

AN INTRODUCTION TO CONSERVATIVE SEPTUM-PYRAMID SURGERY

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At a recent meeting of the American Medical Association we described twelve categories of nasal surgery ¹ which demand consideration and one of which merits special attention. This is our group number VII, Conservative Septum-Pyramid surgery (C.S.P.), and it is the subject of this paper. I shall comment on some of the groups briefly by means of case reports and photographs and will elaborate in greater detail upon some of the important elements of Conservative Septum-Pyramid surgery.

Group I. Submucous resection of the nasal septum

Case report 1. Sequellae of submucous resection operations can often only be discovered years after the surgery. To bring out one of the difficulties that the submucous septum resection can produce, the nose is examined with the head to one side as it is in sleep (Figure 1). In this position the patient being shown has great difficulty in using the uppermost nostril which in this instance is the right. You note that the number 600 is recorded. This designates the "work coefficient" (of 600); whereas, when her head is in the upright position the work coefficient is 180. For most people in the sleeping position with the "nostril up" a work coefficient of 300 would be high. These figures are the sums of time and pressure factors. In this case the nasal pressure is doubled and the work load for breathing, being proportional to the cube of the pressure difference, is therefore increased eight times.

Group II. Rhinoplasty

Case report 2. The usual rhinoplasty, too, has its problems and sometimes patients need several operations to bring a given case to a satisfactory conclusion. Multiple and even single operations of this kind occasionally lead to serious breathing disturbances. A patient was operated four times. Even though cosmesis is good and the result more than ordinarily acceptable, the function has become progressively worse.

Group III. Maxilla-premaxilla approach to septum surgery

Case report 3. The well-known hemitransfixion incision is the beginning of the approach to the septum by way of the maxilla-premaxilla ². This incision is

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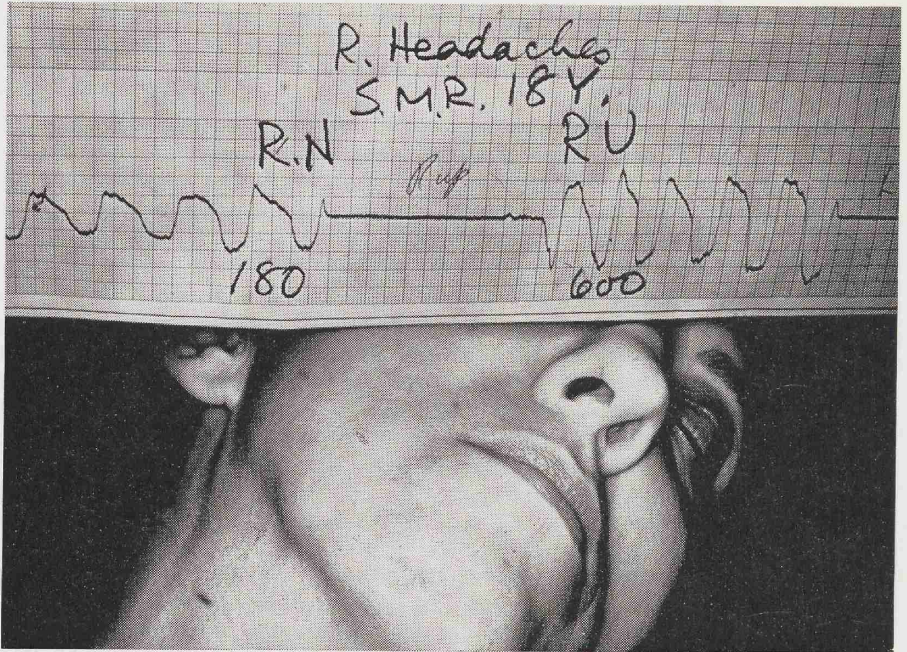


fig. 1. 18 years after submucous resection of nasal septum. In sleeping position work coefficient at right (uppermost and functioning) nostril is an excessive 600 — a possible cause of her severe headaches. R.N. is right nostril in upright position. R.U. is right nostril uppermost as in sleeping position.

through skin (not mucosa) and through it one can reach every part of the septum and operate on all of the septum or any part or parts of it. Anything from a simple movement of the septum to a complete and total excision of all the hard parts can be accomplished. Only through this approach can the isolation of the four compartments be brought about without which the most effective septal surgery is impossible. This topic will receive more attention later as many of its essential principles are often integrated into the Conservative Septum-Pyramid operation.

Group IV. Separate but consecutive operations

Case report 4. This young man had had five adenoid operations in early childhood (Figure 2). Following this, because of continued nasal obstruction, an extensive septum operation was performed, also in childhood. Later he needed further septal work, then a correction of the saddling of the nasal dorsum with a hip graft, and still later an implantation of fetal bovine bone onto the dorsum.

