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CLEFT PALATE

by

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Cleft Palate and Hare Lip have always been subjects of interest to members of both medical and dental professions, though perhaps regarded by most rather as a curiosity than a study. To many general practitioners cases so rarely come that a comparison of the case is not possible. One general practitioner of twenty five years' standing tells me that he has never had one cleft palate patient. On the other hand, having cases referred to me as I do, I sometimes see seven and eight different cases in one day.

Opinion is still very divided over the question of surgical and prosthetic treatment of cases, but in this paper I purpose giving very brief reference to the methods adopted elsewhere; rather preferring to give an account of work as it is being carried out in conjunction with the surgeons and with the physicians in the Hospitals with which I am connected.

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I propose giving an outline of the early treatment of this malformation, showing how, at first, common materials such as wax, cotton, sponge and leather, were used to block up the cleft. The dental profession perfected the mechanical treatment of Cleft Palate, reaching that stage perhaps with the work of Norman Kingsley.

Then surgical treatment began to gain ground, but I do not propose enlarging upon this, beyond stating that the pendulum swung from the one extreme - entire mechanical restoration, to the other extreme - attempted surgical closure, whereas this thesis embodies

a plea for the more general adoption, in difficult cases, of the rational middle course, so ably outlined by Gillies & Kelsey Fry (1).

I will trace History of Early Treatment, Incidence, Embryology, and Suggested Aetiology, before discussing the actual patient. The patient I will discuss as ~~they~~ he ~~are~~ is treated in this country. Firstly as the baby when only the lip is repaired, then as the child, two or three years of age, when the palate operation is performed.

Little was known or said about the treatment of Cleft Palates until the fifteenth century, although the Greeks used to make appliances for filling the Clefts. In the second century Galen, the famous Greek Physician, referred to the malformation as existing among his people and called it "Lagocheilos", meaning "Lip like a hare".

As early as 1552, Hollerius (2) in his "Observ. ad Calcem de Morbis Internis", proposes to stop the apertures with wax or a sponge.

Then thirteen years later in 1565, Alexandra Petronius, in his "de Margo Gallico", in addition to wax, suggests cotton or a gold plate.

In 1579, Ambrose Pare published in Paris his book on Surgery. He advised and used gold and silver plates which he described as follows:- "Made like unto a dish in figure, and on the upper side, which shall be towards the brain, a little sponge must be fastened, which, when it is moistened with the mixture distilling from the brain, will become swollen and puffed so that it will fill the concavity of the palate that the artificial palate cannot fall down, but stand fast and firm as if it stood of itself."

This record is worthy of note, inasmuch as it proves that even in these early days, mechanical contrivances, dental plates, or obturators, whatever we may choose to call them, were used and shown to be practicable.

In 1649, Isaac Guillemean, in his "de Ouvres" gave a drawing of an instrument similar in form to Ambrose Pare's, but suggested that as it was not always possible to adapt the plate perfectly to the roof of the mouth, a lining of sponge or lint should be applied, in order to render the closure more complete.

In 1653, Amatus Lusitanus, in his "Curat. Medic. Centur." mentions a boy with diseased cranium (see later reference to Syphilis) and perforated palate, whose voice was restored by means of the gold plate and sponge. This is the first recorded success in the treatment of cleft palate. "The boy's speech was restored."

In 1685, Nic. Tulpius in his "Observat. Medici." mentions the same mode of treatment.

In 1715, Garangeot in his "Treatise on instruments" is the first that we find making any step in advance of his predecessors with regard to the construction of obturators. Describing one, he says - "This instrument has a stem in the form of a screw, upon which runs a nut. To make use of it, take a piece of sponge, cut in the shape of a hemisphere, with a flat surface: pass the stem of the obturator through the sponge and fix it by means of the nut. Dip the sponge in water, squeeze it dry and introduce it through the aperture."

In 1723, Fabricii Hieronimi in his "Chirurgicis operationibus" recommends sponge, lint or silver plate, not suggesting any new form of instrument, but he is the first writer to make specific mention of congenital Cleft Palate in contra distinction to accidental Cleft or perforation, although Galen referred to Hare Lip.

In 1734, R Wiseman, Sergeant Surgeon to King Charles 11. in his "Chirurgical Treatises", gives an account of his paste composed of myrrh, sandarac and a number of other ingredients to be mixed into a paste, which, in conjunction with an apparatus, would perfectly exclude air by its complete adaptation to the margins of the cleft. We are, unfortunately, not informed how this "paste" palate was kept in position.

In 1739, Heister, in his "Institutions of Surgery", suggests the use of a gold or silver plate adapted to the perforation and furnished with a handle or small tube, which, being armed at the top with a sponge, may thereby exactly close the perforation.

In 1754, Astruc, in his "Treatise on Syphilis", makes the first mention that we have of a silver button to the metallic obturator, in place of the sponge, in order to avoid the unpleasantness arising from the absorption of mucus.

I might mention here that I have wondered whether most of these early clefts were not syphilitic perforations of the hard palate. As previously stated, Fabricili Hieronimi was the first to mention congenital cleft palate in contra-distinction to accidental cleft or perforation.

Now we find Astruc, in his work on Syphilis, continues to describe his obturator, just as all the previous writers had discussed their types of obturator. For instance, he does not state that a similar type of apparatus as is used for closing congenital clefts may be used for syphilitic perforations.

I mention this point here because I have wondered whether congenital cleft palate has not come to us with the diet of civilization. I have not yet been able to find any record of cleft palates being found in heathen or barbarian races.

Cartwright and Coleman examined 200 ancient skulls in the Crypt of Hythe Church all had perfect maxillae. J R Mummery examined over 3000 skulls of ancient and modern uncivilised races. All maxillae were perfect. On the other hand, it has been suggested to me that in heathen races if such cases were born, no effort would be made to preserve their life. They would be destroyed or left to perish.

Dr Price of Renwick Hospital for Infants, who has spent two and a half years in the Solomon Islands, moving about from one village hospital to another, assures me that he did not see one case of cleft palate or hare lip amongst the natives, either child or adult; but there is one specimen of a cleft palate skull of a South Sea Islander in the museum of the Royal College of Surgeons, London.

Bland Sutton (3) recorded that at the London Zoo, of the lion cubs born in captivity, 99% had cleft palates. At the Dublin Zoo, the same condition of affairs existed until the diet was changed, then the percentage of lion cubs born with this deformity became negligible.

In 1764, we have the first record of a surgical operation being performed to correct the condition. The operation was performed by M. Le. Monier, a French dentist.

In 1786, M. Pierre Fourchard, in his "Chirurgeon Dentiste", gives an account of some

instruments which show a very great improvement on the forms previously in use. The sponge, as a means of support to the obturator, being substituted by an arrangement of metallic wings, worked into proper position after introduction into the cleft, by means of a hollow stem and nut, which, when screwed down, kept the wings (covered with soft sponge) across the aperture.

There are descriptions given of others on the same principle and of one on a then new plan, depending for its support upon ligatures round the canine teeth.

It will thus be seen that more than two hundred years elapsed before any decided improvement took place in this department of dental science.

M.M. Dubois, Foucou, Touchard, Bourdet, Cullerier and De Chamont give descriptions of a variety of appliances, obturators, all more or less resembling the instrument of Fourchard, with its arrangement of wings, clasps and screw nuts.

In 1819, M. Roux of Paris published rules to be observed in Surgical Closure of clefts.

In 1820, the next advance was made by M. De La Barre, who is first to mention the use of "elastic gum" in the restoration of the velum and uvula. The artificial palates designed by this man were ingenious in the extreme, but of such a complicated nature that none but a man

of considerable manipulative dexterity could ever hope to be successful in their application.

The introduction of the "elastic gum" marks an important step with the construction of restorations for cleft palate.

1828. Mr Snell described his methods. He must have obtained far better results than his predecessors, because he first set about obtaining an accurate model of the mouth, on which he mounted and fitted his obturator. No previous writer had mentioned making a model of the mouth. Snell says that he was not aware of any other than his own method, with the possible exception of one method proposed by Mr Alcock in the Medical Intelligencer. I have not been able to find a description of Alcock's method.

