

N^o 444

"A Treatise on Adenoid Vegetations
in Children."

Mrs. C. B.

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A Treatise on Adenoid Vegetations in Children

Although the disease now known under the name of "Adenoids" is usually spoken of as comparatively new, evidence is not lacking to show that this pathological condition existed years ago. Meyer pays particular attention to this point in a paper which he read before the Medical Society of Copenhagen on March 6th 1894 & which was published in "Archiv: für Ohrenheilkunden" December 1895. In this paper he refers to several old portraits which displayed features of adenoids, notably those of Antonio Canova⁽¹⁾ the sculptor (1755-1822), and Charles V⁽²⁾ whom he describes as having an open mouth, thick upper lip and narrow nose, (see figs 2 & 3). Mention is also made of Francis II, King of France and first husband of Mary Stewart, who died at the age of sixteen, as being affected with adenoids. Again Potiquet the French otologist in his book entitled "La maladie et la mort de François II roi de France" describes him as an unhealthy boy of a morose character, with

Antonio Camsova

(after Freyer).



Fig (a)

Karl V.

(after Freyer).



Fig: (b).

a pimply face, always breathing through his mouth which was always open; his breath was bad, he spoke through his nose (*parlent du nez*), had a chronic ear discharge and always had a great antipathy to study. Michelet asserts that he suffered from hereditary syphilis while another author attributes his symptoms to the scrophulous diathesis. He died from meningitis in 1560.

The Emperor Marcus Aurelius presented the appearances of an adenoid subject.

Treyer also refers to the bust of a young woman⁽³⁾ in the Braccio (Chiaramonti) of the Vatican Museum (fig c) as having an adenoid face, or as he aptly puts it "a mouth carrying out the function of a nose".

On examining the more recent literature on the subject one finds that adenoid vegetations were first seen by Czermak.⁽¹⁴⁾ In 1860 he reported a case in which he had noted two small tumours in the upper part of the nasopharynx on the left side close to the opening of the Eustachian tube, part of which looked like a "cock's comb". Unfortunately, he did not seem to fully recognize the importance of what he saw.

Fig. c



Bust in Braccio Charamonti (no 192)
(after Freyer).

Voltolini⁽⁵⁾ in 1865 noticed a man who had some growths projecting into the nasopharynx, the electric cautery was applied to these growths and this was found to improve the hearing.

About this time also Lowenburg⁽⁶⁾ observed some cases, but he like Czermak and Voltolini failed to grasp their true significance.

In 1865 also, Sir Andrew Clark⁽⁷⁾ in a paper on Nasopalatine Gland disease, drew attention to the presence of "focled cheesy masses", which he thought were contained in the cavities of the glands.

It was left however for Wilhelm Meyer of Copenhagen to recognise the clinical importance of the condition, and to give to it the name of "adenoid vegetations". In the year 1868 he published a paper which was read before the Royal Medical and Surgical Society in the following year entitled "On adenoid vegetations in the nasopharyngeal cavity - their pathology, diagnosis and treatment".

This paper appeared in the Transactions of the Royal Medical and Surgical Society of London in 1870.

In this paper⁽⁷⁾ he calls attention first of

all to the defects of speech, now known as the adenoid speech, coinciding with a very marked defect of hearing, like a chronic cold. He was unable to cure these two defects by removing the swelling of the mucous membrane of the nose and throat, and even after the removal of the enlarged tonsils these symptoms still remained.

This first case is very interesting and worthy of note as it shows how much he had been impressed by these symptoms and how he traced them to their true cause:—

A young lady¹⁸¹ consulted him for defective speech and deafness. Having cleared ~~away~~ the obstructed nasal passage and having removed the enlarged tonsils and the swelling of the nose and soft palate he found no improvement in these defects. Finding posterior rhinoscopy impossible he passed his forefinger behind the soft palate into the so-called naso-pharyngeal cavity and was very much surprised to find it almost full of soft masses which ~~felt~~ felt like earth-worms. After several fruitless attempts he at last succeeded in removing the growths and the patient's voice became

clear and she could breathe freely through the nose. Eighteen months after operation she reported herself and was quite well. On examining these specimens he found that they established their identity with the closed follicles of the mucous membrane of the nasopharyngeal cavity from which they arose, the relative quantity of blood vessels and the presence of real areolar tissue forming an immaterial difference between them. He even went so far as to lay down a rule that a "deaf patient who breathes through the mouth and has a thin compressed nose is affected with vegetations in the nasopharyngeal cavity, and to confirm this we do not even require to notice the speech."

It is impossible to speak too highly of Freyer's powers of observation and of the perseverance he displayed in tracing the symptoms to their true cause in spite of the numerous obstacles which presented themselves

Probably the greatest tribute ever paid to Freyer was by Sir Thos. Mackenzie when he said that the discovery of adenoids had prevented thousands of people from becoming

helplessly deaf.

He died in 1895 having lived to see the results of his labours fully recognised by the whole universe.

To emphasize the importance of the disease, it only requires one glance at some of its results. Suffice it to mention here deafness (80% of deaf cases being due to adenoids) and such reflex phenomena as asthma, laryngismus stridulus and the numerous catarrhal conditions to be mentioned later.

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Etiology.

In dealing with this branch of the subject one is at once impressed by the large number of factors which tend to the production of this disease. It is a matter therefore of no little difficulty to adopt a convenient classification, as in many cases the borderland between cause and effect is far from easy to define. The following classification seems to embrace most of the causative elements:—

I. Predisposing causes.

- 1 Age.
- 2 Sex.
- 3 Heredity.
- 4 Atmospheric and Climatic Environment.
- 5 Race.
- 6 Hygienic Surroundings.
- 7 Syphilis.
- 8 Tubercle.
- 9 Rachitis.
- 10 Rheumatism.
- 11 Deaf mutism.
- 13 Defects in Development.

II Euciting Causes.

- 1 Catasthal conditions
- 2 The Euanthemata.
- 3 Vertussis.
- 4 Diphtheria.

Predisposing Causes: -

1 Age.

In a series of 211 cases which I have had the opportunity of observing the youngest was 10 months and the oldest 16 years. It will be convenient to analyse these cases and compare them with the results obtained by other observers: -

<u>Age</u>	<u>Number</u>
0-3 years	20.
4-7 "	92.
8-10 "	68
12-15 "	29.
16 "	<u>2.</u>
	<u>211 = Total.</u>

It is interesting to compare the results of Meyer observation on his original 102 cases of corresponding age which were as follows ⁽¹⁾.

<u>Age</u>	<u>Number</u>
Under 5 years	3.
5-10 "	34

<u>Age</u>	<u>Number.</u>
10-15 years	25.
15-20 "	21..

The youngest case was 3 years.

In 500 cases collected by Mr. ⁽²⁾Brude and Logan
Turner the youngest child was 18 months -
their observations were as follows: -

<u>Age</u>	<u>Number.</u>
0-5 years.	57.
6-10 "	141.
11-15 "	115.
16-20 "	86.

From these figures the above mentioned authors draw the following deductions: - that adenoids are most common between the ages of 6 & 15 years, fairly common between 15 & 20 years and under 5 years.

My series of cases tend to show the commonest age to be between 4 & 11 years, while under 3 years they are often found.

It is stated by some that the condition is congenital as they have found adenoids in infants of a very tender age eg 9 months. I feel very tardy about accepting this theory because I have examined many children whose ages varied from two to ten months and I

have never found any signs of adenoids before the tenth month.

One would be fairly accurate in saying that the commonest age is about 8 years.

2 Sex

Sex seems to exercise very little effect in the causation of adenoids.

In 211 cases I found 97 ~~males~~ males as compared with 114 females:—

<u>Age</u>	<u>Male</u>	<u>Female</u>
0-3 years	8	12
4-7 "	47	45
8-11 "	29	39
12-15 "	12	18
16 "	1	0
	<u>97</u>	<u>114</u> = 211 Total.

In Freyer's series of cases 52 were males and 50 females.⁽³⁾ McBride and Turner⁽⁴⁾ found that in 500 cases 263 were males and 237 females.

Particular attention is paid by Freyer to the⁽⁵⁾ fact that the ratio of the sexes varies considerably at different periods of life and quotes as an example the age from 15 to 20 when he found 13 females to 8 males - he explains the fact

by observing that young women of this age pay more attention to their defects of appearance than do young men. I have found that the females are in excess of males at all periods of life, but I am unable to find any observer who has had the same experience. Most of the available evidence tends to show that males are in excess of females.

As an explanation of my results I would suggest that young girls are more frequently under the constant observation of their parents than boys, whose pursuits lie out of doors as a rule, hence their defects are more readily detected.

Sex therefore seems to be a very unimportant element in the etiology of adenoids.

3. Heredity.

Heredity is an exceedingly important factor in the causation of adenoids, but accurate information is somewhat difficult to obtain, especially in hospital practice, as on inquiry from the parents one is usually told that such things were not taken much notice of in their young days. But in spite of

this one is often able to elicit some history of "weakness of the Throat" in some parents. Family predisposition or proclivity, which should be distinguished from pure heredity is often found. In my series of 211 cases I have notes of 4 families in which more than one member was affected.

One instance in which 5 members were affected is worthy of note - 3 of these were under my own observation ~~and~~ and were operated on by me, while the other 2 were operated on by another man. A point of considerable interest in this family was that in the 3 cases which I operated on each bled profusely. I was fortunate enough to be able to trace the Doctor who operated on the other two, & on questioning him the cases were at once brought to his mind by the difficulty he had in arresting the haemorrhage. So we have here a history of 5 members of one family affected with adenoids, all of whom were bleeders.

The other families had 2, 2 & 3 members affected.

Crowley⁽⁶⁾ finds that 30% of his cases had more than one member of the family affected,

while McBride and Lerner found 30 out of 500 cases so affected.

Woakes⁽¹⁷⁾ lays great stress on the family proclivity and advances the following theory in regard to it: - "that the exact nature of the inherited proclivity is found in the inhibitory power exercised by the Vasomotor centres over the particular tissue involved, and leading to hyper nutritional states of this region; and ~~the~~^{which} condition of tendency to local vasomotor paresis is undoubtedly transmitted by parents to their offspring."

The time has not arrived for us to speak with a great degree of accuracy on the subject of heredity pure and simple, as the disease is of comparatively recent origin.

Crowley⁽¹⁸⁾ has paid a great deal of attention to this subject and finds that in 8% only of cases could he get any evidence of the disease in the parents.

4. Atmospheric and Climatic Environment.

People living in countries where a cold and damp atmosphere prevail are especially liable to adenoids, as people living under

Fig. d.



Young Greenlandic with adenoids.
(after Meyer).

such conditions are very liable to catarrhal conditions of the throat, and it is now a well established fact that catarrhal conditions are very potent causes of adenoids as will be seen later.

Again children living in towns are much more liable to adenoids than those who live in the country, because, in towns the atmosphere is always loaded with numerous dust particles and very often with acid fumes, which are bound to lead to irritation of the nasopharynx.

5 Race.

Reports have come from very distant quarters with regard to adenoids, and Meyer directed particular attention to this in his last paper⁽⁹⁾.

For example in Greenland out of 60 children examined only 16 (26.7%) were free from adenoids i.e. 44 (73.3%) suffered from this affection. Vide fig (d).

In North Dakota Dr. Quamy (as quoted by Meyer) found adenoids in a large number of children whom he examined.

In China according to Dr. Cantley they are found in pure Mongolians.

Adenoids are also prevalent in Sumatra, South East Africa and South America.

It therefore seems quite reasonable to assume that probably no race is free from adenoid vegetations.

6. Hygienic Surroundings.

This seems to be one of the most important factors in the causation of adenoids and for this reason viz: that children living in dirty, crowded rooms have their general health considerably impaired.

Also children who are badly fed tend to have their vitality greatly lowered and are rendered more liable to the exanthemata, which, as we shall see later, are most important exciting causes of adenoid growths.

I. Syphilis.

Syphilis especially the congenital variety is a factor of no mean importance in the causation of adenoids. What is the condition of the upper air passages in a case of congenital ~~syphilis~~ syphilis? Briefly they are as follows:— Coryza is one of the earliest and most constant of the local affections of syphilis.

a secretion is given forth from the Schneiderian membrane at first thin, but later giving rise to scabs. The thickening of the membrane caused by this inflammation renders breathing through the nostrils almost impossible and spreads downwards, and may affect the throat and larynx. A catarrhal condition of this kind must surely have an effect in the causation of adenoids. Doubtless one of the most potent ~~causes~~ factors of the inherited depreciation of structure of the organ of the body is syphilis.

