

ENVIRONMENTAL SCAN

# Ankyloglossia Diagnosis and Treatment in Canada: An Environmental Scan

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## Context

Health Canada and the World Health Organization promote exclusive breastfeeding for the first six months of life.<sup>1,2</sup> The Canadian Community Health Survey (CCHS) reported that 89% of mothers initiated breastfeeding in 2011-2012 – a slight increase from 85% in 2003.<sup>3</sup> The percentage of mothers who breastfed exclusively for six months (or more) also increased from 17% in 2003 to 26% in 2011-2012.<sup>4</sup> There may be increased pressure to identify barriers to successful breastfeeding as professional organizations increasingly endorse breastfeeding as the optimal choice for nutrition in newborns and infants.<sup>5</sup>

The CCHS reported that one of the most frequently cited reasons for stopping breastfeeding before six months was “difficulty with breastfeeding technique.”<sup>4</sup> One condition that can affect breastfeeding is ankyloglossia. Ankyloglossia, commonly known as tongue-tie, is characterized by an abnormally short lingual frenulum, the mucous membrane on the underside of the tongue.<sup>6</sup> This can result in restricted tongue movement, which may impact an infant’s ability to latch properly to the mother’s breast, thereby reducing the mother’s milk supply subsequent to suboptimal attachment,<sup>7</sup> as well as other functional, speech-related, and oral hygiene-related sequelae.<sup>8,9</sup> Related to breastfeeding, ankyloglossia can lead to inadequate milk intake, prolonged feeding times, and maternal nipple pain to the point of bleeding.<sup>8</sup> The Canadian in-hospital rate of diagnosis was 22.6 per 1,000 live births;<sup>10</sup> a potential underestimation, as many cases of ankyloglossia are diagnosed in other care settings. US studies documenting prevalence have presented estimates ranging from 4.2% to 10.7% in newborns.<sup>5</sup>

There is some evidence that performing a lingual frenectomy may improve maternally reported feeding outcomes in newborns.<sup>5,11,12</sup> A lingual frenectomy – also referred to as tongue-tie release or frenotomy – is the splitting of the frenulum using sterile scissors or a scalpel, and sometimes laser-based techniques.<sup>8,13</sup> Side effects are rare but can include bleeding or infection, and damage to the tongue or salivary glands.<sup>5,13</sup> It is also possible that the frenulum may reattach to the base of the tongue, requiring re-surgery.<sup>13</sup> Under certain circumstances, a more extensive procedure called a frenuloplasty may be performed, typically under general anesthesia and using surgical tools.<sup>13</sup> The wound closure, in that case, is completed in a specific pattern aimed at lengthening the frenulum, whereas a frenectomy is a simple release without suturing.<sup>13,14</sup> There is disagreement concerning when a frenectomy should be performed, partly stemming from the fact that there is no universally accepted definition of ankyloglossia.<sup>5,15</sup>

Canadian jurisdictions have reported a noticeable increase in the rate of frenectomies partially attributed to an emphasis on mothers initiating breastfeeding prior to hospital discharge, although further understanding of the factors influencing this trend is needed.<sup>16</sup> It has also been suggested that more detailed clinical practice guidelines are necessary to ensure that infants with breastfeeding problems due to ankyloglossia are treated properly.<sup>16</sup>

## Objectives

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

- to describe current practices for the assessment and diagnosis of ankyloglossia in Canadian jurisdictions