Snell's own words are - "My method of constructing an obturator is, with a gold plate, accurately fitted to the roof of the mouth, extending backward to the os palati, or extremity of the hard palate, a part of the plate about an inch in length, being carried through the fissure. To that part of the plate which answers to the nasal fossae, are soldered two plates, meeting in the centre and carried upwards through the fissure to the top of the remaining portion of the Vomer, to which it should be exactly adapted and made to the natural shape of the nasal palatine floor: thus the fluid of the nose will be carried directly backward to the

fauces. A piece of elastic gum is next attached to the posterior part of the plate, where the natural soft palate commences, extending downwards on each side as low as the remaining part of the uvula, and grooved at its lateral edges to receive the fissured portions of the velum. A movable velum is placed in the posterior centre of the elastic gum. That these may partake of the natural movements of the parts during deglutition, a spring is affixed behind them, one end of which is fastened to the posterior and anterior surfaces of the principal plate and the other rests gently against the posterior face of the india rubber; this keeps it always in close apposition with the edges of the fissure during deglutition. It is requisite here to mention that the elastic gum should be placed in a gold frame as it would shrink up by remaining in the mouth. The frame should pass around its edges only, leaving the centre open. The whole apparatus is held up by electric gold springs round the teeth on each side."

In 1845, Mr Stearn, a surgeon of London, communicated four articles to the Lancet on congenital deficiency of the palate and gave a description of an appliance he had designed. It consisted of a gold plate fitted across the hard palate, having attached to it, by means of two spiral springs, an artificial velum of elastic rubber consisting of a body, wings and grooved edges to receive the margins of the cleft.

In 1857, Mr Sercombe read a paper before the Odontological Society entitled "Cleft Palate": Its surgical and mechanical treatment". He describes

a very ingeniuos apparatus of his own design. He makes a gold plate to cover the hard palate, held in place by clasping suitable teeth, a piece of the gold projects backwards and is perforated by a series of small holes. Now the velum is made of two pieces of vulcanised india rubber, the larger piece extremely thin, the smaller piece thicker. The two pieces are sewn together, the stitches passing through the perforations which were made in the posterior projections of the gold plate. The larger piece is made to conform to the sides of the cleft, being so thin it is adaptable - but would be displaced by the weight of mucus accumulating upon its surface were it not supported by the smaller piece sewn on the central portion.

In 1862, Williams showed a type of hinged apparatus.

In 1864, Dr Norman Kingsley of New York brought before the Odontological Society of Great Britain, a method which demands the highest praise on account of the perfection of the method by which his results were obtained. The obturator resembled that constructed some years previously by Mr Stearn, but the "Modus operandi" was particularly interesting. Plaster of Paris was used for taking the impressions instead of wax and the elastic rubber velum was prepared in metallic moulds, rendering duplication of them a very easy matter.

INCIDENCE.

After having thus introduced my subject, let us consider its prevalence. I have enquired of the various Government Departments, to ascertain the total

number of babies born with Cleft Palates each year, and the number of children suffering from this deformity who are at present being educated at public schools, but no statistics have been kept. I have gone through the records of case histories at the Royal Alexandra Hospital for Children for the past fifteen years, and these records show that during the thirteen years 1916 - 1928, 331 patients were treated for Cleft Palate or Hare Lip. 62·84% of them were males, 37·2% females. During the same period, a total of 70,084 children were admitted, the percentage of males being 55·5%. I mention this comparison because all the figures I have quoted, both from our own hospitals in Sydney and from abroad, show a larger percentage of males than females afflicted with this malformation.

In 1929 239 children were admitted with congenital malformations, including Cleft Palate and Hare Lip, and of these 158 were males, i.e. 62%.

In 1928 204 children were admitted with Congenital malformations, including Cleft Palate and Hare Lip, and of these 123 were males, i.e. 60%.

In 1928

36 children 2-3 years	(24 males (12 females	- admitted for Cleft Palate operation
33 babies under 3 months	(26 males (7 females	- admitted for Hare Lip operation.

In 1929

43 children 2-3 years	(32 males (11 females	- admitted for Cleft Palate operation
34 babies under 3 months	(27 males (7 females	- admitted for Hare Lip operation.

At the Royal Hospital for Women -

In 1927	there were	1632	babies born	0 HL	or CP
1928	" "	1715	" "	2 "	"
1929	" "	1776	" "	0 "	"
1930(incomplete)		1675	" "	1 "	"

TOTAL BIRTHS 6798 - PERCENTAGE OF CLEFT PALATE BIRTHS •05%

The very low percentage of babies born with Cleft Palate at the largest maternity hospital in the City, bears out the writer's observations that by far the greater percentage of these babies are born in the country.

In the year 1929, no babies born at the Royal Hospital for Women had cleft palates, whilst 77 patients with cleft palates were treated at the Royal Alexandra Hospital for Children.

In 1920, the United States War Department issued a report (4) on "Defects found in drafted men". Two and a half million men were examined - about half a million were rejected. Cleft Palate was found in •5% of the men.

GROUP 1. Agricultural occupation exceeds all others in congenital defects, such as curvature of the spine, epilepsy, defective speech, deaf mutism, deformities of the spine, muscular atrophy and Cleft Palate.

IN AMERICA J S DAVIS (5) RECORDS =

		HL & CP		
15,520	deliveries of Negro Women	7	or 1 in 1788	or •045%
11,638	" " White Women (in public hospitals)	13	or 1 in 895	" •1%
3,927	deliveries of White Women (private cases)	4	or 1 in 981	" •1%
15,565	deliveries of Both White series	17	or 1 in 915	" •1%

These figures show that in the white race, environment and social status are apparently of little import.

More than half of these clefts were first children, associated abnormalities occurred in 25%.

Lyons (6) found that the deformity occurs one case in about 1200 births.

Frazer (7) reports that certain nationalities have more cases born percent than is usually accepted as the average figure, For example, the Finnish people 1·1% and Frazer also states that intermarriage is a contributing factor.

James Beavis, of the University of Michigan, has given an interesting account of a large number of cases.

MALES	52·6%
FEMALES	47·4%
Unilateral cleft of lip on right side	40%
" " " " left "	60%
Family history revealing Cleft Palate and Hare Lip in immediate family -	17·5%
Congenital Defects Associated -	20%

SUMMARY The majority of patients are born in rural districts. In common with other congenital malformations, the percentage of males predominates. The cleft is usually in the left hand side.

EMBRYOLOGY

In the human embryo, a little over 2 mm. in length, we find upon the ventral surface, in front of the yolk sac, a round protrusion, the heart; and, in front and above, a depression, the oral sinus. The Anterior boundary of the oral sinus is formed by the projecting frontal extremity of the brain. The sides of the oral sinus are formed by the maxillary and mandibular processes. The floor of the sinus is formed by a thin pharyngeal membrane, which separates it from the pharyngeal cavity and which is lined upon its outer

surface by ectoderm, and upon its inner surface by endoderm. These two membranes are in apposition as there is no mesoderm intervening. Later on in the development of the human embryo, the pharyngeal membrane disappears; thus the oral sinus becomes continuous with the pharynx. In embryos of 8 mm. at about the fifth week, the nasal cavity is still a part of the oral sinus; from the oral sinus, five fissures radiate, the upper pair are the orbito nasal fissures, the lower pair form the mouth; whilst the median fissure separates the lower jaw. Thus the external mouth lips and ala nasi are formed. The mouth and nose at this time still constitute one cavity, the roof of which is the base of the skull; at about the seventh week there is an outgrowth from the deep aspect of each maxillary process, the horizontal plate, which, uniting, form the hard and soft palate. The nasal cavity is divided into lateral halves by the downward growth from the deep aspect of the fronto nasal process of a central vertical septum, to become in time the cartilaginous septum nasi.

Thus the primitive face is formed by the fusion of five processes. The Fronto nasal process which grows downward from above, is joined laterally by the two maxillary processes, to form the upper lip and nose. The two mandibular processes grow inwards to meet and form the mandible. As the median process develops to form the nose, two rounded prominences make their appearance, one at each angle, these are the globular processes which form the alae of the nose, and the intermaxillae. At a later stage each globular process

unites with the lateral or maxillary process to complete the upper lip. In some mammals, especially rodents, the globular processes fuse with the lateral processes, but do not fuse with each other - they remain permanently separated. For example, the median cleft of the hare. In the human embryo, the fusion of the processes takes place during the fifth and sixth week.

