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Salivary mucoceles – racial and histological variations

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SUMMARY

The authors report on their study of 250 cases of salivary mucoceles in Malaysia and discuss racial variations in their distribution. In the Malay male mucoceles formed 5.1% of all specimens reported in them. Likewise the figures by race and sex were: Malay female (4.1%), Chinese female (5.0%), Chinese male (2.7%), Indian male (2.8%) and in the Indian female (2.0%). The overall study showed that both sexes were about equally involved. However in the Indians the males predominated and in the Chinese the females had a higher frequency. In the Chinese female and Indian female mucoceles occurred with the greatest frequency between 0 – 20 years. In the Malay male it was between 11 – 30 years. Mucoceles were rare after 40 years. Mucous extravasation mucocele (MEM) occurred most commonly in the lower lip. MEM in the tongue was more common in the Chinese male and female and Malay female, whereas MEM in the buccal mucosa was more frequent in Europeans. Mucous retention mucoceles (MRM) are extremely rare in the Chinese and Malays who are of Mongoloid racial origin. In contrast to MEM, MRM is rare in the lower lip and is found most frequently in older patients. Like Sela and Ulmansky (1969) this study too showed variant 2 of their histological subclassification of MEM to be the commonest. In the Malay male and female variant 1 was rare and variant 3 was rather uncommon. All the mucoceles were surgically excised. The recurrent rate was 3.0%. All the eight patients with recurrence were of Mongoloid racial origin. Five of the recurrent cases belonged to variant 3 of the histological subclassification and three cases to variant 2.

A MUCOCELE is a circumscribed swelling arising from the abnormal accumulation of mucous secretion. Salivary mucoceles are not uncommon and they are the most frequent lesion involving minor salivary glands. The incidence of mucoceles is understandable since minor salivary glands are widely distributed in the submucosa of the oral mucosa and trauma to the mucosa which causes their formation occurs frequently.

MATERIAL AND METHODS

This study was based on the records of the Department of Stomatology, Institute for Medical Research, Kuala Lumpur and for the years 1967 – 75. Only histologically confirmed salivary mucoceles and patients reported for the first time were included in this study. In all 250 mucoceles were reported.

Between 1967 – 75 this Department reported in all 7425 biopsy specimens. Mucoceles formed 3.4 per cent of all the specimens. In the Malay male mucoceles formed 5.1 per cent of all specimens reported in them. Likewise the figures by race and sex were: Malay female (4.1 per cent), Chinese female (5.0 per cent), Chinese male (2.7 per cent), Indian male (2.8 per cent) and in the Indian female (2.0 per cent).

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FINDINGS

Race, sex and age distribution

Table 1 shows the distribution of mucoceles by race, sex and age groups.

Clinical findings

The clinical diagnosis of mucocele or mucous cyst was made in 83 per cent of the cases. The clinical diagnosis in the other 17 per cent of the cases was benign tumour of epithelial or connective tissue or salivary gland origin, viral wart and sublingual dermoid cyst.

The lesions were consistently painless, freely movable, smooth, soft masses varying in size from a few millimetres to several centimetres (Fig. 1). The larger lesions were usually located in the floor of the mouth, the typical location of the so-called ranula. (Fig. 2). The colour was dependent on the depth at which the mucus accumulated in the tissue. Those masses which were deep had a normal mucosal surface, while the more superficial lesions produced a bluish or translucent change in the mucous membrane. When the lesion was situated immediately beneath the epithelium, a bulla developed containing a clear fluid. Often the mucoceles would "burst" spontaneously or the patient would purposely traumatize them to allow drainage and decompression. A mucocele on cutting was often unilocular and filled with thick gelatinous fluid which often escaped.

Figure 1 – shows the macroscopic appearance of a cleanly excised mucocele which is oval, smooth and soft.

From the available data 17 patients (14.8 per cent) had the lesion for more than one year. Fifty-eight patients (50.4 per cent) had the lesion for less than three months.

Table 1

Distribution by race, sex and age groups of 250 patients with mucoceles

Age	Malays		Chinese		Indians		Others	Total		Percentage
	M	F	M	F	M	F	M	MEM	MRM	
0 – 10	7	7	11	15	4	6	–	50	0	20.1%
11 – 20	19	32	12(1)	26	17(1)	3	–	109	2	44.6%
21 – 30	21	7	9	4	6	2	–	49	0	19.7%
31 – 40	9	2	3	6	3(1)	0(1)	–	23	2	10.0%
41 – 50	0	1	0	2	2	0	–	5	0	2.0%
51 – 60	1	0(1)	1	0	2	0	–	4	1	2.0%
61 – 70	0	0	0	1(1)	0	0	1	2	1	1.2%
71 – 80	0	0	0	1	0	0	–	1	0	0.4%
	57 (22.9%)	50 (20.1%)	37 (14.9%)	56 (22.5%)	37* (14.5%)	12 (4.7%)	1 (0.4%)	243	7*	100.0%
	M:F = 1.1:1		1:1.5		3.1:1					

* In one Indian male the age was not recorded.
Figures within brackets denote Mucous Retention Mucocele (MRM)

MEM = Mucous Extravasation Mucocele.
Others = British Male.

