lethal osteogenesis imperfecta are genetic compounds inheriting from one parent the 300 base pair deletion described here and from the other a so far unidentified collagen abnormality. There are already precedents at the protein level to support this—for example, in the patient with osteogenesis imperfecta and both pro $\alpha 1(I)$ and pro $\alpha 2(I)$ defects described by Byers *et al.*¹⁵ It is noteworthy in this respect that each of our four patients had a delayed $\alpha 1(I)$ migration, suggesting that a subtle defect in $\alpha 1(I)$ collagen might have been the second defect. If this is confirmed then the inheritance of lethal osteogenesis imperfecta in our patients would have been effectively autosomal recessive (doubly heterozygous) and the recurrence risk 25% in the families. Ours would be the first example of the familial transmission of a collagen gene deletion in lethal osteogenesis imperfecta. A 500 base pair deletion in a collagen pro $\alpha 1(I)$ gene has already been identified in this disease¹⁶ and may be an example of the second type of abnormality which we suspect.

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Chronic headache: the role of deformity of the nasal septum

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Abstract

To ascertain a possible causal relation between chronic headache and nasal stenosis arising from deformity of the nasal septum 79 people suffering from both symptoms were observed over one year. On entry to the study they were randomly allocated to either an operative or a control group. The patients in the operative group underwent nasal reconstructive surgery, and the control patients were observed without treatment. Comparison of the two groups showed a considerable decrease in headache after operation.

These findings support the suggestion of a causal relation between chronic headache and nasal stenosis and indicate that a nasal origin should be borne in mind in cases of otherwise unexplained chronic headache.

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Introduction

Many textbooks on otorhinolaryngology state that nasal septal deformity with blocking of the nose can cause chronic headache. The question of a causal relation between the two symptoms has been studied. Hansen and Sherman reported cases in which headache improved after nasal surgery, and others have also reported their experience. We are unaware of any reports of prospective controlled trials on this subject. We therefore carried out a controlled clinical trial to assess the effect of nasal reconstructive surgery on chronic headache in patients with nasal airway obstruction.

Patients and methods

The study was carried out from April 1980 to November 1982. Eighty three patients referred to the ear, nose, and throat department for nasal septal deformities met the criteria for inclusion in the study—namely, a history of chronic headache for at least two years; nasal obstruction due to septal deformity; and a lower age limit of 15. Patients with facial pain of purely neuralgic character or with sinusitis were not included.

Patients on the waiting list for nasal surgery were allocated to one of two groups. Those at the top of the waiting list were assigned to undergo operation; those on the waiting list who were not due to be admitted for operation for a year (the waiting time then being about two years) served as controls. Thus the patients in the two groups entered the trial at the same time and consecutively from two separate places on the waiting list without any selection.

Two patients did not attend the follow up examination at one year, and two emigrated. Table I shows the distribution of the remaining 79 patients in the two groups with respect to sex, age, and clinical variables.

TABLE 1—Details of patients and their history

	Operative group (n = 39)	Controls (n = 40)
Male	24	25
Female	15	15
Median age (years)	33	29
Median duration of history of headache (years)	5	5
Family history of headache	20	17
Vasomotor headache	13	16
Frontal headache	34	35
Severity of headache:		
Moderate	15	16
Severe	21	15
Very severe	3	9
Frequency of headache:		
Daily	9	6
Weekly	20	27
Monthly	10	7

At the start of the study each patient underwent thorough rhinological and neurological examination, and the history was recorded on standardised forms. Patients in the operative group underwent nasal reconstructive surgery (using the maxilla-premaxilla approach,⁶ and, if necessary, osteotomy⁷ and surgery of the valve area⁸); no treatment was given to the control patients. At the end of the one year period of follow up we posted a questionnaire to each patient, who was asked to indicate on it whether over the year the headache had resolved, had considerably improved, was unaltered, or had worsened; the patients then posted the questionnaire back to us. Patients were then re-examined and were presented with a similar questionnaire about nasal obstruction, which they filled in unsupervised.

We used χ^2 statistics to evaluate the results, a probability of 0.05 being taken as significant.

Results

Table II shows the outcome in the two groups in respect of headache at follow up after one year. The results favoured operation. The outcome among the patients who had undergone operation was not significantly related to a family history of headache, signs of vasomotor headache, sex, or the severity of the headache ($p > 0.1$).

TABLE II—Headache after one year of follow up

	Operative group (n = 39)	Controls (n = 40)
Absent	11	
Considerably improved	16	7
Unaltered	11	31
Worsened	1	2

Fourteen of the 39 patients who had undergone operation reported that their nasal stuffiness had gone; 17 reported that it had improved, seven that it was unchanged, and one that it had worsened. About one half of the patients in both groups complained of bilateral nasal obstruction. Among patients with unilateral obstruction there was a highly significant association between the side of the headache and nasal obstruction ($p = 0.0043$, two tailed Fisher's test). Only one patient in the control group reported spontaneous improvement in nasal symptoms; in the others the symptoms were unchanged.

Discussion

Recording the effect of various treatments on chronic headache is difficult because of the subjective nature of the symptom. We found it impracticable to ask the patients to fill in daily notes on diary cards because of the long observation time and hence the increased risk of "drop out" and bias caused by attention.

Instead we posted a simple questionnaire to the patients, which they filled in at home, thus minimising bias.

A placebo effect is best established in a double blind controlled trial. As blinding is not possible when surgical treatment is used the patients in this study who did not undergo operation served only to show the natural course of the headache. We do not believe, however, that this unavoidable methodological shortcoming accounted for all of the effect of operation. A placebo effect is unlikely to last as long as one year. We saw a transient placebo effect on headache in some of the patients who were operated on, who at the end of the study period recorded that their headache was unchanged.

We conclude that an appropriate operation in cases of septal deformity with nasal blocking is an effective treatment of accompanying chronic headache. This implies a causal relation between the two symptoms. The mechanism of this relation is not obvious. The headache may be closely related to the nasal obstruction itself: some patients with intermittent nasal obstruction reported that the two symptoms occurred simultaneously. Collapse of the nasal cavity may cause irritation of peculiar sensitive areas of the mucous membranes, which may produce symptoms identical with those mentioned in descriptions of migraine and vasomotor headache.¹⁻⁹ We were unable to confirm Pellanda's theory that septal impaction on the turbinates has an important role¹⁰ as impaction was found in only a small proportion of the patients; however, the two symptoms seemed to be related in the absence of impaction.

We did not attempt to distinguish between different types of headache but made one unexpected observation: among the 11 patients who claimed total freedom from headache during the year after their operation four had a history of vasomotor headache or migraine. One explanation of this may lie in the claims that vasomotor headache (as well as headache in general³) may be produced by mucosal contact in susceptible individuals¹⁻⁹ and hence may resolve when the provoking factor is removed.

The results of this study strongly support the often proposed causal relation between nasal stenosis owing to septal deformity and chronic headache; a nasal problem should be suspected in cases of otherwise unexplained chronic headache.

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ONE HUNDRED YEARS AGO Dr. R. Campbell, Civil Surgeon of Tezpor, has, the *Indian Medical Journal* reports, made some experiments with the poisoned arrows taken from the Aka after the raid at Balipara last November. He feels certain that the poison used is dried aconite-root, pounded and fastened on the arrow's head by a gum. As a rule, the shafts and the heads are separate pieces, so that, in trying to pull the arrow out of the wound, the head is left in. He recommends the hypodermic injection of liquor ammoniac, two parts to one of water; and syringing out of the wound with solution of nitrate of silver, forty grains to the ounce, as the most useful treatment. (*British Medical Journal* 1884;i:828.)