- to describe current practices for patient selection for frenectomy (tongue-tie release, also 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, both informed by the components outlined in Table 1. The survey questionnaire was distributed to key jurisdictional informants and stakeholders. 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"> <li>• Strategies for the assessment and diagnosis of ankyloglossia</li> <li>• Frenectomy as a form of treatment</li> </ul>
	Setting	Any Canadian health care setting (e.g., urban, rural and remote settings, primary and secondary care, private facilities)
	Outcomes	<ul style="list-style-type: none"> <li>• Current practices for:               <ul style="list-style-type: none"> <li>◦ the assessment and diagnosis of ankyloglossia</li> <li>◦ patient selection for frenectomies <b>including</b>:                   <ul style="list-style-type: none"> <li>▪ capacity (i.e., eligibility criteria and referral process)</li> <li>▪ location and setting for delivering care (i.e., province or territory; urban, rural, or remote; within a hospital, clinic, or home; remotely delivered)</li> <li>▪ services offered to patients (i.e., types of interventions)</li> </ul> </li> </ul> </li> <li>• Temporal trends related to the use of frenectomy</li> <li>• Canadian guidance on the assessment, diagnosis, and treatment of ankyloglossia</li> <li>• Barriers to and facilitators of optimal diagnosis and treatment of ankyloglossia</li> </ul>
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:

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?

## Screening and Study Selection

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

## Survey

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

The survey was distributed electronically, using Hosted in Canada Surveys,<sup>17</sup> to key jurisdictional informants and stakeholders involved in planning, decision-making, management, and care provision related to assessing, diagnosing, and treating ankyloglossia. Attempts were made to capture responses from each province or territory, including respondents working in rural, remote, and urban health care settings. Survey respondents agreed to the reporting of the information they provided by electronically providing their consent.

The survey targeted the following viewpoints:

- 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.

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

### **Synthesis Approach**

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

Stakeholder feedback was solicited by posting a draft version of the report on CADTH's website and by emails to subscribers to CADTH's mailing lists. Survey questionnaire respondents and key informants involved in refining the project were also asked to provide feedback.

## **Findings**

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

A total of 24 citations were identified in the literature search. No additional articles were retrieved from the grey literature search. Following screening of titles and abstracts, 15 articles were excluded and nine were selected for full-text review. Of the nine potentially relevant articles, three were selected for inclusion in the report.<sup>10,16,18</sup> This was supplemented by two documents identified through additional handsearching.<sup>5,19</sup> No additional literature was identified during search updates.

These final five studies included three observational studies,<sup>10,16,18</sup> one position statement,<sup>5</sup> and one guideline.<sup>19</sup> All studies were conducted in Canada, and guidance and position statements were issued by Canadian organizations.

### **Summary of Survey Respondent Characteristics**

Overall, 36 individuals responded to the survey questionnaire. At least one response was received from all jurisdictions, excluding New Brunswick, the Northwest Territories, and the Yukon. A range of occupations were represented, including pediatricians and pediatric specialists, pediatric dentists, public health nurses and registered nurses, midwives, clinic directors, dietitians, and lactation consultants. Occupational settings included regional health authorities, general hospitals, stand-alone facilities, or clinics; specialized hospitals, stand-alone facilities, or clinics with an emphasis on maternal, newborn, or child health; and breastfeeding clinics, general or pediatric dental clinics, community care settings, home care settings, midwifery clinics, public health offices, education centres, and private practice. Most respondents reported working in urban settings, although 16 of 36 (44%) reported also

working in rural settings and a minority (two of 36 [6%]) of respondents indicated working in remote settings or having remote management capacity. Details about survey respondent characteristics are presented in Appendix 2.

## Current Practices for the Assessment and Diagnosis of Ankyloglossia in Canadian Jurisdictions

### Guidance for Assessment and Diagnosis of Ankyloglossia

The approach used to diagnose ankyloglossia varies depending on the information source. One guideline from British Columbia (*Perinatal Services BC Health Promotion Guideline Breastfeeding Healthy Term Infants*) states that ankyloglossia is present when the infant is unable to adequately extend or elevate the tongue due to a short lingual frenulum attached to the tip of the tongue that restricts movement.<sup>19</sup> The British Columbia guideline<sup>19</sup> recommends that if feeding problems persist, the infant should be referred to a physician for further assessment and a possible frenectomy, as outlined in the American Academy of Breastfeeding Guidelines in Protocol #11.<sup>12</sup> The Protocol #11<sup>12</sup> guidelines state that when breastfeeding is difficult and a short or tight sublingual frenulum is noted, the appearance and function of the tongue may be assessed using a scoring system like the Hazelbaker scale.<sup>20</sup>