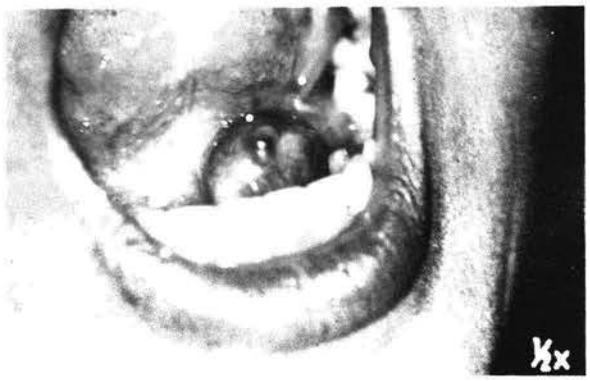

Figure 2 – shows a mucocele on the left side of the floor of the mouth and containing clear fluid. The typical location of the so-called ranula.

Figure 3 – is a low-power photomicrograph showing part of a mucous extravasation mucocele (MEM) with the cystic contents consisting of mucus and inflammatory cells. Glandular tissue is present (Haematoxylin-eosin stain). Orig. magnification ×25.

Histopathology

Histologically, mucoceles can be divided into two main types, viz. (1) mucous extravasation mucoceles (MEM) which is the much commoner variety and where the lining is composed of compressed connective tissue cells (Figs. 3 and 4) or granulation tissue and (2) mucous retention mucoceles (MRM) in which the cystic cavity is lined by epithelium (Fig. 5). Aggregations of glandular tissue are characteristically present in close proximity to the cyst-like space, and are usually the site of inflammatory or degenerative changes.

Figure 4 – is a high-power photomicrograph showing part of a MEM lining composed of compressed connective tissue cells. The amorphous substance seen is mucin. Lymphocytes are also evident. (Haematoxylin-eosin stain). Orig. Magnification ×160.

In all there were 243 MEM and 7 MRM. The ratio of MEM:MRM by race and sex were: Indian male (11.3:1); Indian female (11:1); Chinese male

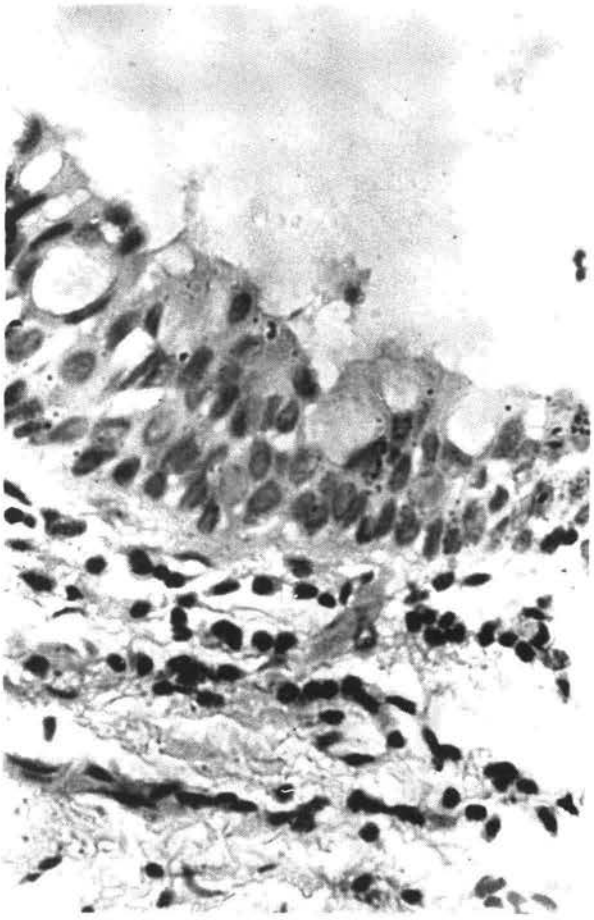

Figure 5 – is a high-power photomicrograph showing part of a mucous retention mucocele (MRM) in which the cystic cavity is lined by epithelium. (Haematoxylin-eosin stain). Orig. Magnification ×160.

