

Australian Collaboration for Infant Oral Research (ACIOR)*

ACIOR Position Statement 1

4 October 2017:

Upper lip-tie, buccal ties, and the role of frenotomy in infants

Morphology

What are the maxillary labial and buccal frena?

The word *frenum* derives from the Latin *frēnum*, meaning 'bridle'. *Frēnulum* is the diminutive of *frēnum*, meaning 'little bridle'. The terms *frenum* and *frenulum* may be used interchangeably when discussing intra-oral connective tissue. In this statement, we use the term *frenum*.

A frenum is a small fold of tissue that secures or restricts the motion of a mobile organ, functioning anatomically as a protective connective tissue anchor, or tether, or tie. Frena are found in various parts of the body.

In the mouth, frena tether the lips to the gum, and the tongue to the floor of the mouth. These include the maxillary labial frenum and the laterally positioned buccal frena.

The midline maxillary frenum is made up of loose connective tissue, dense collagen, elastic fibres and epithelium. Sometimes it also contains muscle fibres, but these are usually few and located outside of the frenum proper.^{1,2}

The buccal frena are small connective tissue folds between the buccal mucosa and the gums, located lateral to the maxillary frenum, typically between the canines and premolars.

This Position Statement does address frena abnormalities associated with genetic orofacial syndromes, which require specialised treatment.

What is the functional relevance of the maxillary labial and buccal frena?

The wide range of maxillary labial and buccal frena morphologies do not tether or tie the lip in a way that impacts on function.³⁻⁵ The infant's upper lip does not need to flange for effective breastfeeding. The upper lip participates in a neutral position in the seal created by the lower half of the face when the breastfeeding infant's face buries symmetrically into the breast. The upper lip is not actively involved in effective milk transfer in breastfeeding, and is not visible when optimal intra-oral breast tissue volume and positional stability of the infant during breastfeeding are achieved.³⁻⁵

How should maxillary labial frena be classified?

Since the diverse range of maxillary labial morphologies do not impact upon function, there is no reason to classify variants as 'upper lip ties'. The Kotlow scale and other systems for

classification of the maxillary labial frena (see Appendix), including the Stanford classification, are of anatomic interest, but lack clinical relevance.^{6, 7}

How should buccal frena be classified?

Since buccal frena do not impact upon function, there is no reason to classify variants as 'buccal ties'.

Why is this topic of concern?

Currently, health professionals diagnose variants of maxillary labial and buccal frena as abnormal in infants with breastfeeding problems or unsettled behaviour, and refer to dentists or other providers for ablation or incision with either laser or scissors frenotomy. Parents are advised to follow-up with wound stretching exercises multiple times a day for two or more weeks. Parents may also be advised to undertake a course of myofunctional or craniosacral therapy, which requires stretching and massage of the infant's oral connective tissues and muscles a variable number of times a day.

There is no evidence to suggest that frenotomy of variants of maxillary labial and buccal frena helps with breastfeeding problems or protects against hygiene difficulties and anterior incisor decay in later childhood, despite claims.^{6, 8, 9}

Although providers of oral surgery claim that pre-post surveys and chart reviews demonstrate the efficacy of the diagnosis and surgical treatment of upper lip-tie,¹⁰⁻¹⁵ these represent only Level IV evidence in the NH&MRC hierarchy and do not prove causal links.¹⁶ Providers of frenotomy have also argued that infants with an upper lip-tie or tongue-tie swallow more air when breastfeeding, causing stomach distention, crying behaviours, and reflux. However, studies that support this claim are methodologically weak, demonstrating interpretive bias.^{16, 17}

What are the risks of maxillary labial and buccal frenotomy?

In the absence of relevant studies, we draw on expert clinical experience and anecdotal reports to list risks in order of clinical significance.

