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PREVALENCE OF VARIATIONS AND ANOMALIES OF THE UPPER LABIAL FRENUM

by

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INTRODUCTION

A previous article (*Sewerin, 1969*) defined and classified variations of the upper labial frenum. The present article reports the prevalence of the different frenum types, and also contains a recommendation for a division of the latter into variations and extreme variations (= anomalies).

MATERIAL AND METHOD

The subject group consisted of 1430 persons of both sexes and different ages. The distribution of subjects according to sex and age is shown in tables I and II.

All the persons examined attended the Department of Oral Diagnosis, Royal Dental College, Copenhagen, as patients during the period from September 1, 1969, to June 30, 1970. No selection was made among patients, except that the following categories were excluded from the study group:

1) aliens and Danish citizens who bore obvious signs of foreign extraction, including Greenlanders, (2) patients referred to the College for frenum anomalies, (3) patients with hypodontia of the maxillary incisors, (4) patients with cleft palate and/or cleft lip, with other congenital deformities of the

jaws or face, and with oro-facial syndromes, (5) patients without one or both maxillary central incisors, (6) patients who had undergone operations on the upper labial frenum or the adjacent mucosa, (7) patients who had suffered a trauma involving injuries to the mucosa of the maxillary incisor region, and (8) patients whose upper labial frenum or adjacent mucosa showed cicatrices, even though these patients were unable to confirm the suspicion of an operation or trauma at some earlier date.

The study was made under clinical conditions and with the naked eye, with the patient's upper lip fully distended. The frena were identified according to the classification previously suggested by the author (Fig. 1). For definitions, see *Sewerin, 1969*.

There were special problems in distinguishing between *frenulum normale* (*simplex*) and *frenulum tectolabiale persistens* in children. In children under 15 years of age *frenulum tectolabiale persistens* was registered as such only if — in addition to extending between the central incisors and linking with the incisal papilla — it was hyperplastic, and if there was a diastema between the central incisors but not between the other anterior teeth.

RESULTS

Prevalence

Table I shows the prevalence of the various forms of frenum. In 60.2 % of the patients examined the frenum took the form of a regular, falciform fold (*frenulum normale*), while in 39.8 % other forms were recorded. The most common variation was an *appendix frenuli* (19.9 %). The next largest group of variations was *nodulus frenuli* (9.1 %). The following types had a prevalence of less than 5 %: *frenulum bifidum* (3 %), *recessus frenuli* (2.8 %), *frenulum tectolabiale persistens* (2.6 %) and *duplicatio frenuli* (0.4 %). In 2.1 % of the subjects studied there was a simultaneous occurrence of more than one structure or form of frenum. Examples of the various forms of frenum types are shown in Figs. 2A—2F.

Sex

Table I also shows the prevalence of variations and anomalies of the upper labial frenum in the two sexes. The coincidence of more than one type of frenum occurred in 30 persons, of whom 23 were males and seven were females. This higher frequency in males is statistically significant ($\chi^2 = 13.9$, $P < 0.001$). There was no significant difference between the sexes as regards the other forms. In the following report therefore males and females will be grouped together, except when reference is made to the coincidence group.

