The Journal of

Laryngology and Otology

(*Founded in* 1887 *by* MORELL MACKENZIE *and* NORRIS WOLFENDEN)

October 1957

NASO-PHARYNGEAL STENOSIS

By W. R. DENNY and C. P. WILSON (London)

NASO-PHARYNGEAL stenosis is one of the more uncommon conditions likely to be met in surgical practice. This is fortunate, as treatment of the condition presents many difficulties and most surgeons with experience of such cases agree that the results of treatment are far from satisfactory.

So many methods of treatment have been described that the choice of technique to employ is difficult and the variety of methods used is sufficient indication of their comparative inadequacy.

Most surgeons when confronted with such a case will hurriedly look through the literature to see if any new suggestions have been published and then decide to follow whichever method seems appropriate to the particular case.

This has been our own experience, and no doubt many others, in like situation, have felt as dissatisfied with their results as we have with ours.

Having given some thought to the causes of the relative failure of treatment and the various problems involved, a technique of operation was devised which, it was thought, would overcome most of the difficulties and it was decided to use this in any subsequent case.

About a year ago, we were fortunate in having a patient of 40 years of age, who had almost complete atresia following lupus. She had had previous unsuccessful attempts at cure and when she came under our care had marked bilateral obstructive deafness, minor difficulty only in swallowing, a very slight nasal voice but almost complete nasal obstruction.

The result of operation has been so satisfactory that we felt it was not inappropriate to review the situation and give a description of the

https://doi.org/10.1017/S0022215100052282 Published online by Cambridge University Press

operation now rather than that an indefinite period should elapse before we could report a further case.

Aetiology

The stenosis (Figs. 1 and 2) is produced as a result of damage to the mucous membrane and submucous tissue either by ulceration or by direct trauma. Subsequent contraction with adhesions between the posterior surface of the soft palate, the posterior faucial pillars and the posterior pharyngeal wall leads to stenosis of varying degree, although complete atresia is rare.

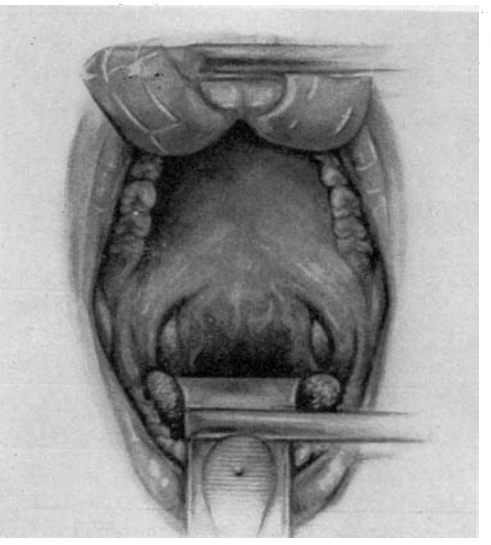


FIG. 1.

Stenosis of nasopharynx with adhesions between posterior surface of soft palate, posterior faucial pillars and posterior pharyngeal wall.

Examination usually reveals an opening of some extent in the neighbourhood of the middle line although Figi (1947) reported complete atresia in seven out of thirty-seven cases.

Writing in 1914, Wright and Smith found that in a series of sixty-nine cases 84 per cent. were syphilitic in origin.

Mackenty in 1926 gave the causes in decreasing order of frequency as syphilis, trauma, diphtheria, tuberculosis and simple inflammation. He suggested that in the traumatic cases there must also be an inherent cicatrizing diathesis as otherwise, he outspokenly comments, stenosis would be more frequent.

Kazantian and Holmes, in 1946, reported 16 cases, in 9 of which stenosis followed the removal of tonsils and adenoids.

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Figi in 1947 gave a list of causes in 37 cases, which is equally disturbing:

1. Excessive trauma during removal of tonsils or tonsils and adenoids—20.
2. Syphilis—8.
3. Indeterminate inflammatory lesions—3.
4. Rhinoscleroma—2.
5. Acid burn—1.
6. Diphtheria—1.
7. Lupus—1.
8. Surgical correction of a congenital malformation of the throat—1.