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

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

Guidance Document	Description
<b>Frenotomy Decision Tool for Breastfeeding Dyads developed by Carole Dobrich<sup>21a</sup></b>	<ul style="list-style-type: none"> <li>• This decision tool is split into two main parts:               <ul style="list-style-type: none"> <li>◦ Part one includes five questions regarding breastfeeding outcomes.</li> <li>◦ Part two includes four questions related to the examination of the anatomy and function of the infant’s tongue and frenulum.</li> </ul> </li> <li>• The two parts are then reviewed and, if a certain score is achieved, a frenectomy is recommended.</li> <li>• The tool also includes other indicators of ankyloglossia.</li> </ul>
<b>The Hazelbaker Assessment Tool for Lingual Frenulum Function<sup>20b</sup></b>	<ul style="list-style-type: none"> <li>• This tool includes two main assessment domains: appearance items and function items.</li> <li>• Appearance items include the appearance of the tongue when lifted, elasticity of frenulum, length of lingual frenulum when the tongue is lifted, attachment of the lingual frenulum to the tongue, and the attachment of the lingual frenulum to the inferior alveolar ridge.</li> <li>• Function items include lateralization, lift of tongue, extension of tongue, spread of anterior tongue, cupping, peristalsis, and snapback.</li> <li>• Post-assessment, a score is tallied and ankyloglossia status is determined based on the score assigned by the tool.</li> </ul>
<b>The Canadian Paediatric Society position statement on ankyloglossia and breastfeeding<sup>5c</sup></b>	<ul style="list-style-type: none"> <li>• The position statement includes a definition of ankyloglossia: 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).<sup>5</sup></li> <li>• The statement also presents information on the prevalence, pathophysiology, and management of ankyloglossia; the frenectomy procedure; and recommendations on examination, diagnosis, and treatment.</li> </ul>
<b>The Goldfarb Breastfeeding Clinic patient handout from the Herzl Family Practice Centre<sup>22d</sup></b>	<ul style="list-style-type: none"> <li>• The patient handout contains a brief explanation of ankyloglossia and a detailed explanation of the frenectomy procedure.</li> <li>• It also provides significant detail on how to care for the infant post-procedure.</li> </ul>

<sup>a</sup>Two respondents from Ontario, one respondent from Nova Scotia, two respondents from Quebec.

<sup>b</sup>Three respondents from Ontario.

<sup>c</sup>One respondent from Nunavut, one respondent from Ontario.

<sup>d</sup>One respondent from Quebec.



Two of 36 (6%) survey respondents reported the use of custom assessment tools developed and created based on existing tools, local expertise, and incorporating existing information from resources such as the Kotlow classification,<sup>23</sup> the Martinelli-developed Lingual Frenulum Protocol with Scores for Infants,<sup>24</sup> and the Hazelbaker Assessment Tool for Lingual Frenulum Function (HATLFF).<sup>20</sup> One (3%) respondent of 36 noted the use of a patient-oriented resource<sup>20</sup> available on the International Breastfeeding Centre website.

## Criteria for Eligibility for Ankyloglossia Assessment and Diagnosis

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

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

It was noted that The HATLFF<sup>20</sup> and the Frenotomy Decision Tool for Breastfeeding Dyads<sup>21</sup> (developed by Carole Dobrich) might be used to inform specific criteria for eligibility. Several respondents (four of 36, or 11%) suggested that every infant should be assessed for ankyloglossia, regardless of symptoms. One respondent indicated that assessment should be up to clinician discretion.

## Current Practices for Patient Selection for Frenectomy Procedures in Canadian Jurisdictions

### Guidance for Patient Selection for Frenectomy

Several Canadian guidance documents for patient selection were identified. The Canadian Paediatric Society position statement states that when ankyloglossia contributes to substantial breastfeeding difficulties, frenectomy should be performed by an experienced clinician.<sup>5</sup> A guideline established by perinatal services in British Columbia<sup>19</sup> states that treatment is not necessary if breastfeeding proceeds successfully; however, if feeding problems persist, the infant should be referred to a physician for further assessment and possible treatment, as outlined in Academy of Breastfeeding Medicine guideline Protocol #11<sup>12</sup> and in Lawrence and Lawrence's<sup>25</sup> guide for the management of breastfeeding for medical professionals to improve breastfeeding effectiveness.

