitators in their jurisdictions.

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369 **Table 4. Facilitators of the Optimal Diagnosis and Treatment of Ankyloglossia**

Facilitator	Proportion of “Yes” Responses ^a
Availability of dedicated facilities for newborn and pediatric care, and breastfeeding care	17/36 (47%)
Availability of care in rural and remote health care settings	17/36 (47%)
Adherence to guidelines on ankyloglossia treatment	22/36 (61%)
Adherence to guidelines on how to assess and diagnose ankyloglossia	23/36 (64%)
Availability of funding (e.g., frenectomies performed in private dental offices and covered by public funding)	24/36 (66%)
Availability of specialized medical expertise (e.g., breastfeeding specialists or lactation consultants)	27/36 (75%)
Awareness of guidelines on ankyloglossia treatment	28/36 (78%)
Awareness of guidelines on how to assess and diagnose ankyloglossia	31/36 (86%)

^aTo survey question “What are the barriers to the optimal diagnosis and treatment of ankyloglossia)

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Other facilitators noted by survey respondents included the ability of non-physicians to refer patients for the procedure and specialized care, and for non-physicians to perform the frenectomy procedure. As well, the availability of follow-up breastfeeding care was perceived to support optimal care. Lastly, the provision of education on ankyloglossia for health care practitioners involved in the management of ankyloglossia was suggested as a facilitator by respondents.

383 **Temporal Trends related to the Use of Frenectomy to Treat Ankyloglossia across**
384 **Canadian Jurisdictions**

385 Population-based data and anecdotal accounts of the current landscape for diagnosis and
386 treatment of ankyloglossia from survey respondents suggest a temporal increase in the rate of
387 diagnosis of ankyloglossia and performance of frenectomy procedures.
388

389 One population-based study in British Columbia reported an increase in the rate of
390 ankyloglossia from 5.0 per 1000 live births in 2004 to 8.4 per 1000 live births in 2013.¹⁵ Over the
391 same period, the rate of frenectomies increased from 2.8 per 1000 live births to 5.3 per 1000
392 live births.¹⁵ The study attributed the increase in diagnosis of ankyloglossia to increased
393 surveillance secondary to the focus on breastfeeding initiation.
394

395 In follow-up to the BC study,¹⁵ an analysis of all hospital-based live births in all Canadian
396 jurisdictions, excluding Quebec, was conducted using Canadian Institute for Health Information
397 data.⁹ The study reported that rates of diagnosed ankyloglossia increased in Canada from 6.86
398 per 1000 live births in 2002 to 22.6 per 100 live births in 2014. The study also observed an
399 increase in frenectomy rates for infants diagnosed with ankyloglossia from 54.7% in 2002 to
400 63.9% in 2014.⁹ The study compared jurisdictional rates of diagnosis to those from British
401 Columbia, noting three-fold higher rates of ankyloglossia in Saskatchewan, Alberta, and the
402 Yukon, and three to four-fold higher rates of frenectomy in the Yukon, Alberta, and
403 Saskatchewan.⁹ The lowest rates of ankyloglossia were observed in British Columbia, with
404 similar rates in Nunavut, Newfoundland and Labrador, and Manitoba. Similarly, British Columbia
405 had the lowest rates of frenectomy procedures, with the exception of Newfoundland and
406 Labrador, and Nunavut. Overall, the study authors describe a rapid temporal increase in
407 ankyloglossia and frenectomy rates over the observation period, and noted substantial regional
408 variation in the rates of diagnosis and treatment of ankyloglossia. They suggest that the change
409 could be attributed to an increased emphasis on breastfeeding initiation before hospital
410 discharge.⁹ Notably, the study does not capture births outside of the hospital or ankyloglossia
411 diagnosis and frenectomy procedures conducted after hospital discharge.⁹
412

413 Although based on anecdotal evidence, 22 of 36 (61%) survey respondents (from jurisdictions
414 including Nova Scotia, Ontario, Prince Edward Island, Nunavut, Newfoundland, Saskatchewan,
415 Quebec, and Manitoba) reported a noticeable increase in the uptake of frenectomies in their
416 jurisdiction. However, all the respondents said they could not confidently quantify the change in
417 the number of frenectomy procedures performed in their jurisdiction.
418