In the early life of the embryo, during the second and third months, the tongue fills the whole mouth. As late as the latter part of the second month, it is thicker than at birth and is kept between the hemispheres of the maxillae. At the end of the 8th week, the embryo becomes a foetus. It has now attained a length of about 25 mm.

FOETAL LIFE

Fourteenth day	Appearance of primitive mouth of stomatodoeum.
Fifteenth day	Disappearance of bucco pharyngeal membrane.
Third week	Mandibular arch of either side formed; maxillary processes bud out from mandibular arches.
Fifth week	Fronto nasal process appears; olfactory pits widely separated by the primitive nose; globular processes appear.
Sixth week	Union of lateral nasal with maxillary processes; division of stomatodoeum into an upper cavity - the nose, and a lower cavity - the mouth.
Eighth week	Union of the three portions of palate commences anteriorly; completion of the upper lip by fusion of the globular processes.
Tenth week	Completion of union of the palate segments, the uvula being the last part to be completed.

(Berry & Legg (8) "Hare Lip and Cleft Palate)

Now at some time during the fifth or sixth week fusion commences to occur between these five processes, and, according to Parsons Schaeffer (9), this critical period when an arrest may occur, may last for a few days or for but a few hours.

The question which now arises is what happens in the case of a cleft palate embryo at this critical time. Is there a definite arrest of development, or is it just a failure on the part of the tissues present to join, or is it possible that both conditions are found. Sometimes the one, sometimes the other.

EXHIBIT 1

Look at this model here taken of a baby one day old. The gap between the two portions of alveolus at its narrowest part measures five eighths of an inch. It is the widest gap occurring at birth that has so far been met with in the writer's experience. The structures of the part corresponding to the cleft APPEAR to be entirely absent. It certainly seems to be a definite arrest of development, but the total width of the palate, from the outer alveolar plate on one side to the outer plate of the other side measures one inch and seven eighths.

EXHIBIT 2

This plaster model also of a baby one day old reveals a cleft half an inch wide at its narrowest part. The total width of the palate is one inch and five eighths.

Both of these plaster casts appear to show a definite loss of tissue. On the other hand, compare this plaster cast.

EXHIBIT 3

The cleft is only one quarter of an inch wide, but the total width of the palate is only one inch and a quarter. So that, although at first sight some of these cases seem to show a tremendous loss of tissue

whilst other cases reveal only a lack of union of the tissue. After carefully measuring up these casts and comparing the measurements with the width of the cleft, I am inclined to agree with Brophy (10) who states definitely that at birth there is no loss of tissue. Sir Arthur Keith (11) states that in his opinion, in the majority of cases of cleft palate, there is no deficiency of tissue at birth, nor for some time after birth. The separation of the parts may be explained by pressure from the tongue, which fills the oral cavity or from upward pressure of the mandible.

Bland Sutton says - Malformations, as such defects are called, arising in this manner, are usually classed as arrests of development, and as it is clearly established that the embryological history of a complex individual may be regarded as an abbreviated history of its evolution, it necessarily follows that should the development of a part be arrested at any particular stage, we should expect to find in some less specialized mammal, this stage represented as a permanent condition.

M. Cadenat (12) insists that the condition is a simple failure of union.

AETIOLOGY

Now what causes this failure to unite? I will discuss a few of the theories that have been put forward.

1. Heredity. It may be a predisposing cause. Going back over the records of the last hundred cases that were treated at the Royal Alexandra Hospital for Children, one child had a Father with a Cleft Palate, another

child had a mother and uncle who had cleft palates, a third child had a cousin with a similar condition, and in only two cases did another child in the same family have a similar condition. R J Gladstone (13) in the Journal of Anatomy, January 1923, states that "These and other ante natal deformities are rarely inherited directly." Out of 554 cases, only two cases occurred in which the deformity was present in one of the parents.

R J Gladstone considers that the transient stage of development, e.g. Hare Lip, Cleft Palate or Spina bifida is due to inadequacy of nutrition or deficient developmental vigour. In those cases in which there is a history of inherited abnormalities it is the deficiency in developmental vigour which is inherited, rather than the particular defect. This may be accentuated by nutrition defects on the part of the mother during gestation, which may determine the appearance of a defect in the offspring.

I must mention, however, that at Guy's Hospital London, I saw a mother bring along her seventh baby with cleft palate. She had brought along one regularly each year. This, however, is not usual. As a rule, only one baby with cleft palate occurs in a family, just as only one mongol appears in a family - with the difference that the cleft palate child is usually the first born.

Warren B Davis (14) of Philadelphia, states that out of his records of 425 cases, treated in 13 years (one every eleventh day) he obtained evidence of the influence of heredity in 57% and he states that with more careful investigation the percentage might have been higher. 56% of his cases were males, 44% females. A careful perusal of his paper discloses the fact that

he took as his evidence of hereditary influence not necessarily a cleft palate, but accepted the absence of a lateral tooth from the dentition of a parent, or an Aunt, or an Uncle, or even a cousin. From my observations as a dentist I must protest against this being taken as evidence, because there is a definite trend in our race for lateral incisor teeth to be missing altogether from our dentition. A child may inherit the large teeth of one parent and the small features of the other parent; there is definitely not room for all the teeth. We may find lateral incisors missing or cuspid teeth unerupted lying high up in the palate, or wisdom teeth impacted, but to count this as evidence of heredity influencing of cleft palate - I feel is quite wrong.

Clement Lucas (15) states that absence of, or deformity of the lateral incisors in one generation may be the precursor of cleft palate in a later generation.

So much for the influence of Heredity, but I hope to hear this point discussed at the end of my paper.

11. Improper nourishment of the mother; insufficient calcium and potassium. Quite a large percentage of patients come from country districts where the diet is not as varied as that of the city dweller. Again, some of the mothers give a history of severe morning sickness. I should greatly appreciate a discussion on these two points at the close of my paper. I can find no record of cleft palates occurring in heathen or uncivilized people. J R Mummery examined over 3000

skulls of ancient and modern uncivilized races and found the dental arches perfectly formed. At the London and Dublin Zoos, where the lions were fed on horse flesh, 99% of the lion cubs born had cleft palates. In the Dublin Zoo the diet was varied by the addition of goats, rabbits etc, which the lions were able to devour with skin and bones; and the percentage of the cubs born with cleft palates became negligible.

In our Australian Zoos, no animal has ever been born with a cleft palate. On inquiry, the curator of each Zoo has stated that the diet of all pregnant animals is very carefully balanced.

In 1909, at the Berlin Zoo, a pair of Jaguars had 32 cubs one year. All had cleft palates and all died. Next year, the diet was changed. Instead of cold meat, hot flesh containing blood was substituted. This year, the same pair of Jaguars had 25 cubs born all perfect.

In the animal kingdom, the diet seems to play an important role. On the other hand, Dr Chalmers J Lyons states that he once observed a litter of ten puppies, nine of whom had cleft palates in various stages, but in this case the mother's diet was normal. This, to my mind proves nothing, because that dog's diet may have been deficient, even if it were its usual diet.

111. The effect of drugs or toxins, alcohol and syphilis, has been suggested, but is contrary to

evidence. Some mothers have told me that during the fifth week of pregnancy they have used chemical means in a vain endeavour to bring about an abortion. But on the other hand, we have positive evidence that this has not taken place when babies with cleft palates have come along. Also in the majority of instances when this practice has been unsuccessfully attempted, the baby in due course has exhibited no signs of cleft palate.

Professor Keith (16) in an article contributed to the British Medical Journal in August 7th 1909 states - More suggestive of the true cause of the condition are -

1. Malformations with which cleft palate is so often associated (Spina bifida, anencephaly, morbus cordis, atresia ani, and club foot.)

2. The observations of experimental embryologists, such malformations may be produced by disturbing the development of the embryo by various means, but one may conclude from Prof. Mall's observations on malformed human embryos that morbid uterine or placental conditions are the commonest cause of malformations of the lip and palate in man.