Woakes⁽¹⁰⁾ in speaking of the Prae-catarhal state draws the following conclusions: -

In those subjects who from birth onwards show repeatedly recurring catarrhal tendency and in whom hypertrophic changes in the nasopharynx result from these attacks, there is found a disturbance of equipoise between the functions of nutrition and excretion, due to a defective working power inherent in the organs primarily concerned in these processes. And, further, the possession of a diluted syphilitic taint is a sufficing factor in determining the condition.

I have only notes of one case in which

adenoids were associated with congenital syphilis, but it seems now to be quite an established fact that adenoids are very common in children suffering from congenital syphilis.

8. Tuberculosis.

Meyer in his original paper feels inclined to regard *shuma* as the most important cause of adenoids, the more so as the structure of adenoid vegetations so closely resembles that of lymphatic glands.

One does not, now, feel justified in stating, that tuberculosis is the most common cause, but it would indeed be a most remarkable fact if the tubercle bacillus should leave the glandular structure alone, when it displays such liking for glands all over the body.

Again ~~the~~ Crowley feels disposed to look upon the majority of the cases of adenoids as being in children with the tubercular taint, and finds a history of Phthisis in 40% of his 350 cases.

Shield⁽¹⁴⁾ speaks of adenoids as being very prevalent in children and young persons of the "lymphatic temperament" in whom the slightest irritating cause sets up

hypertrophy

In my series of cases I was able to obtain a history of tuberculosis in 13% of them, therefore I do not feel disposed to agree with Crowley on this point, because adenoids seem to develop without any trace of tubercle being present at all and I think by far the greater majority are of this nature.

However it must be admitted that the inherited tendency to tuberculosis exerts an influence in the causation of adenoids.

9 Rickets.

In diseases where catarrhal symptoms are common we find adenoids very prevalent, under this description comes the disease called Rickets. I have been very much struck by the large number of cases of adenoids which I have seen associated with rickets, out of 413 cases in which evidences of rickets were found 30 (ie 26.8%) had adenoids in varying degrees.

Crowley ⁽¹²⁾ noted ~~that~~ ^{this} is 18% of his cases (350), but he also states that this does not represent anything like the actual number of cases in which rickets would have been found, had

he had the opportunity of examining earlier in life.

10. Rheumatism.

The subject of predisposing causes would I think be incomplete without reference being made to rheumatism. In children of the rheumatic diathesis, I have often been impressed by the tendency which they display to tonsillitis, the inflammation very frequently involving the pharynx. Especially have I noticed this in cases of chorea in which there was a distinct rheumatic history. It therefore seems quite natural to suppose that repeated attacks of catarrhs of this nature would predispose to hypertrophy of the pharyngeal tonsil.

11. Deaf mutism.

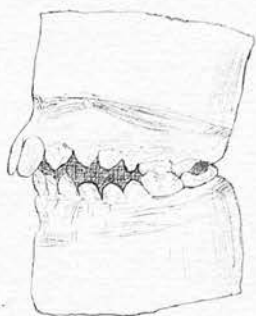
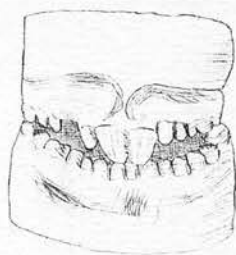
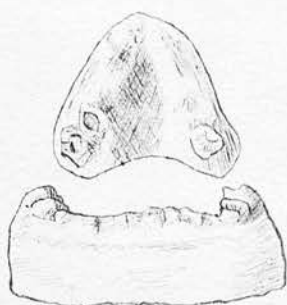
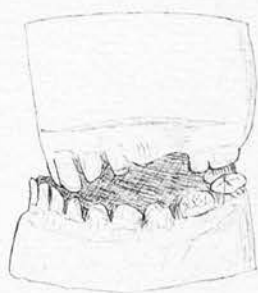
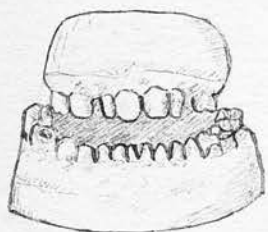
This has frequently been cited as a cause of adenoids. How far this is true it is very difficult to say, but it is interesting to note that the percentage of deaf mutes troubled with adenoids is very high - as high as 70% in some instances, while in apparently normal children the percentage is from 1-5%.

12. Defects in development.

In discussing the factors under the above heading one is at once confronted by the difficulty of drawing a line of demarcation between cause and effect.

As an example of this let us look at the much discussed V shaped palate. Is it not rather a result of adenoids than a cause? It may be granted I think without hesitation, that in persons who have narrow jaws, should they develop adenoids are much more likely to have symptoms of obstruction than persons with fully developed jaws. Has any explanation been put forward which throws light on this subject?

I think the explanation of Mayo Collier ⁽¹³⁾ worthy of note. Briefly his proposition is as follows: - In mouth breathers from obstruction air is drawn into the lungs mainly through the oral opening, this stream of air on its way to the lungs as it passes the posterior nares withdraws from the nasal cavity a portion of its air thus rendering the internal pressure much less than the external pressure. This increased pressure not only pushes up and elevates the hard and soft palate but it squeezes and approximates the halves of the upper jaw and so impedes its proper development



and expansion. This is exemplified in other parts of the body eg in Varicocele which is commonest on the left side because of the greater difficulty of blood getting into the left Renal Vein as it is at right angles to the Inferior Vena Cava, while on the right side it is oblique, therefore suction is greatest on the right side and less blood goes through the left Renal Vein than through the Vena Cava hence greater suction.

This explanation appeals to me more than any I have seen, and tends to prove that the V shaped palate is a result rather than a cause of adenoids. Maxy Collier's illustrations (vide p. 24).

Another deformity is Cleft Palate. In this condition Leuckhart's Tonsil is directly exposed to the irritation of a powerful current of air through the mouth. Also another cause of irritation in this deformity is the food which also comes into direct contact with the tonsil. Some authorities do not even allow this a cause, but say that it is ~~due~~ because we get a clearer view of the nasopharynx and hence we are not so liable to miss the hypertrophy.

In other conditions of deformity eg highly arched palate it seems very difficult to imagine how they can be pure causes of adenoids - but one

The adenoid tissue is becoming hypertrophied from the reasons stated above and when the cold eventually gets better we find that the hypertrophy of the adenoid tissue never vanishes totally but if the child is healthy it will of course entirely disappear. This process will go on being repeated till at last we have the adenoid tissue becoming so large that it gives rise to obstructive symptoms.

In like manner septic processes in the throat or nose will give rise to permanent hypertrophy of the adenoid tissue of the nasopharynx.

These catarrhal conditions of the throat are one of the most potent causes of adenoid vegetations.

2 The Exanthemata.

Most of these affections display, in a greater or less degree, catarrhal symptoms and act very much in the same way as "colds" and "sore-throats". Many cases can be traced to this cause, but it must be remembered that the fact of adenoid symptoms being first noted after a severe illness does not indicate that they have not to some extent existed before. Measles is especially important because of its mode of onset, and because of its catarrhal

sequelae. Crowley obtained a history of measles in 40% of his cases.

3 Diphtheria

In spite of this disease attacking the throat in such a vigorous manner, it seems to be a very ~~low~~ trivial factor in the production of adenoids - only accounting for some 2% of cases. I have never seen a case of adenoids following an diphtheritic attack.

4 Pertussis

This disease is responsible for about 2% of cases.

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Anatomy.

Before describing the condition of the hypertrophied pharyngeal tonsil it is necessary, in order to obtain a clear conception of the changes, to look at the structure of the normal pharyngeal tonsil.

The pharyngeal tonsil is a normal structure in the human body and is of foetal origin and is developed with the faucial tonsils.

It covers the roof of the nasopharyngeal ~~cavity~~ cavity from just behind the vomer, and also runs down the posterior wall, and extends from one fossa of Rosenmüller to the other. Vestigial prolongations are met with in the fossae of Rosenmüller and according to most authorities on to and even into the Eustachian tubes.

According to Grautman⁽¹⁾ the pharyngeal tonsil may be divided into an anterior and a posterior part. The former is subdivided ~~into~~ by six anteroposterior clefts, while the latter running towards Rosenmüller fossa is also cleft, but the furrows run forwards and outwards.

When removed en masse the pharyngeal tonsil is a fleshy lump, very soft, bleeds easily and it is furrowed in appearance, a marked depression is noted dividing it into two lateral halves, this

depression being called the "Recessus Medius". By union of the ridges on either side of this depression an enclosed space is formed in which exudation may be retained leading to cyst formation.

Structure.

Tricinscopically the pharyngeal tonsil may be divided into layers as follows:—

1. Epithetium is 0.11 mm thick. It consists of cells of the ciliated, columnar type, ciliated at their free borders, and containing deeply stained nuclei; they are conical below and slightly granular.

Below this layer of cells one finds six layers of cubical and ovoid cells which rest on a fine basement membrane which is a fine band without definite structure, the uppermost layer of this row of cells sends spindle-like processes between the lower parts of the columnar cells.

Immediately above the basement-membrane and below the second layer one finds a row of cells with nuclei.

Thus there are three layers of cells resting on a basement membrane.

2. Membrana Propria.

Is the true adenoid tissue and is from 10 to 20 times thicker than the epithetium. It consists of

a very fine network of connective tissue fibres in which are numerous lymphoid cells, very well seen on staining. Spindle cells are also seen. In this reticular layer closed follicles are found. The reticular layer is thick at the periphery and loose at the centre and is filled with lymphoid cells. According to Hautman⁽²⁾ capillaries reach up to this layer, but I think it would be much more correct to say that bloodvessels, capillaries and lymphatics are found in this layer. Stellate spaces are also seen.

3 Submucous layer.

This layer consists of bands of nucleated fibrous tissue containing bloodvessels and lymphatics. Leucocytes are also seen. Most of the mucous glands are found in this layer, they are convoluted in type and are lined by nucleated columnar epithelium.

Below this layer and joining at one end the Basilar fibro cartilage; it, however, takes no part in the gland itself.

The above description of the normal pharyngeal tonsil affords one some points upon which to base a discussion on the hypertrophied state

Physiology.

The exact rôle played by the pharyngeal tonsil is not accurately known. Our knowledge so far seems to confine itself to the part played by the leucocytes which is of a double character.

Many of the leucocytes pass into the lymph stream and then into the blood; many however pass out onto the surface of the structure and act as phagocytes destroying any organisms which may be present. When the tonsil is in an hypertrophied condition the leucocytes do not seem to pass out so readily. This is important in connection with the question of infection of other glands through the tonsil to be discussed later.

Pathology.

It is now necessary, having briefly described the structure of the pharyngeal tonsil in its normal condition, to pass to the examination of the changes which take place when the tonsil becomes hypertrophied.

Before doing so however one may say a few words as to the sites selected by these growths. The most common sites are the posterior and superior walls

of the nasopharyngeal cavity, this was first noticed by Meyer⁽³⁾ and has been verified by later observations. The vegetations are also met with in Rosenmüllers fossae very frequently, and according to some writers they are seen growing from the margin of the choanae and from the Eustachian tubes. They are also found at times between the orifices of the Eustachian tubes.

A few words may be said with regard to the macroscopical appearances of these growths. Meyer⁽⁴⁾ originally described them as consisting of three forms: -

- 1 Crustate ~~in~~ the fossae
- 2 Cylindrical on the lateral walls.
- 3 Flat on the posterior wall.

These may be again divided into the soft and hard varieties according to the locality from which they spring. The latter seems the better classification.

The more usual and recent grouping is: -

- 1 Pedunculated
- 2 Sessile.

These again being divided into the soft and hard varieties.

On examining an hypertrophied mass after removal

Admirals removed from Rasopharynx



Fig. 2

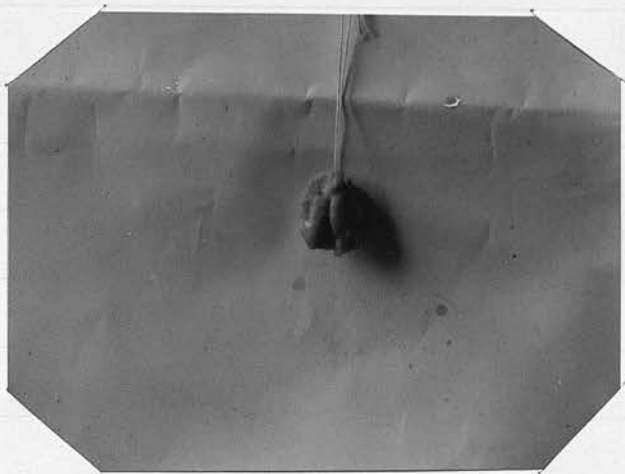


Fig. 2'

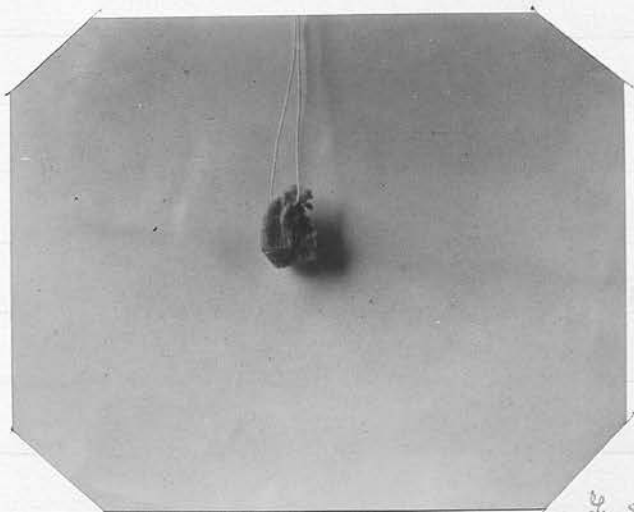


Fig. 2''

Adenoids removed from *Macrophysum*.