There is often a need throughout the years of the developmental growth of an individual for many operations. This is what we wish to imply by the expression "separate, consecutive, but related operations".

Figure 3 is a graph of the breathing pressure tests of a young man. We wish to point out that even after many operations he feels very well and looks very

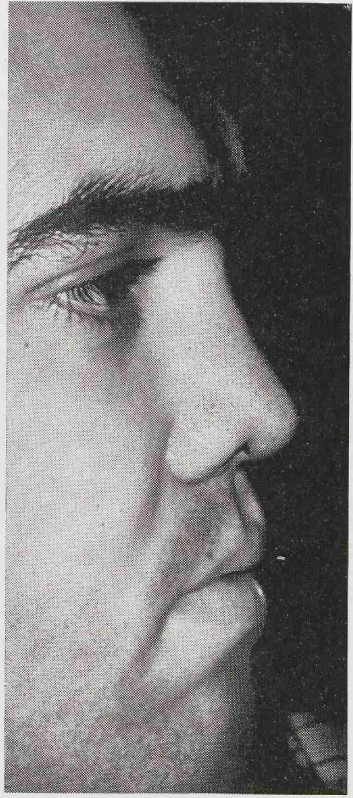


fig. 2. 8 years after 5 adenoidectomies and total reconstruction of septum. Picture at right is 6 years later: 3½ years after iliac bone graft, 2 years after implantation of bovine bone, and 1 year after another nasal injury. Demonstrates preservation of form and less mouth breathing.

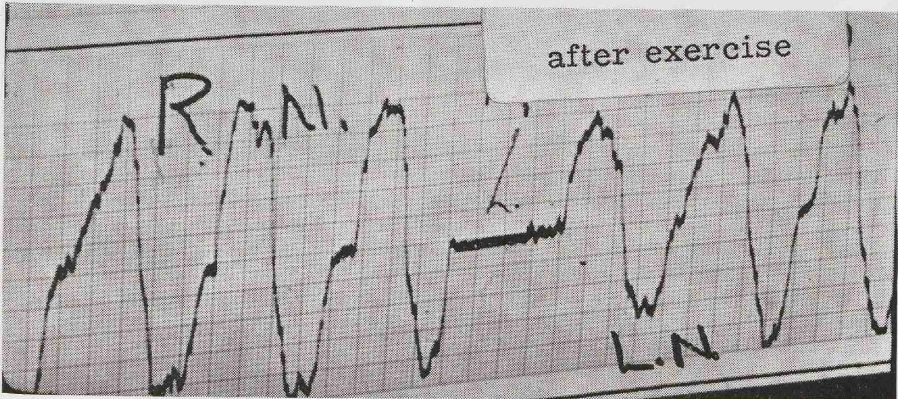


fig. 3. 15 months after third nasal operation. Following moderate exercise, breathing pressures are high — the result of narrowing of the nasal valva areas induced by injury and surgery to these parts.

good, but the nasal pressures are still high especially after exercise. It is necessary to determine what is the cause of such disturbance. In his case it is a stenosis of the ostium internum on each side and still another operation or two will have to be added to his series for the procuring of further functional rehabilitation.

Group V. Separate but simultaneous or concomitant operations

Case report 5. This young man represents the familiar group of patients in which a septum operation and a rhinoplasty are both indicated (Figure 4).