The survey respondents were asked if there are any policies, frameworks, guidelines, or other guidance documents in use in their jurisdiction to guide the patient selection for frenectomy procedures. In the survey, seven of 36 (19%) respondents (from Ontario, Quebec, and Newfoundland) indicated that they use a form of policy, framework, guideline, or another guidance document for the selection of patients for frenectomies. The guidance documents

referenced were exclusively the same ones used for ankyloglossia diagnosis, including the Canadian Paediatric Society position statement,<sup>5</sup> the Frenotomy Decision Tool for Breastfeeding Dyads developed by Carole Dobrich,<sup>21</sup> and the HATLFF.<sup>20</sup>

## Eligibility Criteria for Frenectomy

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

## Criteria That Exclude Patients From Frenectomy

Most of the survey respondents (23 of 36, or 64%) reported that there are criteria that would exclude patients from receiving a frenectomy procedure in their jurisdictions. One respondent indicated that procedures are not typically conducted until the infant has had feeding issues for four months. On the contrary, other respondents (six of 36, or 17%) explained that, if the child is older than a few months, local physicians may be hesitant to perform a frenectomy. These patients may receive a subsequent referral to a specialized physician, which may involve longer wait times. Objective conditions such as the risk of bleeding, poor infant development, medical instability, health conditions preventing performing the procedure, and certain types of malocclusion that could be misdiagnosed as ankyloglossia may be incompatible with performing a frenectomy. Further considerations that may preclude frenectomy include an inability to understand the conduct or outcomes of the procedure, a previous frenectomy, the absence of an assessment score or outcome indicative of ankyloglossia, and the determination of an underlying cause of breastfeeding issues not related to ankyloglossia.

## Qualifications Required to Perform Frenectomy

In Canada, physicians (including dentists) perform frenectomy procedures. The Canadian Paediatric Society position statement notes that a referral to an ear, nose, and throat specialist or a physician with experience performing frenotomies should be made.<sup>5</sup> One study from Nova Scotia reported that the most common surgical procedure performed by a dentist is a frenectomy (29.4% of dentists reported they performed this procedure).<sup>18</sup> No literature was identified on the involvement of other health care practitioners in conducting frenectomies. Two (6%) respondents indicated a desire to allow non-physicians to conduct the procedure, but no information was shared regarding the current involvement of other types of practitioners in performing frenectomies, although one respondent indicated that lactation consultants may assist.

## Perceived Barriers to and Facilitators of the Optimal Diagnosis and Treatment of Ankyloglossia

No literature on barriers or facilitators to the optimal assessment and diagnosis of ankyloglossia or appropriate patient selection for frenectomy was identified. Survey questionnaire responses are summarized by barriers and facilitators below. Factors impacting assessment and diagnosis, and treatment, are presented together.

### Barriers

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

**Table 3: Barriers to the Optimal Diagnosis and Treatment of Ankyloglossia**

Guidance Document	Proportion of “Yes” Responses <sup>a</sup> (%)
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%)

<sup>a</sup>To survey question: “What are the barriers to the optimal diagnosis and treatment of ankyloglossia?”

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

### Facilitators

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

**Table 4: Facilitators of the Optimal Diagnosis and Treatment of Ankyloglossia**

Facilitator	Proportion of “Yes” Responses <sup>a</sup> (%)
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, 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%)

<sup>a</sup>To survey question: “What are the barriers to the optimal diagnosis and treatment of ankyloglossia?”

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.

### Temporal Trends Related to the Use of Frenectomy to Treat Ankyloglossia Across Canadian Jurisdictions

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

One population-based study in British Columbia reported an increase in the rate of ankyloglossia from 5.0 per 1,000 live births in 2004 to 8.4 per 1,000 live births in 2013.<sup>16</sup> The rate of frenectomies also increased from 2.8 per 1,000 live births to 5.3 per 1,000 live births.<sup>16</sup> The study attributed the increase in the diagnosis of ankyloglossia to an increased surveillance secondary to the focus on breastfeeding initiation.

