ON
THE CURE OF CLEFT PALATE

BY
OPERATION IN CHILDREN,

WITH A
DESCRIPTION OF AN INSTRUMENT FOR FACILITATING THE
OPERATION.

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Received Oct. 4th, 1867—Read Jan. 14th, 1868.

THE operation for the cure of fissured soft palate has been brought nearly to perfection by the labours of Sir William Fergusson. He first recommended and practised, as essential to success in the operation, the systematic division of those muscles that tend to draw asunder the margins of the cleft.

Professor Langenbeck, Mr. Pollock, Mr. Avery, Dr. Billroth and others, have done almost as much for the treatment of fissures of the bony palate, and thus it is that there is as little room as there is need of improvement in the *modus operandi* usually adopted for the cure of these deformities.

The object of this communication is, if possible, to extend the benefits of the operation (both on the hard and soft palate) to patients of tender years, to those deficient in physical courage or in the power of enduring bodily pain.

As the matter at present stands we have a good and successful operation, but very painful to the patient, and therefore limited in its application to individuals of adult age and of courageous and resolute disposition.

Referring to this subject Sir W. Fergusson writes,¹ "Unless the patient is remarkably steady and determined to permit the operation to be finished, it is useless to attempt it, and such fortitude is not to be expected before the age of puberty."

And, again, the same author in his lectures before the College of Surgeons, thus expresses himself:—"I have never attempted the operation in infancy, and consider the circumstances most favorable at or above puberty, but I have frequently operated between the ages of ten and fifteen² when patients have been steady and courageous. I have never operated under chloroform, and, whilst I do not deny the possibility of doing so, I am of opinion that, as a rule, it is absolutely necessary to have the patient conscious, so that he may facilitate the steps of the operation in various ways."

Mr. Pollock, in writing on the same subject in 'Holmes's System of Surgery,' thus expresses himself:—"The age of the patient is a matter of some consideration to the surgeon who proposes to operate for the permanent closure of a cleft palate. There can be no doubt, as a general rule, that the patient should be old enough to desire an operation, should have sufficient determination to endure it, and should be able to estimate the advantages derived from it. For many reasons the age of fifteen appears to be the earliest period for the operation; often a later period is desirable, though in some few instances it has been performed on younger children."

¹ 'Practical Surgery,' p. 530.

² 'Lancet,' 1864, vol. i, p. 723.

Mr. Pollock goes on to notice the tedious nature of the operation—the inadmissibility of chloroform—and recommends that, in the early years of life and up to the period of puberty, an artificial palate should be worn; the patient being subsequently allowed the refusal of an operation.

Langenbeck's¹ published opinion on this subject is to the following effect:—The earlier experiences of the success of staphyloraphy lead uniformly to the result that, before the expiration of the sixteenth year of life, the operation cannot be undertaken with any certainty of success.

Our experience shows that the operation can be employed at a far earlier age.

He goes on to say—"I fear, however, that for staphyloraphy the age of seven years will be a limit not to be overstepped as a rule, and that one must abstain from employing the operation in younger children."

Langenbeck states that simple staphyloraphy, *i. e.* the operation on the soft palate alone, has been recorded in eleven instances in children between the fourth month and sixth year of life, and in every case unsuccessfully;² while Billroth has succeeded in curing a cleft of both the hard and soft palate in a young infant in three operations, the first operation being undertaken when the child was but twenty-eight weeks old.

Of the performance of the operation says the same author:—"The difficulties of staphyloraphy in young children, though inexpressibly great, yet may be surmounted; the union of the wound in its whole extent can also take place, as I have in two cases experienced, though the nutrition of the child always suffers somewhat on account of the pain in swallowing not allowing them to take sufficient nourishment; this, especially, causes the separation of the sutures, and is, as appears to me, an insuperable difficulty. On this account children begin to fail about the sixth or eighth day after the operation; before the sutures are entirely separated, the suture holes begin to suppurate, and the soft palate that had united again separates."

¹ 'Lang. Archives,' Band. v, p. 43.

² Loc. cit., p. 44.

