

RHINITIS-CHRONICA-TROPICA: Clinical, radiological, histopathological, therapeutic and ethnological studies on Chinese, Indians, Malays and 'others'

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Introduction and Scope of Study

IN THE WORLDWIDE EFFORTS to treat tropical diseases, one disease which is very common in many parts of the Tropical Belt and one that is very often neglected is Chronic Tropical Rhinitis.

In comparison with other classical tropical diseases, this condition is considered a minor one and only in the more advanced of the developing countries is some attention paid to it.

Detailed figures from those areas are not available but according to many years of personal experience in West Africa and Southeast Asia, the percentage of chronic tropical rhinitis is very high.

Of the many thousand patients who attended our University E.N.T. Department in the past five years, about 75% of them had pathological conditions of the nose or related to the nasal region.

Owing to the lack of adequate diagnostic facilities (clinical and radiological) in many of these

developing countries, reports on rhinitis of the tropics consist mostly of only clinical observations on response to drug treatment.

Furthermore, the "running and obstructed nose" as mentioned above is considered so common amongst the native population, that many people seeking either temporary relief only by "native medicine" or, if available, with anti-histamines and vaso-constrictor drugs, just accept it as "God-given" and live with it, doing nothing at all about it.

In regions where surgical facilities and professional skill are available, cautery of the turbinates, in most cases "surface cautery" (Jaffè 1957) or submucous cautery (Gnanapragasam 1972) is performed.

In view of the lack of adequate facilities for treatment, its ubiquity and relatively minor tendency to serious complications in spite of neglect or inadequate treatment, it is not surprising that chronic tropical rhinitis has not received the same interest as the more traditional infective tropical diseases.

Surgical procedures in many of the tropical countries are in general still very limited, especially E.N.T. specialist services; therefore treatment either by cautery or by more sophisticated techniques is often a rarity. The fact that in some areas traditional objections against modern surgical procedures still persist further complicates the matter.

Nevertheless, as steady progress in development is made in many of these tropical countries, the results of our five-year experience in the treatment of chronic tropical rhinitis in different ethnic groups (Chinese, Malay, Indian, Ceylonese, Pakistani, Eurasian and European) may be of interest in other regions for the future when their surgical facilities and E.N.T. specialist services improve. Those working in these areas might also find our report encouraging because of the great number of favourable results of our treatment obtained in cases which had proved refractory to treatment by anti-histamines, vaso-constrictors or cautery.

The aim of this present study is to demonstrate that minor surgical approach to chronic tropical rhinitis by means of partial "stripping" of the turbinate performed "lege artis" can be very effective in considerably reducing the symptoms and complaints of the patient. In many instances, it also relieves him of the necessity of further continuous medication and the consequent financial burden and loss of time in visits to the

treatment centre. The general and great practical importance for the people living in countries of the Tropical Belt and suffering from chronic tropical rhinitis justifies our effort to present the following data, investigations, statistics, therapeutic procedures, results and conclusions to the interested reader on one of the most common diseases in the Tropics.

Clinical Aspects

A. Patient's Complaints

Nasal blockage, sometimes of the intermittent type, sneezing, lacrimation, loss of smell, nasal discharge of various types, frontal headache, heaviness in the maxillary region, occasional loss of hearing of the conductive type, dry mouth, sore throat, repeated tonsil attacks, irritation of the larynx and tracheo-bronchial tree with hoarseness, cough and expectoration of secretion can occur when the turbinates are chronically inflamed and enlarged as in chronic rhinitis.

B. Inspection of the Nasal Cavity

This may reveal a variety of turbinate shapes, sizes and colours (reddish, bluish, bluish-red, whitish-bluish), oedematous, hyper-plastic, partial atrophic, granulomatous, or combined. In the majority of the cases the lower turbinates are enlarged, in cases of previous cauteries with scars left over. There might be fluid in the nasal cavity of watery, mucous, muco-purulent or purulent consistence.

As far as the *clinical diagnosis* is concerned, these features can be found either in chronic allergic or non-allergic rhinitis.

The combination of long-standing *allergic* rhinitis and low-grade inflammation may produce permanent enlargement of the turbinates, particularly of the inferior ones. When this occurs, the turbinate loses most of its ability to expand and to shrink. The result is continuous nasal obstruction.

Nasal drops, anti-histamines and allergic desensitisation do *not* relieve the obstruction.

The *non-allergic* vasomotor rhinitis with intermittent obstruction with or without nasal discharge will not respond to vaso-constrictor nose drops very well, therefore this treatment should be avoided. Over-use might only cause more stiffness of the turbinates increasing with each successive dose. Since the stage of engorgement of the turbinate is controlled by the autonomic nervous system, and since vaso-constrictors stimulate the sympathetic nerves there tends to be a compensatory reaction of the turbinal vessels after the effect of the nose

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CLINICAL SYMPTOMS OF RHINITIS

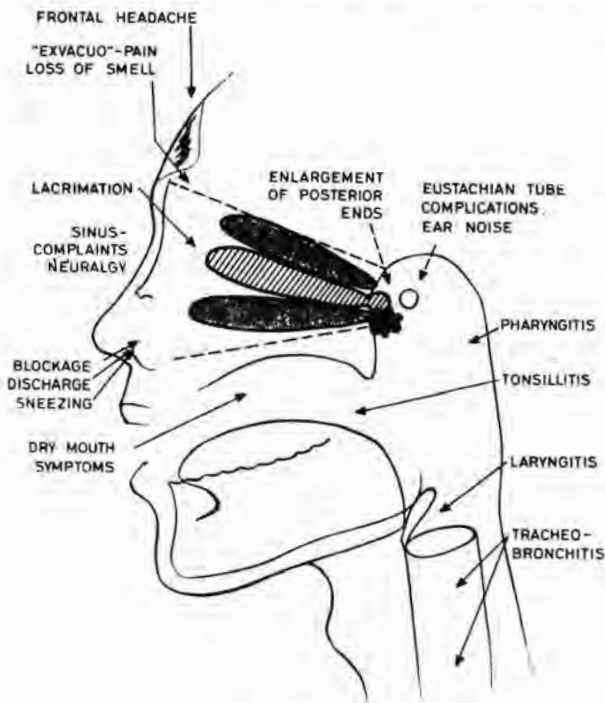


Fig 1

drops is stopped. Thus, after temporary relief the turbinates become more stiff than they were originally.