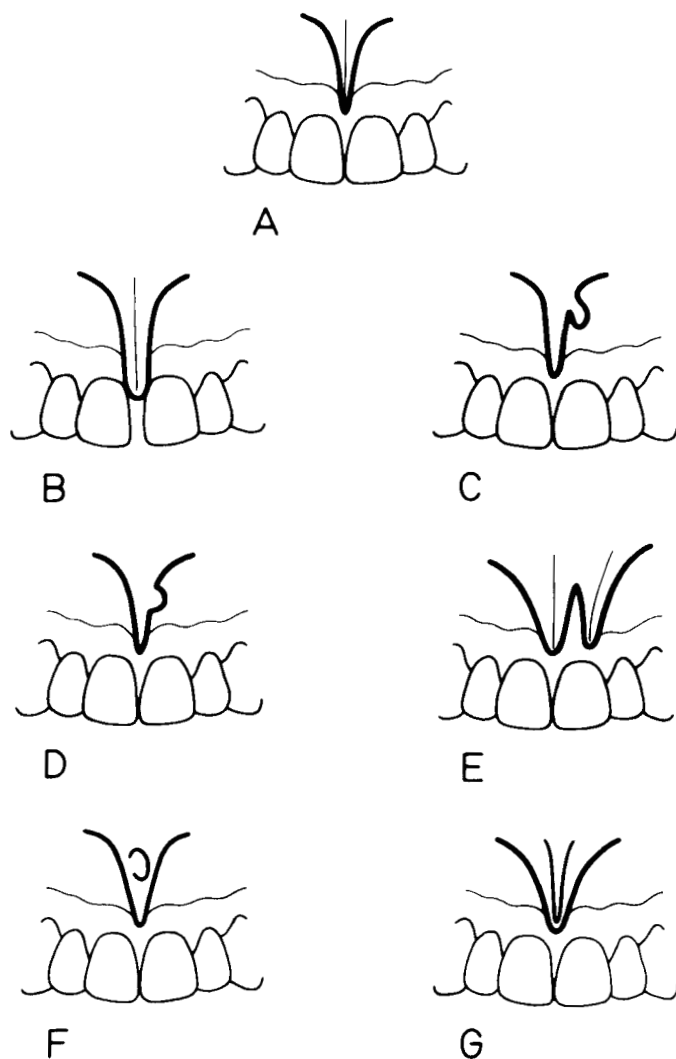


Fig. 1. Classification of types of the upper labial frenum. A: Normal frenum. B: Persistent tectolabial frenum. C: Frenum with appendix. D: Frenum with nodule. E: Duplication of the frenum. F: Recess of the frenum. G: Bifid frenum. Based on *Sewerin*, 1969.

Age

Table II shows the occurrence of the various types of frenum in the following five age groups: 0—14 years, 15—29 years, 30—44 years, 45—59 years, and 60 years and older. Both *appendix* and *nodulus frenuli* are clearly less

Table I

Prevalence of variations and anomalies of the upper labial frenum in males and females

	Male		Female		Both sexes	
	Number	%	Number	%	Number	%
<i>Variations</i>						
Frenulum simplex	374	58.6	486	61.4	860	60.2
Frenulum cum appendice	140	21.9	144	18.2	284	19.9
Frenulum cum nodulo	56	8.8	74	9.3	130	9.1
<i>Anomalies</i>						
Frenulum bifidum	16	2.5	27	3.4	43	3.0
Frenulum cum recessu	12	1.9	28	3.5	40	2.8
Frenulum tectolabiale persistens	15	2.3	22	2.8	37	2.6
Coincidence of two or more variations/anomalies	23	3.6	7	0.9	30	2.1
Duplicatio frenuli	3	0.5	3	0.4	6	0.4
Total	639	100.1	791	99.9	1430	100.1

prevalent in children (0–14 years) than in other age groups. The less frequent occurrence in children is statistically significant in the case of both types (*appendix*: $\chi^2 = 9.3$, $P < 0.01$, *nodulus*: $\chi^2 = 27.3$, $P < 0.001$). Conversely, *frenulum tectolabiale persistens* was significantly more prevalent in children than in other age groups ($\chi^2 = 36.77$, $P < 0.001$). The occurrence of *frenulum bifidum* and *recessus frenuli* was fairly uniform throughout the age groups.

Localisation of appendix frenuli and nodulus frenuli

Both *appendix* and *nodulus frenuli* can be located in various parts of the frenum. The location of these formations was studied, the following three distinctions being made: the third part of the frenum situated nearest to the alveolar process (alveolar location), the middle third (intermediate location), and the third situated nearest the lip (labial location). Most of the structures occurred in the intermediate location (68.6 % of the appendices and 56.2 % of the nodules). The alveolar location was recorded significantly more frequently for nodules (30 %) than for appendices (4.6 %) ($\chi^2 = 17.5$, $P > 0.001$). Conversely, the labial location produced a significantly greater number of appendices (26.8 %) than nodules (13.8 %) ($\chi^2 = 8.46$, $P > 0.01$).