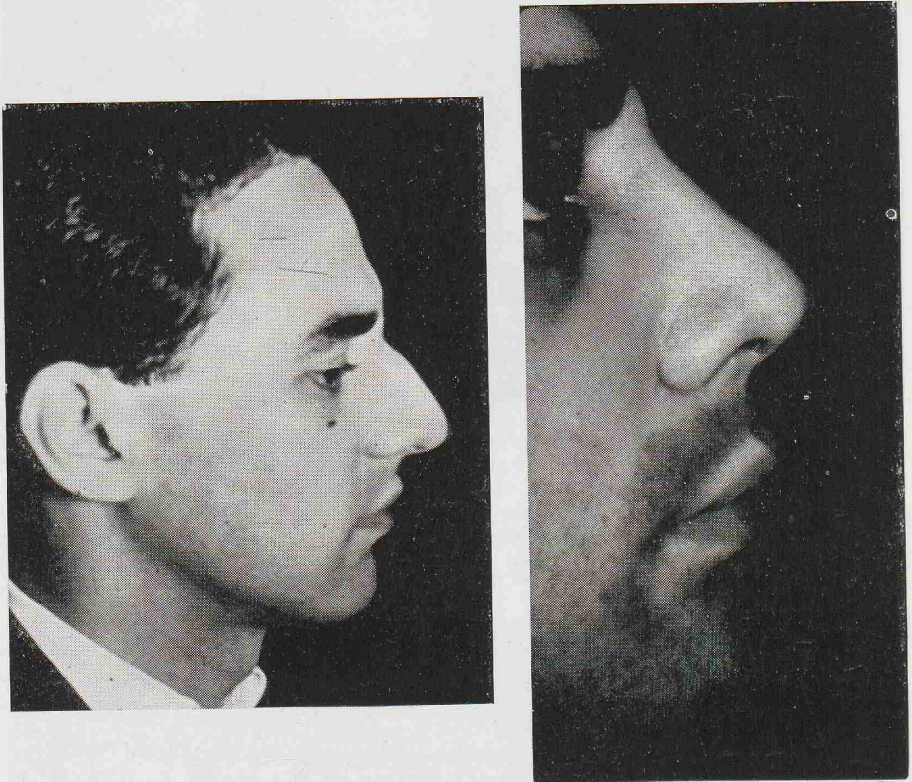


fig. 4. Septum reconstruction and rhinoplasty performed simultaneously.

They may be done in very many instances at the same time, because what needs to be done for each does not interfere with the doing of the other. In this group of cases the two operations can be performed at different times and it is of no consequence whether the septum surgery or pyramid work is done first.

Group VI. Extensive septum and pyramid procedures conjoined

Case report 6. This is a very important patient because he represents the group where **extensive** septum and pyramid procedures need to be done at

the **same** time; in fact, they have to be joined together in order to make each a successful operation (Figure 5). This young man, eight years previously, had a quite large subtotal reconstruction of his septum. And as you know, in

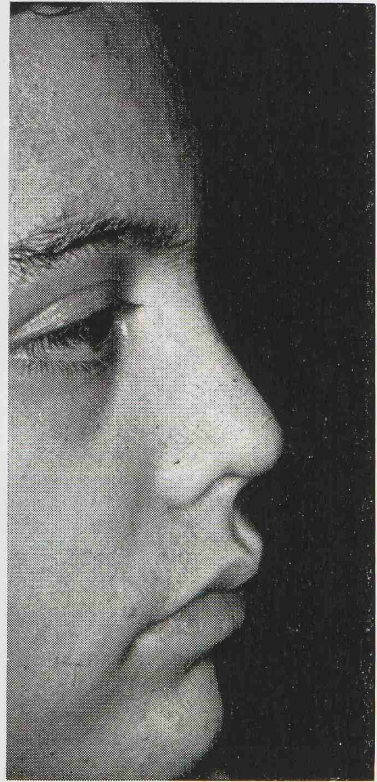


fig. 5. Boy, age 14. 8 years after subtotal septum reconstruction. 10 months after total removal and repair of septum and modified rhinoplasty using "push down" technic for displacing prominent nasal dorsum (hump) into nasal interior.

children when autogenous septal cartilage pieces are replaced, they may grow only too well. Eight years after his original septum surgery he again had an "excessive septum" problem. At operation a total removal and subsequent replacement of the septum was combined with this apparently satisfactory reconstruction of the external pyramid.

We shall discuss group VII last.

Group VIII. Nasal atrophy and septum perforations

The total "smalling" and narrowing of the nose is an operation which we call "endonasal microplasty" (Figure 6). This has proven to be most valuable in the hands of the rhinologist for the treatment and rehabilitation of extreme cases of atrophic rhinitis and ozena as well as for the treatment of early nasal atrophy.

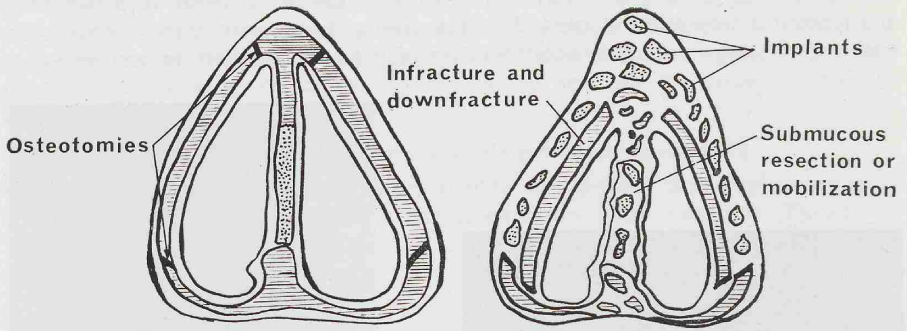


fig. 6. Endonasal microplasty.