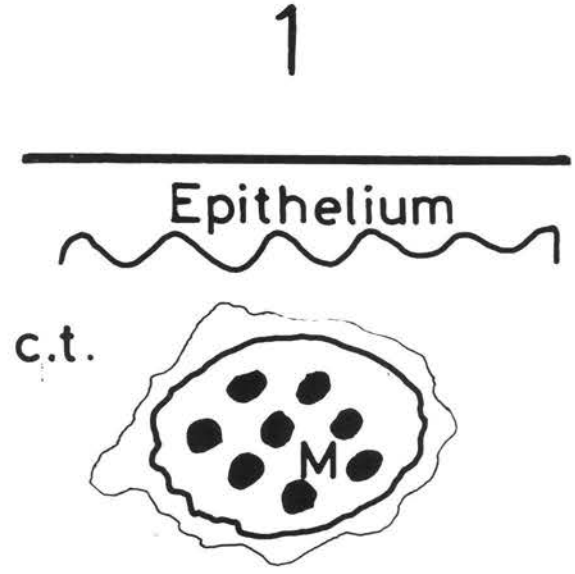

Figure 6 – is a diagramatic representation of the histological subclassification of mucous extravasation mucoceles (MEM) according to Sela and Ulmansky (1969). (a) Variant 1 – Mucin dispersed diffusely with tendency to form small pools. No definite cystic cavity. (b) Variant 2 – Pool of mucin contained in a well-defined cystic cavity and surrounded by a fibrous capsule or granulation tissue and (c) Variant 3 – Pool of mucin just below oral epithelium. Three sides of cystic cavity formed by a fibrous capsule and one side of cyst formed of oral epithelium.
c.t. = connective tissue;
f.c. = fibrous capsule.

(36:1); Chinese female (55:1); Malay male (57:0); and the Malay female (49:1). About 59 per cent of the patients showed aggregations of mucous glands in close proximity to the cyst-like space. Approximately 72 per cent of the Malay males, 50 per cent of the Malay female, 65 per cent of the Chinese male, 57 per cent of the Chinese female, 47 per cent of the Indian male and 58 per cent of the Indian female showed the presence of mucous glands. These glands were often characterized by such secondary changes as atrophy of glandular tissue and its replacement by interstitial fibrosis and dilation of ducts.

Sela and Ulmansky (1969) have further subclassified MEM into three variants (Figs. 6a, b and c). Tables 2 and 4 show the distribution of the histological variants by race, sex and anatomical sites.

Anatomical sites of distribution

Table 3 shows the distribution of mucoceles by anatomical sites. Of the 7 cases of MRM 3 cases involved the floor of the mouth, two cases the buccal mucosa, and one case each the lower lip and tongue respectively.

DISCUSSION

Like Cataldo and Mosadomi (1970) our study too showed that both sexes were about equally involved. However there was a predominance of males in the Indians (M:F = 3.1:1) and of females in the Chinese (M:F = 1:1.5). About 84 per cent of the mucoceles occurred before the age of 31 years and the peak incidence was between 11 – 20 years (45 per cent). Mucoceles were rare after 40 years. In the Chinese female and Indian female mucoceles ocurred with the greatest frequency between 0 – 20