In a group of sixteen malformed human foetuses, the prevailing lesion being anencephaly, the following defects of palate were found:-

4 Bifid Uvula
1 Cleft of soft palate
1 Cleft of hard and soft palate
1 Anterior bilateral fissure
1 Unilateral premaxillary cleft
1 Biparte palate
1 Failure of ossification of the hard palate
1 Absence of premaxilla

Eleven of the sixteen showed malformations of the palate.

IV MATERNAL IMPRESSIONS.

Some of you may wonder that I include this

heading. Amongst the laity it is put down as the certain cause that the mother had a fright, a shock, a fall, saw some dreadful sight; or, most dreadful of all things, visited a dentist. At the close of a lecture I gave to dentists, one practitioner told me that nine cases of cleft palate had passed through his hands and in each case he had ascertained that the mother had had dental treatment performed during the first three months of her pregnancy. I replied to him that nowadays most expectant mothers had their teeth attended to during this period and there had been no sudden increase in the prevalence of cleft palates during the past decade. The most convincing argument against this belief is the fact that mothers with cleft palates are in constant dread of bearing a baby with a cleft palate and yet almost always they bear a perfectly normal child.

V. MECHANICAL INFLUENCE

Force exerted by knee of embryo against the upper jaw, or by the tongue, or by the mandible. Langdon Down refers to flattening of the left side of the cranium caused by pressure of the foetus in utero against the sacrum and he connects this with the speech centres.

VI. INTERFERENCE BY THE RUDIMENTS OF SUPERNUMERARY TEETH.

These do not make their appearance until after the five processes have joined, hence the fallacy of such an idea. Then again, this could only affect bony structures, calcification of which does not begin until a later date still. Again this would not explain clefts

of the soft palate only, Bifid uvulae and Hare Lips not associated with cleft palates.

R M Greenthal (17) states that in 1200 of his cases, 30% show the presence of supernumerary teeth. Prof. Warnekios (18) also states emphatically that both Hare Lip and Cleft Palate originate through the rudiments of a supernumerary tooth. I have models in my collection, showing a perfect set of temporary teeth, correct in number, with no supernumerary teeth present, but a cleft involving the soft palate only - or soft and part of the hard palate.

I might mention here that cleft palate is not due to a failure of osseous centres to coalesce, but rather it is due to the non-union of pre-osseous mesenchymal processes. The rudiments of the lateral incisor are laid down near the field of fusion and may be carried to one side or other of the cleft - or may be left stranded in the soft tissue between the cleft.

V11. Bodecker (20) suggests that clefts of the palate may be caused by the dental lamina or tooth band dipping down between the premaxilla and the maxilla and preventing their fusion. This suggestion must be refused for the same reason as the previous suggestion "V1", also from the embryology of the face as stated by Gladstone. "The union of the globular and maxillary processes occurs at the tenth to twelfth m.m. stage (fifth to sixth week). The primitive dental lamina is said to be formed as a continuous semicircular ingrowth, within the labial margin of

the mandibular arch below and the maxillo-premaxillary arch above, at about the seventeenth mm. stage (seventh week). The alveolar ridges are separated from the labial ridges between the eleventh and twelfth mm. stage. The tooth band is, however, not defined until the embryo is about 17 mm. in length (seven weeks) and is invagivated by the mesodermal dental papillal to form the enamel organs in embryos of 40 mm. in length (9th to 10th week)."

Foote (21) believes that Cleft Palate is a local evidence of a general faulty development of the osseous system and shows that there seems to be a difference in the osseous structure of not only the maxilla but also the long bones in these cases. It is a clinical fact that orthodontists have found it more difficult to treat the jaws of Cleft Palate children than to treat normal cases. The process of osteo-genesis does not seem to be so active.

Mention must be made here of the wonderful work that is being done in the orthodontia clinic of the Great Ormond Street Hospital for Sick Children, London. A T Pitts is very keenly interested in Cleft Palate work and is undoubtedly an authority on the deformities caused by cleft palate operations and methods of correcting them.

His clinic included children of all ages, his task was to correct the position of the teeth of children who had undergone operations upon the palate. Time spent at this clinic was most profitable to me. Pitts demonstrated to me the various deformities caused by the three main types of operation then practised in England, the Brophy, Lane and Langenbeck.

My mornings were spent at Guy's Hospital with Kelsey Fry, where the Gillies Fry method was carried out; making and maintaining a surgical success of the soft palate, and restoring the hard palate with a plate. My afternoons were spent admiring Pitt's almost hopeless task of making mastication possible, for the contracted arches, where entire surgical closure had been attempted.

The article by A T Pitts,(22) "Dental Aspects of Cleft Palate" which appeared in the British Dental Journal on May 1st 1922, fully illustrates my remarks.

So the baby with cleft palate is born, usually giving a history of a normal pregnancy and uneventful labor. At birth the baby is well proportioned, weighing about 8 lbs. This factor makes my statements about lack of calcium in the mother's diet appear ridiculous, but Ernst Schmitz (19) states that only minimal amounts of calcium are found in very early foetuses; the amounts rapidly increasing after the 3rd months, the figures in grammes for each month commencing at the third month are •01045, •135, 1•6, 4•66, 10•44, 16•64, 28•6 grammes at the ninth month and I consider such deficiency need only have occurred in the first six weeks of pregnancy to permit of a failure to unite of any of the five processes. From that time onwards growth may take place quite well but for the fact that later union between the parts does not seem to occur; or we may find only a hare lip - union having taken place with the palatal portion

of the tissues. The complete single Cleft Palate and Hare Lip or complete double hare lip and Cleft Palate is thus explained, but those cases (and they form a very large percentage) where only the soft palate is cleft, or only the uvula bifid, do not permit of such an explanation. I have mentioned earlier that I cannot accept the theory of heredity alone as a causal factor. Certainly in quite a percentage of cases differeing appreciably with various observers, a history of the occurrence of cleft palates is obtained, then again in quite a number of cases it has been definitely proved that going back for four generations, in the direct line, there is no history. Certainly there may have been infant deaths or miscarriages not recorded, but no history in the direct line has been given.

Many of my patients who have been quite intelligent have gone very carefully back over the family history for four generations and have assured one that no case of cleft palate has been known.

So I consider that Heredity alone cannot be accepted as the cause, although it appears to be a contributing factor. In the animal kingdom, diet seems to be a most important factor; in the human race the deformity may be due to defective physical surroundings operating upon the mother, not so much as the parent but as the nourisher of the child within her womb.

Professor Keith (16) states that, "Irregularity of the growth is not the cause but the result of the

cleft condition. The processes which form the palate were in contact during the fifth and sixth weeks of development, but for some reason, union did not take place then. The union of embryological processes is, in every way, comparable to the healing of wounds. The Epithelial coverings on each side of the nasal groove come in contact and form a bridge across which uniting mesoblast may grow. If for some reason union is delayed, and Professor Mall observes that the uterine inflammation (sometimes from syphilis) is the most common cause, growth in the several elements of the palate causes them to separate, and once a breach in their continuity has been effected, union cannot afterwards take place."

"The younger the foetus when this arrest occurs, the smaller will be the cleft." I cannot reconcile this latter statement of Professor Mall's because I consider that the younger the foetus when this arrest occurs the more complete will the cleft be. Then another point about which I have a difficulty is that it appears that sometimes fusion seems to have been delayed beyond the time of normal fusions of the embryonic processes and a prenatal scar results simulating a post-operative scar. I consider that in these cases if an arrest has taken place, the duration of the inhibition must have been short. Another theory for the presence of this scar is given by Rose who suggests that it is probably due to a persistence of raphe of union of the labial segments.

Stoddart (24) describes a definite relationship between the shape of the palate and mental aphasia. Gothic arches and high palates are associated with stigmata of degeneration, but cleft palates are not necessarily associated with mental disorders.

Dr Claye Shaw (25) states - "There is a general relation between the shape of the palate and that of the skull as to length and breadth.

Dr Langdon Down has observed actual clefts of the palate in •05% of cases of congenital idiocy.

Gregner found nine cases in 14,466 children or •06%.

I have referred to Mongols on account of the suggested cause of the condition, and because so often there is only one cleft palate child in a family, just as only one mongol occurs in a family.