Case report 7. There is frequently the need to repeat portions of this operation every year or two. We show this patient nine months after her sixth operation. Her surgical program extended over a period of twelve years. You can note the almost normal appearance of the right inferior turbinate and its relationship to the septum (Figure 7).

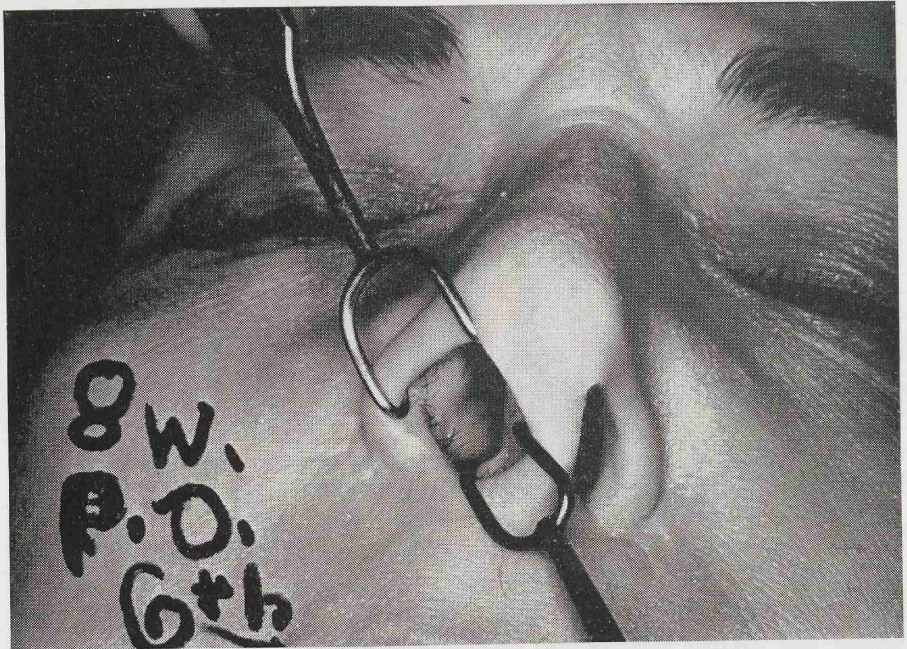


fig. 7. Ozena for 35 years. Recreated inferior turbinate is close to septum. 8 weeks after sixth operation.

Case report 8. This is a healed perforation of the septum which was more than two centimeters in its smallest diameter. What is of greatest interest is the fact that the mucosa under the upper lateral valve was not disturbed in

the repair. This perforation, in other words, was not corrected at the expense of the functioning mucosa of the nasal valve (Figure 8).

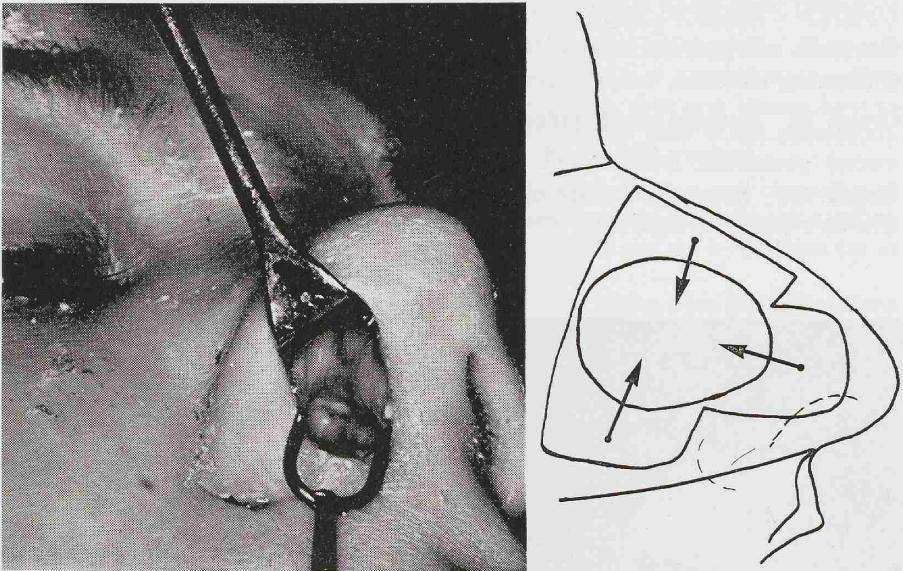


fig. 8. Perforation repaired by joining the flaps outlined and covering both sides with split skin grafts.