In follow-up to the British Columbia study,<sup>16</sup> an analysis of all hospital-based live births in all Canadian jurisdictions, excluding Quebec, was conducted using Canadian Institute for Health Information data.<sup>10</sup> The study reported that rates of diagnosed ankyloglossia increased in Canada from 6.86 per 1,000 live births in 2002 to 22.6 per 1,000 live births in 2014. The study also observed an increase in frenectomy rates for infants diagnosed with ankyloglossia from 54.7% in 2002 to 63.9% in 2014.<sup>10</sup> The study compared jurisdictional rates of diagnosis to those from British Columbia, noting three-fold higher rates of ankyloglossia in

Saskatchewan, Alberta, and the Yukon, and three- to four-fold higher rates of frenectomy in the Yukon, Alberta, and Saskatchewan.<sup>10</sup> The lowest rates of ankyloglossia were observed in British Columbia, with similar rates in Nunavut, Newfoundland and Labrador, and Manitoba. Similarly, British Columbia had the lowest rates of frenectomy procedures, with the exception of Newfoundland and Labrador, and Nunavut. Overall, the study authors describe a rapid temporal increase in ankyloglossia and frenectomy rates in the observation period, and noted substantial regional variation in the rates of diagnosis and treatment of ankyloglossia. They suggest that the change could be attributed to an increased emphasis on breastfeeding initiation before hospital discharge.<sup>10</sup> Notably, the study does not capture births outside of the hospital, or ankyloglossia diagnosis and frenectomy procedures conducted after hospital discharge.<sup>10</sup>

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

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

- an increased quantity of referrals from lactation consultants
- increased provider and parental awareness about the impact of ankyloglossia on breastfeeding
- the increased importance placed on breastfeeding, and the motivation to initiate and continue breastfeeding through challenges
- motivation to seek care to resolve breastfeeding issues
- an increase in the number of providers offering the procedure
- increased networking and dissemination of knowledge (e.g., national conferences) among health care professionals managing ankyloglossia
- the proliferation of private practices offering laser-based releases
- 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.

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

As far as trends related to conducting frenectomy, multiple survey (nine of 36, or 25%) respondents observed that later-born children in families with another child with ankyloglossia are often brought in for assessment because of perceptions around the heritability of the condition, and that they are more likely to receive early assessment and undergo the procedure. Two of 36 (6%) respondents noted that there has been an increase in inter-professional collaboration among health professionals providing care such as lactation consultants and family doctors. Some (11 of 36, or 31%) observed that the procedure is rarely performed on non-breastfeeding infants, and that perception of the necessity of frenectomy and perceived eligible time frame (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 toward

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, or 6%) observed increased utilization of laser-based techniques versus scissor or scalpel.

## Limitations

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

An assessment of treatment effectiveness or outcomes was not within the scope of this report. In addition, the guidance documents identified and summarized in this report were not subject to quality appraisal. The objective was to understand current practices, so no restrictions were placed on the types of guidance documents summarized in the report. Thus, their inclusion is for information purposes regarding current practices, and we are unable to comment on the quality of these resources. This report does not address potential differences in practices to address anterior versus posterior ankyloglossia.

The findings of this report are based on a limited literature search and survey responses from Canadian jurisdictions. Although most Canadian provinces and territories were represented, there were no informants from New Brunswick, Yukon, and the Northwest Territories. In addition, with the exception of Ontario, less than 10 responses were received from the other jurisdictions that participated. Findings reflect the individual perspectives of the survey respondents and literature identified and may not represent all Canadian or local contexts or perspectives.

There was a lack of data available regarding temporal trends related to the use of frenectomy to treat ankyloglossia outside of the hospital setting. As a result, statements on changes in the rate of procedures may not be generalizable to other settings and may underestimate the use of the procedure given the volume conducted outside of the hospital.