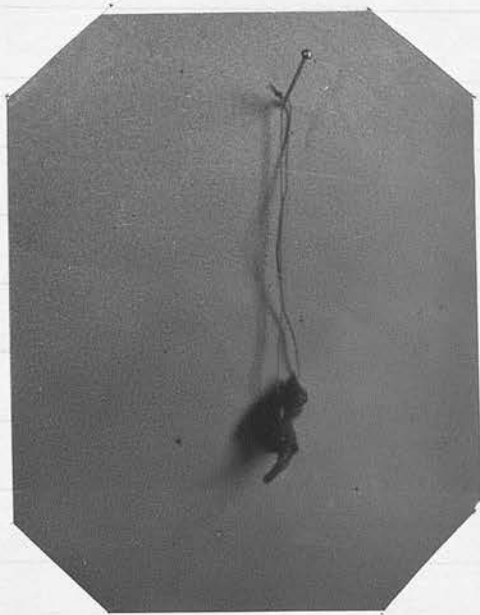


Fig. 2^m

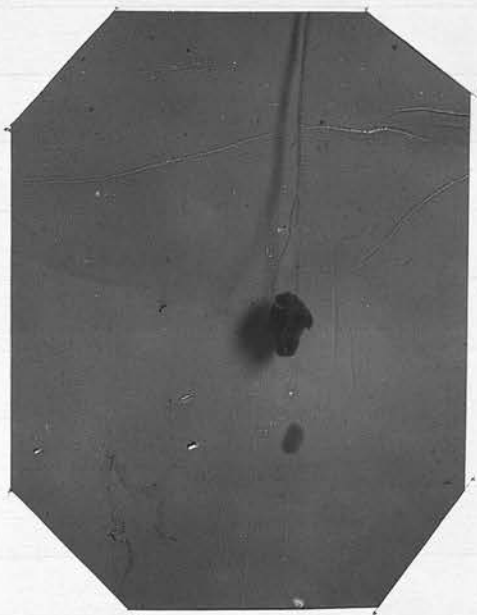


Fig. 2^{iv}

one finds the furrows, already mentioned, still well marked, in fact in many cases they are seen more distinctly thus showing clearly that the change is purely one of hypertrophy and not merely the formation of encrescences on the surface, because if the latter was the case the ridges would tend to become occluded. (Vide pp. 25 & 26)

Cysts are sometimes found in the mass removed and are generally due to a budding over of one of the furrows.

Microscopically.

Epithelium undergoes changes in structure. In many cases it consists of a distinct alteration in type, becoming stratified squamous in variety and considerably thickened. This change is not general but only localised and is often found in young children showing that the cause is not dependent upon prolonged hypertrophy, it is more likely due to the pressure of the growth upon the walls in the smaller nasopharynx of the child. A point which tends to favour this view is that the epithelium is often thickened over cysts. The pressure to which adenoid vegetations are subjected is intermittent in

character and it is a well known fact that intermittent pressure causes hypertrophy. The pressure is chiefly due to the action of the soft palate during swallowing. In some cases the ciliated epithelial type is still present but it becomes thickened.

It is however often found that the opposite condition exists namely that the epithelium becomes thinned even to a single layer devoid of cilia, this is mostly found in the exposed parts and is probably caused by friction.

Support is given to this view by the fact that thinning occurs also in the crypts where the adjacent surfaces are closely opposed. This thinning of the epithelium occurs over large areas. Epithelial cysts are often found in these cases containing mucus chiefly.

Considerable changes occur in the fibrous and lymphoid tissue of the growths. There appears to commence round the bloodvessels an overgrowth of fibrous tissue by a process of perivascular sclerosis, this gradually invades the lymphoid tissue and we often get areas of cells isolated by this process. It is doubtless due to this that the shrinking of the adenoid mass occurs. The process seems to have no

relation to the age of the patient.

McBride and Turner⁽⁵⁾ found it to occur in 50% of their cases under 7 years of age. In a child of 3 this process was observed to have reached a very advanced age.

Bibliography

- (1) + (2) "Hyperplasie der Rachen Tonsille" Krautmann.
- (3) + (4) "On Adenoid Vegetation in the Nasopharyngeal Cavity." *Lancet*.
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- (5) "Nasopharyngeal Adenoids" McBride & Logan Turner.
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Symptomatology

It will now be convenient to pass to a most important section of this subject named the symptomatology. This section extends over a wide area and I feel great difficulty in deciding under which headings the symptoms will be most conveniently discussed, many of the symptoms depending on the position of the growths and others on the degree of hypertrophy.

The line of demarcation is so narrow in many instances that whatever classification is adopted the result cannot be said to be quite satisfactory. I have decided to use the following method of classification: -

- 1 Obstructive Symptoms.
- 2 Catarrhal Symptoms.
- 3 Reflex Symptoms.

1 Obstructive Symptoms.

a The first symptom to look at under this heading is that of the "Adenoid Speech".

This is one of the most important and frequent symptoms in the study of adenoids. ~~in~~

This is the symptom which in many cases is first noticed by the parents, who often tell you that the child ~~can~~ speaks through the nose and is unable to pronounce its words distinctly. The child at first glance seems to be suffering from a chronic cold. This symptom was the one first ~~is~~ remarked upon by Meyer in his original paper. The letters which the patient is usually unable to pronounce are the nasal consonants *sq*, *m* and *n*, the child will say "cobod" instead of "common", "doze" instead of "nose", "soqq" instead of "song".

This speech has been aptly termed "dead" in character, the sounds are quite muffled and the ~~is~~ voice is very wanting in resonance. Meyer quotes⁽¹⁾ the results of various examinations made to discover the prevalence of these symptoms. In Copenhagen 2000 school children were examined out of which 20 is 1% had either a total or almost total "dead" speech. In England at the Davesstock Hill orphan school 700 children were examined and in 1.9% a more or less dead speech was found. In Sweden 623 children were examined and 7.7% had

this type of speech while in Holland out of 4265 children placed under examination 57% were unable to articulate properly.

So characteristic is this "dead" speech that many say that it alone is sufficient for purposes of diagnosis.

It may be well to mention here what are described as Impediments in the speech apart from those produced by nasal obstruction.

These are fairly common. Stuttering and stammering were frequently noticed by Mr. Bride and Turner⁽²⁾ but these authors have difficulty in believing that they are really produced by adenoids, although they record a case in which improvement followed operation. This patient could pronounce m and n quite accurately but he was unable to pronounce a number of consonants so that his speech was difficult to understand thus c became e, f equalled et, g = te, h = ate, j = ta, s = st, v = e, x = et, and y = i.

I have never met with a case of either stammering or stuttering that could be improved by the removal of these adenoid

vegetations.

The next symptom to note is that of "moult-breathing".

When a person breathes through the moult he at once loses the benefits which accrue from the passage of air through the nose, namely the warming and filtering of the air. One can readily imagine that air passing only through the moult enters the upper air passages in a cold condition and laden with impurities.

These two abnormal factors are bound in course of time to set up a chronic inflammation of the pharynx, trachea and bronchial tubes.

Again it is an established fact, that when a person breathes through the moult a sufficient quantity of air is not inhaled, the natural consequence of this is that the ~~air~~^{blood} is not properly oxygenated and we find an excess of Carbonic Acid gas present. This impure condition of the blood gives rise to a train of symptoms somewhat of the following nature :- headache, drowsiness, inability to work or take exercise, the patient at last losing all power of concentration of thought. Inu general results also follow on this

condition is: loss of appetite and consequently the general nutrition of the body is seriously affected.

The effect of the open mouth on the appearance of the patient will be fully discussed in the next paragraph.

Attention may now be turned to the discussion of the "Adenoid Face" which has become almost classical.

Although this symptom has been found to be present in a large number of cases it is by no means universal. We find cases of very well marked adenoids displaying a normal countenance and on the other hand we get cases having an almost typical adenoid face, but on examination no adenoids can be found. However the majority of patients suffering from well marked adenoids have the adenoid facies.

The general expression is somewhat of the following character:-

The patient has an open mouth, thick lips, the upper one usually drawn up displaying the incisor teeth, a vacant expression approaching almost to that of stupidity

and idiocy, pointed nose, heavy dull and listless. Often, one finds a discharge from the nose or ear or from both.

The nose varies considerably in formation. The majority of writers seem to lean to the pointed nose with narrow nostrils. In most of my cases the nose was not pointed as is seen from the accompanying photographs.

Dr. Brude and Turner divide the type of nose into 2 classes:⁽³⁾

1 The pointed variety which gives a budlike appearance to the features which they describe as by no means unattractive and in many instances rather "aristocratic".

2 The snub variety.

The eyes are usually devoid of expression.

Development of the posterior nares is

sometimes arrested and in these cases

the nasopharynx is usually small. On

the other hand the adenoids seem to expand

the posterior nares in some cases the upper

margin becoming in shape somewhat like

an inverted V., and the adenoids then occupy

the angle and greatly impede nasal respiration.

The nasal obstruction also arrests to a certain

degree the growth of the superior maxilla the

Fig (5)



Girl, aged 10 with adenoids.

Fig (8)



Boy, aged 12 with adenoids.

Fig. 10.



Boy aged 8 with adenoids.

Fig. 11.



Girl aged 11 with adenoids.

V shaped palate resulting which has been fully described above.

The teeth tend to overlap, the upper incisors being in front of the lower ones and the canines are often displaced. The incisors are usually uncovered due to the upper lip being drawn upwards. It is by no means rare to find two teeth developed in the same anterior plane. The teeth are generally carious, the explanation being found in the fact that during buccal respiration more tartar is accumulated on the teeth than is found in a healthy condition. The lower jaw is often found to droop. The malar bones are very prominent due to narrowing of the alveolar arch.

Illustrations of adenoid faces will be found in photographs (figs. f.g. h. i.).

Another symptom which may be mentioned here is that of snoring. It is a natural sequence of mouth breathing and is noticed in about 90% of cases (Crowley)⁽⁴⁾

It seems to be caused in the following manner, the passage of cold air over the pharynx sets up an irritative process which causes swelling and accumulation of secretions thus giving rise to a greater degree of obstruction than would

be caused by the presence of the adenoid growth alone.

A symptom which is often noticed is that of night-terrors, which causes great distress to the patients. In Yawsley's ⁽⁵⁾ 307 cases it was found that 56% had night-terrors in varying degrees and he makes special mention of the fact that many of these cases complained of smothering sensations as if they were being smothered with pillows. This gives colour to the theory that these night-terrors are due to imperfectly oxygenated blood acting on the brain. One case is quoted ⁽⁶⁾ by Dr. Bourde and Turner namely "a baby aged 15 months old who suffered from periodic sarache and constant sleeplessness, never resting for more than half an hour at a time and then waking with a cry. The child did not snore, had no difficulty in ~~breathing~~ feeding and threw well, while during the day he was happy and good-tempered. The adenoids were detected in trying to discover a cause for the recurrent-subacute attacks of middle ear inflammation, they were in considerable amount, and from the time of their removal the child has slept well although he had a temporary ear attack.

The parents of patients have often told me about the way in which children woke up suddenly, as if in terror about something they had been dreaming, this led me to enquire further into the matter and I found that out of 72 cases which came under my care subsequently 11 complained of this symptom; 4 of these were too young to describe what they felt, of the remainder (7 cases) 3 complained of a choking sensation, one of drowning and 3 could not give a clear description but only complained of being frightened of something in a dream.