In Mongols there is a history relating to uterine exhaustion or ill health of the mother during gestation, some are the first born, others the last born of a large family. It is exceedingly rare for two Mongols to be born in one family.

A F Tredgold (26) states that Dr Coupland records a child in the Royal Albert Institute, a mongol - one of twins - the other perfectly normal. Dr Shuttleworth reports two similar cases. Dr W M Van der Scheer, Inspector of Lunatic Asylums in Holland, as the result of the examination of 120 cases of mongolism, comes to the conclusion that the condition is the result of increased pressure exerted upon the foetus during the sixth and seventh weeks of intrauterine life by an abnormally small and tight amniotic sac. He thinks that many of the

signs which are not present at birth, but which develop later are due to inscreased amniotic pressure, having caused excessive flexion of the head, thus interfering with the growth of the pituitary bodies and other structures in the interpeduncular region. Dr M Jansen (27) supports this view and considers that there is an intimate relationship in certain anatomical features between mongolism and achondroplasia, the latter being the result of the same cause acting somewhat earlier (between the third and sixth week). Jansen considers that if this pressure acts at a still earlier period (2nd and 3rd weeks) Anencephaly results.

Having thus outlined the early history of treatment, both mechanical and surgical, and given the incidence as about ·1% and given a sufficient description of the embryology to account for the condition, and discussed the suggested Aetiology, the most important matter left is the consideration of the actual patient - the baby.

In the writer's experience a cleft palate baby usually appears quite healthy at birth, often weighing 8 or 9 pounds, which is slightly above the average for a normal baby.

WEIGHTS OF SOME CASES IN WRITER'S OWN PRACTICE

	AT BIRTH	NOW
Helen McEwan	8 lbs 8 ozs	8 lbs 13 ozs - when 8weeks
Phyllis Marlin	6 "	5 " 13 " - " 10 "
Donald Farrant	10 "	7 " 12 " - " 6 "
Robert Magnus	9 "	8 " 2 " - " 3 "
Baby Staples	8 " 1 "	6 " 12 " - " 2 "
Nerolie Rodd	7 "	7 " - " 6 "
Barry Moore	8 " 10 "	7 " 10 " - " 3 "
Stephanie Johnston	9 "	6 " 7 " - " 8 "

If the lip be cleft, the condition is immediately apparent to the medical attendant and to the nurse.

A very great responsibility now rests upon them both. Often it is the first child, its coming has been looked for. The shock to the mother is tremendous and it behoves the medical attendant or the nurse to break the news as gently as possible. The baby need not be shown to the mother until the news has been broken to the rest of the family and the baby has been shown to them. After the mother has had a good sleep and is refreshed, then the baby's condition may be explained and the baby shown to her. The baby's face should be dressed and the cleft closed with an adhesive strapping before the mother is allowed to see it; and then she should be assured that a simple plastic operation can remedy the defect. I feel very strongly upon this point. We, who are constantly seeing new cases, become accustomed to them. When even a photograph of such a baby is regarded with horror by the average layman, we can well imagine how repulsive the baby must appear at first sight to the mother; when its face has been dressed it looks different, because everyone is accustomed to the sight of bandages.

I have had many a parent break down and weep when telling me, weeks after baby had been born, about the first shock they had received.

If the lip be not cleft, the condition of the palate is not always noticed by the medical

attendant or by the nurse.

Instance this case -

Jean Malcolm weighed 3¾ lbs at birth, cleft of soft palate
Twin sister " 7 " " " Normal
5 weeks premature birth
First pregnancy, family history on both sides definitely revealed no history of cleft palate or of twins being born.

This cleft palate baby was spoon fed for seven weeks, the cleft palate remained unnoticed. The mother had bathed the baby and laid it on the table to dress it when the sunlight happened to shine into the baby's opened mouth. The mother was horrified to see"a hole in the roof of the mouth". This is the longest time I have yet known the condition to pass undetected, but any time up to three weeks is quite a frequent occurrence and then it is often the mother who discovers the condition.

Whether the cleft be complete or partial, we are now confronted with the problem of feeding the baby. In a paper read at the Dental Congress in Brisbane, I objected to the word "feeding". Rather it is "The problem of introducing the food into the stomach of the baby". It is a problem indeed; and baby suffers thereby. Babies are often brought to me weighing 5 lbs, 5½ lbs or 6 lbs, even when 8 and 10 weeks old. In fact, their weight does not rise above 6 lbs for six months.

Babies with a cleft palate are not able to suck and so cannot be fed in the usual manner. With lion cubs, it is usual to plug up their nostrils with cotton wool - then they are able to suck. Whilst not suggesting this treatment for babies, I will show, lower down in my thesis, that a similar treatment is in use in America at present.

THE FEEDING OF BABIES WITH CLEFT PALATES HAS BEEN A PROBLEM WHICH HAS NEVER BEEN SATISFACTORILY DEALT WITH.

In 1828, Snell in his work on Artificial Palates suggests blocking up the cleft with sponge or with leather.

Mr Mason suggests swaging a metal plate to approximately fit the vault of the mouth, and then attaching it to the nipple of the feeder. Oakley Coles (2) considers it a better plan to solder this dome on to the top of a teaspoon, leaving it open at both ends.

The milk is thus introduced right at the back of the mouth and may be swallowed without being returned through the nose. I consider this a dangerous procedure to place the liquid so far back, coughing may be thus induced. Coles also designed a breast shield with a similar dome attached.

In 186- Mr G Williams in the Dental Review suggested a flap of thin sheet elastic, not modelled to the arch of the palate, but simply cut out and sewn on to the nipple of the feeding bottle.

Brophy suggested a flap of rubber similar to that of Williams, only Brophy had the piece of rubber attached to a wooden handle. Kelsey Fry showed me plates of ordinary vulcanite as used at Guy's Hospital in conjunction with an automatic force feeding bottle. In the American Journal of the diseases of children, two medical men state that their experience with hard vulcanite obturators has been attended with such little success, that now as routine practice they

tie a strip of rubber round the head of the baby to block up the nostrils, the nurse lifts up the end of the rubber between each suction to give the baby a breath. This method has been tried by a baby hospital in Australia before the introduction of the soft Vela Sucking Plate. In the annals of Surgery 1922, Warren B Davis states that many of the infants were sent to the Hospital in such a poor state, that even with all their care, three percent died from malnutrition soon after admission before any operation could be attempted and another two percent died after the operation.

Kelsey Fry in the British Medical Journal May 5th 1921, stated - When the cleft only involves the soft palate and a small portion of the hard palate, it is only necessary, in order to aid the infant in feeding, to use a specially constructed feeding bottle, by which the liquid is projected into the mouth by means of hand pressure. If the cleft is of a more extensive character, it becomes necessary to construct and fit an obturator on to the teat of the bottle, which will thus prevent food being regurgitated through the nose.

> In the writer's experience, babies born with clefts which involve the soft palate only, find more difficulty in feeding than babies with a complete cleft; the sucking plate is the solution of the difficulty.

Federspiel (28) in his latest book says - "Very large is the number of cases which die in early infancy from lack of nutrition, due to the inability to suck." Robert Farr M D (29) of Minneapolis, states of his own cases - "The high mortality in cleft lip and palate is due to various causes. These children are, as a rule, below par and many of them die before

any surgical attack is made upon them." In our hospitals here we do not have this high percentage of mortality, due, I think, to the high standard of skill exhibited by our nursing staffs.

Very few medical men realise the difficulties encountered in feeding these babies; they do not have the time to spare to watch the process, lengthy and tedious as it is, which they feel can quite well be left to the nurse. A medical man, director of a system of baby welfare clinics, assured the writer that his clinics found no difficulty in feeding cleft palate babies, whereupon the writer immediately asked him whether he had ever, personally, watched one cleft palate baby being fed. He had to confess that he had not. It is a dangerous procedure in the practice of medicine to take things for granted. The writer has spent hours watching these little sufferers being fed by various methods, both by skilled nurses, and by the mothers; and so is in a position to criticise these various methods, and point out their disadvantages.