POST. SEPT.
 POLYPS & ETHMOID EXEN.
 RHINO.
 2Y. 7M P.O.
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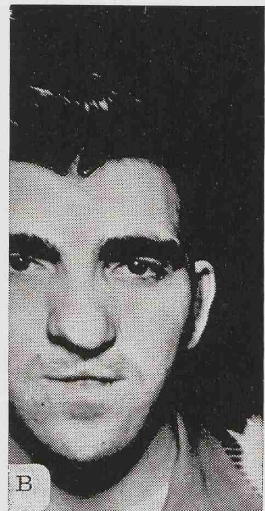


fig. 9. A. Good breathing pressures and graphs 2 years and 7 months after septum repair, exenteration of polyps and hyperplastic ethmoid tissue, and rhinoplasty. B. Preoperation photograph showing repaired harelip.

The next four groups will be mentioned by title only.

Group IX. Sinus surgery

Including trans-sinus hypophysectomy.

Group X. Congenital anomalies and gross structural defects

(Following infection, trauma, surgery, malignancies.)

Group XI. Unusual combinations of septum, sinus, pyramid, atrophic (etc.) surgery (Figure 9)

Group XII. Repeated similar operations

(Re-do's planned before or after first operation) (Figure 10).

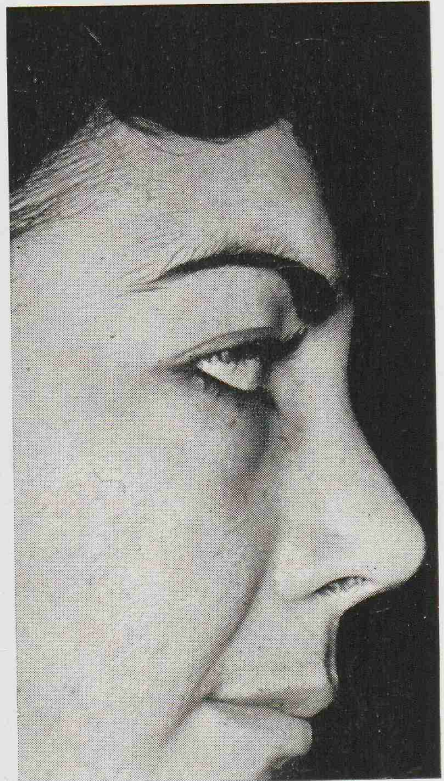
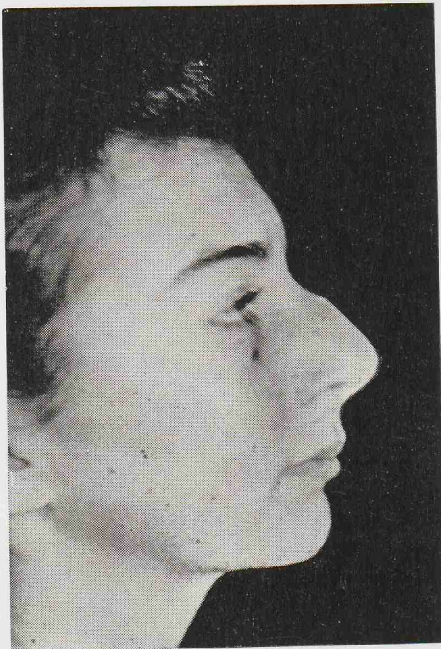


fig. 10. 28 months after repair of nasal dorsum irregularities and deficiencies which followed original rhinoplasty.

Group VII. Conservative Septum-Pyramid surgery

To return to group seven, the Conservative Septum-Pyramid operation, the most important one. To the word "conservative" should be added „conserving". We make every attempt in doing the septum and the pyramid work to avoid injury or excision of any piece of tissue that can be spared to the end that function can be retained and, if possible, improved.

One need not insist that all surgery should be based on physiological considerations, even that surgery which is done primarily for cosmetic and esthetic reasons. One must always question, however, whether the esthetic operation planned will permit preservation of the existing function or whether the operation will bring an improvement; or, as is too frequently the case, will the operation be done at the sacrifice or the expense of some function. This all implies that one knows the functions of an organ, that one knows how to test for these functions and how to evaluate the tests. This is not adequately the case as far as the nose is concerned. The several commonly known activities of the nose such as smelling, warming, moistening and cleansing of the air we breathe, the pathways that the air takes within the nose, and ciliary action are properties that we do know about, but do not as a rule test for in our diagnostic preparations for surgical procedures.