419 Survey observations about the drivers behind increased rates of ankyloglossia and frenectomy
420 included:

- 421 • An increased quantity of referrals from lactation consultants
- 422 • Increased provider and parental awareness about the impact of ankyloglossia on
423 breastfeeding
- 424 • The increased importance placed on breastfeeding and motivation to initiate and
425 continue breastfeeding through challenges
- 426 • Motivation to seek care to resolve breastfeeding issues
- 427 • An increase in the number of providers offering the procedure
- 428 • Increased networking and dissemination of knowledge (e.g., national conferences)
429 among health care professionals managing ankyloglossia
- 430 • The proliferation of private practices offering laser-based releases

Environmental Scan

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- Patient self-referral and self-diagnosis resulting from increased patient awareness might contribute to increased rates, in contradiction to the aforementioned expectation that referral must come from a certified practitioner.

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Conversely, referral to musculoskeletal care or other physical interventions, when indicated, is perceived to have reduced the number of procedures.

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As far as trends related to the conduct of frenectomy, multiple survey (9 of 36 [25%] respondents observed that later-born children in families with another child with ankyloglossia are often brought in for assessment, due to perceptions around heritability of the condition, and that they are more likely to receive early assessment and undergo the procedure. Some (2 of 36 [6%]) respondents noted that there has been an increase in inter-professional collaboration amongst health professionals providing care such as lactation consultants and family doctors. Some (11 of 36 [31%]) observed that the procedure is rarely performed on non-breastfeeding infants, and that perception of the necessity of frenectomy and perceived eligible timeframe (e.g., prior to hospital discharge) may vary by practitioner. Two respondents (6%) suggested that frenectomy is increasingly performed by dentists versus other practitioners, often necessitating patient out-of-pocket payment for the procedure. It was also indicated by five respondents (14%) that there might be a trend towards over performance of frenectomy as well as re-surgery for unsuccessful procedures given the simplicity of the procedure compared to other strategies to support breastfeeding. Others (2 of 36 [6%]) observed increased utilization of laser-based techniques versus scissor or scalpel.

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456

457 **Limitations**

458 This Environmental Scan presents an overview of current practice for ankyloglossia diagnosis
459 and frenectomy procedures in Canada.

460
461 An assessment of treatment effectiveness or outcomes was not within the scope of this report.
462 In addition, the guidance documents identified and summarized in this report were not subject to
463 quality appraisal. The objective was to understand current practice, so no restrictions were
464 placed on the types of guidance documents summarized in the report. Thus, their inclusion is for
465 information purposes regarding current practice, and we are unable to comment on the quality
466 or reliability of these resources.

467
468 The findings of this report are based on a limited literature search and survey responses from
469 Canadian jurisdictions. Although most Canadian provinces and territories were represented,
470 there were no informants from New Brunswick, Yukon, and the Northwest Territories. Findings
471 reflect the individual perspectives of the survey respondents and literature identified and may
472 not represent all Canadian contexts.

473
474 There was a lack of data available regarding temporal trends related to the use of frenectomy to
475 treat ankyloglossia outside of the hospital setting; as a result, statements on changes in the rate
476 of procedures may not be generalizable to other settings.

477
478 **Conclusions**

479 This Environmental Scan set out to capture perspectives on current practices related to
480 assessment and diagnosis of ankyloglossia and the use of frenectomy procedures from
481 Canadian jurisdictions.

482
483 Some respondents reported that they use specific guidance and criteria to help diagnose
484 ankyloglossia. Several resources were highlighted, but other tools commonly cited in the
485 literature, such as the Coryllos grading and Bristol tongue assessment tool were not
486 acknowledged.^{25,26} The varied approach to diagnosis indicated by the Environmental Scan
487 findings is consistent with conclusions of an earlier review. The review summarized articles
488 regarding the diagnostic criteria used for ankyloglossia and the methods used for diagnosis in
489 studies of ankyloglossia prevalence, and reported substantial variation in diagnostic criteria and
490 the age of assessment used.²⁷ Multiple reports have commented on variation in international
491 appropriateness criteria and guidance for ankyloglossia management, noting that some
492 countries recommend treatment, when appropriate, while others do not endorse it.^{9,25} Nearly all
493 the survey respondents agreed that there is a need for additional guidance regarding the
494 assessment, diagnosis, and treatment of ankyloglossia. While several societies and
495 organizations have issued statements on ankyloglossia, they tend to provide broad suggestions
496 (e.g., not supportive of universal treatment, treatment recommended in circumstances where
497 breastfeeding is impaired) rather than specific direction for patient management.