It will now be convenient to look at the effect of adenoids on the mental condition of the patient. These symptoms are of very grave importance because the child's teachers and parents are unwilling to believe that their child is dull and rather lean to the belief that the child is lazy, consequently the unfortunate child is driven to work and not being able to keep up with his fellows, is punished accordingly. On examining cases of this kind more closely one sees that the cause is not laziness, because on taking the child away from his work and putting him down to play

he shows no more desire to amuse himself than he did to work. He does not run about and play with other children, he prefers rather to sit about quietly taking no interest in his surroundings. The condition seems to be one of inability to concentrate the thoughts described by Guye as "aphrosesia" or lack of mental power which renders the child dull and stupid. This however is by no means a universal symptom (Crowley found it only in 28% of his cases. In many instances a child with adenoids is bright and intelligent. Dr. Boude and Turner are inclined to regard this symptom as due to the effect of obstruction on the nervous system (not reflex) while continental writers ascribe it to the lymphatic connection between the nose and subarachnoid space. Others consider it is due to the child being deaf, i.e., that there is no real dullness but only an inability to hear what is being said to it. I have only come across one well marked case of "aphrosesia", this was a child of 5 years sent to Hospital as suffering from some cerebral affection possibly tubercular in nature. On examination the child had a dull and vacant expression, was very listless and continually complaining of headache and was always

inclined to sleep. The lungs contained mucous rales at the bases. Appropriate remedies were applied without any improvement. On examining the pharynx I found a mass of adenoids which were removed under Nitron oxide gas and very quickly signs of improvement manifested themselves. I saw the child 3 months later and she had gained considerably in weight, the lungs were clear and she was quite bright and able to attend school regularly.

A few other milder cases I have seen, but even they were not numerous.

Headache is a symptom sometimes met with and is worthy of mention. It is usually frontal in character and I have seen it in some cases but certainly not in a large proportion. Dr Poide and Sumner in 500 cases did not find a single instance of headache whereas Crowley found it in 55% of his cases nearly half of which were cured by operation. The cause may doubtless be traced to the imperfect oxygenation of the blood attendant on nasal obstruction.

Trask gives the following case which illustrates the condition: -

"A girl aged 15 had daily frontal headaches. She



was unable to breathe through the nose during sleep, which was never refreshing, and she was slightly deaf with coids. On examination she had marked adenoids. Their removal under Ethyl Chloride afforded complete relief.

Crowley seems to have been particularly successful in relieving this distressing symptom as the above figures show.

It will now be convenient to pass to a most important group of symptoms produced by adenoids namely ear affections. It must be clearly understood that all ear affections are not of necessity due to obstruction, but as I mentioned before it is a matter of extreme difficulty to discuss the symptoms in groups as the line of demarcation is far from easy to define. Hence, for the sake of convenience all the ear affections will be discussed under this heading.

Without doubt the most important lesions produced by adenoids concentrate themselves on the organ of hearing. The amount of harm produced in this organ varies considerably, the deafness in some cases amounting almost to absolute inability to appreciate sound waves while in others the

damage is small in amount.

A word or two with regard to statistics: -

Woakes⁽⁸⁾ found that only 5% of his cases escaped some ear complication. Meyer found that out of 102 cases 72 suffered from disease of the ear. Crowley⁽⁹⁾ had a percentage of 60 suffering from deafness in a varying degree. H. Hude and Turner⁽¹⁰⁾ found that out of 500 cases 304 suffered from deafness, of these 304, 22 were deaf in one ear only. In 98 of these cases however there were evidences of past or present middle ear suppuration, while in eight the patients suffered from what has been variously described as middle ear sclerosis, ankylosis of the ossicles and profuse catarrh. In 25 cases earache was a prominent symptom.

In my 211 cases deafness was a symptom in 123 (58.3%) of cases while 52 (ie 24.6%) had aural discharge.

In discussing the manner in which adenoids bring about these changes in the organ of hearing we will look first at the Eustachian Tube obstruction of which is the commonest cause of ear mischief.

Obstruction of the Eustachian tube may be brought about in 2 ways: -

1/ By direct mechanical pressure on the orifice,

a mass of adenoids extending into the fossa of Rosenmüller and so occluding the orifice. The onset of the deafness in these cases is usually slow and gradually increasing till finally the deafness becomes absolute.

Besides the pressure element in the production of deafness we have to remember that vegetations may grow right into the Eustachian orifice and so cause grave danger to the middle ear.

2 The next way in which adenoids cause obstruction of the Eustachian tube is as follows: -

Suppose a mass of adenoids, lying in the nasopharynx, becomes inflamed, there is nothing to prevent the inflammation from spreading up the Eustachian tube and giving rise to a stricture which will obstruct the tube.

The method occurs much more frequently than the pure mechanical method.

One may even go a step further in speaking of this inflammation. The inflammatory mischief may spread right up the Eustachian tube into the middle ear itself, and there set up inflammatory processes. These cases are not nearly so amenable to treatment as the former cases and often result in ankylosis of the ossicles and adhesions.

We may now pass to consider the results which the presence of organisms in the nasopharynx produces on the ear. A mass of adenoids occupies the nasopharynx, this cavity cannot be described as a sterile one as numerous organisms are found in it amongst which are the *Staphylococcus pyogenes aureus* and *Streptococcus pyogenes* and also other organs of suppuration. Suppose this mass of adenoids is subjected to a local congestion eg "cold" or one of the exanthemata it becomes a veritable breeding ground for the organisms present and they grow and multiply under such favourable conditions. The congestion spreads gradually to the Eustachian orifice and passes up the Eustachian tube, the organisms pursue the same course but finally they arrive in the tympanic cavity and there set up their suppurative processes and give rise to a suppurative otitis media. This method of infection of the middle ear is often overlooked. The ear is examined and a correct diagnosis of suppurative otitis media is made, treatment is applied and no improvement - rather place. In all cases of this nature the nasopharynx should be most carefully examined especially in children as no permanent-improvement-

will accrue till the adenoids are removed.
Inflammation of the mastoid cells may be
produced by this infective process and according
to some authorities it is of fairly frequent
occurrence from this cause.

The results of removal of adenoids on hearing
will be discussed when dealing with prognosis.

I now come to the discussion of the subject of Deaf-mutism in connection with adenoids. Numerous authors give statistics with regard to this condition and they show that a large proportion of cases of deaf-mutism have adenoid masses in their post nasal spaces.

Frankenberger (quoted by Dr. Pouch & Sumner)⁽¹¹⁾ has collected complete statistics and found that 59.49% of his deaf-mute cases had adenoids. Lemcke found 5.8%, Wróblewski 57.5% and Aldrich 73%.

In my 211 cases I found 2 cases of deaf-mutism. One case was brought by its parents to have its tongue put right - believing it to be tongue-tied. On examination the tongue was quite normal, the child was 2½ years old and had never spoken a word, neither could he hear. On examination of the ear I found both membranes indrawn, no discharge from the ears. ~~the~~ On putting the finger into the nasopharynx a thick pad of adenoids was felt which bled somewhat freely. These were removed under an anæsthetic. The child was kept under observation for 3 months, & attempts were made to get the child to articulate but I regret to say that no success ensued. The child did not return after 3 months.

The other case is reproduced in the accompanying

fig. 131



Wrat mute referred to on page. 59.

photograph, ^{Fig. 18} The child was 3 years old, very deaf and had never attempted to speak. The nasopharynx was full of adenoids which were removed under an anaesthetic. I saw the child 2 months after operation and no improvement had taken place either in speech or hearing. The patient has been lost sight of since. Judging from these 2 cases I cannot say that I have met with any success as regards improving their speech and hearing, but one is consoled by the fact that both children became able to breathe through their noses, and their general health improved, so I think one was quite justified in performing the operation.

Mr Bude and Sumner have met with a large number of cases, and have invariably come to the conclusion that, in addition to changes observable in the middle ear, the auditory nerve or labyrinth was involved.

Jeansley ⁽¹²⁾ quotes several cases in which distinct improvement followed operation and says that all adenoids present in cases of deaf-mutism should be removed, as the general condition of the child is so much improved after operation.

With this latter view I entirely concur, especially in cases of deaf-mutism, because in any case

I have seen the children have had very great difficulty in breathing and have been of a decidedly flabby consistence, the latter being due most probably to the feeble nourishment of the child owing to deficient oxygenation of the blood.

One cannot abstain from making a few remarks about the general condition of patients suffering from adenoids. For example the growth of these children. After seeing a large number of cases one cannot help being struck by the large proportion of them who display appearances of retarded development. They are usually stunted in growth, narrow chested, devoid of muscular power and of a puny nature. These conditions are doubtless due to the fact that the impeded entrance of air produces a tendency to defective respiration of air and consequent decrease in the oxygenation of the blood, tending to lower the general nutrition of the body.

On removal of the obstruction and provided the after-treatment is thoroughly and carefully carried out a marvellous change occurs. The child increases in height and girth, and

Consequently in weight and assumes a healthy appearance provided of course that there is no coexisting disease.

It would not be out of place to mention, while speaking of the general condition of the body, certain deformities produced by nasal obstruction dependent on adenoids, more especially those connected with the chest.

As the entrance of air is impeded the lungs do not expand to their full extent, and consequently more or less of a vacuum is produced, hence the pressure of the external air on the chest wall becomes considerably higher than the internal pressure. The natural result of the abnormal condition is that the costal cartilages give way before the pressure of the external air, and the sternum is protruded in a forward direction. At the same time the lower part of the sternum is drawn in by the action of the attached fibres of the diaphragm. The condition then produced is known as "pigeon-breast."

I have frequently noticed this phenomenon of "pigeon breast" especially well marked in children who have adenoids associated with Rickets.

where the bones are somewhat late in ossifying.
Anterior and lateral curvature of the
spinal column are sometimes due to the
effects of ^{the} obstruction mentioned above.

Night sweats were found to occur in many
instances by Woakes⁽¹³⁾, who states that they
are probably due to the complementary
activity of the skin, acting as a set off
to the impediment to respiration.

II. Catarrhal Symptoms.

It will now be convenient to pass to the consideration of the second group of symptoms ~~namely~~ namely "Catarrhal".

I will endeavour to deal as systematically as possible with the tracts which may be affected by catarrh of the adenoid mass in the nasopharynx.

Catarrhal conditions in connection with the auditory apparatus have already been discussed. The first for consideration will be the effects of catarrh on the nose.

One is at once impressed by the number of patients whose parents state that they are continually suffering from colds, in fact some say that they are scarcely ever free from them, and the child is frequently wrapped up till it can hardly breathe in the vain hope of curing the cold. The child certainly does present all the symptoms of a chronic cold. One is compelled to believe that adenoids act as a predisposing cause to colds and sore throats. I have over and over again experienced great difficulty in getting parents to consent to let their children have their adenoid vegetation removed, as they are

inclined to imagine that it is a very drastic measure to resort to for the cure of a cold. The effect however of the removal of the offending mass is attended with most excellent results in such cases as I have just described, and I am convinced that in many instances the only way to cure this chronic coryza is to remove the adenoid mass as soon as possible.

Another symptom in this connection is that of discharge from the anterior and posterior nares. This "flux" varies considerably in intensity, and in many instances becomes very troublesome especially if it be from the anterior nares as it leads to an eczematous condition of the upper lip for the cure of which ointments are tried in vain.

I have often noticed when examining the pharynx that there has been a lump of mucopurulent material, very tenacious in character, sticking to the posterior wall of the pharynx curvy - and evidently coming down from the posterior nares, and which the patient experiences great difficulty in dislodging. I would suggest that in many cases this lump of mucopurulent material is the cause of that short cough so frequently

met with in cases of adenoids, and by this means the patient endeavours to dislodge the offending material which clings so tenaciously to the rough posterior wall of the nasopharynx, so different from the smooth wall of the normal cavity.

It would seem quite natural to conclude that this abnormal condition of the nasal cavity would produce some impairment of the functions of the sense of smell especially when the nasal fossae were greatly blocked. This however does not seem to be the case in many instances. I have never met with a case myself.

The same remarks would apply to the sense of taste but this also seems to be of rare occurrence, although McBrude and Turner ⁽¹⁴⁾ quote a case of a boy aged 5 years who after having his adenoids removed began to enjoy and appreciate the taste of food.

While speaking of nasal affections one may draw attention to the fact that children, with marked nasal obstruction are unable to blow the nose. This gives rise to great inconvenience especially

if the patient is unfortunate enough to catch a cold.

The condition of epistaxis is also worthy of mention. I have met with it in 3 cases. Suffice it to note one of these namely a boy aged 9 years came to me with bleeding from the nose, on several occasions. I carefully examined each nostril but failed to discover an ulcer or any condition likely to account for the haemorrhage. On the second visit I examined his pharynx by posterior rhinoscopy and found it full of adenoid vegetations. - however I did not then advocate removal. He returned again in about 3 weeks having had 2 attacks in the meanwhile. I then advised removal of the mass. I saw him last about 3 months after the and up to that time he had had no recurrence of the bleeding.