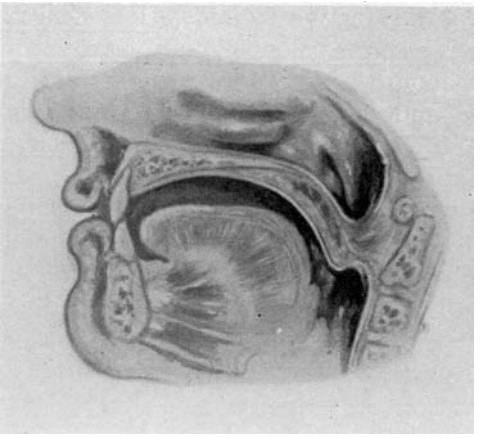


FIG. 2.
Sagittal section of stenosis.

It would appear that syphilis, as one would expect, is now becoming a less important aetiological factor and that trauma, at least in some countries, is taking its place.

Symptoms and Signs

These will depend upon the degree of the stenosis but will include nasal obstruction, retention of nasal secretions with secondary infections involving the sinuses, and Eustachian obstruction. There may be a nasal intonation of the voice and there may also be the changes in the lower respiratory tract consequent upon prolonged mouth-breathing. If there is complete occlusion, the nasal appearances may resemble those of choanal atresia with a pool of secretion in the floor of the nose and pallor of the mucous membrane. Examination of the pharynx will in most cases reveal the cause of the symptoms.

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Treatment

Nichol, in a masterly summary in 1896, revealed his appreciation of the difficulties involved in the treatment of this condition. He stated: "The defect in all operations is that, no matter how deep the incision has been made or how much tissue has been excised, or how strong or persistent dilatation has been exercised, the cicatricial tissue steadily advances in the process of healing from the bottom of the cut." He stressed that the outer angles of the newly constituted nasopharyngeal airway required epithelialization from the beginning or else the reconstruction was doomed. Using fundamentally the treatment employed for syndactylia—the placing of a seton at the base of the web—he obtained successful results in 13 out of 14 cases and it would appear that the 14th failed because the patient had active syphilis. Heavy silk braid was drawn through the stenosis a short distance lateral to the remaining lumen and was left in situ for about two weeks to allow epithelialization to occur. It was then removed and the tissue between this track and the central opening was divided. The procedure was repeated on each side as many times as was required to produce an adequate opening. Although apparently good results were obtained, this is a time-consuming procedure and many months would have to be spent before a satisfactory airway could be made.

Mackenty (1926) mentioned several methods of treatment:

1. Simple dilatation—this is tedious and painful.
2. Dilatation with incision—there is a marked tendency for contraction to recur.
3. Nichol's method.
4. Diathermy division of the stenosis—it was thought that diathermy division might prevent post-operative contraction.
5. Division of adhesions and cauterization of the raw surface with acid.

He then outlined two methods of his own.

In the first, a flap was raised from the posterior pharyngeal wall, on each side of the central opening, based on the edge of the soft palate. The soft palate was then freed and the flaps doubled back and sutured to its upper surface. In the second method, if flaps could not be made due to loss of mucous membrane, or were otherwise unsatisfactory, he divided the adhesions and then divided the soft palate in the middle line, deliberately producing a cleft soft palate with a triangular opening. He reported that following this operation speech was adequate, but he does not mention if nasal regurgitation occurred. After both methods subsequent dilatation was necessary.

O'Connor (1937) used split skin grafts. He made submucosal pockets from below, upwards and outwards. Into these pockets he inserted stent moulds wrapped around with skin. After one week the stent was removed and the web between the pocket and the original central opening was

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divided. A soft rubber cone dilator was worn for 16 days and finger dilatation used afterwards. He adopted this method because he felt that rigid fixation of a graft by a dental appliance must fail owing to the movement of the pharyngeal wall.