As a cure, it has been proposed to tolerate a blocked nose for two to three weeks without giving any type of vaso-constrictors. After that period normal function could be expected. In cases where endocrine factors are responsible, specific hormonal treatment is indicated. In nervous-tense persons, psycho-therapy or psychiatric help has been recommended.

C. In our daily practice, the patients seen had mostly a long history of previous treatment with no real permanent relief and consequent frustration, depression and even suicidal attempts as there seemed to be "no way out of the misery".

D. The following are typical treatment histories which clearly show the problems in connection with the blocked and discharging nose:—

1. Nose drops (vaso-constrictors) — Applied over weeks or months with little or no effect.

2. Anti-histamine tablets — In a great number of cases taken over many years without real response, in one case up to a total of 10,000 (!)

tablets had been provided previously over the years, leading finally to drowsiness and incapability to work.

3. Cautery (surface or submucous) — With temporary relief only.

4. Repeated cautery — With temporary relief or no relief.

5. Submucous resection of the nasal septum — With temporary relief only.

6. Repeated cautery — No more relief of symptoms.

7. New trial of

(a) Antihistamine — No response.

(b) Nasal drops — Only very short relief.

8. (a) Nasal drops — No more response.

(b) Anti-histamine — No more response.

(c) Cautery — In some cases up to ten times cautery was performed previously which failed.

Considering the failure rate recorded in the case histories prior to our treatment, the question arises why are there failures?

It has been stated previously that nasal drops and anti-histamines have their special range of indications, but if they are given freely (as the daily practice of unsuccessful treatment histories reveals) they may do more harm than good to the condition as well as produce psychological problems and entail profitless financial burdens.

Another important factor is the proper and complete *clinical diagnosis*.

If, for instance, paranasal sinus X-rays (Werner & Chuah 1972) have not been taken (which was the case in the overwhelming majority of the patients referred to us or who came to seek our clinical treatment because of unsuccessful previous therapy), and pathology of the paranasal sinuses has not been excluded as well as treated, then certainly any local intra-nasal therapy could not be very effective. (See also chapter on X-ray examination prior to our treatment).

The practical consequences arising from the treatment-resistant nose require a method which has proven to us immensely valuable in the last five years, namely partial resection of the turbinates. This method, though already known for a considerable time, is not much advocated in non-tropical countries because of the fear of developing, along with the reduction of the size of the turbinate, another pathological condition instead — atrophic rhinitis (ozaena). As far as the tropics are concerned, with its high temperature and humidity

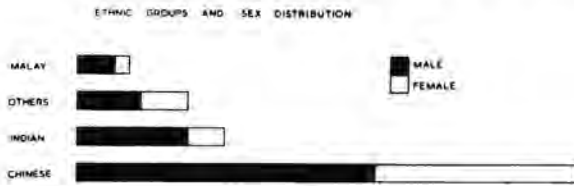


Fig 4

level, the fear of creating ozaena by a partial turbinectomy can be neglected. The following observations, conclusions and suggestions are based on our clinical, radiological and histopathological study of 220 patients who underwent 440 partial lower turbinectomies ("stripping" of turbinates).

Our investigations were not only aimed at clarifying the diagnosis and the reasons for lack of response to previous therapy, but also at seeing the effects of the surgical procedure and to obtain information for analysis concerning the response to them of the ethnic groups in Malaysia (Malays, Chinese, Indians and "Others").

Ethnic Groups and Sex Distribution (Fig. 4)

The different ethnic groups are represented in the following proportions:—

Chinese	61.82%
Indians	18.18%
"Others"	13.64%
Malays	6.36%

The total male and female figures of all ethnic groups are male 62.73% and 37.27% female; nearly twice the number of males as compared with females.

Within the different ethnic groups the percentage distribution between the two sexes is as under:

Chinese	Male	59.56%
	Female	40.44%
Indian	Male	75%
	Female	25%
"Others"	Male	56.67%
	Female	43.33%
Malay	Male	71.43%
	Female	28.57%

Proportions between the sexes are similar in Chinese and "Others", but in Indians and Malays there are nearly three times as many males affected as compared with females.

AGE DISTRIBUTION
(All Races, All Sexes)

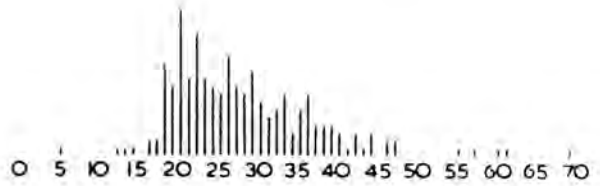


Fig 5

Age Distribution

The majority of cases (all races, both sexes) are within the ages of 20-35 (see Fig. 5).

The distribution within each of the ethnic groups according to age (Fig. 6) reveals similar results.

Age and Sex Distribution



Fig 6

In the older age group are only occasional cases because the older patients might be either (a) not more concerned about their chronic nasal conditions, (b) disappointed about previous ineffective treatment, (c) not aware of the facilities available for surgical treatment, (d) afraid of surgery, (e) or have already atrophic changes of the nasal mucosa and therefore no more obstruction of the nasal airway.