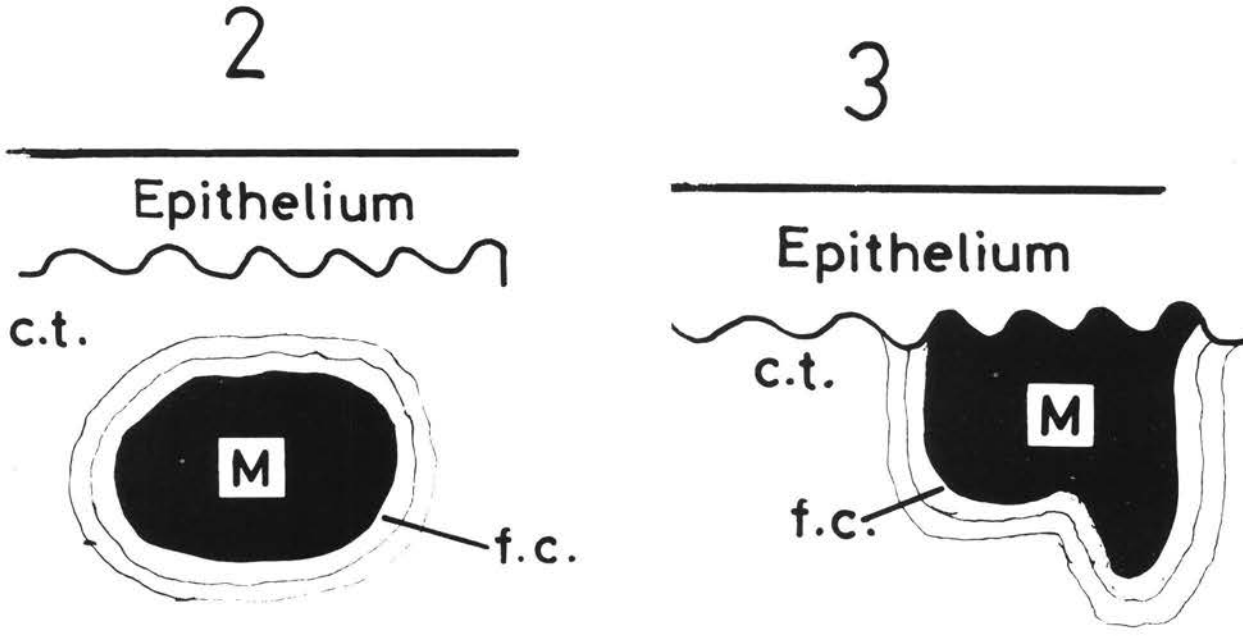

Table 2
Distribution of histological variants of mucous extravasation mucoceles (MEM) in 196 patients (after Sela and Ulmansky, 1969)

	Malays				Chinese				Indians				Total	Percentage
	M	%	F	%	M	%	F	%	M	%	F	%		
Variant 1	1	2.8	1	2.4	6	19.4	12	24.5	7	25.9	3	27.3	30	15.3%
Variant 2	25	69.4	27	64.2	14	45.2	16	32.6	10	37.0	6	54.5	98	50.0%
Variant 3	3	8.3	5	11.9	9	29.0	12	24.5	9	33.3	2	18.2	40	20.4%
Variant 1 + 2	3	8.3	2	4.8	1	3.2	4	8.2	–	–	–	–	10	5.1%
Variant 1 + 3	–	–	2	4.8	1	3.2	2	4.1	–	–	–	–	5	2.6%
Variant 2 + 3	4	11.2	3	7.1	–	–	1	2.0	1	3.8	–	–	9	4.6%
Variant 1 + 2 + 3	–	–	2	4.8	–	–	2	4.1	–	–	–	–	4	2.0%
	36	100%	42	100%	31	100%	49	100%	27	100%	11	100%	196*	100.0%

* In 47 cases the biopsy material was inadequate for histological classification.

Table 3
Distribution of mucoceles by race, sex and anatomical sites

Anatomical site	Malays		Chinese		Indians		Others	Total	Percentage
	M	F	M	F	M	F	M		
Lower lip	38	24	22	26	29(1)	8	1	148(1)	59.6%
Upper lip	0	1	0	0	0	0	0	1	0.4%
Lip Nos	2	1	1	0	0	1	0	5	2.0%
Floor of mouth	13	13(1)	5(1)	13	1	1(1)	0	46(3)	19.6%
Tongue	0	6	5	11	1(1)	0	0	23(1)	9.6%
Buccal mucosa	2	3	2	2(1)	1(1)	1	0	11(2)	5.2%
Palate	0	1	1	1	0	0	0	3	1.2%
Alveolar process	0	0	0	1	0	0	0	1	0.4%
Mouth Nos	2	0	0	1	2	0	0	5	2.0%
Total	57	50	37	56	37	12	1	243(7)	100.0%

The figures within brackets denote Mucous Retention Mucoceles (MRM).
Nos – Not otherwise specified.

Table 4

Distribution of histological variants (V) by anatomical sites

	V1	%	V2	%	V3	%	V1 + 2	%	V1 + 3	%	V2 + 3	%	V1 + 2 + 3	%	Total	%
Lower lip	14	46.7	60	61.2	30	75.0	5	50.0	3	60.0	7	77.8	1	25.0	120	61.2%
Floor of Mouth	2	6.7	23	23.6	1	2.5	3	30.0	1	20.0	–	–	2	50.0	32	16.3%
Tongue	6	20.0	7	7.1	4	10.0	1	10.0	1	20.0	2	22.2	1	25.0	22	11.2%
Cheek	3	10.0	5	5.1	2	5.0	–	–	–	–	–	–	–	–	10	5.1%
Palate	2	6.7	–	–	–	–	1	10.0	–	–	–	–	–	–	3	1.5%
Lip Nos	1	3.2	2	2.0	2	5.0	–	–	–	–	–	–	–	–	5	2.6%
Mouth Nos	2	6.7	1	1.0	1	2.5	–	–	–	–	–	–	–	–	4	2.1%
	30	100%	98	100%	40	100%	10	100%	5	100%	9	100%	4	100.0%	196	100.0%

Nos: Not otherwise specified.

years. In the Malay male it was between 11 – 30 years. In the others the greatest frequency was between 0 – 30 years.