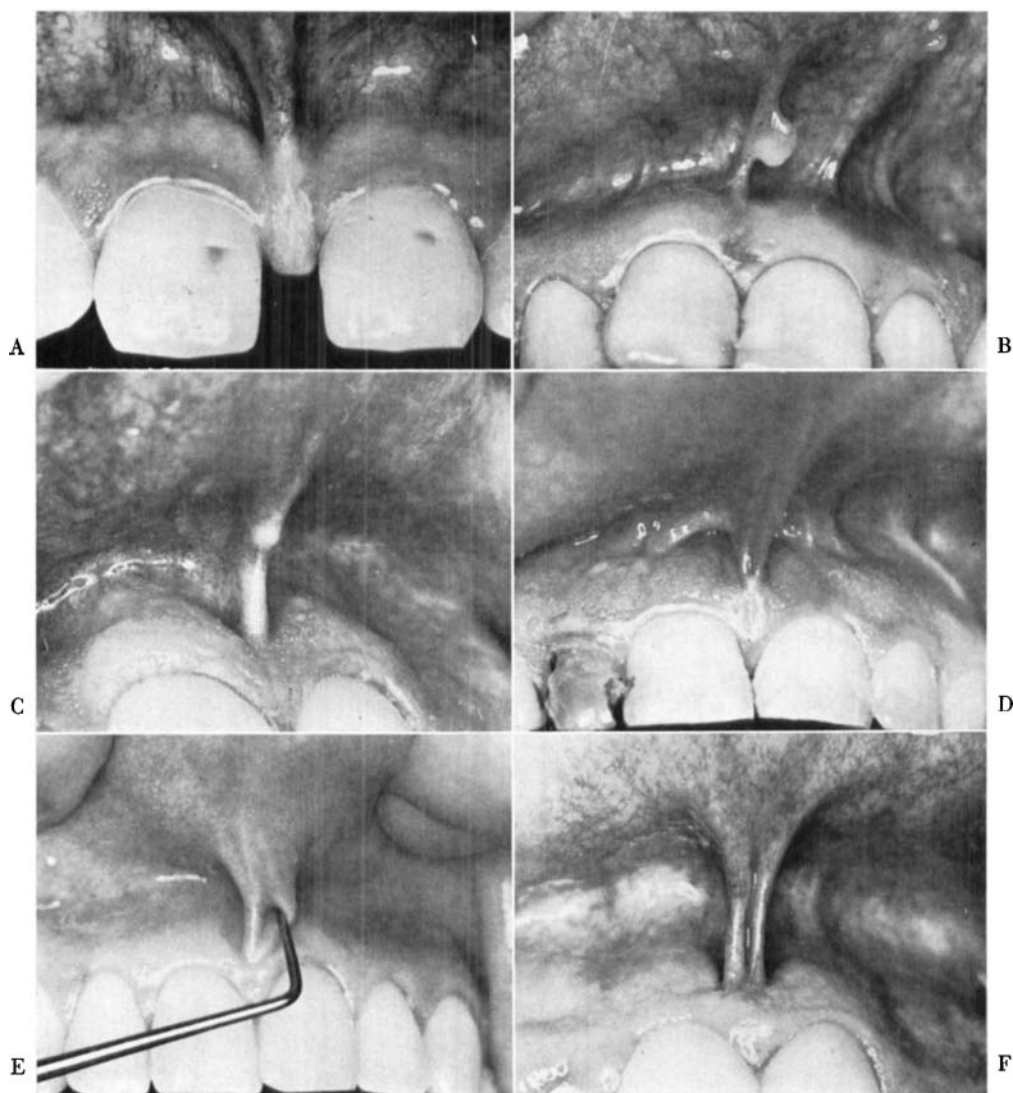


Fig. 2. Cases of variations and anomalies of the upper labial frenum. A: Persistent tectolabial frenum. B: Frenum with appendix. C: Frenum with nodule. D: Duplication of the frenum. E: Reces of the frenum demonstrated with a gauge. F: Bifid frenum.

DISCUSSION

Very few studies have been published pertaining to types of the upper labial frenum and their prevalence.