Children were usually not treated with "stripping". Only in special cases and after other factors such as removal of adenoids or treatment of sinusitis which could produce nasal discharge and obstruction had been eliminated and in whom the symptoms continued despite conservative treatment with vaso-constrictors and anti-histamines a surgical approach was made, first by cauterly and if ineffec-

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X-RAY

Results Of Paranasal Sinuses

Total No. Of Cases: (T.N.C.) 220
 Maxillary Sinuses (M.S.)-Pathology
 a) Unilateral (U.L) 34 Total
 b) Bilateral (B.L) 58 } 92
 Frontal Sinuses (F.S.)-Pathology
 a) Unilateral (U.L) 9 Total
 b) Bilateral (B.L) 10 } 19

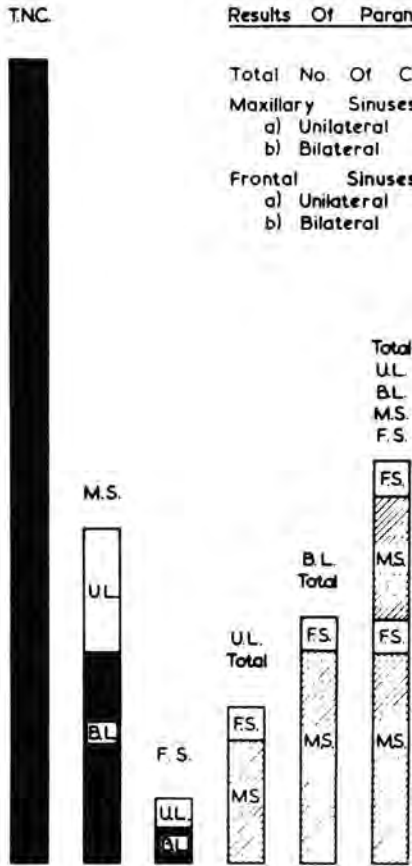


Fig 7

tive followed by "stripping". For this reason, our figures for the children are also low.

The analysis of X-ray investigations of the paranasal sinuses reveals the following (Fig. 7):

Out of the total number of 220 cases, the total number with X-ray pathology of the paranasal sinuses was 50.46%.

The detailed figures were as follows:

41.82% of all cases had pathological changes of the maxillary sinuses. 36.96% had unilateral pathology of the maxillary sinuses. 63.04% had bilateral pathology of the maxillary sinuses.

8.64% of all cases had pathological changes of the frontal sinuses. 52.63% had unilateral pathology of the frontal sinuses. 47.36% had bilateral pathology of the frontal sinuses.

86.82% of all cases had deviation of the nasal septum.

RELATIONSHIP OF UNSUCCESSFUL CAUTERY(ct)

(I) PRIOR TO OPERATION ON THE TURBINATE AND
 (II) WITH X-RAY PATHOLOGY (xp-ct)

ETHNIC GROUPS AND SEX DISTRIBUTION

ct: Cautery
 xp: X-Ray Pathology
 tnc: Total No Of Cases

Male
 Female

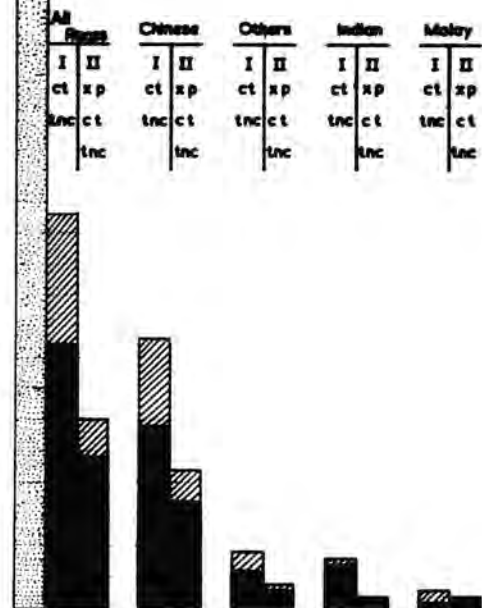


Fig 8

The treatment of the pathological conditions in the paranasal sinuses was therefore of great importance for the treatment of the chronic tropic rhinitis.

**Patients with history of Unsuccessful Cauterization and X-ray Pathology Prior to Operation
Ethnic Groups and Sex Distribution (Fig. 8)**

A. Relationship of Ethnic Groups and Sex Distribution of unsuccessful Cautery.

Out of the total number of 220 cases we operated on with "stripping" of the turbinate, 28.64% had *previous unsuccessful cauterization* (1-10 times), consisting of 66.67% males and 33.33% females. Males, therefore, were twice as much involved as females, which corresponds with the basic relationship of males and females in our study as mentioned previously.

Within the *different ethnic groups* the *previous unsuccessful cauterization* proportions are:

Chinese	19.55% out of the total number of cases.
— Male	67.44%
— Female	32.56%
"Others"	4.09% out of the total number of cases.
— Male	66.67%
— Female	33.33%
Indians	3.64% out of the total number of cases.
— Male	87.5%
— Female	12.5%
Malays	1.36% out of the total number of cases.
— Male	33.33%
— Female	66.67%

As far as the different ethnic groups are concerned, the figures for males in Chinese, "Others" and Indians appear in similar proportions, twice as many males as females in the Chinese and "Others", whilst the figures for Indian males are seven times higher than the figures for Indian females. Only the Malay group shows reverse proportions where the female figures appear as twice as much as the male figures.

The proportions of 19.55% Chinese, 4.09% "Others", 3.64% Indians and 1.36% Malays reveal also the *previous trend to surgical procedures* which is clearly in favour of the overwhelming majority of the Chinese, whilst Indians and "Others" show a similar tendency. The Malays

represent a minority of one-eighth of the Chinese figures.

Relationship of X-ray Pathology to Unsuccessful Cautery (Fig. 8)

B. X-ray Pathology of the paranasal sinuses was present in 13.64% of all 220 cases in which *unsuccessful cauterization* attempts have been made previously. 80% were male. 20% female.

