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ORO-ANTRAL FISTULAE—A STUDY OF CLINICAL, RADIOLOGICAL AND TREATMENT ASPECTS

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Summary. Clinical and radiological aspects of 86 patients with oro-antral fistulae were studied and two commonly employed methods of repair were compared. Fistulae were found to be twice as common in males as in females. The highest frequency was recorded in the fourth decade (41%), and the commonest site was the first molar region (49%). All patients had antral infection which is attributed to the long delay in the detection of fistulae. The most frequently observed radiological feature was polyps with mucosal thickening (49%). Comparison of results of surgical repair by a buccal flap method (Rehrmann, 1936) and a palatal flap method (Ashley, 1939) showed no significant difference ($p>0.05$).

Introduction

An oro-antral fistula (OAF) is an unnatural communication between the mouth and the maxillary sinus resulting most commonly from the extraction of teeth (Killey & Kay, 1975). Erhl (1980) reported that OAF could occur once in 180 extractions of the upper first molar, and once in 280 extractions of the upper second molar. No studies of its epidemiology, clinical aspects and treatment methods have been carried out in Sri Lanka.

A common complication of OAF is resultant infection of the maxillary antrum. There seems to be experimental evidence to show that maxillary sinusitis is present 48 h after the creation of a fistula (Haanaes & Gilhuus-Moe, 1972; Valderhaug, 1973). In the treatment of OAF, sinusitis has to be controlled, and this is comprehensively described in the literature (Killey & Kay 1975).

Although several methods of surgical repair of OAF have been described, only a few have received wide acceptance (Killey & Kay, 1975). The buccal flap method, first described by Rehrmann (1936) is a simple and effective means of closure. Killey and Kay (1975) obtained a 93% success rate with this method. Obradovic *et al.* (1981) reported a significant reduction in the buccal sulcus depth following repair of OAF by this method, and also facial oedema, both sequelae due to horizontal sectioning of the periosteum at the base of the flap. Several workers have attempted to develop methods that avoid incising the periosteum. The Moczar buccal flap is recommended for edentulous patients (Wovern. 1982). Gold foil, bone chips, dura mater and fascia lata have been used to cover the bony defect, with varying degrees of success. However, Killey and Kay (1975) were of the opinion that the apparent reduction in sulcus depth is not permanent. Wovern (1982) disagrees with this view and reports permanent sulcus depth reduction in a one year follow up study.

Another popular method of closure of OAF is the palatal flap technique, first described by Ashley (1939). A large flap carrying the greater palatine vessels, which ensures a good blood supply, is mobilised from the palate. This method may be useful for repair of fistulae which are larger than 1 cm (Ehrl, 1980).

Clinical experience shows that fistulae in Sri Lanka are discovered usually after a

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long lapse of time. Delay in treatment of OAF often results in infection of the antrum which complicates treatment (Killey & Kay, 1975; Ehrl, 1980). In the UK and Europe, OAF is usually detected much earlier and therefore infection may not be as common as in Sri Lanka.

Thus the question arises whether the palatal flap on account of its superior blood supply could give better results in long standing OAF complicated by antral infection. This aspect is investigated in the present study. The clinical and radiological features of OAF are also analysed.

Material and Method

86 patients with OAF who had reported at the General Hospital, Kandy and the Dental School Peradeniya, during the period January 1978–December 1984 were investigated with regard to age, sex, site, presenting features, radiological appearance, and duration of the fistula. Diagnosis was based on the Luc-Caldwell test of blowing air through the fistula, and introduction of a silver probe into the antrum through the fistula (Ehrl, 1980). 15° occipito-mental X-rays were taken and the findings were categorised as: clear; cloudy; even mucosal thickening; polyps with mucosal thickening; and fluid level (Killey & Kay, 1975). All patients were screened for diabetes, anaemia, cardio-vascular and respiratory disease, and found to be free of these.

The patients were allocated to two groups according to the treatment method: palatal flap group and buccal flap group, alternately as they presented. The antral infection was first controlled with antibiotics and antral irrigation, which was continued until clear return was obtained. The fistulae were repaired under local anaesthesia either by the palatal flap method or the buccal flap method in the standard manner described by Killey and Kay (1975). Antibiotics were continued for 7 days post operatively and nasal decongestants and inhalations were used for 5 days. Sutures were removed on the tenth day. Results were assessed on the fourteenth post operative day. Criteria for successful repair were the same as for diagnosis of fistulae.

Results

The present series consisted of 57 males (66%) and 29 females (34%). Male:Female ratio was 2:1. Fistulae occurred most commonly in the fourth (41%) and fifth (23%) decades (Table I). The highest frequency was recorded in relation to the upper first molar (49%). The next most common site was the second molar

Table I
Distribution by age

Age in years	Number of patients	%
0–10	0	0
11–20	3	4
21–30	15	17
31–40	35	41
41–50	20	23
51–60	13	15
Total	86	100

(30%). An unusually high incidence was observed in relation to the second premolar (8%) (Table II).