The advantages of being able to cure cleft palate in childhood will at once be conceded by those who are familiar with the deformity, and the inconveniences it entails. The imperfections of deglutition, taste and smell, and the unnatural thirst, will probably be remedied at whatever period of life the cure of the deformity be effected. But it often happens that the union of the palate by operation is accomplished too late to do more than slightly improve the defective articulation, though it may cure the nasal resonance of the voice.

A resolute and intelligent adult patient, after a successful operation, may acquire by his own efforts, or with the aid of an instructor, the power of distinct and normal articulation. But in some the difficulty of unlearning an almost life-long habit is well nigh insuperable.

It is probable that were the deformity of cleft palate cured in childhood, before or whilst the power of speech is being acquired, there would be but little difficulty in teaching a child to articulate distinctly.

It is at least certain that the earlier the cure was effected, the less difficulty would the patient have in learning to speak plainly.

It is needless to occupy the time of the society in discussing the advantages of an early cure of the deformity, they will be conceded by all. I will at once, therefore, describe the plan by which I hope that these advantages may be obtained.

The plan which I venture to introduce to the society depends largely for its success on the employment of an instrument whereby the jaws are opened and fixed, the orifice of the mouth is dilated, and the tongue is held down; and this without in any way incommoding the operator, or encroaching on the small space at his command.

By the use of this instrument the patient is rendered perfectly helpless; the palate and fauces are brought plainly into view, and much more room is obtained for the manipulation of instruments than can be gained by the most strenuous voluntary efforts of the patient. Chloroform can and should be used, and thus the operation may be performed with far

greater rapidity and precision than when the surgeon is dependent upon the self-control of even the most courageous patient. The instrument in question, which is a species of gag, consists of a tongue-plate for depressing that organ; attached to this plate are two lateral expanding arms of a peculiar shape, which can be opened by a key working on a cog-wheel: these are for dilating the orifice of the mouth; they have teeth plates which act upon the jaws and open them. A strap is made to pass round the back of the neck, to keep the instrument in position.

This gag will be found useful in excision of the tonsils of unruly children, in operations on the pharynx and interior of the mouth. It can be used in operations on the tongue, but if employed for this purpose, it must be turned upside down, *i. e.* the tongue-piece must rest against the roof of the mouth.

I should think it might prove of service in laryngoscopy, and especially in operations on the interior of the larynx when it is important to economise space and secure a steady position.

I may be excused for shortly stating the details and order of operative proceeding that I have found most useful when performing staphyloraphy under chloroform.

It is important that the stomach should be quite empty, and equally so that the patient should be in no degree in want of food, so as to avoid both chloroform sickness on the one hand, and the necessity of taking food soon after the operation on the other.

The patient being under chloroform, in the recumbent position, in front of a window, his head may be supported on a pillow by an assistant standing behind the table. The gag being introduced, closed, and the strap drawn tight, the jaws and lips can be opened to the desired extent, and the instrument may be given into the hands of the assistant who holds the head.

The following is the order of proceeding that seems best adapted to the circumstances of the operation when done under chloroform.

1st. To pare the edges from below upwards.

2nd. To pass the sutures.

3rd. To draw up the palate holding all the sutures in one hand, and with the palate on the stretch to divide, if necessary, the palato-pharyngeus, and subsequently the levator palati; if the palate will not come easily together, two lateral oblique cuts may be made, one on either side above the highest suture, separating the soft from the margin of the hard palate to a small extent.

4th. To sponge out the parts, and tie the sutures beginning at the lowest.

5th. To avoid using the sponge, if possible, until the close of the operation.

Sickness occurring during the operation is an embarrassing circumstance, though by no means an insuperable difficulty. On two occasions I have postponed the operation on observing the child vomit while taking chloroform. On four occasions I have satisfactorily completed the operation notwithstanding the sickness.

The paring the edges of the fissure from below is impor-

tant to avoid being embarrassed by the flow of blood from above. It is well to postpone the division of the muscles until late in the operation for the same reason. By drawing the palate forwards by means of the sutures the muscles which prevent the approximation of the fissure are at once appreciated, and by thus putting them on the stretch their division is facilitated.