Within the different ethnic groups the following proportions were found:

Chinese	10% out of the total number of cases. 34.92% out of the total number with X-ray pathology. Male 77.27% Female 22.73%
"Others"	1.82% out of the total number of cases. 6.35% out of the total number with X-ray pathology. Male 75% Female 25%
Indians	0.91% out of the total number of cases. 3.17% out of the total number with X-ray pathology. Male 100% Female 0%
Malays	0.91% out of the total number of cases. 3.17% out of the total number with X-ray pathology. Male 100% Female 0%

Comparison between the total number of cases in each ethnic group with the total number of cases with X-ray pathology shows a similar proportion in each group of three times as many with X-ray pathology than those without.

About 50% of cases which had been unsuccessfully treated by cauterization and which had X-ray examination done were found to have pathological conditions in the paranasal sinuses. This explains why, even if the cauterization had been successfully done, spreading of inflammation and reinfection from the sinuses would have prevented positive response to the cauterization.

The request for paranasal sinuses X-ray examination as well as treatment of paranasal sinuses pathology prior to cauterization or intra-nasal surgery is

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therefore justified in order to avoid any failures of the intended surgical treatment.

Analysis of the different ethnic groups shows that the majority of the failure cases were males:

- In the Chinese group — More than three times the number of females.
- In the "Others" group — Three times the number of females.
- In the Indian group — Only males were involved.
- In the Malay group — Only males were involved.

In comparison of the failure rate with the total number of 220 cases, 10% were Chinese, 1.82% "Others", 0.91% Malays.

Of the total number of paranasal sinus X-ray pathology cases: 34.92% were Chinese, 6.35% "Others", 3.17% Indians and 3.17% Malays. The Chinese group therefore is involved more than five times as often as the "Others" and about ten times as often as Indians and Malays.

Methods of Treatment

- A. General: Allergic desensitization, treatment of endocrine disturbance (hypo-thyroidism, hypo-metabolism), psychiatric treatment.
- B. Local Medical: Vaso-constrictor drugs, anti-histamines, submucous injection of sclerotising agent.

C. Surgical Treatment of Turbinates (Fig. 9).

1. Cautery.
 - (a) Surface cautery.
 - (b) Submucous cautery.
2. Resection of turbinate bone (Odenal 1930, et. al.).
3. Neurotomy of Vidian-nerve (Malcomson 1959, Golding-Wood 1961, et. al.).
4. "Stripping" of turbinates with or without infraction of turbinate bone.
5. "Stripping" of turbinates with or without submucous resection of nasal septum (S.M.R.).
6. "Stripping" of turbinates with partial resection of turbinate bone (in special cases only).

Comments of Methods of Treatment

As far as *allergic desensitization* in the tropics is concerned, there are very well known tremendous difficulties in connection with such attempts because

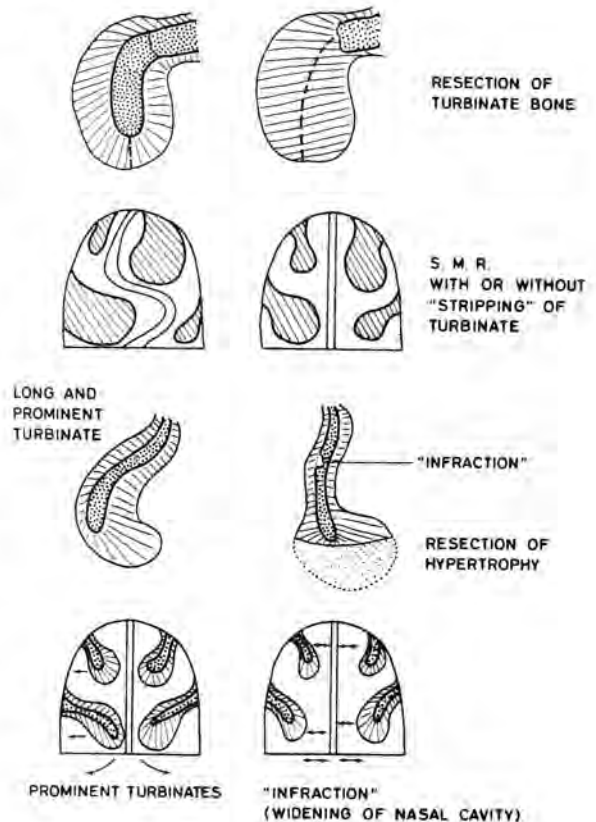


Fig 9

of the multiple factors involved and the psychological problems arising. Even if only one allergen is responsible, it may be difficult to deal with the case owing to the often indifferent approach of the patients as a result of their variable stages of mental development.

The same psychological and therapeutic problems arise with medication by *vaso-constrictor drugs* which might be used and applied by the patient, not in the way as prescribed by the doctor or due to their becoming ineffective after prolonged application or over-use in non-allergic vasomotor rhinitis. This leads to stimulation of the sympathetic nerves with compensatory reaction and reactive enlargement of the turbinates, with or without nasal discharge, and turbinate stiffness, thus reversing the intended effect of increasing the nasal airway with shrinking of the turbinates.

Similar problems of no response to medication can be observed with *anti-histamines* in the case of combination of long-standing allergic rhinitis and low-grade inflammation. A permanent enlargement of the turbinate is the result.

The results of injection of a sclerotising agent are also not very encouraging; therefore, surgical methods have been used where facilities as well as professional skill were available. With regard to *submucous resection of the inferior turbinate bone or neurectomy of the Vidian nerve*, we did not entertain these techniques.

The effect of surface cautery of the turbinate can be seen from Figure 10. In a considerable number of cases observed after this technique had been used elsewhere, an enlargement effect (Fig. 10) was noticed, the temporary reduction of the size of the turbinate having been subsequently reversed.