The methods in common use are -

1. Teaspoon - a very lengthy tedious process, a lot of milk is spilled and dribbled, the milk goes cold during the process, is contaminated with the secretions and dust found in the nasal cavity. In a normal baby the nasal secretions, with the dust strained out of the air, run out in front and are wiped away by the nurse. With a cleft palate baby they drain backwards and are washed down with the milk.

The baby should be nursed on the lap, or slightly propped up on a pillow in bed, so as to keep the head slightly elevated. Half a teaspoon of expressed breast milk, or its artificial substitute, is taken, the spoon placed just inside the lower jaw and the food allowed to run into the mouth, then baby is watched until this is swallowed and a breath taken before the process is repeated.

A tremendous amount of air is swallowed with the food. Vide. Exhibit 4. X ray films taken of a baby two days old -

1. Before meal
2. After meal

2. Pipette or Medicine Dropper - The same remarks apply to this method, as to the spoon method, except that this method is more dangerous in inexperienced hands, as the milk may be dropped too far back which would cause the baby to cough and choke. The food should be dropped just inside the lower jaw. It is most important to watch the baby swallow the mouthful, then have a breath before putting any more milk in the mouth.

3. Ordinary Feeding Bottle - With extra large hole in the teat, this amountsto a hose. The milk just runs out in a continuous stream. Care must be taken not to choke the baby. Milk and air is gulped down as rapidly as the baby can manage. The rubber teat is forced up into the cleft increasigg the width of the cleft.

4. Force Feeding Bottle. Same remarks apply as above.

5. Catheter tube inserted over tongue. This method can only be used by a trained nurse.

Procedure for a tube feeding: Take the funnel of a glass syringe and a small rubber catheter. See that the catheter is quite firm and that the bore is large enough to enable food to pass through freely, that is, without blocking the catheter.

Connect catheter with the funnel and then run water through same to make sure that bore is clear.

Have ready on a plate, covered mug containing nourishment, mug of water, jar of glycerine to lubricate the catheter and catheter and funnel.

Have baby in bed propped up slightly on a pillow, one nurse at left hand side of bed steadying head with the right hand and holding baby's hands with left hand.

The second nurse, standing at right hand side of bed, takes in the left hand the funnel with catheter attached, empty, holding the lubricated catheter in right hand, gently inserts it over the baby's tongue (taking care to keep catheter away from lip sutures, if the lip has recently been operated upon) till there is a gurgling sound in funnel which is a sign that the catheter is in the stomach. Wait a few seconds till baby becomes accustomed to tube, then pour a little water through the funnel to make sure that there is no blockage with mucous and that catheter is not in the trachea and proceed with the feeding. When finished, pinch catheter between finger and thumb and draw out quickly. Do not leave baby immediately as he may vomit and become asphyxiated.

Prop him and hold the lower jaw if he is inclined to vomit.

There is sometimes a difficulty in tube feeding as the tube becomes blocked with mucous, if this should happen the tube will have to be removed, cleaned and re-inserted.

If care be taken with this method of feeding, no food is wasted and baby will usually sleep between feeds.

The tube may be inserted through the nostrils, if only a single cleft palate, but it is much safer to feed over the tongue.

With any of the above methods the baby is liable to vomit up the meal shortly afterwards. I have seen parents spend over two hours giving a two weeks old baby three ounces of milk.

Babies do not thrive on account of -

1. Nervous exhaustion with the effort of feeding and resultant loss of rest.
2. Enormous amount of air swallowed.

But neither of these disadvantages are found if a soft Vela Sucking Plate is made for the baby, enabling it to be fed just as a normal baby. The method I have found most successful is, first of all to get the baby, if possible when one day old, then, using a specially constructed impression tray (Exhibit 5), obtain an accurate impression of the mouth, hard and soft palate, in dental composition (Exhibit 6) and construct a sucking plate (Exhibit 7) out of soft vela rubber. Full instructions for impression taking and construction technique are given in the Dental Journal of Australia September 1930. The plate is soft and may be bent, but is elastic and resumes its original shape in which it was made to fit the mouth perfectly. This point

bending the plate together when inserting in the mouth is important, when the plate is being used a week after the cleft lip has been repaired with a plastic operation. The lip is never stretched when the plate is being inserted. When the sucking plate is in place, the baby may readily be fed out of an ordinary bottle. See Cine Kodak Film of impression taking, plate fitting and babies feeding with plates in position. This film was taken at the Renwick Hospital (Exhibit 8).

With such a sucking plate inserted, baby is fed in a normal manner, in ordinary time and puts on weight and enjoys its proper rest.

SUMMARY. A comparison of Hospital records of the general condition of the baby and the weight, with the weight and condition of a normal baby of the same age and a careful perusal of recent literature on this subject, will afford ample proof of my statement, that until recently "the feeding of babies born with cleft palates has been a problem which has never been satisfactorily dealt with.

In Australia, the lives of these babies have been preserved, but at what a cost to the baby! And with what skill and care on the part of the nurse! Not to mention the constant self denial and sacrifice of the mother. The turning point seems to be about the age of six months (the baby still weighing 6 or 7 pounds). I saw a baby, brought over a hundred miles from the country by its father, the hospital had refused to admit the baby until a month old, when the lip would be repaired. The distracted parent was faced with the

problem of feeding the baby. A teaspoon was suggested to him. The baby was referred to me. A sucking plate was made that day and on the second day of its life, I fed it with an ordinary feeding bottle. These specially constructed sucking plates are the solution to the problem of feeding babies born with a cleft palate.

All the tissues of the mouth, cheeks and lips have normal exercise and develop accordingly. In three weeks the baby is usually a good subject for an operation upon the lip. If a plate has not been used, no development of the lip tissue takes place and the surgeon does not find such a good case for operation. If a baby be under-nourished, the tissue will be weak, thin and anaemic. Every baby born with a cleft palate should be fitted with a specially constructed soft vela sucking plate as early as possible. The lip operation should not be performed until the weight of the baby is normal, the general condition is good and the lip tissues have developed as a result of the exercise they have had with the sucking plate.

Excellent results are obtained by our surgeons repairing Hare Lips; but sometimes they break down. Factors influencing this are -

1. The general condition of the baby. A poorly nourished baby is a bad surgical risk.

2. The tone of the tissues themselves.

3. Lateral tension, influenced by the width of the cleft tending to pull the parts asunder. When spoon feeding has been resorted to no development of the lip structure takes place. With a sucking plate in place, each half of the lip works against the plate and some measure of muscular development takes place.

When spoon feeding is resorted to, the tongue rounds off the corners and increases the aperture between the two portions of the lip. In the palate, hard and soft, the tongue also pushes up and rounds off the sides and increases the width of the cleft. With a plate in place I have noticed that the two pieces of the lip, instead of remaining passive, work against the anterior projection of the plate. As for the palate, the plate has a flattening effect upon the tissues. It tends to spread them out more (to become a flat surface rather than a bundle or roll of tissues) and thus stretching them must decrease the width of the cleft. The plate has the same effect upon the tissues as a rolling pin has upon a lump of dough - it flattens it out and increases its area.

Lastly, with the plate in place, suction is possible. This suction produces a negative pressure in the mouth. This increases the blood supply in the mouth, thus more nourishment is carried to the tissues resulting in better development. As mentioned earlier in the paper, I do not think that there is any loss of tissue at birth, but normal development cannot take place unless the tissues get normal exercise, with a good blood supply.

Once the lip operation has been performed, the anterior projection is cut off the sucking plate with a pair of scissors and then the plate is used as before: after an interval of one week, during which time the baby should be tube fed, great care being taken that no milk is allowed to run out through the nose, thus over the lip, soiling the wound.

If the baby regurgitates food through the nostrils, which is very often the case, the lip has to be dressed each time this happens, much to the discomfort of the baby.

Now we must consider the cleft of the palate.

When should it be operated upon?
Should it be treated surgically or mechanically?
If a surgical operation is decided upon, what type of operation should be performed?

Lyons[6] says - "We will all agree that the primary excuse which we have for operating on a cleft palate is the hope of establishing good phonation. When an operation fails to do this, it cannot be said to be successful. How often do we see cases in which the cleft palate seems to be closed, yet speech is not improved in any perceptible degree."

Dr W J Roe (30) of Philadelphia said - "The closure of the cleft, even if it is surgically successful, unless it restores the function of the tissue, invariably leaves the patient worse off than before and also frequently prevents satisfactory subsequent treatment.