The use of the sponge to the palate, as is well known, increases the amount of tonsillar secretion, and is apt to excite vomiting. If the steps of the operation be done in the order above described, its use is seldom required until the last stage.

The material that I have found best adapted for sutures for the soft palate in the young, is *fine fishing gut*, if there be any tension on the suture; while *horsehair* has answered best for the lower part of the velum and uvula, or in any case where the sides of the cleft come easily together. Both these substances, if soaked for a few minutes in water, will become sufficiently supple for use. They have the advantage of being quite as unirritating to the tissues as silver wire; while being softer they cause less pain during the movements of deglutition; they do not abrade the tongue, and, unlike wire, they can be removed without giving pain to the patient, or disturbing in any way the newly united soft parts.

In fastening both gut and horsehair sutures, a third knot should be added to the ordinary double knot usually tied; this is a necessary precaution to be secure against slipping.

I have tried, with good result, the clamping down the suture with a perforated shot in lieu of tying: this is apt to cut the suture, unless a small glass bead be threaded on the sutures and passed down in front of the shot.

In regard to the unirritating nature of both gut and horsehair when introduced into the tissues, it may be worth mentioning, that in a little girl, aged nine, I removed the sutures more than a month after they were introduced; and at that time the wound was perfectly and soundly cicatrised, the sutures appearing to cause no sort of inconvenience or irritation.

With a view to simplify and expedite the performance of the operation I have found it convenient to dispense with the silk threads generally used for drawing the permanent sutures into position, and, instead, to pass the gut or horse-hair at once through both sides of the cleft palate.

This can be done by employing a fine and rather sharply curved tubular needle, or by using a needle in a handle bent at nearly a right angle, with an eye near the point. One can imagine that the width of the cleft might be so considerable as to prevent the passing of the sutures in the manner described, but when practicable, much time and trouble may be saved by the adoption of the plan.

In order to adapt the needles to the small dimensions and delicate structure of the soft palate in children, I have had them flattened laterally, instead of on the concave and convex aspect, as is usual in curved needles. This allows of the needle being made much finer without any loss of strength at the curve.

It is advisable in operating on children that forceps should be sparingly used to the margins of the palate. They were, therefore, only employed in passing the first or lowest suture. When this had been adjusted, it was used to draw the palate forwards, so as to bring the free edges somewhat together and within easy reach of the needle for passing the next suture. Thus, in turn, each suture was used to assist in adjusting the one next above it: this plan saves much trouble and avoids bruising the margins of the cleft.

In every case the principles recommended by Sir W. Fergusson have been carried out, though the plan used for dividing the muscles has been that practised by Mr. Pollock. That is, the levator palati has either been divided (or at all events its division has been attempted) through a puncture in front of the soft palate, the palato-pharyngeus has usually been notched and occasionally the palato-glossus. Where the soft parts were very scanty, and the tension considerable, oblique lateral cuts have been made at the upper angle of the fissure, separating the soft palate from its attachment to the bones for a small extent.

The patients operated upon have been allowed a liberal supply of wine and fluid nourishment after the operation, and have not been confined to their beds.

APPENDIX.

Appended is a table of eleven cases of operation on cleft palate, in all of which the gag was employed and chloroform was administered.

In all of these the operation of staphyloraphy was performed, that is, no attempt was made in any case to separate the muco-periosteum from the roof of the mouth, nor to unite the fissure of the hard palate.

Two of the cases only were simple uncomplicated fissures of the soft palate; the result in both of these was entirely successful.

The remaining cases were all complicated with fissure of the hard palate to a greater or less degree; of these, six were successful, and three unsuccessful.

The operations in the cases of uncomplicated cleft of the soft palate were, as one would suppose, easily and quickly performed. One of these patients was thirteen years and the other two years and eleven months old. The articulation of the younger child began to improve from the date of the operation. Of the elder child Dr. Priest reports, nine months after the operation, that she "continues to improve, her articulation is much better, and he hopes in a few months that very little trace of the infirmity will remain."