Crowley (1956) found among 416 male, caucasian persons in the United

Table II
Prevalence of variations and anomalies of the upper labial frenum in different age groups

Type of frenum	0—14		15—29		30—44		45—59		>60		all ages	
	years		years		years		years		years			
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Frenulum simplex	206	65.6	332	55.4	174	61.5	112	64.3	36	60.0	860	60.2
Frenulum cum appendice	43	13.7	140	23.4	56	19.8	30	17.3	15	25.0	284	19.9
Frenulum cum nodulo	10	3.2	66	11.0	22	7.8	24	13.8	8	13.3	130	9.1
Frenulum bifidum	17	5.4	20	3.3	6	2.1	0	0	0	0	43	3.0
Frenulum cum recessu	9	2.9	18	3.0	10	3.5	3	1.7	0	0	40	2.8
Frenulum tectolabiale persistens	23	7.3	6	1.0	6	2.1	1	0.6	1	1.7	37	2.6
Coincidence of two variations/anomalies	6	1.9	13	2.2	7	2.5	4	2.3	0	0	30	2.1
Duplicatio frenuli	0	0	4	0.7	2	0.7	0	0	0	0	6	0.4
Total	314	100.0	599	100.0	283	100.0	174	100.0	60	100.0	1430	100.1

States that 24 % had a tag on the frenum presumably corresponding to the *appendix frenuli* of the present classification. In a smaller subject-group of females the structure was found in 20 % of cases. No mention is made in the article of the age of the subjects but there is a reasonable agreement with the prevalence of 19.9 % ascertained in the present study. If Crowley's patients were adults, the similarity is even greater because a number of the patients in the present study were children, and among these the prevalence was significantly lower.

The not-infrequent occurrence of recesses of the frenum (2.8 %) in the present material is interesting. The «fistule congénitale médiane de la lèvre supérieure» described by Lannelongue & Ménard (1891) has been considered a great rarity. There have been only a few case reports of similar deformations, and they have usually been found as secondary changes resulting from other cleft formations or developmental anomalies located in the jaws or facial region (Braithwaite & Watson, 1950; Kriens, 1968; Francesconi & Fortunato, 1969; Mackenzie, 1970). All the cases of recesses of the frenum found in the present study occurred independently of other such deformations.

A persistent tectolabial frenum was found significantly more often in children (7.3 %) than in adults (1.3 %). The greater prevalence in children presumably indicates that a number of the frena recorded among children as *frenulum tectolabiale persistens* will at a later stage undergo normal regression. This emphasises the difficulty of distinguishing at an early age between

a pronounced and deeply inserting but normal frenum and a *frenulum tectolabiale persistens*, and demonstrates the risk of making a mistake in operating too early.

The fact that *appendix* and *nodulus frenuli* were recorded more frequently among adults than in children indicates that these structures occur as a result of regression of the frenum during childhood.

Crowley (1956) stated that the *appendix frenuli* was more frequently located near the lip than near the alveolar process; this observation is confirmed by the present study. There is on the other hand no confirmation that *nodulus frenuli*, as claimed by Crowley, is *exclusively* located near the alveolar process, although the present author did in fact find that *nodulus frenuli* occurs more frequently near the alveolar process than near the lip.

Reformulating the classification

If the distinction between anatomical variations and anomalies (extreme variations) is drawn at a prevalence of 5 %, we see that three variations of the upper labial frenum occur and that there are five forms of anomaly. The oft-used terms *frenulum normale* and *frenulum anormale* are justified, if they are applied to *categories of types* of frenulum. However, as many authors apply them to *individual types* their use cannot be vocated. In particular, many authors apply the term *frenulum anormale* only to a severe, deeply inserting frenulum coinciding with a diastema between the medial incisors. On the subject of frenum WHO's International Classification of Diseases (1969) includes only the description «abnormal labial frenum» (750.87).

The following classification is recommended:

A. *Variations of the upper labial frenum*

1. *frenulum simplex*
2. *frenulum simplex cum appendice*
3. *frenulum simplex cum nodulo*

B. *Anomalies of the upper labial frenum*

1. *frenulum bifidum*
2. *frenulum cum recessu*
3. *frenulum tectolabiale persistens*
4. *duplicatio frenuli*
5. coincidence of two or more frenulum variations or anomalies.

The names and definitions of the various types correspond to those recommended earlier (Sewerin, 1969) except that the term *frenulum normale* is amended to *frenulum simplex*.