Crowley found the condition present in $4\frac{2}{3}$ of his cases.

In this connection an interesting case of haemorrhage is quoted by Geasley⁽¹⁵⁾. The patient, a little girl, aged $6\frac{1}{2}$ years, was troubled with bloodspitting. She had discharge from both ears with occasional pain. She was a mouth breather

No physical signs in the chest. On examination blood was seen trickling down from the soft palate. She had a large mass of soft adenoids which were removed under chloroform. She had no recurrence of the haemorrhage.

This case seems very analogous with the one quoted above, except that in my case the blood was discharged through the nose doubtless due to a difference in the position of the adenoids. Possibly some catarrhal condition had excited the haemorrhage.

Sneezing is a symptom which has been attributed to the presence of adenoids. An interesting case in which a cure occurred is quoted by Marsh.⁽¹⁶⁾

A child, aged 6, was sent for incessant sneezing, every few seconds, except during sleep. She was not neuritic. Her tonsils were enlarged and adenoids were present. These were removed and a complete cessation of the sneezing followed.

I have never met a case like the one just described, but it is doubtless due to a reflex action set up possibly by some slight catarrh of the hypertrophied mass.

Deviations of the nasal septum are also met with,

while hypertrophy of the Inferior Turbinals is often associated with adenoids.

One may conveniently say a word about the association of adenoids with enlargement of the faucial tonsils.

I have made careful statistics and have found that in 211 cases of adenoids, enlarged faucial tonsils appeared in 66 cases i.e. 31.2%. In Guide and Turner found this condition present in 29.6% of their cases.

On the other hand I have found that out of 152 cases of hypertrophied faucial tonsils 121 i.e. 78.5% had adenoids associated.

These statistics are interesting because they tend to show that the hypertrophy spreads from the faucial tonsils to the pharyngeal tonsils. Seeing that the faucial and pharyngeal tonsils are developed together it is only natural that the connection between the two should be very intimate.

This brings me to the consideration of another cavity namely the Pharynx.

An adenoid mass situated in the pharyngeal cavity may be the seat of ^{an} inflammatory process set up by some catarrhal condition such as a common cold. The mass becomes congested, enlarged, and the obstruction caused by the mass alone is considerably increased and the breathing consequently becomes more difficult.

This condition may likewise be set up by some septic process. A case of this nature I met with in a boy aged 9 who had a mass of adenoids in the nasopharynx revealed by posterior rhinoscopy. I noted that the mass was studded all over with yellowish white spots. His temperature varied from 101° - 103° F. - he seemed very unwell and complained of intense headache. Not having met with this condition before I took a swabbing of the throat and a culture on agar-agar yielded a luxuriant growth of streptococci which was confirmed by the microscope. Upon a gargle of Carbolic acid and glycerine the condition soon subsided. The adenoid mass was removed about a month later. I find a somewhat similar case quoted by Dr. Bruce and Lerner (17)

in a boy of 13. The pathological changes in such a condition seem to be analogous to those which occur in a condition of follicular tonsillitis.

Another interesting condition is that in which one of the recesses in the pharyngeal tonsil becomes converted into a cavity called Tornwaldt's Bursa by adhesions. When the bursa becomes inflamed we get a condition set up known as Tornwaldt's disease which gives rise to post-nasal catarrh. The tendency of an adenoid mass to catarrhal changes likewise predisposes to this disease.

The inflammation arising in the pharyngeal tonsil does not always confine itself to that area alone. A spread of the inflammatory process takes place and it may pass down to the larynx setting up acute and chronic laryngitis. Doubtless a great factor also in the production of these laryngeal affections is the mouth breathing which renders the larynx very dry. Further the discharge which comes from the nasopharynx may with great readiness pass into the larynx and there light up inflammatory conditions of that organ.

The same remarks apply to the irritative conditions set up in the Glacis and Bronchi. It is even said that pneumonia may be set up in this way: and this seems quite feasible when one remembers that pneumococci are found free in the throat of healthy persons. Also the fact that the free entrance of air is interfered with, renders these cavities more susceptible to the action of microorganisms than they would otherwise be.

Swelling of the throat may also be caused by adenoids. Such a case is recorded by McBride and Turner⁽¹⁸⁾ in which the removal of the mass resulted in a complete cure of this unfortunate and distressing symptom.

While speaking of laryngeal conditions and their results it will be well to say a few words with regard to the Digestive System. This is a very important point in children where the gastrointestinal tract is so very sensitive and where the least abnormal condition will set up grave constitutional disturbances. For example the swallowing of the nasopharyngeal mucus may give rise to

irritation of the gastrointestinal tract and it is quite possible that any condition of this kind would sadly impede the child's development and might in many instances account for its stunted growth.

Again the blood in cases of adenoid obstruction often contains an excess of Carbonic acid gas which would tend to increase the peristalsis of the intestine. If this becomes very marked grave conditions may be set up such as severe diarrhoea and even intussusception might result.

III. Reflex Symptoms.

The affections of reflex character attributable to adenoids are somewhat numerous. In discussing them one is at once met by the difficult problem of discerning which are true reflex phenomena and which are only partially reflex. This is especially marked in throat symptoms e.g. spasm of glottis.

The first of these to be considered is "Stenosis". This obstinate and unfortunate condition is frequently met with in children suffering from adenoids, and I have noticed that the nocturnal variety is most common. In my 211 cases of adenoids 11 suffered from this distressing condition. In 7 the nocturnal variety was present, and in 4 both nocturnal and diurnal conditions prevailed. Two of these cases may be quoted:-

(a) A girl, aged 6, who had suffered from diurnal and nocturnal stenosis for 3 years. She was admitted to Hospital and appropriate remedies were exhibited with the result that the diurnal variety was cured, but the nocturnal variety still remained obstinate. Finally I examined her nasopharynx by posterior rhinoscopy and there found a large mass of adenoids. I was

not ~~permitted~~ permitted however to remove the growths.

(8). A girl, aged 5 who had been troubled with nocturnal enuresis for 2 years. Her nasopharynx on examination was found to contain a large quantity of adenoid vegetations. The growths were removed under Chloroform but up to the present (3½ months after operation) no improvement in her condition has taken place.

My other cases did not give very satisfactory results after removal although in 4 cases a slight improvement did occur. But I cannot lay claim to an absolute cure in any instance.

As regards the manner in which the condition is caused I would suggest that it is due to deficient oxygenation of the blood setting up a reflex action. I find that Dr Birds and Lumer endorse this view and in addition give it as their opinion ⁽¹⁹⁾ that it may be connected with impeded respiration or with a form of night terror. These authors have not met with many cases.

Another symptom which may be mentioned here is that of 'Cough'. The cough is usually of a hacking character. As I mentioned before

a great cause of the cough may be a plug of mucopurulent material adhering to the wall (posterior) of the nasopharynx. Such an offending body as this may set up a cough in two ways: -

a a direct-voluntary cough whose object is to dislodge the article.

b an involuntary cough with the same object in view but of a purely reflex nature.

I now pass to a condition which seems in many instances to be excited by adenoids, namely Bronchial Asthma.

The condition I think may be caused in either of 2 ways: -

1 By inhaling air through the mouth instead of through the nose; an inrush of cold air takes place, and this is bound to act as an irritant to the sensitive bronchial mucous membrane and a reflex spasm of the tubes is set up.

2 Its origin may lie in the nasal obstruction which causes forced and increased respiratory efforts.

McBride and Turner relate a case in which a temporary cure was brought about by the

removal of the adenoid mass.

I have only met with one case myself namely that of a girl aged 12 who suffered periodically from asthmatical attacks. Her nasopharynx contained a considerable quantity of adenoids which were accordingly removed. She went 3 attacks following the operation were not nearly so intense, although they were still most distressing. After this I lost sight of the patient.

Marsl ⁽³⁰⁾ records an interesting case in which he cured a boy of asthma by removal of the growths. "A boy aged 12 suffered from asthmatic attacks which kept him indoors for most of the winter. There was no obstructive symptom, but adenoids were found to be present on rhinoscopic examination. They were removed. He has been quite free from asthma since".

Whatever the etiology of this condition may be, one seems bound to confess that operations on the adenoid growths do not lead to very satisfactory results.

Another condition to be mentioned under this heading is that of epilepsy. I have only seen 1 case of adenoids associated with epilepsy.

The growths were removed but no permanent result followed. The age of the child was 7 years. I cannot find a record of any case of epilepsy cured by the removal of adenoids.

Chorea is a condition said to be caused by adenoids. I have frequently met with cases of chorea associated with adenoids but I have no notes of any case having been cured by their removal.

Jeansley⁽²¹⁾ on the other hand mentions several cases of chorea the cause of which he attributes to the removal of adenoids without an anaesthetic.

A few reflex symptoms such as Laryngeal Stridor, Laryngismus stridulus and spasm of the glottis may be discussed together.

I have not met with an instance of any of these 3 conditions but one is struck by the success which has attended the interference of some surgeons.

Ernst Smith⁽²²⁾ had a child aged 1 month who suffered from attacks of laryngeal stridor. The patient's adenoids were removed and there was no return of the attacks. He attributes the stridor to spasmodic contraction of the

any sphenoidal folds and believes this to be due to the irritation set up by the adenoids in the nasopharynx.

An interesting case of spasm of the glottis is recorded by ⁽²³⁾Maish: -

A child aged $4\frac{1}{2}$ had repeated attacks of spasm of glottis. The enlarged tonsils and adenoids had been removed 18 months before. The operation was repeated and there was no return of the spasms.

This case is interesting as it is also an example of the recurrence of adenoids 18 months after removal.

Spread of Infection from the Pharyngeal Tonsil to the Cervical Glands.

One frequently notices in children marked swellings of the cervical glands, sometimes unilateral and at other times bilateral. Some of these cases may be explained by the organism spreading from the pharyngeal tonsil to the lymphatic glands.

The processes may be divided into 2 classes

1. Subercular and
2. Nonsubercular.

The pharyngeal tonsil may be regarded as a lymphatic gland situated at the periphery. It is connected with the parotid and retropharyngeal glands and also with the upper set of the deep cervical glands i.e. those situated about the bifurcation of the common carotid artery and along the upper part of the Internal Jugular Vein. As described above the hypertrophied pharyngeal tonsil affords a most admirable site for the growth of organisms of various kinds, and considering its intimate connection with the lymphatic glands of the neck, it strikes one most forcibly that these glands must often be infected from the hypertrophied tonsil.

1. Subercular infection.

It has been shown by several authorities (see later)

that tubercular conditions of the pharyngeal tonsil exist - in a small percentage of cases, so it seems quite natural to assume that some of ~~these~~ cases of enlarged cervical glands arise from this point.

It is interesting to glance at the following table quoted by Dieulafoy⁽²⁴⁾ which shows results of some investigations on the subject: -

Pluch & Fischer	in 32 cases	5 tubercular	= 15.6%
Gottstein	" 33 "	4 "	= 12.1%
Brundie	" 64 "	8 "	= 12.4%
Lewin	" 200 "	10 "	= 5%
Luzzatti	" 50 "	2 "	= 4%
Weu	2/10 =	7 "	= 3.3%

Dieulafoy⁽²⁵⁾ experimented on guinea-pigs by inoculating them with portions of the hypertrophied tissue removed from the pharynx of 35, and 7 of the guinea pigs i.e. 20% became tubercular: -

<u>A</u>	Developed Tub. nodule	3
<u>B</u>	" tubercle without nodule	4
<u>C</u>	No result	<u>28</u>
		<u>35</u>

i.e. 20% or 1 in 5 cases were tubercular.

A source of fallacy must not be forgotten in connection with this experiment - namely that some of the animals may have been inoculated

with bacilli contained in the surface secretion while the true hypertrophied tissue may have been from tubercle. The percentage of Pflüger and Fischer (15.6%) however comes close to that of Dieulafoy. Dr. Birds and Lumer investigated 100 cases of adenoids and discovered evidence of tubercle in 3%, in one of which tubercle bacilli were found - in neither did caseation occur. In the 1st case enlarged cervical glands were present, in the 2nd case no enlarged glands, in 3rd case an old cicatrix was present in the neck which was due to the bursting of an abscess 3 years before, also a few enlarged glands. Wen has also found evidence of tubercle in a small percentage of his cases.

A word with regard to the histological appearance of these tubercular conditions when present: -

Pale areas are seen lying in the lymphoid tissue and containing multinucleated giant cells. The periphery is composed of pale, elongated, epithelioid cells while the interior is denser. Large giant celled nodules are also seen. Small caseous points are sometimes but not frequently present.

Summing up the evidence one may say that

a tubercular condition exists in a percentage of cases, and, that, taking into consideration the intimate lymphatic connection between the tonsil & the cervical glands, an easy passage for bacilli exists.