The subjects of complicated cleft of the palate—six in number—who were successfully submitted to operation were three, five, six, nine, ten, and twenty-seven years of age respectively. The operation in every case was performed upon the plan of which a description is given in the paper.

Inquiries have been made, whether there is not danger of blood getting into the larynx during the performance of the operation under chloroform? I can only reply that no symptoms have been observed during or after the operation

that would indicate that blood had entered the larynx, though frequently blood has been vomited after the patient has been put to bed. Indeed, there is but little bloodshed until the very last step in the operation, if the order of proceeding be followed that is here recommended.

I have counted as successful all cases where I have succeeded in curing the fissure in the soft palate. One of the cases recorded in this category still requires a small operation to unite the uvula, and in another there remains a small central hole in the soft palate; defects which can be remedied at the first convenient opportunity.

In no case was the union of the hard palate attempted by operation, and I believe that ere long I shall be in a position to prove that, provided the union of the soft palate be effected in early life, the operation on the hard palate will in many cases be unnecessary, and in some inadvisable.

The measurements that I possess showing the gradual contraction of the hole left in the roof of the mouth warrant me in anticipating thus much; though none of my cases are of sufficient duration to enable me thoroughly to realise my anticipations.

Thus in one case, No. 2, the operation was performed ten months ago, and the gap left in the hard palate measured exactly an inch in its long diameter ten days after the operation; seven months afterwards this hole measured $\frac{1}{8}$ of an inch.

In case 3, the operation on the soft palate was performed fourteen months ago, leaving a considerable hole in the roof of the mouth; this hole is now about the size of No. 6 catheter.

In case 7 the soft palate was united ten weeks ago, leaving a hole in the roof of the mouth measuring one inch in its long diameter; a month later this opening had diminished by a quarter of an inch.

I have, for the present, abstained from making any remarks on the effect of an early operation on the power of articulation, since my experience is much too recent to admit

of any well-grounded conclusions being formed on the subject.

Three instances of failure are recorded in the table of cases, one was in a child aged two years, who proved quite unmanageable ; after the operation this infant did not cease to endeavour to tear out the sutures with his fingers.

Another failure was in the case of a girl, aged thirteen years, in whom I am at a loss to assign a cause of the non-union, unless it were that the levatores palati muscles were not satisfactorily divided.

The third, in whom the operation failed, was a boy three years of age, in whose case the separation of the wound was due to vomiting which came on the third day after the operation.

On a future occasion I shall hope to include all these as successful results.

An instance of successful operation on the palate of a woman, aged twenty-seven, has been tabulated, since I cannot but believe that the plan recommended is suitable to all ages ; and I would venture to hope that in future chloroform will generally be administered for the performance of this operation.

Additional experience, for which I trust we shall not need to wait long, is required to determine the most favorable period of childhood at which the cure of cleft palate can be undertaken.

Case.	Name, age, sex, &c.	Nature of the deformity and state of the patient.	Operation.	Result.	Remarks.
1	— Cater (F.), æt. 13; St. Bartholomew's, March 27th, 1867.	Complete cleft of the soft palate. Speaks very indistinctly.	Under chloroform. Four gut sutures employed. Lev. palati and pal. pharyngei divided.	Complete union. Perfect symmetry of the palate.	Nine months afterwards articulation reported to be much better and improving.
2	L. Brown (F.), æt. 9; St. Bartholomew's, Feb. 22nd, 1867.	Cleft of all soft and half the hard palate. Speech unintelligible. Food returns through nostrils.	Chloroform. Soft palate closed with five gut sutures. Muscles divided and oblique cuts made on either side to relieve tension.	Wound united throughout. A hole one inch long between soft and hard palate. Seven months later this measured $\frac{1}{8}$ inch.	Articulation much improved, but very imperfect. Food no longer returns.
3	C. Wilkins (F.), æt. 6; Children's Hospital, Nov. 4th, 1866.	Cleft of soft and of posterior third of the hard palate. Speech unintelligible. Food frequently returned by nostrils.	Gag used, without chloroform. Soft palate closed with four silver sutures. Muscles divided. Five months later three horsehairs were passed through lower part of palate.	Soft palate united, except lower part. Second operation quite successful. A small hole in the roof of the mouth.	Speech very much more distinct. Food does not return. Hole in the roof of the mouth the size of a No. 5 catheter.
4	J. Bartlett (M.), æt. 2; Children's Hospital, March 26th, 1867.	Complete cleft of hard and soft palate and alveolar process, with harelip. Cannot speak.	Chloroform. Soft palate closed with five gut sutures. Muscles divided. Two months later operation repeated.	Roy proved unmanageable. Nothing but uvula united. Unsuccessful.	This patient could not be prevented from dragging with his fingers at the sutures.