Dr Harvey Sutton (31) states that in his extensive experience in Australia, he has not found one cleft palate person who was able to speak correctly.

Not so long ago I was called in consultation by a dentist about the extraction of an impacted tooth for a cleft palate patient. The patient, aged about 26, had already had thirty-two operations performed and was about to embark upon another series. The patient was determined to have the cleft closed surgically. He was a horseman and was afraid to wear a mechanical contrivance in case he met with an accident and was thrown, in which case he feared that anything fixed in his mouth might cause him a serious injury.

After his 32 operations, he still had a very extensive cleft - his speech was not good, but the

pharyngeal muscles were wonderfully developed and it was wonderful to watch the muscles working in an effort to block off the nasal cavity. How much simpler it would have been to have constructed an obturator for the patient and contrast the cost of this with due regard to the loss of time on the part of the patient (even though the operations were performed in a public hospital, expense was incurred nevertheless), with the expense of the numerous operations.

The keen surgeon naturally seeks to close the cleft surgically.

If the cleft can be closed surgically to restore the function of the tissues, then all must agree that it is the preferable treatment. By restoring the function of the tissues I mean forming a muscular soft palate, which is readily movable and which can at will completely block off the nasal cavity posteriorally by meeting the posterior pharyngeal wall. When hard and soft palates are united surgically, the soft palate must of necessity be short, but if the extent of this shortness be kept at a minimum, then with training the patient can approximate the pillars of the fauces and thus help to decrease the size of the cleft.

In the treatment of cleft palate, both surgical and mechanical, the ideals we aim for are -

1. The establishment of normal function.
2. The correction of associated deformities.
3. The prevention of post-operative deformities.
4. The ultimate well-being and good health and appearance of the patient.
5. Good phonation.
6. Good occlusion of the teeth to permit of mastication of the food

From a dental viewpoint, complete surgiczl closure of the entire cleft is not a success. Once the surgeon has successfully closed the cleft, his work is complete, but as time goes on the contraction of scar tissue narrows the upper arch, drawing the upper teeth together and throwing them out of occlusion with the lower teeth. The soft palate is also drawn forward.

Ehrmann (32) at the French Congress of Surgery in 1888, stated that he had proved with many consecutive models taken of his cases over a period of years that a lateral con&raction of the dental arch was a constant sequel to all operations and was most marked in proportion to the width of the cleft. In my practice I see many Cleft Palate babies both in private and in Hospital, then I see the next stage from two to three years of age, when surgical closure of the cleft is attempted. Then finally I make appliances for two types of patients.

1. Those who are still unable to completely block off the nasal cavity from the mouth, after surgical closure.

2. Those patients who had the lip operated upon in infancy and upon whom no attempt has been made to close the Cleft surgically.

EXHIBIT 9 illustrates the comparatively simple type of appliance made for such a patient fourteen years old upon whom no surgery other than that of the lip had been attempted.

EXHIBIT 10 shows the plaster-cast of this girl's mouth, revealing a normal arch and good occlusion for mastication. This obturator has been worn successfully.

EXHIBIT 11 is a plaster cast of another patient aged 11 years, who had a complete double Hare Lip and Cleft Palate. Only the lip operation has been performed. I am convinced that this patient is better off

with an obturator than with attempted surgery.

When no surgical attempt is made to close the palate, the stress of mastication regulates the position of the teeth as they erupt, the upward pressure of the tongue rounds off the sides of the cleft and we find the patient has good occlusion of the permanent teeth. The eruption of the temporary teeth is not at all regular, but with the permanent dentition the time is more regular, the tooth or teeth in the actual site of the cleft may be missing or displaced to one side.

A number of adult patients still present, upon whom no surgery other than the lip has been performed, the posterior pharyngeal wall shows great muscular development due to the patients attempts to close the nasal cavity. The muscular action of the superior constrictor is especially noticeable with the formation of a definite bulge on the posterior wall of the pharynx known as the Passavant cushion. Excess adenois tissue is usually present just as it is found with cleft palate children and as in the case of young children with cleft palate should not be removed, unless very definite indications are given, calling for its removal because it helps materially to close the cleft. The mucus membranes of the nasal cavity are greatly enlarged, the turbinates in the model Exhibit 10 fill almost the entire nasal cavity. To construct an obturator for this class of patient is a simple straight-forward task. For the second class of patient who has had surgical treatment, the problem is very different indeed. There may be small perforations in the hard palate; these are easily covered by the dental plate. Then the missing tissue at the back of the shortened soft palate has to be replaced by a mechanical appliance Vide Exhibit 12.

Photograph of a case made, the soft palate extension being hinged on to the dental plate, is grasped between the muscles of the fauces. The patient's soft palate is very scarred and has very little movement; speech has been improved greatly but is by no means perfect. It cannot be denied that this patient would have been much better served with a dental appliance only rather than with such disappointing surgical treatment followed by an intricate dental appliance.

H D Gillies (33) London, says "I hope that the correctness of this principle will so appeal to the surgeon that he will seldom attempt to repair the hard palate and never before the eruption of the permanent teeth." Gillies then refers to his colleague Kelsey Fry, "expressing gratitude for his tactful handling of an enthusiastic surgeon who first wanted to close all traumatic hard palate defects by plastic operations and later learnt that surgical success was less efficient and far more difficult to come by than the dental closure. This war time experience at The Queen's Hospital, Sidcup, led Gillies to elaborate upon his methods of treating congenital clefts.

Dr Balcomb Quick (34) Surgeon at the Alfred Hospital, Melbourne, in the Journal of the College of Surgeons of Australia, states "During the last few years, it has become evident in various quarters that the more or less standard operation for cleft palate - that of Langenbeck, often fails to give satisfaction. Although the immediate result of a successful operation, a palate soundly united in length, may be pleasing to the eye, the functional result may later prove disappointing in the extreme.

This brings us to the discussion which will never be solved until co-operation is secured betwenn the surgeon and the dental surgeon, to the ultimate gain of the patient. If the surgeon can successfully close the cleft by operation, then it is by far the preferable mode of treatment, but there are certain cases which, after repeated operation, come to the dental surgeon for prosthetic treatment, which is now most difficult. Perforations in the hard palate are very easily covered with a dental plate. Soft palate restorations are very difficult.

When the cleft is extensive, surgical closure cannot be attained without interfering with.

1. Mastication.
2. General health of the patient which in measure depends upon the successful mastication of the food.
3. Appearance resultant upon the contracted upper arch.
4. Speech.

If no surgery were performed but a dental appliance were made, none of the above principles would be violated.

When my interest in this work was confined to the two classes of patients referred to -

1. Those who had had no surgical treatment.
2. Those who had had surgical treatment but still had need of an obturator.

I accepted the prevalent dental criticism finding fault with the surgical treatment, but since it has been my privilege to work in co-operation with the surgeons here, my views have been entirely reformed.

When a cleft is so wide that doubt may reasonably be expressed as to the final success, I am quite sure that it is preferable to close the soft palate surgically, ensuring its full length posteriorally and then to cover the cleft in the hard palate with a simple dental appliance.

In 1887 Dr G V Black stated - "We may cut away the lips, the teeth, and the tongue and the patient may talk plainly after all, but if we cut away the soft palate, it seems to be utterly impossible for the patient to speak perfectly.

To illustrate this mode of treatment, I have the permission of Dr Vickers to show the models and photographs of this patient of his at the Royal Alexandra Hospital for Children, Patient Joyce Potts, aged 6½ years, admitted with complete Cleft Palate and Hare Lip.

EXHIBIT 13 Photograph of the patient.

EXHIBIT 14 Plaster model of the mouth. A plastic operation was performed to repair the lip. The soft palate was united up to and including the posterior border of the hard palate.

EXHIBIT 15 Plaster model of the mouth after completion of surgery.