1. Haemorrhage if scissors frenotomy (mitigated by use of laser)¹⁸
2. Unnecessary pain and distress
3. Wound infection¹⁹
4. Oral aversion resulting in worsened feeding problems in infant with pre-existing breastfeeding or feeding problems
5. Underlying feeding/breastfeeding problems remain unidentified and unmanaged
6. Worsened diastema of upper incisors in later childhood due to scarring

What is appropriate, evidence-based management of maxillary labial and buccal frena?

We recommend no intervention, as maxillary labial and buccal frena are normal anatomic variants and do not 'tie down the upper lip' to impact on breastfeeding or feeding function. Unnecessary anxiety is created for parents when a normal anatomic variant is labelled as a 'tie'.

The presence of what may appear to be a prominent midline maxillary frenum in infancy is not predictive of spacing between permanent maxillary central incisors. If a significant diastema emerges in later childhood, intervention may be appropriate at that time.

ACIOR Position Statement 1 Summary:

Upper lip-ties, buccal ties, and the role of frenotomy in infants

1. In infants, maxillary labial and buccal frena:
 - a) demonstrate a wide range of normal anatomic variation
 - b) do not impact upon function, including in breastfeeding
 - c) are not appropriately labelled as 'upper lip ties' or 'buccal ties'.
2. There is no role for frenotomy of maxillary labial or buccal frena in normal infants.
3. In the absence of benefit, frenotomy for maxillary labial and buccal frena poses unacceptable risk.

Appendix

Aetiology

Embryologically, the oral frena develop from central cells of the vestibular lamina. The maxillary labial frenum originates from the tectolabial bands, which appear at three months in utero and connect the tubercle of the upper lip with the palatine papilla. As the lateral halves of the alveolar ridge fuse, the bands are divided, forming the palatine papilla palatally and the labial frenum labially.^{1, 20, 21}

The position of the maxillary labial frenum shifts apically as the alveolar process develops and moves coronally.^{1, 22} Commonly, the maxillary labial frenum inserts at the mucogingival junction but individual variations are marked.²³⁻²⁵ The relative shape and size of the maxillary labial frenum change with age and variations among individuals are also substantial.²⁴⁻²⁶ In line with the migration of the maxillary labial frenum with age, the width of any presenting diastema also commonly decreases from infancy to early childhood, but this may vary again when children reach the mixed-dentition stage.²⁷

Classification of maxillary labial frenum

Sewerin (1971) classified the frenum according to morphological variations into "normal, normal with a nodule, normal with appendix, normal with nichum, bifid labial frenum, persistent tectolabial frenum, double frenum and wider frenum".²⁸

Mirko et al (1974) classified frena by position of insertion and attachment:²³

- Mucosal – frenal fibres attached to mucogingival junction

- Gingival – frenal fibres inserted in attached gingiva
- Papillary – frenal fibres extended into interdental papilla
- Papilla Penetrating – frenal extended to palatine papilla.

Mirko et al reported that mucosally attached frenum were the most common in adults and papillary attached frenum were the least common.²³

Classification of maxillary labial frenum alters with development

Boutsi and Tatakis in 2011 utilized Mirko's classification in their study of different types of maxillary labial frenum in 226 children, aged 1-18 years, and concluded that "age differed significantly among children with different type of frenum attachment ($p=0.0006$)". Older children were more likely to have mucosally attached frenum whereas the youngest children were more likely to have papillary penetrating frenum. They did not find any gender or ethnic differences.²⁴ The findings from Lindsey et al., which examined 1285 English infants, children and adults, and those from Popovich et al. concur with the results of Boutsi and Tatakis, namely that apical migration of the maxillary labial frenum occurs with increasing age in children.²⁹

Very occasionally, in the case of a frenum which is exceptionally large, or when the frenal attachment fails to migrate sufficiently, a persistent band of tissue is observed at or crossing the alveolar ridge crest and between the central incisors. It is possible that this may be associated with hygiene-related, anatomical and aesthetic concerns in later childhood and adulthood e.g. gingival margin retraction, dental plaque retention, diastema, lip or vestibule restrictions.^{1, 8, 24} In these rare cases, frenotomy may be of benefit, but this decision is made in later childhood or early adulthood, not in infancy.

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