5	S. Brown (F.), æd. 2 yrs. 11 m.; Children's Hospital, August 27th, 1867.	Complete cleft of soft palate. Can only speak one or two words. Food rarely returns through nostrils.	Chloroform. Fissure closed with two horsehair and two gut sutures. Second operation, gut and horsehair used. Mus- cles divided.	Attacked with scarla- tina the day after the operation. Unsuccessful. Successful.	Five months after the operation this child had learned to speak well, so the mother reports.
6	L. Aspley (F.), æd. 3 yrs. 2 m.; Children's Hospital, June, 1867.	Cleft of soft palate and posterior part of hard. Articulation very indis- tinct.	Chloroform. Soft pa- late closed by two gut sutures and one silver wire. Four months later the operation was repeated. A month later two su- tures passed.	Scarlatina and hoop- ing-cough succeeded the operation, and the result was unsuccessful. Half the palate united. Attacked by mumps. The soft palate is nearly completely united.	The power of articula- tion has much improved.
7	F. Cunningham (M.), æd. 10½; Children's Hospital, August 30th, 1867.	Cleft of soft palate and posterior part of hard. Articulates very imper- fectly. Cannot be under- stood.	Chloroform. Soft pa- late closed by two gut sutures and one horsehair suture. Muscles divided.	Soft palate united. A hole one inch in length remains in the roof of the mouth.	A month after the ope- ration the hole in the roof of the mouth was three quarters of an inch in length.
8	H. Miles (M.), æd. 5; Children's Hospital, August 20th, 1867.	Double harelip and complete cleft of the hard and soft palate, with erec- tion of columna nasi. Four years ago the harelip was cured, and the cleft in the hard palate has since greatly improved.	Chloroform. Soft pa- late united by one silver suture and four gut sutures. Muscles divided.	Union of all the palate except the lowest part and the uvula, which during the process of cicatization came to- gether.	Articulation greatly im- proved. The hole between the hard and soft palate is diminishing.

Case.	Name, age, sex, &c.	Nature of the deformity and state of the patient.	Operation.	Result.	Remarks.
9	M. A. Blake (F.), æd. 13; Children's Hospital, Oct. 28th, 1867.	Harelip and cleft of hard and soft palate. Harelip cured twelve years ago, and one horsehair suture, all ulcerated out. Speaks very badly. Food occasionally returns.	Chloroform. Soft palate united by four gut sutures. Muscles were imperfectly divided. Second operation similar to the first, four months later.	Three days after the operation the sutures had all ulcerated out. Unsuccessful.	The non-union in this case seemed due to some constitutional peculiarity, as the local conditions were unusually favorable.
10	A. Harding (F.), æd. 27; St. Bartholomew's, Oct. 30th, 1867.	A very wide cleft of the soft and half the hard palate. Articulation very imperfect.	Chloroform. Soft palate united by four gut sutures. Muscles divided.	Soft palate united, leaving a hole in the roof of the mouth 1½ inch long.	Three months later the hole in the palate had diminished to ⅜ inch in length. Articulation had much improved.
11	E. Knight (F.), æd. 3; Children's Hospital, Dec. 16th, 1867.	Double harelip. Cleft of hard and soft palate. Two years ago the harelip was cured. Speaks very badly.	Chloroform. Soft palate united by four sutures. Muscles divided and incompletely.	Vomiting came on two days after the operation, and the sutures all gave way.	Non-union in this case seemed to be due to the vomiting, though the incomplete division of the muscles was unfavorable to success.