SUMMARY

The upper labial frenum was examined in 1430 Danes of both sexes and of different ages. The frena were grouped according to the classification previously suggested by the author. Three types of frena were found in more than 5 % of those examined, and were designated *variations*. The most prevalent variation was *frenulum simplex* (60.2 %), followed by a frenum exhibiting an *appendix* (19.9 %) or *nodulus* (9.1 %). Five types of frena had a prevalence of less than 5 % and were designated *anomalies*. Among these *frenulum bifidum* was the most frequent (3.0 %). The occurrence of *recessus frenuli* was surprisingly high (2.8 %), as this anomaly had been regarded as extremely rare. No major sex differences were observed but some types demonstrated different prevalence in different age groups. Appendices and nodules on the frenum were less frequent in children than in adults. Conversely, persistence of the tectolabial frenum was more frequent among children. This finding is ascribed to the difficulty of distinguishing a pronounced frenum from a persistent tectolabial frenum in children and emphasises the risk of operating too early in childhood.

RÉSUMÉ

PRÉVALENCE DES VARIATIONS ET DES ANOMALIES DU FREIN DE LA LÈVRE SUPÉRIEURE

Le frein de la lèvre supérieure a été examiné chez 1430 sujets danois des deux sexes et de différents âges. Les freins ont été répartis suivant la classification proposée antérieurement par l'auteur. Trois types de freins ont été trouvés chez plus de 5 % des sujets examinés; ces types ont été désignés comme *variations*. La variation la plus courante était le *frein simple* (60,2%); venaient ensuite les freins présentant un *appendice* (19,9%) ou un *nodule* (9,1%). Cinq types de freins avaient une prévalence de moins de 5 %, et ont été désignés comme *anomalies*. Parmi celles-ci, le *frein bifide* était la plus fréquente (3,0%). La présence d'un *frein à recessus* était étonnamment fréquente (2,8%), puisque cette anomalie a été considérée comme extrêmement rare. Aucune différence importante liée au sexe n'a été observée, mais certains types présentaient des prévalences différentes dans les différents groupes d'âge. Les appendices et les nodules du frein étaient moins fréquents chez les enfants que chez les adultes. Inversement, la persistance du frein tectolabial primitif était fréquente chez les enfants. Ce fait est attribué à la diffi-

culté existant pour distinguer un frein accentué d'un frein tecto-labial primitif persistant chez les enfants, et souligne le risque d'opérer trop tôt dans l'enfance.

ZUSAMMENFASSUNG

DAS VORKOMMEN VON VARIATIONEN UND ANOMALIEN DES FRENULUM LABII SUPERIORIS

Das Lippenbändchen der Oberlippe wurde an 1430 dänischen Personen beiden Geschlechtes und verschiedenen Alters untersucht. Die Bändchen wurden gemäss der früher vom Verfasser aufgestellten Einteilung (Abb. 1) klassifiziert. Drei Typen von Frenula traten mit einer Häufigkeit von über 5 % auf und erhielten die Bezeichnung *Variationen*. Die am häufigsten auftretende Variation war *Frenulum simplex* (60,2 %), dann folgte *Frenulum cum appendice* (19,9 %) und dann *Frenulum cum nodulo* (9,1 %). Fünf Typen von Frenula traten bei weniger als 5 % der untersuchten Personen auf und erhielten die Bezeichnung *Anomalien*. Bei diesen war *Frenulum bifidum* die häufigste Erscheinung (3,0 %). Das Vorkommen von *Recessus frenuli* war auffallend (2,8 %), da man sonst diese Anomali für äusserst selten hält. Die Häufigkeit der verschiedenen Frenulum-Typen war bei beiden Geschlechtern gleich, gewisse Typen aber traten mit verschiedener Häufigkeit in den verschiedenen Altersgruppen auf. So waren Appendices und Knötchen am Frenulum bei Kindern seltener als bei Erwachsenen. Dagegen kam *Frenulum tectolabiale persistens* signifikant häufiger bei Kindern vor. Dieses Verhältnis wird auf die Schwierigkeit zurückgeführt, bei Kindern ein kräftiges, aber sonst normales Frenulum von einem persistenten tectolabialen Frenulum zu unterscheiden, und unterbaut die Gefahr von Irrtümern bei der Operation in zu frühem Alter.

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