In our own work we have had the occasion to list more than thirty functions and properties of the nose and have seen that there is a possibility of measuring and evaluating many of them³. From a practical **clinical** point of view, however, actual testing has always proved difficult and complex. Many of our predecessors and colleagues through the last seventy-five years have worked with many phases of this problem and have had the same discouraging experiences. Zwaardemaker⁴ said that rhinology needs a simple objective test for the evaluation of nasal function. This is a test still being sought. Our own studies during the last six years with the measuring of breathing pressures and flow pressures through the nose have encouraged

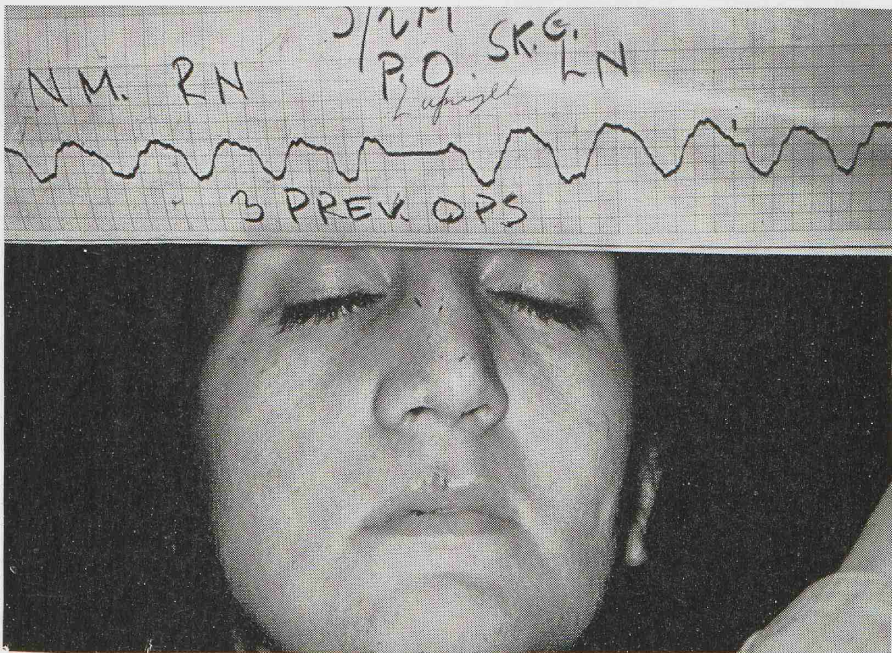


fig. 11. Three previous nasal operations. Good average nasal pressures obtained by repair of nasal valva areas with skin grafts.

us to persist in the pursuit of such a test. We feel rather confident that pressure tests as well as other objective tests will in the future be as commonly used, as widely accepted and as fundamentally depended upon as audiometry is in otology, as electrocardiography is in heart disease, and as physiologic tests are for the understanding of pulmonary-cardiac function and disease. We feel sure such function investigations will also rapidly expand the scope of rhinologic surgery. We have included here only brief consideration of some of the pressure tests in the evaluation of operations designed to conserve structure and function of the nose.

We cannot discuss all the details of the Conservative Septum-Pyramid operation, but we herewith insert an incomplete list of twenty-seven procedures often employed ⁵.

1. Repeated re-examination and re-evaluation of septum and pyramid pathology just before and during surgery.
2. Right hemitransfixion preserving membranous septum.
3. Maxilla-premaxilla approach to the septum.
4. Sub-total reconstruction of septum if at all possible.
5. Intraseptal separation of nasal bones (medial osteotomy).
6. Intercartilaginous incisions with limited uncovering of pyramid.
7. Preservation of attachment of right mucosal flap to septum cartilage **to preserve valve** and left flap attachment to membranous septum and columella.
8. Lower lateral cartilage freeing and delivery by "method of precision" (preserving nostril rim).
9. Domes of lower laterals preserved intact if at all possible.
10. Long arm U alar incision for modifications of lobule and base.
11. Alar lateral osteotomy usually above and oblique to naso-optic groove.
12. Cautious "push down" and other moderate changes of dorsum.
13. Slight trim of nasal bones in area of nasal angle.
14. Intraseptal separation of upper lateral cartilage from septum (and modification) with preservation of canopy of soft tissues.
15. Modifying upper lateral cartilages preserving mucosa completely.
16. Shortening of upper lateral cartilages and preserving mucosa — done in repeated steps — after limited intranasal separation.
17. Spine repair.
18. Base sutures.
19. Replacement of autogenous septal bone or processed cancellous bovine bone (Squibb) into septum.
20. Shortening of septal cartilage (caudal border) preserving mucosa.
21. Inferior and/or other strip removals of septum cartilage.
22. Saline gauze strips for intranasal packing.
23. Autogenous and/or processed bone and cartilage implants to dorsum and tip.
24. Protective dressings.
25. Adequate postoperative medical management.
26. Written and photographic records.
27. Evaluation of surgical results obtained using objective tests such as rhinomanometry.