Goodyear (1939) depressed the soft palate from above using a frontal sinus catheter and incised the palate at the most dependent point. He suggested that after this manœuvre the soft palate elevated itself and the raw edge was opposite intact mucous membrane of the nasopharynx. Even if the method did prevent recurrence of the adhesions between the palate and posterior pharyngeal wall, it would not obviate the main cause of subsequent contracture which is fibrous tissue growing in from the lateral angles.

Vaughan (1946) described two methods which he had evolved. In the first the soft palate was dissected from the pharyngeal wall and a silver diaphragm was drawn up to separate the raw surfaces; this was anchored by wire around the columella and was worn for four weeks. In one case some contraction occurred but not sufficient to mar the result. In a second case subsequent dilatation was required.

He later suggested suturing skin grafts into the lateral angles after using Mackenty flaps for the soft palate. The raw surface left on the posterior pharyngeal wall was separated from the soft palate by a silver diaphragm but was not otherwise covered.

Kazantian and Holmes (1946) pointed out the necessity of determining pre-operatively the extent of the scarring and suggested that X-ray examination using opaque media should enable this to be done adequately. They condemned skin grafts on account of the poor tissue upon which they would be grafted and on the continual movement to which they would be subjected. They recommended the use of flaps made from the oral surface of the palate and posterior pharyngeal wall to cover the raw surfaces of the velum, and from the superior surface of the palate and posterior naso-pharyngeal wall to cover the raw surface of the posterior wall. These flaps might require supplementing by a buccal flap. They claimed that the result was good if the eventual opening allowed respiration and drainage of secretions. One feels from the description that the patient would be left with a palatal insufficiency.

Figi (1947) made a transverse incision of 5 cms. length across the edge of the soft palate, dividing the fibrous adhesions. Around two rubber tubes, which were to allow nasal respiration, a sponge rubber mould was attached. The sponge rubber was covered with a split skin graft and the whole drawn up to separate palate from posterior pharyngeal wall. It was anchored around the columella. The skin graft was sutured to the palatal and pharyngeal mucosa. The appliance was left in position for two weeks. It was followed by a self-retaining acrylic obturator. The lumen obtained at the end of 5 weeks was 1·5 cms.

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Cinelli (1948) resorted to older methods. He separated the soft palate from the posterior pharyngeal wall and inserted a large self-retaining rubber tube. This was left in position until epithelialization was complete. He said it did not cause great discomfort and could be retained for several months.

Vaughan (1949) further described an ingenious flap technique. The flaps were obtained from the posterior pharyngeal wall and two were raised from each side. One was swung round to cover the raw palatal edge and the other was slid upwards to give a mucous membrane covering to the area which the free edge of the soft palate would tend to encounter. Following the operation a dilator was passed daily for several weeks.

He emphasized, like many others, the tendency of cavities lined by skin grafts to contract. He suggested that raw areas covered by flaps had less tendency to do so.

McLaughlin and Ireland (1950) reported a case of complete atresia. A semicircular flap based posteriorly was raised from the soft palate, the underlying tissues were excised and the dissection was carried deep into Passavant's ridge. The palatal flap was turned up—it did not survive but acted as a protective dressing. A silver tube was covered with gutta percha and made to fit the opening. This was covered with a skin graft. The mould was attached to dental cap splints. The pharyngeal prosthesis anchored to the teeth immobilized the soft palate and allowed the graft to take there although it would not take on the pharyngeal wall because of movement. The final diameter was 12 mms. and there was imperfect speech and nasal regurgitation.

Dowd (1954) emphasized that all methods of treatment using mucous membrane flaps or skin grafts required subsequent dilatation. He employed Mackenty's flap method, inserting an acrylic mould anchored around the columella immediately after operation. When the swelling subsided, he used an obturator attached by wires to the upper teeth.

Consideration of these reported accounts and suggestions emphasizes the generally unsatisfactory results of treatment.

The main requirements are (1) an adequate airway. (2) A normally functioning soft palate to allow closure of the nasopharynx on swallowing and to permit normal speech.