The problems connected with *submucous* cautery might be summarised as follows:

As far as the technique is concerned, (Fig. 10/11) are referred to. Complications are possible depending on the position of the cautery needle. But even in cases where the procedures are performed "lege artis", the *anatomical structure of the*

POSITION OF CAUTERY NEEDLE

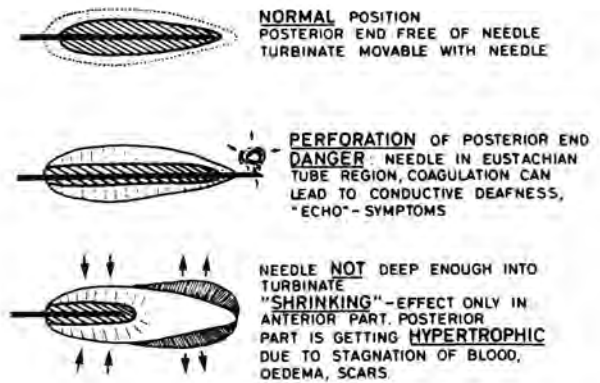


Fig 11

rhino-angiological network A/V type or V/A type (Swindle 1937), as well as circulatory disturbances within the rhino-angiological network as a result of cautery in localised areas of the turbinate may lead to failures with reversion of the intended shrinkage effect.

Our main surgical approach for the past five years has been the partial "stripping" of the turbinate in the overwhelming number of cases of the inferior turbinates where the usual medication showed no signs of positive response or where repeated submucous cauteries failed, or cautery was clinically contra-indicated.

Clinical Evaluation of Size and Shape of Turbinate (as demonstrated in Figure 2/3).

The individual variations depending on the type and reaction to previous conservative and surgical treatment reveal a multitude of possibilities with regards to the "stripping" technique. The soft tissue lining of the turbinate might be easily removable or it might, in other instances, be very difficult to remove due to the adhesion of the scarred soft turbinate tissue to the turbinate bone as the result of one or multiple previous cauteries. In this latter type of case, the danger of fracturing the turbinate or of accidentally removing it with the scarred soft tissue of the underlying bone during "stripping" is considerable.

Not only arterial bleeding, but also change in the basic structure of the physiological nasal airway

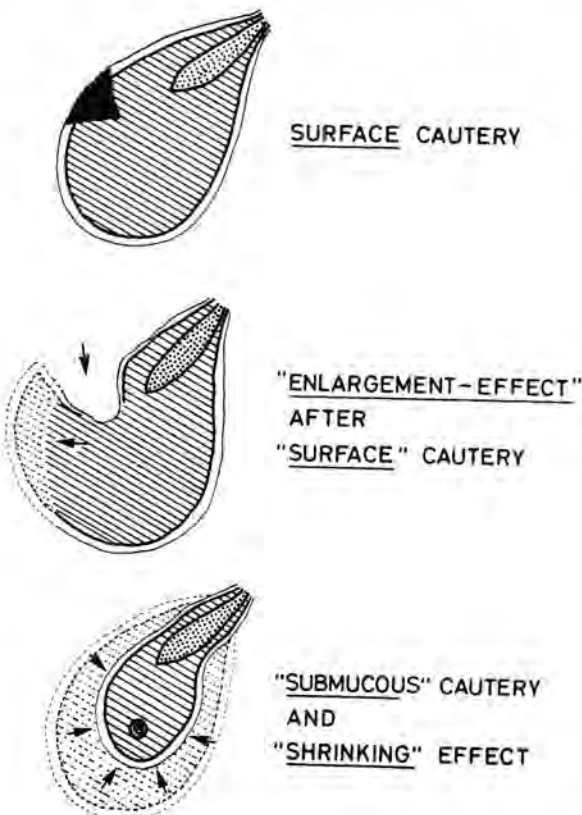
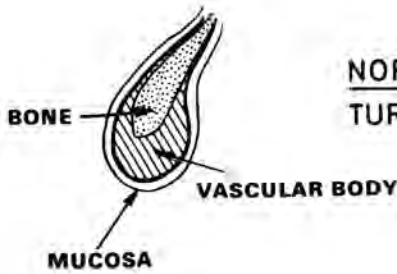
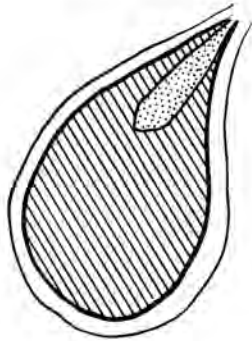


Fig 10

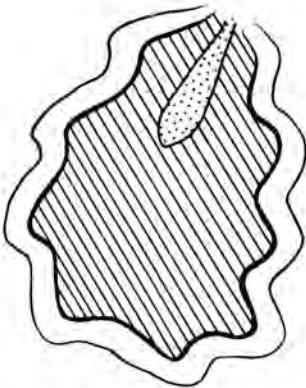
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**NORMAL
TURBinate**



**VASOMOTOR
HYPERTROPHY**



**CHRONIC
HYPERTROPHY**

Fig 2

would be the result of partial or total loss of turbinate bone.

In order to prevent such complications a careful partial dissection of the soft tissue turbinate is necessary. (See below).