The basic principles involved include:

1. Making all incisions cautiously.
2. Avoiding unnecessary connective tissue injuries; e.g., when uncovering pyramid.
3. Retaining normal tissues and tissue relationships; e.g., the upper lateral valves.
4. Preserving functioning structures such as the nasal roof (dorsum) and the bone-cartilage junction of the dorsum ("keystone" area).
5. Creating harmonious structural characteristics based on ethnic and anthropological considerations.

As we said earlier Conservative Septum-Pyramid surgery is very often indicated; and we believe, also, that in our own culture and country it could probably be easily corroborated that it is the most frequently indicated of all operations done anywhere in the body.

We will show a few typical examples:

Case report 9. This particular patient, besides being asthenic and allergic, was also an asthmatic. Following surgery a great improvement in general health was reported and has persisted up to this time three years later. (Figure 12).

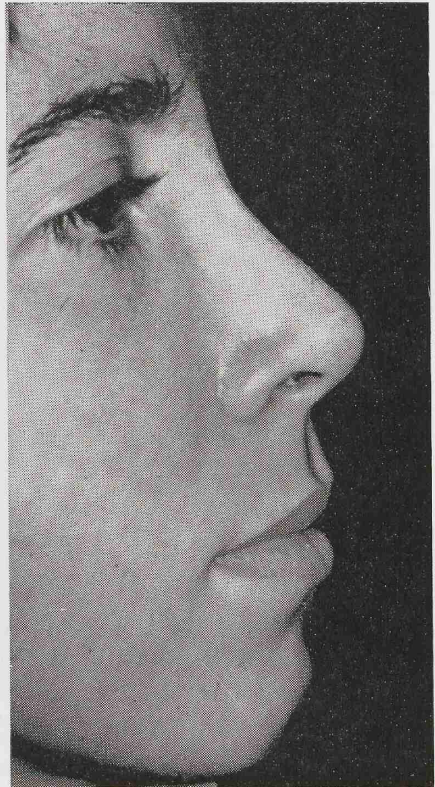


fig. 12. Two years after conservative septum and pyramid surgery. Relief of asthma still pertains.

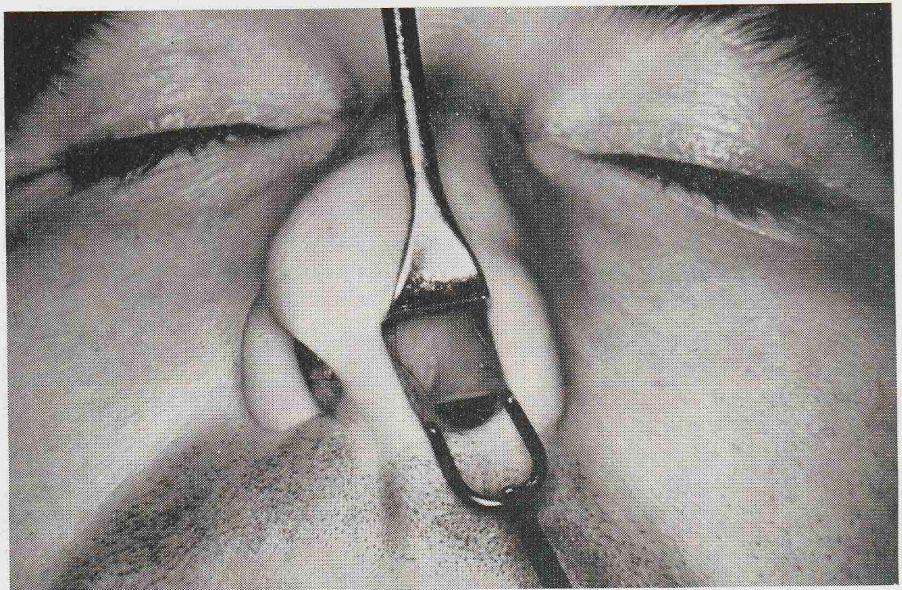


fig. 13. Marked impaction and deviation of left side of nasal septum anteriorly.