## Conclusions

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

Some respondents reported that they use specific guidance and criteria to help diagnose ankyloglossia. Several resources were highlighted, but other tools commonly cited in the literature, such as the Coryllos grading tool and the Bristol Tongue Assessment Tool, were not acknowledged.<sup>26,27</sup> The varied approach to diagnosis indicated by this Environmental Scan's findings is consistent with conclusions of an earlier review. The review summarized articles regarding the diagnostic criteria used for ankyloglossia and the methods used for diagnosis in studies of ankyloglossia prevalence, and reported substantial variation in diagnostic criteria and the age of assessment used.<sup>28</sup> Multiple reports have commented on variations in international appropriateness criteria and guidance for ankyloglossia management, noting that some countries recommend treatment, when appropriate, while others do not endorse it.<sup>10,26</sup> Nearly all the survey respondents agreed that there is a need for additional guidance regarding the assessment, diagnosis, and treatment of ankyloglossia. While several societies and organizations have issued statements on ankyloglossia, they tend to provide

broad suggestions (e.g., not supportive of universal treatment, treatment recommended in circumstances where breastfeeding is impaired) rather than specific direction for patient management.

Fewer respondents reported using guidance documents to inform the patient selection for treatment, although many acknowledged that there are certain criteria that would exclude patients from gaining access to a frenectomy in their jurisdictions. The findings indicated that physicians (including dentists) are the primary group performing frenectomies in Canada. While this may be the case, studies on the effectiveness of frenectomy have reported that a range of health professionals – family, neonatal, and pediatric doctors; general, pediatric, or specialty surgeons; and lactation or specialist consultants – are involved in conducting the procedure.<sup>29,30</sup> Several survey respondents noted interest in the expansion of the acceptable disciplines able to perform frenectomy.

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

Although no jurisdiction provided concrete data on the temporal trends for the use of frenectomy procedures in their jurisdiction via the survey questionnaire, most of the respondents reported an anecdotal increase. These observations were corroborated by two population-based studies that observed a significant temporal increase in both diagnosing ankyloglossia and conducting frenectomy procedures across Canada.<sup>10,16</sup> Similar usage patterns have been reported in the US, with a more than 10-fold increase in the rate of frenectomy procedures performed from 1997 to 2012.<sup>31</sup> The increase in the uptake of frenectomy procedures has been suggested to stem from a renewed emphasis on breastfeeding encouraged by health care providers and organizations, including the World Health Organization.<sup>1,2</sup> Input on the drivers behind the increased diagnosis and treatment of ankyloglossia from survey respondents was consistent with this, also suggesting the contribution of increased patient, family, and practitioner awareness about the condition, and the growth in the number of practitioners able to refer to and conduct the procedure.

An increase in the number of public queries and non-clinical media coverage of ankyloglossia has been reported, while formal research and evidence generation research on the topic has slowed.<sup>32,33</sup> Future research initiatives have been suggested to further the understanding of the impact of ankyloglossia on infant feeding, develop better evidence on the effectiveness of frenectomy, determine the impact of variation in practitioner perception of the need for frenectomy on current practice, and on the potential for standardization of diagnostic and treatment practices across professions and settings.<sup>10,31,34</sup>

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## 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
- 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 or 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 or 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

## Appendix 2: Information on Survey Respondents

**Table A1: Jurisdictions and Organizations**

Province/Territory <sup>a</sup>	Organization Represented by Survey Respondents
British Columbia (n = 2)	College of Midwives of British Columbia BC Women’s Hospital & Health Centre
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 & 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 CHEO—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 de Benny Farm CIUSSS du Centre-Ouest-de-l’Île-de-Montréal 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

<sup>a</sup>No responses received from New Brunswick, the Northwest Territories, or the Yukon.

**Table A2: Occupations and Settings**

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

<sup>a</sup>Respondents selected one option; six individuals were lactation consultants in addition to their primary occupations.

<sup>b</sup>Respondents could select more than one option.

<sup>c</sup>Out of a total of 36 respondents.