In order to obtain these results it is obvious that (1) simple division of adhesions is inadequate if the scar tissue which has produced them is allowed to remain. (2) The skin graft applied to the raw surfaces must be attached to the muscles of the pharyngeal wall and not to a prosthesis so as to eliminate movement between the graft and the tissues to which it is applied.

These criteria have been accepted in the treatment of stenosis in other regions such as the larynx, and it would appear that many of the failures resulting in recurrence of the stenosis are due to failure of removal of the

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scar tissue, or to inadequate application of the skin graft to the underlying muscles.

Further damage to the musculature or the use of flaps containing muscle tissue must result in deficient functioning of the soft palate.

The operative technique devised was intended to eliminate as far as possible the causes of failure in one particular case and naturally it would be unlikely to be suitable for all cases without some modification.

An incision is made transversely through the scar tissue uniting the soft palate with the posterior pharyngeal wall, thus opening up the naso-pharynx. This incision is carried outwards to the posterior pillar of the

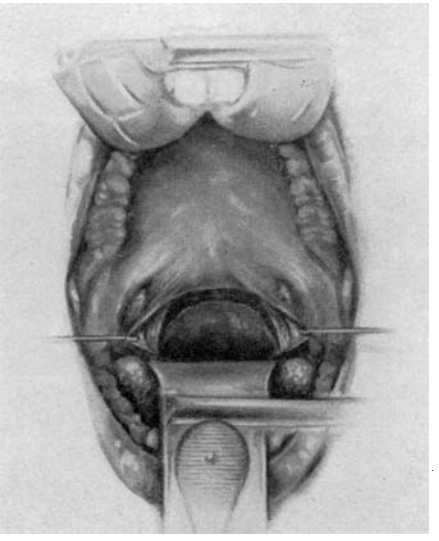


FIG. 3.

Soft palate has been separated from posterior pharyngeal wall. Edges of mucous membrane are undercut and scar tissue has been removed to expose palato-pharyngeus.

fauces and then downwards along the posterior border of the pillar to a point well below the lower limit of the scar tissue. The incision is deepened until the palato-pharyngeus muscle is reached. The mucous membrane of the lower edge of the incision is elevated and also the mucous membrane of the outer edge of the lateral part of the incision and the scar tissue is dissected from the surface of the palato-pharyngeus and the superior constrictor as far as the middle line. This is repeated on the opposite side. (Fig. 3.) Not only does this provide a suitable surface for the subsequent grafting but by freeing the palato-pharyngeus also gives mobility to the soft palate and allows it to be drawn forwards as as to expose the posterior surface of the cut edge. This traction is carried out by putting 3 stitches in the edge of the soft palate. The mucous membrane of the upper surface of

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the soft palate is undercut and the scar tissue on the upper surface of the edge of the soft palate is removed. A strip of skin is prepared about 2·5 cms. in width and 15 cms. in length. One end is sutured in the middle line to the muscular tissue of the posterior pharyngeal wall and to the undercut mucous membrane above and below (Fig. 4). It is then sutured into the lateral angle behind the palato-pharyngeus and between it and the superior constrictor. This is done by passing a needle lateral to the anterior faucial pillar, tonsillar bed and posterior faucial pillar, the graft is transfixed and the stitch brought out by the same route. The lower edge of the graft is sutured to the lower angle of the incision. There is some

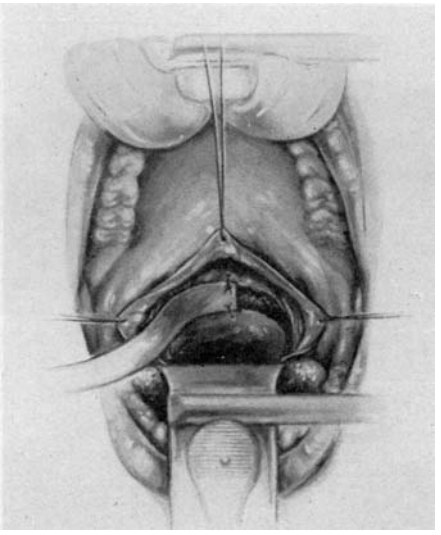


FIG. 4.
Skin graft sutured in middle line to posterior wall of pharynx.