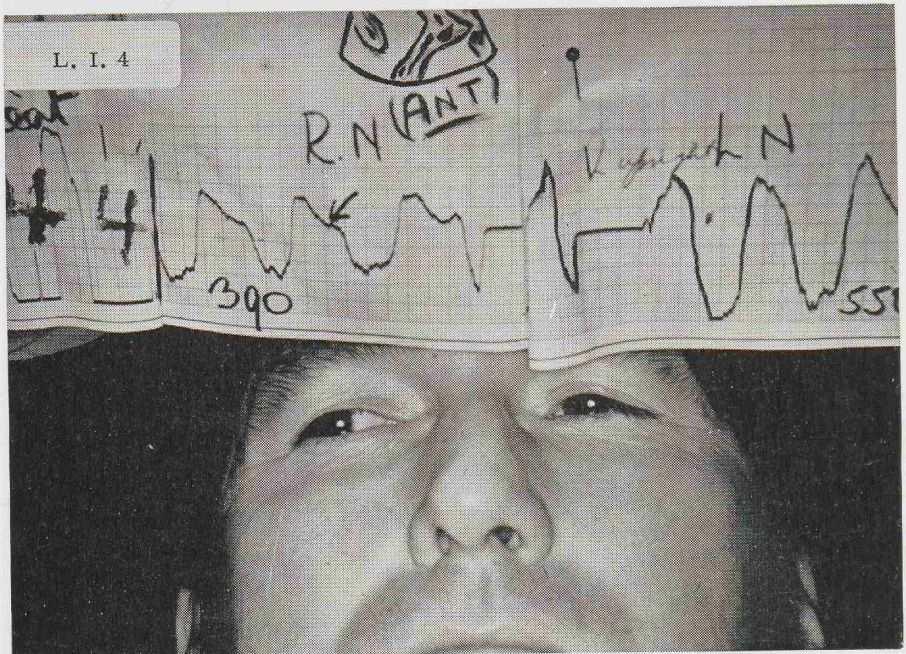


fig. 14. Left anterior septum deviation and impaction. Nasal pressures on both sides markedly increased. Work coefficient (left) of 550 is very high. On inspiration through left nostril only 4 (instead of 8) liters per minute can flow without creating a pressure of more than 100 mm of water.

Case report 10. Here is a pyramid change together with a correction of a marked left anterior impaction (Figure 13). The breathing pressure tests show Right Normal (head in normal upright position), 390. This is high, but Left Normal, 550, is very high. L.I. 4 means that only 4 instead of 8 liters of air per minute can be inspired through the left nasal chamber within the limits of the work effort that can be normally expended (Figure 14). Tests show continuous improvement seventeen days, eight weeks, and two years after operation (Figure 15). The flow capacity has also improved to a normal 8 liters per minute.

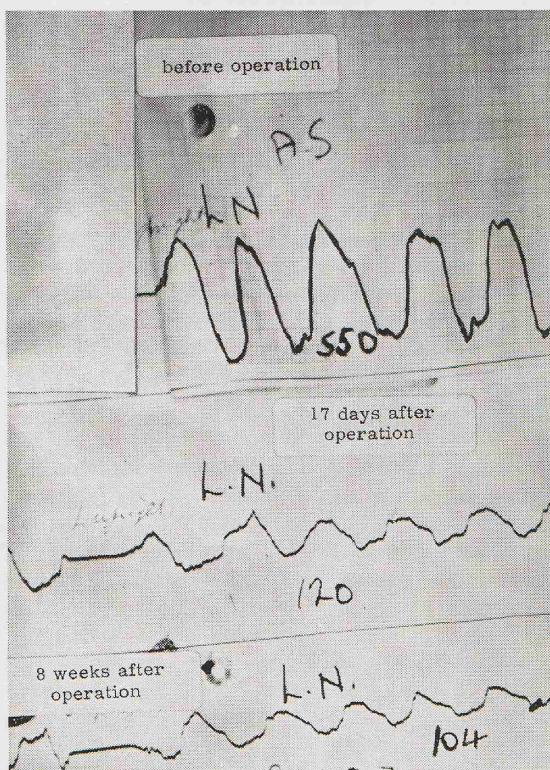


fig. 15. Improvement in nasal pressures and lowering of work coefficients after septum reconstruction.

Case report 11. In this instance only a little of lobule work and a moderate amount of septum correction were done. This patient states that he feels and breathes very well and physical examination corroborates this report. Objective rhinomanometric tests, however, reveal the presence of the same functional abnormalities that existed preoperatively and may be suggesting that more of the nose is involved in the physiologic disturbance than we had a right to suspect. It may also be that other organs or systems are responsible for the abnormal respiratory changes seen in the pressure graphs.

SUMMARY

The following summary of indications for the Conservative Septum-Pyramid surgery is short, but discloses, however, the wide field in which such therapy is of prime importance.

1. Pyramid and septum surgery in children, older people and in those who are otherwise debilitated.
2. Recent fractures and dislocations of bone and/or cartilage of the pyramid and septum.
3. Old pyramid and septum fracture deformities.
4. Anatomical and functional disturbances in noses previously operated.
5. Developmental abnormalities following natal and post-natal trauma.

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- ⁵ Scientific Exhibit presented by M. H. Cottle, R. M. Loring, and I. E. Gaynon at the 111th Annual Meeting of the American Medical Association, Chicago, June 24-28, 1962.

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