Our Routine Operating Technique for "Stripping" of Turbinates

'A'

1. Superficial anaesthesia with local anaesthetic (Xylocain spray) of one nasal cavity.

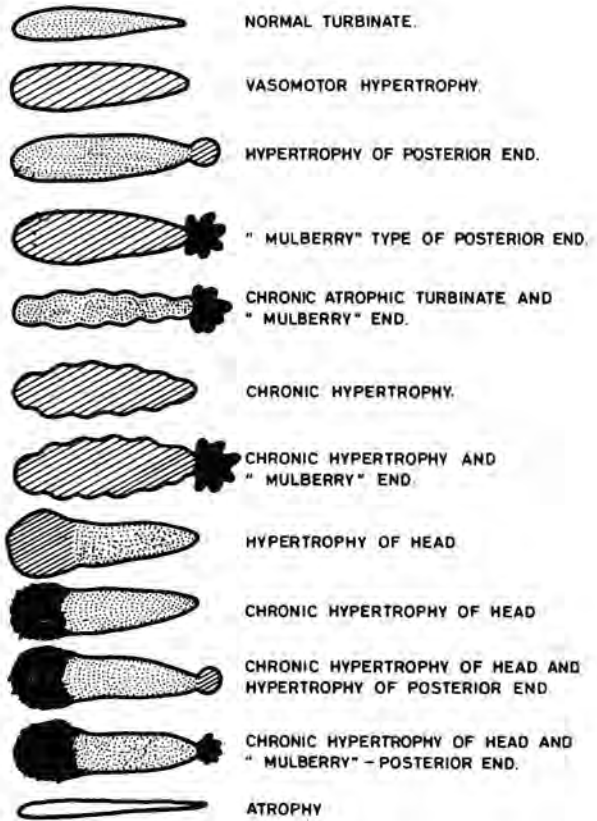


Fig 3

2. Submucous injection of one per cent procaine 1-2 c.c. containing one drop of adrenalin only into the turbinate. (Injection to be done slowly with repeated aspiration to prevent intravasal injection.)
3. Testing of anaesthesia with probe.
4. Incision with scissors starting behind the head of the lower turbinate and resection of enlarged soft turbinate part (Fig. 12); before reaching the end of turbinate, the mobile soft part of the turbinate is pushed backward with a forceps into the nasopharynx without damage to the turbinate bone. If there is enlargement of the posterior end of the turbinate, this will be removed too.

In case of enlargement of soft tissue as well as turbinate bone, additional procedures which may be performed are either infrafracture with or without partial resection of turbinate bone (Fig. 9/12).

The partially exposed turbinate bone after "stripping" is not to be cauterised to prevent

necrosis, but only covered by nasal packs (technique see below).

5. Nasal packing (Fig. 12)
 - (a) Two small gauze packs covering the turbinate wound extending from the nostril to the choanal region.
 - (b) One long gauze pack is applied on top of them and fills the remaining part of the nasal cavity.
6. Similar procedures of this technique on the turbinate of the other side.
7. Closure and compression of nostrils by two crossed cellophane or plaster tapes (Fig. 13).
8. External nose pack (Fig. 13).

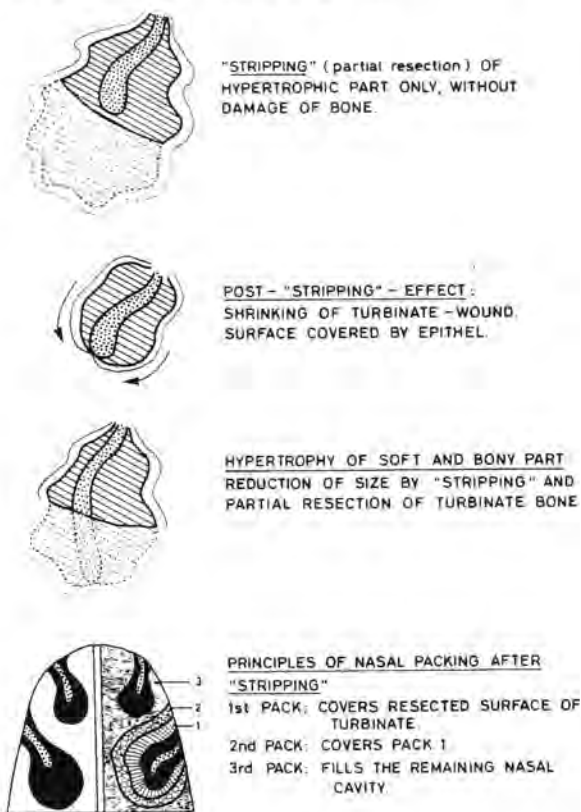


Fig 12

'B'

9. The specimen of "stripped" turbinates are sent for biopsy in separate containers.
10. Prescription
 - (a) Tetracycline capsules — 4 x 250 mg. daily for five days.

CLOSURE OF NOSTRILS BY 2 TAPES AND EXTERNAL PACK

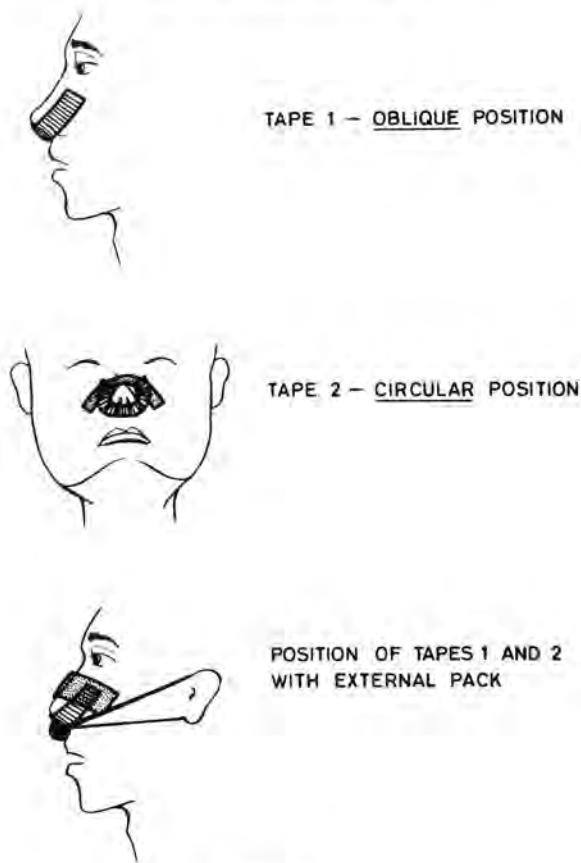
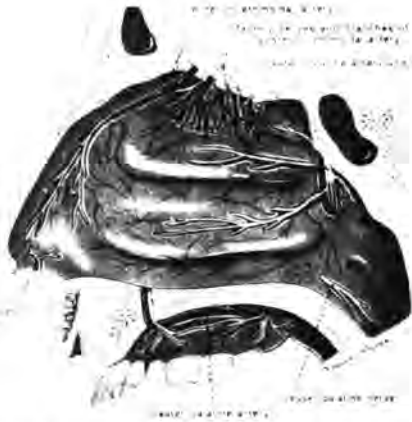