498
499 Fewer respondents reported using guidance documents to inform the patient selection for
500 treatment, though many acknowledged that there are certain criteria that would exclude patients
501 from gaining access to a frenectomy in their jurisdiction. The findings indicated that physicians
502 (including dentists) are the primary group performing frenectomies in Canada. While this may be
503 the case, studies on the effectiveness of frenectomy have reported that a range of health
504 professionals — family, neonatal, and pediatric doctors; general, pediatric or specialty surgeons;
505 and lactation or specialist consultants — are involved in conducting the procedure.^{28,29} Several

506 survey respondents noted interest in the expansion of the acceptable disciplines able to perform
507 frenectomy.
508

509 Beyond guidance, substantial input on factors affecting optimal diagnosis and treatment of
510 ankyloglossia was provided. Common barriers related to a perceived lack of guidance, funding,
511 expertise and education for practitioners, appropriate facilities, access to and cost of care for
512 patients living in rural and remote areas, consensus on how to deliver care, insufficient
513 collaboration among practitioners, and lengthy wait times. In contrast, insight obtained on
514 facilitators may be useful in the development of strategies to address these challenges. Of note,
515 improved awareness of and monitoring of adherence to guidelines, enhanced funding, greater
516 availability of specialized care and facilities for breastfeeding in all geographical settings,
517 expansion of the disciplines involved in referral and treatment, measures to support continuity of
518 care, and better education on ankyloglossia care for health care practitioners were suggested to
519 be supportive of optimal care.
520

521 Although no jurisdiction provided concrete data on the temporal trends for the use of frenectomy
522 procedures in their jurisdiction via the survey questionnaire, most of the respondents reported
523 an anecdotal increase. These observations were corroborated by two population-based studies
524 that observed a significant temporal increase in both the diagnosis of ankyloglossia and conduct
525 of frenectomy procedures across Canada.^{9,15} Similar usage patterns have been reported in the
526 United States, with an over 10-fold increase in the rate of frenectomy procedures performed
527 from 1997 to 2012.³⁰ The increase in the uptake of frenectomy procedures has been suggested
528 to stem from a renewed emphasis on breastfeeding that is encouraged by health care providers
529 and organizations, including the World Health Organization.^{1,2} Input on the drivers behind the
530 increased diagnosis and treatment of ankyloglossia from survey respondents was consistent
531 with this, also suggesting the contribution of increased patient, family, and practitioner
532 awareness about the condition, and the growth in the number of practitioners able to refer to
533 and conduct the procedure.
534

535 An increase in the number of public queries and non-clinical media coverage of ankyloglossia
536 has been reported, while formal research and evidence generation research on the topic has
537 slowed.^{31,32} Future research initiatives have been suggested to further understanding of the
538 impact of ankyloglossia on infant feeding, develop better evidence on the effectiveness of
539 frenectomy, determine the impact of variation in practitioner perception of the need for
540 frenectomy on current practice, and on the potential for standardization of diagnostic and
541 treatment practices across professions and settings.^{9,30,33}
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641 **Appendix 1: Survey Questions****Ankyloglossia Diagnosis and Treatment in Canada**
General Information

1. In which jurisdiction do you work?
 - Alberta
 - British Columbia
 - Manitoba
 - New Brunswick
 - Newfoundland and Labrador
 - Northwest Territories
 - Nova Scotia
 - Nunavut
 - Ontario
 - Prince Edward Island
 - Quebec
 - Saskatchewan
 - Yukon
 - Federal Health Program (such as, Indigenous Services Canada, Canadian Armed Forces, Correctional Service Canada)
 - Other (please specify) (Free Text)