II. Non-tubercular.

One must not imagine that all ~~the~~ cases of enlarged cervical glands are due to tubercle, the organism of suppuration must also be taken into consideration. Streptococci ~~are~~ for example are continually found on the surface of the tonsil and lie there, awaiting some diminution in the resistance of the part eg: cold, to exert their influence. Owing to the close connection between the adenoid mass and the cervical glands any ~~foreign~~ tissue absorption will readily pass by means of the lymphatics to the glands in fact the microbe itself can pass with great readiness. I have often noticed that the glands tend to subside when the catarrhal attack ceases only to return at the next attack. Even after repeated catarrhal inflammation the glands do not as a rule suppurate, although I have met cases in which the glands have suppurated yet I

thinks one is safe in saying that the majority do not reach this stage. This path of infection is very important and I think that great benefit is derived from the removal of adenoids especially if the attacks are of frequent occurrence.

Dr. Bude and Turner⁽²⁶⁾ kept 32 cases of enlarged glands under observation, 30 were affected with enlargement (chronic) of the cartoid glands, 26 of which had bilateral enlargement. Twenty five of these were seen 6 months after operation on the nasopharynx and in none of these had the glands disappeared. At periods varying from 6-15 months after operation glands had diminished in size. In 4 cases 18 months after operation no diminution had taken place. They were hospital cases so that in ~~some~~ some of them a possible source of glandular irritation remained in slight enlargement of the faucial tonsils.

From these cases diminution of the glands does not take place as quickly as one would expect after removing the source of infection. There is no record of a case however progressing after removal, which is of great importance preventing as it does the advance toward suppuration. Taking all

the evidence together it seems most advisable
to remove the offending growths & so remove
the focus of infection.

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Diagnosis

Having discussed the symptoms of adenoids at some length it becomes necessary to say a few words about their diagnosis. It will at once be readily understood that an early and accurate diagnosis is essential for the future of the child. Many cases can be at once recognised by the typical adenoid face before described, also by the adenoid speech which is so characteristic.

One however does not always feel justified in relying wholly on one's immediate powers of observation in diagnosis, therefore it becomes necessary to have some confirmatory method.

1. The first method is one described by Graulmann⁽¹⁾ and is worthy of note. It will not apply however to all cases eg: when the growth is situated high up in the vault of the pharynx. This method may be conveniently called that of "Inspection of the Pharynx." On inspection through the mouth the faucial tonsils are enlarged also the uvula, the posterior wall of the pharynx is more or less swollen, red, oedematous and often infiltrated. To make a thorough inspection the soft palate and tonsils should be raised with a spatula

and in some cases the hypertrophied pharyngeal tonsil is at once brought into view.

I have not found this method of great value in these cases and this seems only natural when one remembers that adenoids are usually most numerous in what may be termed the nasal part of the pharynx and not in the buccal portion.

This method may often have led one to suspect adenoids if when the posterior wall of pharynx is covered with small lymphoid nodules about the size of a pea.

2. Posterior Rhinoscopy.

This method is of a much more service than the one mentioned above. By it one is enabled to explore the whole of the nasopharyngeal cavity. Perhaps it would not be out of place to describe the method commonly in use.

In children this method is often a matter of great difficulty as the mere sight of an instrument being passed into the mouth causes them so much alarm that the performance has to be abandoned. A good deal however may be ~~done~~ done by coaxing the child and explaining to him that he is not going to be hurt.

Numerous instruments have been invented for holding up the soft palate during this operation notably those of Fränkel and Voltolini. I have usually found them quite unnecessary.

The direct examination is best carried out as follows: -

The patient sits facing the observer with the light placed in a convenient position so that it can be reflected into the mouth by a mirror (either the head mirror or a spectacle mirror)

A rhinoscopic mirror is now selected (they vary in size and form some being movable and some fixed) the most convenient size is about $\frac{3}{4}$ " in diameter. The tongue is now protruded and held by the left hand of the observer guarded by a towel or the tongue may be depressed by a spatula. The patient is now asked to breathe quietly through the nose and the light is thrown into the throat. The mirror may now be introduced with the right hand care being taken to keep it vertical so as to avoid touching the soft palate in passing into the nasopharyngeal cavity or else you will get some reflex phenomena produced. The whole of the cavity cannot be seen at once however, so that the mirror must be moved about in different directions in order to see the

whole of the cavity. When the mirror is in the horizontal position we can see the vault of the pharynx; by inclining the instrument to the right or left we can see the Fossae of Rosenmüller. If the mirror is turned upwards and forwards we can see the nasal septum, on each side of which are the posterior openings of the nasal fossae; by turning it still further forwards we can see the nasal ~~to~~ meatus and the turbinated ~~to~~ bodies.

In very sensitive throats the surface may be brushed with a solution of cocaine before the examination is to be made. - or cocaine may be injected hypodermically.

A few remarks may be made with regard to the appearances seen in such a case of adenoids.

We may see a well marked pad of adenoid tissue more or less ridged, pink in colour and often covered with mucus. The masses may be pendulous in some cases. In a well marked case the hypertrophy may be so great ~~as~~ that the space above the palate may have become occluded.

Between the orifices of the Eustachian tubes a mass of hypertrophied tissue may be seen. Dr. Boile and Gurney lay particular stress on this point - for the following reasons: - should the interval be

quite filled up hearing will doubtless be interfered with, but should an interval remain between the adenoid pad and the tube it is possible that the hearing will not be interfered with.

3. Anterior Rhinoscopy.

This method is newly mentioned in passing. It is not nearly so satisfactory as the posterior form. It is however, sometimes useful in children who will not allow an instrument to be passed into their throats. It will not be necessary to enter into a discussion of this method.

4. Palpation or Digital Examination.

This method of exploration seems to give the best information regarding the presence of adenoids in the nasopharynx. To perform this one stands on the patient's right; passing the left arm round the patient's neck, the forefinger of the left hand, guarded by a towel, is passed into the left angle of the mouth, should the child wish to bite the cheek can be pushed in between the molars to prevent him doing so. The forefinger of the right hand is now passed behind the soft palate and made to traverse the vault of the pharynx rapidly. If adenoids are present the finger comes upon a

soft gelatinous mass, and if the examiner has the *tactus eruditus* of experience the growths will at once be recognised. On withdrawing the finger it is usually blood stained (should adenoids be touched) however light the contact may have been.

Differential Diagnosis.

Sarcoma

The affection of the nasopharynx is not often met with in children. These tumours are soft and give a feeling to the finger very much like that of adenoids. They are however smoother than adenoids and often bleed very copiously.

Fibroid Tumours.

These are much more sharply defined than adenoids on rhinoscopic examination. On palpation they are much harder than adenoids.

Tertiary Syphilis.

Two cases are mentioned by ⁽²⁾Yeasley. One occurred at the age of 10 and the other at 15. In each a mass was found in the nasopharynx which could not be distinguished from adenoids.

one case was operated on but was followed by perforation of the palate - the other was not operated on due to heart disease and later it perforated also.

A tuberculous mass in the nasopharynx may be mistaken for adenoids.

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Prognosis.

Speaking generally the prognosis in cases of adenoids is very good as far as the relief of obstructive symptoms is concerned provided no other cause exists at the same time.

In cases where mouth breathing has existed for a long time it is often difficult to get patients to breathe through their noses and a careful course of teaching has to be gone through in order to acquire this function.

Again the adenoid is often very difficult to remove and in many of these cases McBride and Turner are of opinion that the inability of the soft palate to shut off the nasopharynx is the cause. This however may be overcome in time.

Crowley in analysing his cases into four groups as follows:—

- a Those in which the result was quite successful.
- b Those in which the result was partially successful.
- c Those in which ~~no~~ improvement only took place.
- d Those in which no improvement took place.

It will be interesting and instructive to look a little more minutely into the cases which occurred under these headings:—

Group a. comprised 143 out of 200 cases and

in them all the symptoms caused by the adenoids were at once relieved. He lays great stress on the fact that children after having had the adenoids removed often tend to continue their habit of mouth breathing which must be strenuously guarded against - and suggests keeping a bandage round the child's jaw during the night - and continually correcting the child during the day.

Group b: comprised 23 cases. In these one symptom still remained either snoring, nasal discharge, ear discharge or deafness.

Group c. includes 25 cases in which improvement only took place. These are all accounted for in various ways eg. in one an elongated eustachian tube was present; in 3 others otitis media was the cause and so on.

Group d. No improvement followed operation in 8 cases. In 1 or 2 cases no adenoids were present and the others had some symptom or symptoms which were not relieved.

I have experienced great difficulty in arriving at a definite prognosis in my cases as one so frequently loses sight of them in Hospital practice I can only remember 2 cases in which improvement did not occur - one case was a deaf mute and the

other was a case of deafness.

It is quite a common belief that adenoids shrink about the age of 15. Now this is not strictly accurate because many cases have occurred in which it was necessary to remove the growths after this age - even in adults. Without doubt adenoids do tend to atrophy about this age but it must not be forgotten that the effects of adenoids produced before this age may tend to become permanent so that in most cases the idea that children will outgrow the adenoids is open to question. In this connection it must be remembered that at puberty the nasopharyngeal cavity increases out of all proportion to the adenoid mass hence the apparent diminution of the growths may be due to the enlargement of the nasopharynx.

The prognosis of cases with regard to deafness should receive consideration. It varies naturally with the aural condition which is present.

If the tympanic membrane is indrawn and one finds that of Politzer's bag markedly improves the condition great benefit may be anticipated.

In suppurative conditions of the middle ear we may

Three hours after operation

Watch { R. 9" L. 27" Whisper { R. 19" L. 14 feet. Loud Voice { R. 25 feet L. 25 feet.

The improvement in the left ear both in whispering and in answer to a watch are really marvellous.

A few words must be said regarding the recurrence of adenoids after their removal. It is a pretty general belief that recurrence is very rare. Cases have been recorded in which there seemed to be a recurrence of the growths but they are very few. Crowley however is of opinion that with whatever amount of care the operation is done, in quite an appreciable percentage of cases ~~there~~ will be a recurrence. It is a very difficult matter to get statistics with any degree of accuracy because should symptom recur the parents are very liable to take the child elsewhere. Recurrence of symptoms must be clearly distinguished from recurrence of adenoid growths. Symptoms do recur in many instances but they are very rarely due to recurrence of the adenoids. They are usually due to some other cause eg nasal affections, incomplete operations in which bits of tissue have been left behind which at once become swollen when the patient catches cold, or to the development of hypertrophied conditions of the tonsils.

Crowley had a true recurrence of symptoms in 30 out of 200 cases. In 22 of these adenoids were present.

I have only seen a recurrence in one instance.

It is necessary to remember that such symptoms as snoring and deafness often recur some weeks after operation if the patient catches cold but the return is only temporary in character and will soon pass away.

Time of recurrence 3 to 78 months after operation.

To sum up the results one may say: -

- 1 The prognosis is very good.
- 2 Risk of operation practically nil.
- 3 Recurrence rare.

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Treatment.

The diagnosis of adenoids having been made the question of treatment at once arises.

Although most surgeons advise operation one must not at once jump to the conclusion that all cases of adenoids must necessarily be operated on. The action of some surgeons in removing every case of adenoids which they see has recently been justly condemned. A few years ago it was quite the fashion for children to have their throats scraped whether symptoms of adenoids were markedly present or not. When one considers the serious results attendant on the neglect of adenoids one feels that careful observation and examination is necessary in all cases and should never be neglected, and if an opinion is arrived at that the operation is not necessary, one should never fail to point out to the parents that should any symptoms of note arise the child ~~must~~ must be brought back at once.

In cases where marked symptoms are present doubtless the most efficacious treatment lies in the removal of the growths.

The treatment at once resolves itself into 2 groups 1. Nonoperative + 2. Operative. These will be discussed in turn.

1. Non operative treatment.

This method still find considerable support among many practitioners, but in most recent works on the subject great stress is not laid on it. I must confess that I have not observed much good done by it although I have tried it in many instances. In cases where there is only a small quantity of adenoids which do not give rise to marked symptoms, one is justified in trying it, especially if the child is nearing the age of puberty, in the hope that the adenoids will undergo fibrous atrophy in a short time. Again when few adenoids are present, but on catching cold the growths swell and cause embarrassment of respiration, one may try this treatment in the hope that the inflammatory condition will subside and normal respiration be restored.

Remedies somewhat of the following nature

may be tried : -

℞. Sodii Bicarb. gr̄v
Calcii Chlorid gr̄v
Q_d ad ℥ii
℥.

This may be used as a douche, syringing
along the floor of the nose at the temperature
of the body.