difficulty in placing a suture at the upper edge of the graft as this will be behind the lateral border of the soft palate. Intermediate sutures are placed between the middle line and lateral recess to the mucous membrane of the posterior wall above and below. The graft is now carried forward and wrapped around the free edge of the soft palate, being held in place by sutures passing through the whole thickness of the palate and both layers of the graft, in other words, binding the edge of the soft palate (Fig. 5). It is then sutured into the opposite lateral recess and finally to the posterior pharyngeal wall in the midline. As the graft is progressively laid down the raw surfaces of the pharynx and palate are painted with Thrombin. Because of the uncertainty of obtaining good contact at the lateral angle above the soft palate, a piece of split rubber tubing about 3 cm. in length and about a centimetre in diameter is sutured into each

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lateral angle (Fig. 6). These rubber tubes are removed in 7 days. Subsequent dilatation was not performed and restitution of the normal functions

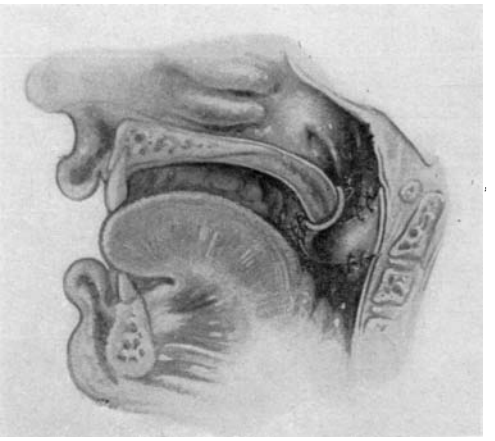


FIG. 5.

Sagittal section to show skin graft sutured to posterior pharyngeal wall, binding of soft palate and positioning of graft in lateral angle.

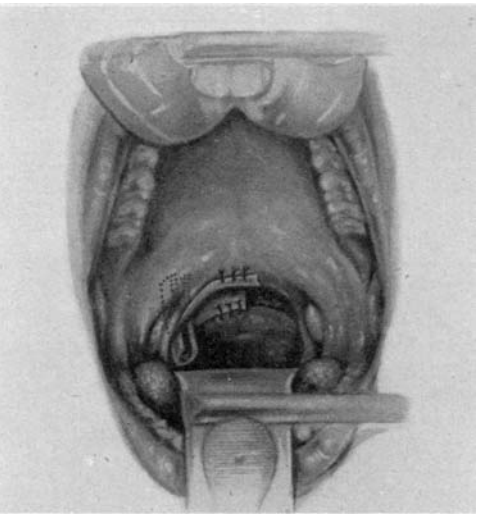


FIG. 6.

Split rubber tube in situ. A suture would be inserted between tube and posterior pillar below graft. For clarity only right half of graft is shown.

of the palate was effected. The airway was adequate, there was no regurgitation of food on swallowing and the voice was normal.

To date, the condition remains satisfactory although the original deep

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groove behind the palato-pharyngeal muscles has filled in. It is possible that dilatation might have prevented this, but a satisfactory result would appear to have been achieved without.

The length of the skin graft causes it to be somewhat unwieldy and there might be some advantage in using two grafts, one for each side. It might even be that the operation could be carried out in two stages but this would make removal of the scar tissue on the upper surface of the palatal edge more difficult.

Syphilitic scarring is notoriously the most difficult type to contend with and it is probable that the result in the case described would have been less satisfactory had the condition been due to this disease. If the stenosis is due to operative trauma, there may be even less tendency to subsequent contracture than in the cases of lupus but the functional result will depend in such cases upon the degree of muscular damage produced at operation.

Summary

The difficulties in treating nasopharyngeal stenosis are discussed and the various forms of treatment so far attempted are reviewed.

A new operative technique is described which it is suggested gives the maximum chance of restoration of normal function to the soft palate and reduces post-operative scar contraction to a minimum.

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