2. What is your profession or role? In addition to your occupation or title, please describe your role as it relates to assessing and diagnosing ankyloglossia and/or providing treatment for patients who have ankyloglossia (i.e., frenectomies). (Free Text)

3. Are you currently involved in any capacity with assessing and diagnosing ankyloglossia and/or providing treatment for patients who have ankyloglossia (e.g., frenectomies)?
 - Yes; please describe the nature of your involvement (Free Text)
 - No; if no you will be redirected to the end of the survey

4. What best describes the type of facility you work in? (select all that apply)
 - Regional health authority
 - Government office (e.g., ministry-level)
 - General hospital, facility, or clinic
 - Specialized hospital, facility, or clinic with an emphasis on maternal/newborn/children health
 - Breastfeeding clinics
 - General dental office
 - Specialized dental office with an emphasis on children
 - Dental association
 - Speech language facility
 - Rural health care setting
 - Remote health care setting
 - Urban health care setting
 - Other (please specify)

5. Please describe the type of facility you are representing and in which you predominantly practice (e.g., name and description of type of facility). (Free Text)

6. Do you work in one or more of these geographical settings? (Please select all that apply.)
 - Urban

Environmental Scan

Rural

Remote

(Please self-identify based on your local understanding of the criteria for remote. As an example, [Health Canada](#) defines various levels of remote, ranging from remote isolated = no scheduled flights or road access and minimal telephone or radio service, through to non-isolated remote = road access and less than 90 km away from physician services)

Other (please specify) (free text)

Assessment and Diagnosis

7. Are there any policies, frameworks, guidelines, or other guidance documents in use in your jurisdiction to guide the assessment and diagnosis of ankyloglossia?
- Yes (e.g., please list the title, year, and link if available, option to upload multiple links)
 - No

Selection for Treatment

8. Are there any policies, frameworks, guidelines or other guidance documents in use in your jurisdiction to guide the selection of patients for frenectomies?
- Yes (e.g., please list the title, year, and link if available, option to upload multiple links)
 - No
9. Are there specific criteria that a patient must meet
- 9a. To be assessed and diagnosed for ankyloglossia? (Free Text)
 - 9b. To obtain a referral for a frenectomy (also known as tongue-tie release)? (Free Text)
10. Similarly, are there any criteria that would exclude patients from gaining access to a frenectomy? (Free Text)

Ankyloglossia and Frenectomy Trends

11. What is the current incidence of ankyloglossia in your jurisdiction (i.e., rate per population)? Please specify what year the statistic is from. (Free text)
12. What is the current rate of frenectomy procedures performed in your jurisdiction (i.e., rate per population)? Please specify what year the statistic is from. (Free text)
13. Has there been a noticeable change in the rate of frenectomies performed in your jurisdiction? If yes, can you provide reasons why there might be an increase/decrease?
- Yes (Increase); Please describe (Free Text)
 - Yes (Decrease); Please describe (Free Text)
 - No Change
 - Unknown
14. Have you observed any trends related to performing frenectomies in your jurisdiction?
- For example, does the frequency of frenectomy procedures differ in breastfed vs formula-fed babies, or in firstborn versus later-born children, or based on other criteria? (Free text)

Barriers and Facilitators

15. What are the barriers to optimal diagnosis and treatment of ankyloglossia? (select all that apply)
- Lack of guidelines on how to assess and diagnose ankyloglossia
 - Lack of guidelines on the treatment of ankyloglossia
 - Lack of funding (e.g., frenectomies performed in private dental offices and not covered by public funding)
 - Lack of access to specialized medical expertise (e.g., breastfeeding specialists; lactation consultants)
 - Lack of dedicated facilities for newborn/pediatric care and breastfeeding
 - Lack of rural and/or remote care
 - No consensus across clinical specialities regarding how to manage patients with ankyloglossia

- Other (please specify) (Free Text)

16. What are the facilitators (or enablers) of optimal diagnosis and treatment for ankyloglossia? (select all that apply)