A spray containing some astringent preparation
may also be employed : -

℞. Ac. Tannici gr̄xv
Sod. Bicarb gr̄xv
Glycem. ℥iſs.
Q_d ad ℥ii
℥.

In cases of adenitis with repeated inflammatory
attacks I have found Glyco-Thymoline of great
value. Use equal parts of Glyco-Thymoline
and water in an atomiser and spray the
throat frequently.

Antiseptics such as weak carbolic acid and
Chloride of Zinc may also be used.

Tincture of Iodo 15 grains to the ounce is also of
service in overcoming this condition.

Along with these local applications constitutional remedies must be prescribed amongst which may be mentioned St. Monique, Iron and the hypophosphites.

Climatic treatment may also be borne in mind remembering that damp atmospheres are conducive to adenoid hypertrophy.

Great perseverance will be necessary in carrying out any of these ~~or~~ methods or satisfactory results will not be obtained.

The use of caustics and the Thermo-cautery is never resorted to at the present day.

While speaking of non-operative treatment one must not fail to mention the method of Respiratory exercises advocated by Arbutnot Lane. I will give a brief summary of the method and then proceed to criticise it. ⁽¹⁾

The proposals are as follows: -

First, children should be taught to increase their vital capacity by breathing properly and efficiently. While performing this act of respiration all muscles not concerned in the process must be at rest.

When they are breathing freely a large quantity of oxygen is inhaled and the tissues perform their functions in a more satisfactory manner. The exercises should be performed in as good an air as can be obtained and should be supported by fatty foods.

Secondly, the mouth should be kept shut habitually, and certainly during the respiratory exercises. If the nasal passages are blocked with mucus, they should be cleared by vigorously blowing the nose. It is only under these conditions that air passes freely and forcibly in and out through the nasopharynx.

The result of these exercises are that the child becomes brighter, more active - in short, healthier.

Some indications for operative treatment are: -

1. When the child has been so thoroughly neglected that he is unable to drive air through the nasopharynx, when development is in abeyance.
2. When for some reason or another, such as considerable difficulty in forcing air through the nose, ear trouble, important school or other

engagements, peculiar circumstances etc, it is necessary to telescope the process.

3. When the child is too young to do what it is told.

He describes a child suffering from adenoids as follows: - Chest flattened in front, abdomen thrown forward, the dorsal spine is flexed, shoulder projects forward and the lower angles of scapula are prominent on back of chest, i.e. round shoulders. No variation during inspiration and expiration.

He seems to aim at getting a perfect development of the nasopharyngeal cavity and says that the only mechanical factor upon which the nasopharynx has to depend for its development is the ~~pressure~~ pressure exerted on it by forcible passage of air through it during the respiratory process and that the development of the superior maxilla, malar bone and lower jaw varies of necessity with that of the nasopharynx. He is also of opinion that when systematically carried out breathing exercises are a complete success and as regards operation he says "For a long time I have been obliged to perform this operation on the pharyngeal tonsil, but very occasionally in private practice. On the other hand, I have seen

a large number of cases treated without operation with complete success, when patients were informed by wellknown authorities that operative interference was absolutely necessary. It is only in a very small proportion of cases that an operation is required."

I am quite unable to bring myself to believe that any kind of exercise can dispense with operations. It is also a very difficult matter to get parents to rigidly carry out a long process of treatment of this nature more especially is this the case in Hospital practice.

As an adjunct to operations I think they are of very great value and I always make a point of instructing parents in the method of carrying them out after all almond operations.

II. Operative Treatment.

It will be convenient to look for a few moments at the Indications for operation before passing to the actual operation itself. To my mind the whole question turns on the degree of symptoms produced by the growths. The indications may be classed in groups according to the symptoms displayed by the patient:—

- 1 When the growths are large and cause interference with speech and respiration eg. mouth breathing, adenoid facies, snoring, aphrosexia.
- 2 When catarrhal conditions of the nose and pharynx frequently occur eg. colds, bronchitis.
- 3 When deafness is present due to middle ear disease from whatever cause.
- 4 Recurrent earache. When a pad of adenoid tissue is pressing on the orifice of the Eustachian tube, if foetid discharge from the ear is present—the operation should be postponed till this has received treatment.
- 5 In deaf mutes
- 6 When enlargement of the cervical glands is present as they may become infected with tubercle.
- 7 When defects in physical development are present.

One meets with many cases which one does not feel justified in operating on. In such instances as these the parents should always be instructed to wait for any symptoms of obstruction etc and told to bring the child should any indication arise.

With regard to the age at which it is best to operate I would say that it is immaterial. The youngest case I have operated on was 11 months. Age cannot be looked upon as a guide, one must rather be guided by the symptoms. About the usual time is 5-6 years.

A few remarks may be made here about the choice of an anaesthetic.

Most of the operations I have performed have been done under Chloroform anaesthesia and I have found it to answer admirably. It has usually been given by the open method either dropped from a bottle onto a Spurrer's mask or of a towel rolled into the shape of a cone, or by a towel folded into a square and about one inch of its margin folded up so as to form a pad which is laid against the patient's ~~chin~~ chin and kept free from Chloroform. The chloroform should be removed as soon as the conjunctival reflex is abolished because at this stage the laryngeal reflex is unaffected

and there is no danger from suction of blood or debris into the air passages. In children it is often a matter of great difficulty to get them to breathe at first as they are often inclined to hold their breath; to overcome this one has to resort to various devices such as telling them that you are going to give them some scent to smell. The method of counting up to 30 I have found particularly satisfactory. One is greatly struck by the large amount of Chloroform required to get a patient suffering from adenoids under, the adenoids seem almost to absorb the chloroform themselves, but doubtless it is due to the embarrassment of the respiration.

Ether may also be used or a mixture of 1 part of chloroform and 2 of ether also given by the open method. The combination of gas and ether is also quite good, but the apparatus is so very cumbersome.

Fulvous oxide gas is sufficient in some cases and in older patients may be given in a sitting posture. But as one is never sure how long the operation will take this method is probably not so good. ~~is~~ owing to the short period of anaesthesia.

I have used Karcolite, Kéleme and Ethyl Chloride in about 30 cases with very gratifying results. Their great advantage over gas is that the period of anaesthesia is longer (about 2 minutes) and no congestion or cyanosis is produced, the apparatus too is quite convenient. The recovery from the anaesthesia is quite rapid. The great disadvantage is the expense.

It may be mentioned here that sponges on handles should always be at hand with which to swab out the pharynx both for the convenience of the operator and anaesthetist.

On the whole I am of opinion that Chloroform is as good as any in the hands of an experienced anaesthetist.

With regard to local Anaesthetics I am convinced that they are not of much value in adenoid operations because by painting the area with cocaine one does not penetrate to the depth to which one cuts.

Methods of Operating.

The first cutting operation one hears of was performed by Meyer⁽²⁾ using his ring knife shaped as in fig (1).

The instrument consisted of a transverse oval ring, the axes being 1.4 & 1 centimeter respectively and breadth 1.4 millimeters, having one sharp edge and one rounded off and having a slender stiff flexible stem 10 centimeters long bearing the ring at one end and joined into a roughened handle at the other. The operation was performed by passing the left index finger into the nasopharyngeal cavity, and with the right pass the instrument through the nose keeping the long axis perpendicular - the adenoids were pushed up to the knife by the finger in the nasopharynx and cut off as near the base as possible. This was done without an anaesthetic and is described by Meyer as not being painful, but it used to cause headache and stupor for a few hours after the operation. One operation was rarely sufficient, so several performances were required.

The next instrument was devised by Lowenberg and has received the name of Lowenberg's Forceps (fig (2)). The instrument has been altered and

Fig. (1)



Meyer's Ring Knife

fig. 2.



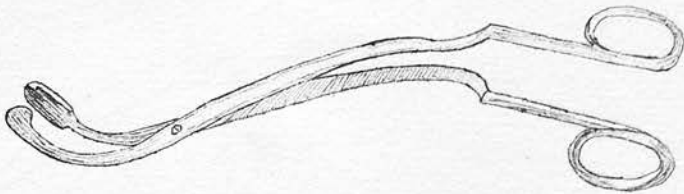
Lowenberg's Forceps.

Fig: 3



Woakes modification of Lowenberg's Forceps

Fig: 4.



Walsham's modification of Lowenberg's Forceps.

modified by various operators notably Symon,
Woakes (fig 13) Kuhn, Mackenzie and Walsham (fig 4).
The forceps are passed (under an anaesthetic) through
the mouth behind the soft palate, they are then
opened and a mass of adenoids seized and withdrawn
partly by tearing and partly by cutting. The
instrument is then introduced again as often as
necessary. Care must be taken not to seize the
lips of the Eustachian Tubes therefore keep the
instrument well in the middle line. They can
be made to reach any part of the nasopharynx
but cannot be used if the cavity is small.

About this time also the finger nail was advocated
by surgeons as an efficient means of clearing out
the nasopharynx. The object seems to have been
to crush the growths and so injure their vitality
leaving a septic sloughy mass. This may be
effective in cases where the growth is small,
but I do not advocate it in a case of marked
adenoids. It is however most useful as an
adjunct to other instruments, as one's sense of
touch is much greater when using the finger
than when using an instrument.

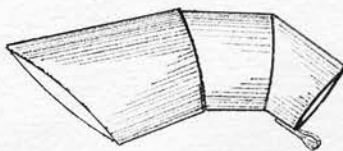
As an improvement upon the finger nail, artificial

Fig: 5



Sir W. Danby's artificial mail

Fig: 6



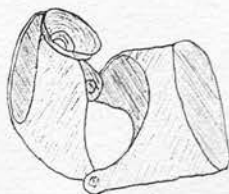
Lemnox-Berone's artificial mail protector

Fig. 7.



Copart's artificial nail applied

Fig. 7A.



Copart's artificial nail.

nails were introduced, made of steel which fitted over the end of the finger. The chief are those of Sir W. Dalrymple, Copart and Lennon Browne seen in (figs. 5, 6 & 7). In using these instruments the index finger of the right hand is first used to explore the nasopharynx, then the nail is fixed on and the adenoids scraped away. The end of the finger is exposed so that one can feel where and what one is removing. The instrument has also been used to finish off operations performed by the forceps.

The next advance was the invention of ~~ringknives~~ ringknives and currettes

The chief ringknives are Freyer⁽⁵⁴¹¹⁾, Lange⁽⁵⁴⁹⁾ and Hartmann⁽⁵⁴⁸⁾

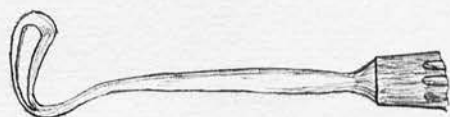
Hartmann's knife has its cutting edges on the upper and posterior surfaces, it was something like Freyer's ring knife in appearance but it was introduced through the mouth, the lateral walls were scraped first - then it was passed up to the vault and then the posterior wall was scraped. The operation was completed by the finger nail.

Freyer's original knife has already been described.

The chief currettes are those of Jottstein, Deblanche, Gaulman, Mackenzie and Golding Bird.

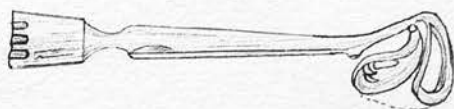
Jottstein's curette (fig. 10) has a double curve one

Fig. 10.



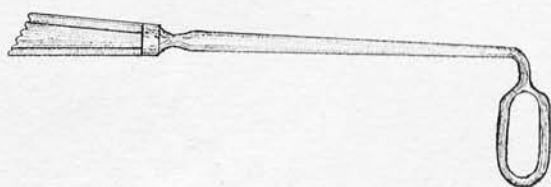
Goltstein's Curette

Fig 11



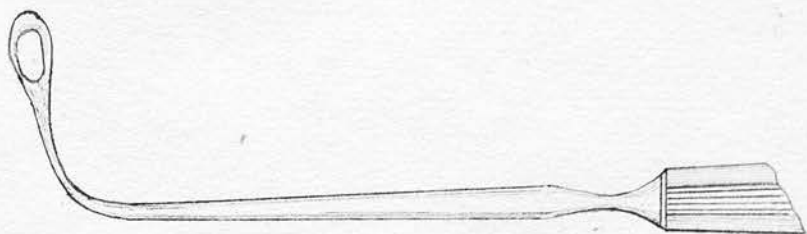
Delstanche's curette.

Fig. 8



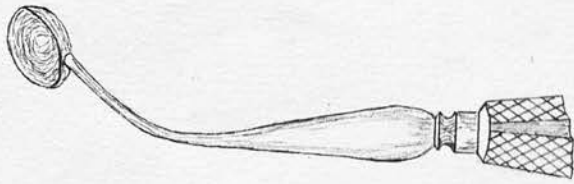
Hartmann's Ring Knife.