Fig 13

- (b) Analgesic tablets.
- (c) Menthol paraffin nasal drops.
11. Patient is hospitalised at least for one night.
12. Procedures in the ward:
 - (a) Half sitting position, head forward.
 - (b) Observation of nasal bleeding.
 - (c) Icepack around the neck and on nose, (eyes remaining free of pack) for the first 24 hours.
 - (d) Change of external nasal pack only if necessary.
 - (e) Food. No coffee, no tea, no hot spices, no alcohol, no smoking, no hot diet.
 - (f) Mouth cleaning allowed.

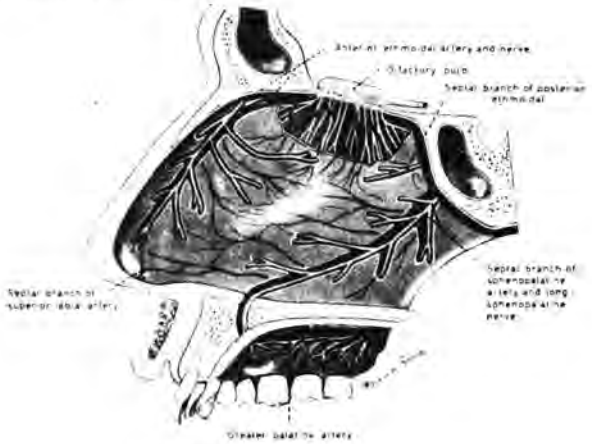
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(a) The blood vessels and nerves of the lateral wall of the nasal cavity.

Fig 14

From: Sobotta et al (1965)



(b) The blood vessels and nerves of the nasal septum.

Fig 15

From: Sobotta et al (1965)

13. "Medical certificate" (M.C.) for patient for one week's rest.
14. Removal of long nasal pack right and left side one to two days after surgery with or without Xylocain spray anaesthesia or hydrogen peroxide.
15. Removal of the two remaining nasal packs covering the surface of each "stripped" turbinate with or without Xylocain spray, or hydrogen peroxide is done three to four and five to seven days after surgery respectively.
16. After nasal packs have been removed completely, the nose is cleaned and menthol paraffin nose drops applied for one week, either with or without alternating ephedrine nose drops.

Post-Operative Bleeding

This can be coped with satisfactorily if the nasal packing has been done properly and precautions taken as mentioned in the section on post-operative procedures.

Bleeding might occur during the removal of the nasal packs especially if it is done too early and without care. Repacking might therefore be necessary if the bleeding does not stop after the usual time.

It might be a surface bleeding only from the partially denuded turbinate bone (diffuse bleeding) or arterial bleeding from branches of the greater palatine artery and sphenopalatine artery (Fig. 14/15).

In all of our cases, the bleeding could be con-

trolled in the usual way by sitting position with head forward, icepack on nose and forehead, sometimes with icepack around the neck, two small nasal packs in the nostrils, anterior nasal pack and bed rest.

No post-nasal pack had to be applied which might be necessary in the case when, during the "stripping" of the turbinate, accidentally part of the posterior turbinate bone has also been removed. In this instance, cautery of the bleeding spot might be tried or in severe cases the ligature of the internal maxillary artery might help after a Caldwell-Luc approach, with resection of the posterior wall of the maxillary sinus. The final measure would be the ligature of the external carotid artery.

None of these methods mentioned above were necessary in any of our cases post-operatively.

As slight post-operative bleeding might sometimes occur when after all the packs have been removed, the wound membrane is becoming loose, or in female patients prior to menstruation. In order to avoid the latter, we do not operate on female patients in the pre-menstrual period, but only after completion of the menstruation.

Bleeding after operation might also occur from the nasal septum region if the intra-nasal packs have been applied into the cavity too tight after "stripping" of the turbinate and are removed by force and without care. Anatomically involved are the septal branches of the sphenopalatine artery, the superior labial artery and the anterior ethmoidal artery (Fig. 15).

Histopathology

440 biopsies were taken from 440 inferior turbinectomies.

The main histological diagnosis was chronic inflammation.

Out of the total number of 440 biopsies taken, 78 (17.73%) showed positive eosinophilic reaction. (a) 36 (7.55%) showed a moderate number of eosinophilic cells. (b) 42 (9.55%) showed a larger number of eosinophilic cells.

Out of 17.73% of the preparations with allergic signs, rather more than half had heavy eosinophilic infiltration.

As most of our patients received anti-histamines over a short or longer period prior to our treatment, it is now possible to understand why in the overwhelming number these drugs were ineffective because no allergy was present.