- Awareness of guidelines on how to assess and diagnose ankyloglossia
- Adherence to guidelines on how to assess and diagnose ankyloglossia
- Awareness of guidelines on ankyloglossia treatment
- Adherence to guidelines on Ankyloglossia treatment
- Availability of funding (e.g., frenectomies performed in private dental offices and covered by public funding)
- Availability of specialized medical expertise (e.g., breastfeeding specialists' or lactation consultants)
- Availability of dedicated facilities for newborn/pediatric care and breastfeeding care
- Availability of care in rural or remote health care settings
- Other (please specify; e.g.) (Free Text)

Guidance Needs

17. Please indicate your level of agreement with the following statement:

There is a need for further guidance (e.g., guidelines, frameworks, policies, clinical pathways) to provide direction regarding the diagnosis and assessment of ankyloglossia.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Please indicate your level of agreement with the following statement:

There is a need for further guidance (e.g., guidelines, frameworks, policies, clinical pathways) to provide direction regarding the treatment of ankyloglossia.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Permission to Contact

19. Would you be willing to be consulted further on this topic, either through an informal phone call or by email?

- Yes
- No

20. Can you suggest any others who would be willing to be consulted further on this topic, and/or complete this survey?

- Yes (Free text - insert contact info)
- No

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647 **Appendix 2: Information on Survey Respondents**648 **Table A1: Jurisdictions and Organizations**

Province/Territory ^a	Organization Represented by Survey Respondents
British Columbia (n = 2)	College of Midwives of British Columbia BC Women's Hospital
Alberta (n = 1)	Clinicians in private practice
Saskatchewan (n = 3)	The Berry Breast Support Private practice
Manitoba (n = 2)	University of Manitoba Baby Sleep 101
Ontario (n = 18)	Pediatric Oral Health and Dentistry International Breastfeeding Centre Kindercare Pediatrics Birth and Baby Needs Mother's Nectar Lactation Consultation Services Little Bird Pediatric Dentistry Halton Healthcare East Ottawa Midwives Midwives of Mississauga Midwives of Muskoka Children's Hospital of Eastern Ontario Canadian Paediatric Society Kensington Midwives Black Creek Community Health Centre Clinicians in private practice
Quebec (n = 4)	Health E-Learning CLSC Benny Farm CIUSSS Centre-Ouest Clinicians in private practice
Nova Scotia (n = 3)	Nova Scotia Health Authority Clinicians in private practice
Prince Edward Island (n = 1)	Health PEI
Newfoundland and Labrador (n = 1)	Eastern Health
Nunavut (n = 1)	Qikiqtani General Hospital

^aNo responses received from New Brunswick, the Northwest Territories, or the Yukon

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651**Table A2: Occupations and Settings**

Occupations and Occupational Settings of Respondents	Number of respondents (%) ^c
Occupation^a	
Pediatrician	5 (13.8%)
Pediatric otolaryngologist	1 (2.8%)
Pediatric dentist	3 (8.3%)
Registered nurse	5 (13.8%)
Public health nurses	2 (5.6%)
Midwife	6 (16.7%)
Clinic director	2 (5.6%)
Clinical dietitian	1 (2.8%)
Lactation consultants	11 (30.6%)

Table A2: Occupations and Settings

Occupations and Occupational Settings of Respondents	Number of respondents (%) ^c
Occupational Setting^b	
Regional health authorities General hospitals, standalone facilities, or clinics Specialized hospitals, standalone facilities, or clinics with emphasis on maternal, newborn or child health Breastfeeding clinics General dentist clinics Specialized pediatric dental clinic Community settings Home care settings Midwifery clinics or offsite care Public health offices Private practice Education centers Speech language pathology clinics Dental associations	8 (22.2%) 6 (16.7%) 11 (30.6%) 10 (27.8%) 2 (5.6%) 3 (8.3%) 3 (8.3%) 7 (19.4%) 1 (2.8%) 1 (2.8%) 6 (16.7%) 1 (2.8%) 0 (0%) 0 (0%)
Geographic Setting^b	
Urban Rural Remote Remote management (e.g., telehealth)	34 (94.4%) 16 (44.4%) 2 (5.6%) 2 (5.6%)

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^aRespondents selected one option; 6 individuals were lactation consultants in addition to their primary occupation

^bRespondents could select more than one option

^cOut of a total of 36 respondents