Fig. 9.



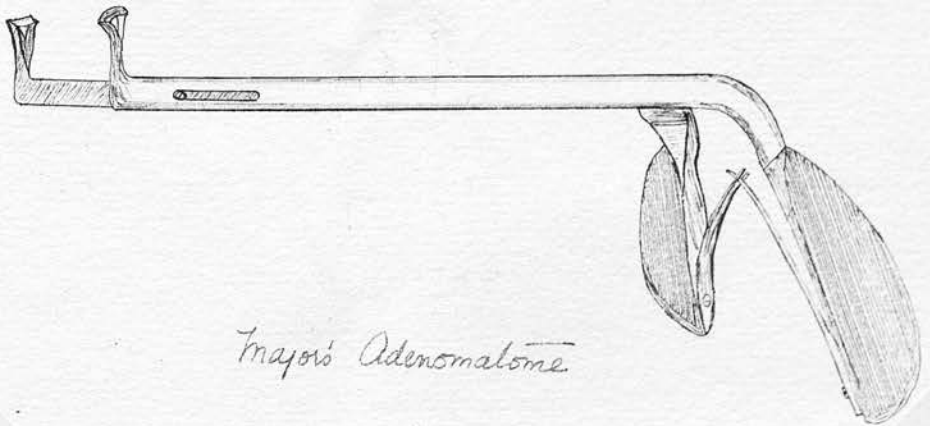
Grange's Ring Knife.

Fig: 12



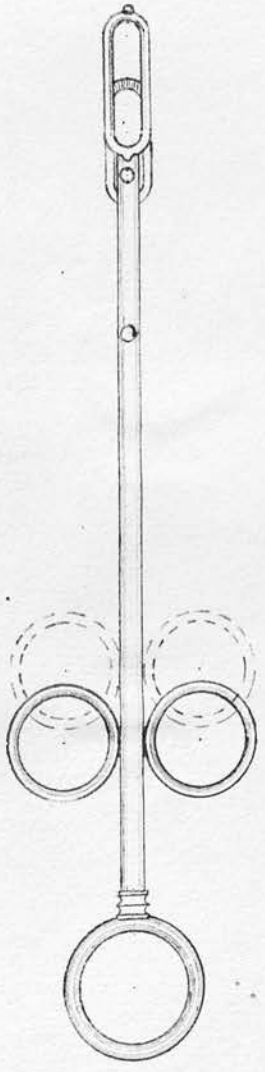
Trautman's Curette.

Fig: 13



Mayor's Adenomatome

Fig: 14



Hausman's Ophthalmome.

at the tip downward in direction and the other at the junction of head and stem.

Delstanché's modification (fig 11) consists of the addition of a cradle with 2 small hooks which catch the mass and bring it away in the cradle. - otherwise it is the same as a Jottstein.

The curette (either Jottstein or Delstanché) should be passed behind the soft palate right up to the septum and pressure made against the vault of the pharynx and continuing the pressure the instrument is swept backwards and the mass is brought away. This can be done as often as required. The nail usually completes the operation.

Hautman's curette (fig 12) is very like a Volkmann's spoon with a long curve leading to the head. I have never seen this instrument used.

Another instrument devised for this operation is that of the ~~Wilde's~~ Adenomatome. The chief are those of Major (fig 13) and Hautman (fig 14).

These figures illustrate the fact that the instruments work on the principle of scissors and their use is attended with great danger even in the hands of a skilled surgeon as they will take away anything they get hold of. Their object is to remove the growth in one cut. The whole of the nasopharynx

cannot be reached with them.

Wire snares have been invented by some for the removal of adenoid growths but I have never seen them used. I cannot imagine that they are of great value for this purpose.

The choice of instrument depends entirely on the surgeon but the ones in most common use are Joststeins or Delstanches modification, Rowenbergs Forceps. Hartmanns ring knife and the finger nail as an adjuvant.

A few words with regard to the position of the patient during an operation for adenoids.

The chief ones are as follows: -

a The patient lies on his back and after being anaesthetised the head is made to hang over the end of the table. By this method blood is prevented from entering the larynx. This is considered to be the safest method by Crowley, McFoude and Turner.

b The patient lies on his back, if a pillow is used it should be a very small one. The head is kept in the middle line. As soon as the operation is

Completed the left arm is seized and the patient is turned almost onto his face. If this is thought to be too much, at the end of the operation, he may be turned onto his right side, the left arm raised and a finger inserted into the ~~angle~~ ^{right} right side of the mouth and the angle depressed so that the blood is drained away from that point.

c. The operation may be performed with the patient sitting in a chair.

As regards the preparation of the patient some surgeons are inclined to precede the operation by the employment of nasal douches. Murre for example advocates irrigation of the nose with boric acid 2 or 3 times a day for some days before the operation. I have had no personal experience of this method as all my cases have been done without any local preparation.

The only preparation that seems to me necessary is to give the patient a dose of castor oil the night before followed by an enema on the morning of the operation. No food to be given on the morning of operation save a cup of beef tea about 7 a.m. supposing the operation to be at 11 a.m.

I now pass to the description of the operations in detail, and will endeavour to describe the most usual methods employed.

1. The method of Forceps followed by the Curette.

The patient is chloroformed, so that he is well but not too deeply under, lying on a table with his head towards a window. When the operation is to be begun a gag is inserted and it is important to see that no teeth are knocked out in so doing. Indeed for the above reason it is important to bring the patient's head over the end of the table, the position which is considered safest and best for the operation, and allow it to hang down before inserting the gag.

The operator now introduces his finger to find out the exact shape and size of the mass to be removed.

A Kuhn's forceps is employed and under the direction of the left index finger made to grasp the main bulk of the mass. The main mass of a small or even a medium sized growth is thus usually removed and extracted. The guarded Goltstein's curette is now introduced up to the septum and pressure made against the vault of the pharynx and continuing this pressure the instrument is swept backwards.

After these manoeuvres the nasopharynx is usually so far cleared; but it is well to introduce the finger, and if any adenoid tissue be detected

Hartmann's curette is now passed behind the palate and worked from side to side, care being taken not to engage the Eustachian orifices which of course are somewhat more endangered by an instrument which works laterally than by one which cuts in an antero-posterior direction. The finger nail proves a good substitute for Hartmann's instrument and is in some respects safer, especially so when adenoid tissue is in contact with the prominent cartilages of the tubes. The operation must be done rapidly. The haemorrhage is abundant and the throat will have to be kept clean by sponging.

This is the method adopted by Dr. Bride & Turner.

2. The method in which the Adenomatome is employed has been described when speaking of the instrument.

This operation is attended with great danger & is not to be advocated in general practice, the instrument itself being of a very clumsy nature.

I have had no personal experience of the two

operations above described, but I have seen the first one performed on many occasions with apparent ease.

3 I now pass to the description of the curette operation which I have used in nearly all my cases. The patient is laid on his back on the table and anaesthetised with Chloroform. A gag is now (the patient being under) is introduced between the left molars, care being taken not to remove any teeth in so doing. The head is kept in the middle line by the anaesthetist. The mouth having been widely opened, the operator standing on the right side of the patient, passes his index finger (right) into the nasopharyngeal cavity and ascertains the condition of affairs. I always make a point of doing this even if the cavity has been previously explored, because one is enabled to make a much more accurate search when the patient is under chloroform. A Delstanché's Curette is now passed behind the soft palate well up to the septum, firm pressure is exerted and then a quick sweep is made by drawing the cutting edge over the pharyngeal wall. The adenoid mass is brought out fixed in the cradle. A Gottstein curette is now quickly

introduced and two or three sweeps are made to clean away any lateral mass left. The finger (index) is now introduced and any adenoids left are removed by the finger nail. Rosenmüller's fossae must be well explored by the nail care being taken not to injure the orifices of the Eustachian tubes. The patient is now tilted onto the right side, the left arm raised and the blood will flow out quite freely through the nostrils and from the angle of the mouth. It is well to squeeze the nostrils from above downwards in order that any blood may be driven out.

Some authorities advocate blowing the nose in order to get rid of the blood but when using an anaesthetic this is somewhat difficult to accomplish. The bleeding usually ceases in a few minutes and does not cause any further trouble. Sponges or handkerchiefs may be freely used during the operation.

This operation may be performed under Nitrous oxide gas, Tricobute, Chloroform or Ethyl Chloride. Nitrous oxide gas may be given to the patient sitting in a chair but I have always found it more convenient when given in the sitting posture. It must not be forgotten that all the instruments should be sterilised before operation.

After treatment.

The patient should be removed to bed at once and lain on his right side in order that any blood may be more easily expectorated. The room should be well ventilated free from draughts and foul smells. He should be encouraged to go to sleep as soon as possible. The parents should always be warned that some blood will in all probability be vomited and that they must not be alarmed on that account.

The patient should be kept in bed for two days at least. For the first 5 or 6 hours after the operation the patient should only receive teaspoonfuls of hot water or small pieces of ice; after this time all bleeding will have ceased and he may be allowed milk and beef tea. On the second day he may have soft milky food e.g. milk puddings and custards; this diet should be continued for the next 3 days when he may have a little fish. The pharynx will be healed in from 10-14 days.

No douching should follow the operation; it is absolutely unnecessary, and subsequent inflammation of the middle ear may often be traced to this cause, as infected material is thereby driven up the Eustachian tubes.

The temperature rarely rises over $100^{\circ}F$, and it is remarkable how little pain the patients suffer after the operation. The nose is often a little stopped for a few days but this is probably due to slight swelling of the turbinated bones. The child should be taught to breathe through the nose and a natural speech must be aimed at as soon as the pharynx is quite sealed.

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- (2) "Adenoid Vegetation in the Nasopharynx" Transactions of Medico-Chirurgical Society. Vol. LIII. (May). p 212.

Complications.

Speaking generally it may be said that the risks and complications are practically nil, this may be fairly true but still the fact must not be lost sight of that accidents do occur although happily they are few and far between. It will be well to glance for a few moments at the chief complications which may arise. In 200 cases Crowley found that 19 suffered from some unpleasant after effects.

1. Haemorrhage.

As a rule not much trouble is likely to occur from haemorrhage except in haemophylia. The cases quoted on page 14. are examples of this, but even in the cases the haemorrhage was controlled without an enormous amount of trouble by the use of adrenalin chloride applied on swabs.

The following case of death after removal of adenoids associated with enlarged tonsils is interesting:—⁽¹⁾

A boy aged 7 was admitted to Guy's Hospital on the following day after was given and the tonsils and adenoids removed. Haemorrhage at the time was greater than is usually the case, a good deal of blood was swallowed and subsequently

vomited. The patient was put back to bed and his pulse was noticed to be 160 per minute and very feeble. In an hour or so his pulse improved, but it was found that both sides of the neck and also the left cheek were considerably swollen from blood extravasations. The swellings increased and gradually reached the sternum and clavicles, - the pulse meanwhile getting more feeble and rapid. No further bleeding took place in the mouth or nasopharynx. He was ordered to suck ice and enemata of half a drachm of Calcium chloride were given every hour. In about 8 hours blood was found to be extravasating into the pharyngeal submucous tissue. Intubation was performed in 15 hours time after operation with temporary relief. Later tracheotomy was performed. He died 32 hours after operation.

Autopsy The pharynx, larynx and the tissues of the neck generally were found to be infiltrated with blood. Thymus much larger than normal. No other abnormality. No tendency to haemophilia. It would appear that in this case a general oozing had occurred into the surrounding tissues most probably due. I think to a tendency to haemophilia.

There are various causes which may tend to the production of obstinate haemorrhage in some instances. These causes may be enumerated as follows:—

- a. Wounding of pharyngeal veins.
- b. Haemophilia.
- c. Abnormalities of the Internal Carotid.
- d. Sloughing away of the mucous membrane of the pharynx.
- e. After the application of cocaine for their removal.

2. Contracting of contagious diseases of scarletina measles, diphtheria.

In one of my cases a child aged 6 was operated on for adenoids. He was sent home 5 hours after the operation and contracted scarlet fever in a few days. He was doubtless infected by his mother.

3 Stiff neck is a complication met with by ⁽²⁾Proxley in 7 cases and it lasted from 7-21 days. He notes that feverishness was always associated with the condition also large glandular swellings on each side of the neck and he attributes the stiff neck, to the glandular enlargement. I have never seen such a case.

4. Ear complications

Acute middle ear inflammation may be met with sometimes, but it is usually easily cured.

Otitis has been met with by Crowley but it soon passed off.

6 Pulmonary affections

I cannot say that I have met with any complication in this system but it is interesting to note that Crowley¹⁵ has had one case of Broncho pneumonia and one case of Lobar pneumonia following the removal of adenoids.

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M.B. C.B.