Like Cataldo and Mosadomi's (1970) study of 594 mucoceles and Harrison's (1975) review of 400 mucoceles and Southam's report of 236 mucoceles, the lower lip was the commonest site for MEM (60 per cent) (Fig. 7). The floor of the mouth (19.6 per cent), tongue (10 per cent) and buccal mucosa (5 per cent) were involved in descending order of frequency. MEM in the tongue was more common in the Chinese male and female and Malay female whereas MEM in the buccal mucosa was more frequent in Europeans. The location of MEM in the lower lip was usually lateral because of the habit of biting the lower lip with the maxillary canines. Only one case of MEM in the midline of the lower lip was reported in a 6-year-old Chinese boy. In contrast mucoceles were rare in the upper lip. The occurrence of MEM in the ventral surface of the anterior two-third of the tongue was probably due to the habit of playing with the tongue and by rubbing it against the mandibular anterior teeth.

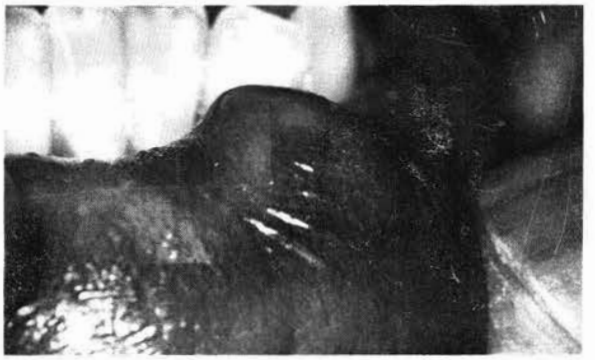

Figure 7 – shows a mucous extravasation mucocele (MEM) in the lower lip.

The frequency of MEM:MRM in the Indian male (11.3:1) and Indian female (11:1) is almost similar to the studies of Cataldo and Mosadomi (1970) – 12.3:1; Cohen (1965) – 10.4:1; Harrison (1975) – 9:1; Sela and Ulmansky (1969) – 13.5:1 and Standish and Shafer (1959) – 15.5:1. In contrast Chaudhry et al (1960) – 5.6:1 and Robinson and Hjorting-Hansen (1964) – 4.7:1 reported a higher frequency of MRM. Our study also shows that MRM seems to be extremely rare in the Chinese and Malays who are of Mongoloid racial origin. The frequency of MEM:MRM in them were respectively: Chinese male (36:1); Chinese female (55:1); Malay male (57:0) and Malay female (49:1). Moreover both in the Malays and in the Chinese mucous gland aggregations were more frequent in the males whereas in the Indians it was more common in the female.

Harrison (1975) as well as Southam (1974) have emphasized that in contrast to MEM, MRM is found most frequently in older patients and is rare in the lower lip. Our findings too support these observations. Harrison (1975) has stated that these differences indicate that different causative factors are present. The possibility has been suggested that MRM may arise from dilatation of a duct which was partially obstructed by a sialolith or a mucous plug. Southam (1974) however is of the view that there is no evidence to support the generally accepted suggestion that MRM is due to duct blockage and he postulates that either they may arise as spontaneous cystic change in an oncocyte-lined duct or they represent a cystic type of papillary cystadenoma. He further adds that a dilated oncocytic duct, a cystic papillary cystadenoma and a MRM may therefore be different manifestations of the same pathological process.

Like Sela and Ulmansky (1969) our study too showed variant 2 (50 per cent) of their histological subclassification to be the most common. In the Malay male and female variant 1 was rare and variant 3 was rather uncommon. Variant 1 occurred most commonly in the lower lip (46.7 per cent) and secondly in the tongue (20.0 per cent). Variant 2 occurred most frequently in the lower lip (61.2 per cent) and secondly in the floor of the mouth (23.6 per cent). Variant 3 occurred most commonly in the lower lip (75.0%). A combination of more than one variant formed about 14 per cent of the cases.

All the mucoceles were surgically excised. In eight patients there was a recurrence (3 per cent). Seven of the patients (86 per cent) were Chinese. The other patient was a Malay male. Six cases of recurrence were in the lower lip, one case was on the floor of the mouth and another case involved the buccal mucosa. Five of the recurrent cases (63 per cent) belonged to variant 3 of the histological subclassification and three cases (37 per cent) to variant 2.

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