	Free Nasal Airway	Improvement	No Complaints
Chinese			
— Male	66.67%	76.92%	75.00%
— Female	61.54%	76.92%	76.02%
Indians			
— Male	77.78%	66.67%	51.14%
— Female	100.00%	100.00%	20.00%
"Others"			
— Male	100.00%	88.89%	88.89%
— Female	100.00%	100.00%	100.00%
Malays			
— Male	100.00%	80.00%	75.00%
— Female	100.00%	50.00%	100.00%

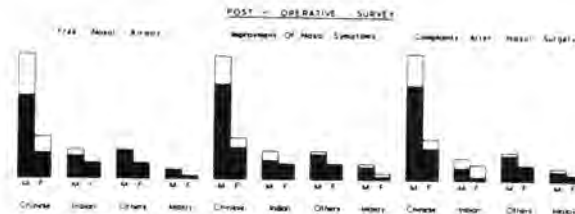


Fig 16

Post-Operative Survey after "Stripping" of Turbinate (Fig. 16)

This took the form of asking the patients the following questions:—

1. Do you have a free nasal airway?
2. Do you have improvement of your previous nasal symptoms?
3. Do you have any complaints after nasal surgery?

The answers were:

1. Free nasal airway: 75% of all the males, 76% of all the females.
2. Improvement of previous nasal symptoms: 76.67% of all the males, 84.84% of all the females.
3. No complaints after the surgery: 73.33% of all the males, 84% of all the females.

The ethnological evaluation of these findings within and between the groups of Chinese, Malays, Indians and "Others" revealed the following:

The restoration of the free nasal airway in both sexes was possible in the majority of cases: 100% in the Malay, "Others" and Indian female group, whilst 60% to 70% of the Chinese males, females and Indian males responded.

Improvement of previous nasal symptoms was 100% in the Indian females and "Others" group whilst the male group of Chinese, "Others" and Indians gave 76% to 88% positive response. The small Malay female group showed a 50% response.

100% of the "Others" and Malay female group had no complaints whilst all the remaining groups had 75% or more. In the Indian female group, a 20% positive response was noted, which might have some relationship to the individual response to nasal conditions.

The Nose after Surgery; Clinical and Functional Evaluation

From the statistics presented in the previous section regarding the patient's comments on the results of the "stripping" of turbinate, it has been noted that an absolute majority of positive answers have been received one to four years after surgery. Post-operative complaints were present only in a minority of cases which indicates the good clinical and functional effect of this type of treatment.

Such results are not surprising as the basic form and shape of the turbinate has not been changed by the operation, but only the hypertrophic part reduced in size, allowing the normal air-current function.

Slome (Cit. Scott-Brown et. al. 1965) stated

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that it seems clear that except in forced respiration, the respiratory air currents are restricted to the central part of the nasal chambers. Air currents do not pass through the lower part of the nasal cavities nor does any considerable volume pass up into the relatively small olfactory area of the human nose. Narrowing of the nasal cavity in the region of the middle meatus constitutes, therefore, an important obstruction to the free passage of air. Septal deviation, spurs, polypi, mucosal hyperplasia and other causes of obstruction disturb the respiratory air currents. This may result in imperfect conditioning of the air and produce local changes in the mucosa. Valvular function has been attributed to the inferior turbinate. The engorgement and depletion of its mucosa controls the passage of air through the nose. In normal noses the resistance to the flow of air through the nasal passages is low. With partial nasal obstruction, the resistance may be nearly doubled.

No post-operative ozaena has been observed due to the care taken during operation to avoid any damage to the turbinate bone as well as the remaining mucosa lining with regenerated after some time.

Slome (Cit. Scott-Brown et. al. 1965) studied regeneration of the mucous membrane of the paranasal sinuses and stated it has been definitely established that normal, functioning ciliated epithelium can be regenerated following operative removal of the complete lining of the maxillary sinus. This epithelial regeneration occurs mainly by growth from the margin of the operative opening into the sinus and to a less extent from islands of mucosa left behind.

A similar principle applies to the partial denuded turbinate.

In cases of repeated previous cautery, where the turbinate had been deformed by many scars, after "stripping" of the turbinate a new functional epithelial cover of the partially exposed turbinate bone developed.

Under conditions in the tropics with permanent warm weather and high humidity, the phenomenon of a "dry nose" after "stripping" of the turbinate is therefore very unlikely and the fear of creating a post-operative ozaena can be disregarded.

Conclusion and Summary

This study deals with the problems connected with chronic tropical rhinitis, one of the most common diseases in tropical developing countries.

After a review of clinical and therapeutic

aspects, the problem of therapy resistance is discussed and our method of "stripping" of turbinate demonstrated.

Results on 220 patients, who underwent 440 operations, who were resistant to the usual methods of treatment by vaso-constrictor drugs, anti-histamines and cautery are presented.

Statistics regarding sex, age and racial distribution of patients, X-ray investigations (660 films) and a summary of the histopathology of 440 partial "stripped" turbinates is given. Our operative technique and post-operative care are described. Follow-up records for 1-4 years of the results obtained after surgery as well as the response of the patient to this type of treatment reveal the great practical value of "stripping" of the turbinate (partial turbinectomy) "lege artis" done as a very effective way of therapy in cases of chronic tropical rhinitis resistant to other treatment. Any fear of post-operative ozaena can be disregarded, thanks to our technique and climatic conditions in the tropics, high temperatures and humidity.

Partial turbinectomy, taking into consideration the physiological principles of nasal function as a decisive factor, especially in tropical Malaysia, is very well indicated in the treatment of therapy resistant cases. This refers to various ethnic groups of Malays, Chinese, Indians, Ceylonese, Pakistanis, Eurasians and Europeans.

The excellent results obtained after operations done by seven different surgeons of the department justify the wider use of this minor surgery procedure under the conditions of patient care described.

Taking into consideration the good and lasting effect of this surgical procedure, it becomes in the long run also a help in the socio-economic sectors, because of its time and manpower saving effects for the community. In the developing countries, owing to the fact that a high percentage of the population is affected by chronic tropical rhinitis, effective treatment saves a great amount of money in the health budget by reducing the cost of drugs which would otherwise be used over long periods. The higher initial expenses for the procedures are very well justified, taking into account the savings gained later on. The technique of "stripping" of the turbinate in cases of therapy-resistant chronic tropical rhinitis should, therefore, have a bright future in developing tropical countries.

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