All 86 patients had symptoms of antral infection as shown in Table III. Pain over the maxillary region and discharge of pus into the mouth was present in all 86 patients.

Table IV reveals the time lapse between occurrence and discovery of fistulae. 51% of fistulae had been detected more than one year after the extraction that caused them, and a further 33% after the lapse of 6 months.

Radiological appearances of the antra confirmed that they were infected. None of the patients had clear antra on the affected side. 42 patients (49%) had polyps with mucosal thickening which indicated long standing infection. Even mucosal thickening was seen in 16 (19%) and a fluid level was seen in 17 (20%) patients (Table V).

Results of surgical repair are shown in Table VI. There was no significant difference between the proportions that demonstrated successful repair in the two groups ($p>0{\cdot}05$) (Students 't' test was used).

Table II
Distribution of fistulae by site

Site	Number of patients	%
Second premolar	6	8
First molar	42	49
Second molar	26	30
Third molar	12	13
Total	86	100

Table III
Presenting features

Symptoms	Number of patients	%
Pain	86	100
Discharge of pus	86	100
Escape of fluid into nose	49	57
Foul taste	62	72

Table IV
Duration of fistulae

Duration in months	Number of patients	%
0–3	0	0
4–6	3	4
7–12	29	33
13–24	44	51
25	10	12
Total	86	100

Table V
Radiological findings

Antral appearance	No of patients	%
Clear	0	0
Cloudy	11	12
Even mucosal thickening	16	19
Polyps with mucosal thickening	42	49
Fluid level	17	20
Total	86	100

Table VI
Results of surgical repair

Method of repair	No. & % of patients		Total
	Successful	Unsuccessful	
Buccal flap	38 (86%)*	6 (14%)	44
Palatal flap	39 (93%)*	3 (7%)	42
Total	77 (90%)	9 (10%)	86

*Difference not significant ($p>0.05$) (Student's 't' test).

Discussion

The frequencies of OAF in relation to sex, age, and site seem to follow the general pattern described by other authors (Killey & Kay, 1975; Ehrl, 1980). Extraction of teeth is necessary more often in males and their teeth may be more difficult to extract. This explains why OAF is twice as common in males as in females (Killey & Kay, 1975). Similarly, more teeth may be extracted in the fourth decade than in other age groups, which would explain the high incidence in the fourth decade.

The incidence of OAF is apparently lower in Sri Lanka than in the West. Ehrl (1980) had observed an incidence of 1 in 180 extractions of the first molar and 1 in 280 extractions of the second molar. If OAF occurs as commonly in Sri Lanka, more of them should be seen in our clinics considering the fact that more teeth are removed in this country than in the West.

The incidence of antral infection consequent to OAF seems to be higher in the present series than that in the findings of other workers. In the series of Killey and Kay (1975) 23.4% of patients were symptomless and only 12.1% had pain. Antral infection could be attributed to the long duration of the fistulae experienced in Sri Lanka.

There was no significant difference between the success rates of the two methods of treatment. These findings support the opinion that the buccal flap method and the palatal flap method are equally effective means of OAF closure. The apparently superior blood supply of the palatal flap does not seem to make it more suitable for the repair of long standing fistulae. Perhaps what is more important than the choice of method of repair is the control of antral infection prior to

surgery. Wovern (1982) who studied this aspect had found that wound breakdown occurred in 21% of patients in the absence of pre-operative therapy to control infection, compared to a breakdown rate of 2% when infection was controlled.

References

Ashley, R. E. (1939). Method of closing antro-alveolar fistula. *Annals of Otology, Rhinology, Laryngology*, **48,** 632.

Ehrl, P. A. (1980). Oroantral communication. Epicritical study of 175 patients, with special concern to secondary operative closure. *International Journal of Oral Surgery*, **9,** 351.

Haanaes, H. R. & Gilhuus-Moe, O. (1972). A histologic study of experimental oro-paranasal communications in monkeys. *International Journal of Oral Surgery*, **1,** 250.

Killey, H. C. & Kay, L. W. (1975). The Maxillary Sinus and its Dental Implications. Bristol, John Wright, pp 40–70, 143–148.

Obradovic, O. Todorovic, L. & Pesic, V. (1981). Investigations of the buccal sulcus depth after the use of certain methods of oro-antral communication closure. *Bulletin du Groupement International pour la Recherche Scientifique en Stomatologie et Odontologie (Bruxelles)*, **24,** 209.

Rehrmann, V. A. (1936). Eine methode zur schliessung von kieferhohlen perforationen. *Deutsche Zahnarztliche Wochenschrift*, **39,** 1136.

Valderhaug, J. (1973). Reaction of mucous membrane of the maxillary sinus and the nasal cavity to experimental periapical inflammation in monkeys. *International Journal of Oral Surgery*, **2,** 107.

Wovern, N. V. (1982). Closure of oroantral fistula with buccal flap; Rehrmann versus Moczar. *International Journal of Oral Surgery*, **II,** 156.