EXHIBIT 16 A dental appliance was constructed, of which this is a duplicate. Reference to Exhibit 15 will show that the permanent first molars have partially erupted and the temporary molars are in situ. No means of attachment for the appliance could be obtained from any of the teeth. A vulcanite plate was made to cover the hard palate, vela flanges were continued

into the nasal cavity, closely adapted to the floor of the nose; an anterior flange was closely adapted to the alveolar borders in front, so that the nasal cavity was entirely blocked off. The obturator was easily inserted by pushing the vela flange up into the nasal cleft; once there, the elastic flange closely fitted to the floor of the nose and thus held the obturator in place, it required a strong pull to dislodge and remove the appliance.

This will not in any way interfere with the development of the child's mouth; and later on when the child is fourteen and the permanent teeth have erupted, a simple dental plate may be readily made by any dentist with two clasps around any of the permanent teeth selected, such a dental plate will quite effectively close the perforation in the alveolus and hard palate and enable the missing teeth in the cleft to be replaced, thus improving the patient's appearance by holding out the upper lip.

This little patient, wearing her appliance, was shown at the general meeting of the Australian Dental Association on Thursday 25th September 1930, when the success of an obturator for such a young patient, just seven years, was remarked upon.

Whatever method might have been employed to close this patient's hard palate, a contraction of the dental arch would have been caused and the anterior teeth would have drawn together.

Let us consider this little patient again - she came to hospital aged 6½ years with a Hare Lip

and a complete cleft of the hard and soft palates, With a central and lateral incisor tooth missing on one side, but with the teeth on the upper jaw occluding with the teeth on the lower jaw. Dr Vickers, with a plastic operation, repaired the upper lip so that now the patient has quite a good appearance. At a later operation, Dr Vickers united the soft palate and soon after operation a post operative plate (which I had constructed beforehand) was inserted. The soft palate healed up very well. The patient now has a splendid appearance, a good muscular, flexible soft palate and good occlusion of her teeth and she is wearing a special obturator which will close the remaining cleft in the alveolus and in the hard palate. In seven years' time any dentist can make her an ordinary vulcanite plate, carrying the two anterior teeth which are missing and this ordinary dental plate in itself will serve to close over the cleft in the hard palate.

If the surgeon had attempted to close the cleft in the alveolus and in the hard palate

Firstly — The appearance of the patient would have been ruined. She would have had four front teeth crowded together all out of place instead of six teeth, four of her own and two artificial, correctly spaced.

Secondly — Her occlusion would have been ruined. The crowded teeth in the contracted upper arch would not properly meet the lower teeth.

Thirdly — The resulting contraction would have drawn the soft palate forwards, thus ruining the function of the soft palate.

Finally — It would be a most difficult case to then construct any appliance in an endeavour to render her speech intelligible.

If surgery had been attempted, one or other of the following methods would have been employed -

1. Lane's flap method. This invariably contracts thatside of the arch from which the flap has been taken. In England, mortality of 12.5% following this method was recorded.

11. The Langenbeck. This is the usual method adopted here, a bilateral contraction of the upper arch results, and some shortening in an antero posterior direction.

Success does not always follow the first attempt to close a cleft palate surgically. Stirling Bunnel (35) of San Francisco, in 1927 Volume of Surgery, Gynecology and obstetrics, states that he finds it almost the rule for palates to partially break down during the first and second week after repair. The sucking power in an infant is surprisingly great. Measured by a manometer on a series of new born babies the average force exerted was 152 mm. of mercury, the highest recorded being 200 mm. In adults it averaged 440 mm. At the Royal Alexandra Hospital for Children the lip is repaired as soon as the condition of the baby is suitable, usually three weeks; then the palate is attended to at about two years of age.

The reasons advanced for deferring the palate operation are -

1. At two years of age the baby is less likely to persist in sucking at the stitches.

11. At that age the baby has been taught discipline and is less likely to persist in crying (crying breaks down the repair).

111. Liquid food has been replaced by solid food, which is swallowed without any attempt at sucking, which would strain the soft palate.

IV. It is preferable to perform the operation before the child has learned to speak incorrectly.

Credit is due to our surgeons for the excellent results which they obtain, a measure of which success is due to the pre-operative care of the patient.

Pre-operative treatment. When a baby or child is admitted to Hospital for either lip or palate operation, three consecutive swabbings are taken of the nose and fauces, to exclude the possibility of Diphtheretic infection. If one test be returned positive, a virulence test is done on a guinea pig; if this test proves the organism to be avirulent, then only the usual prophylactic pre-operative treatment is necessary before the operation.

If the virulence test be positive, the operation is definitely contra indicated and an attempt is then made to eradicate the diphtheria infection, firstly by such palliative methods as swabbing with mild antiseptics, then later, if these have proved unsuccessful, stronger solutions may be used Peroxide Eusol, various collosal silver salts as Neo Sylvol, Argyrol, Silver Nitrate 2% to 10% solution.

If all three swabbings are returned negative, then the nose and mouth are washed out with a menthol preparation for the two days previous to the operation.

Carious teeth are filled or extracted. I saw a Brophy operation performed on a young child at the University Hospital in Tokio, Japan; and I was astounded to see several very carious teeth in the mouth.

Suggested caused of breakdowns in the surgical repair of palates -

1. Stitches are licked out by the tongue. If a person breaks a small piece off a tooth or loses a filling or scratches

the roof of his mouth his tongue licks it incessantly. So you can readily understand a child worrying horse hair stitches with its tongue.

2. Crying breaks down the repair, children are not contented on liquid diet for 10 to 14 days.

3. Lateral tension tends to separate the parts united.

I am indebted to Dr Wilfred Vickers for co-operating with me and allowing me to try out a new post operative plate which I feel assured we can now claim to possess certain advantages. Before the operation I obtained an impression of the palate and constructed a plaster cast. On to this plaster cast I added a thickness of wax over the site of the lateral incisions and also over the positions of the stitches and the field of operation.

A soft vela plate is now made which fits the periphery of the mouth but is sopiously relieved over the field of operation. This post operative plate is inserted as soon as the child recovers from the anaesthetic. It acts as a splint and holds the parts together, if anything tending to approximate them, because any upward pressure of the tongue against the centre of the plate which does not fit up tends to draw the sides together. The child's tongue licks the smooth surface of the plate and then rests happily. Semi solid food is given at the first meal, the child is more contented and picks up more readily.

Bunnel (35) claims that since he restricted the activity of the tongue he has had less breaks in his cleft palate surgery. He fixes a silver screen across the upper jaw resting upon the gums it prevents the tongue from touching the palate.

I feel sure that our Soft Rubber Plate would be more comfortable for the child than the silver shield used by Bunnel or the celuloid screen used in Leningrad by Limberg. The plate does not interfere with free drainage but it may hold mucous in the region. However, the field of operation is always moist and I cannot see much difference between being wet or being wetter. I may state here that this post-operative plate does not possess the suction that the sucking plate, previously described, does; but it does not need to stay right up in position so long as it keeps the tongue away and keeps food away during meal times, then it is taken out and washed.

I cannot claim that this post-operative plate will stop Cleft Palate repairs from breaking down, but it will prevent the stitches from being sucked out and will prevent the tongue from pushing up and bodily displacing the tissues. This plate or shield is an attempt to restrict the movement of the tongue. With some children it is not advisable to attempt any restriction, because this discipline evokes such an outburst of temper that "discretion is deemed the better part of valour" with such children.

Finally, allow me to conclude with the quotation I have used before -

"Accuse not Nature, she hath done her part.
Do thou but thine." - Milton.

ACKNOWLEDGMENTS

The writer gratefully acknowledges his indebtedness first of all to Professor Reading of Sydney University for teaching him the ground work of obturator construction and giving him an insight into the great possibilities which existed for further study abroad. Secondly, to A T Pitts of Great Ormond Street Hospital for Sick Children, London, whose clinic provided a comprehensive review of the end result of various types of surgery and enabled the writer to more fully appreciate the work of Kelsey Fry, Director of the Dental Laboratory of Guy's Hospital, London. The writer owes a very great debt of gratitude to Kelsey Fry; his enthusiasm for cleft palate work was most inspiring.

To Professor Priestley, Professor Burkitt and Sir Charles Clubbe, for encouragement and advice.

To the Honorary Surgeons, Dr Howard Bullock, Dr R B Wade, Dr Hipsley and Dr Wilfred Vickers, for their co-operation.

To the Superintendent of the Royal Hospital for Women, Dr Williams; of Renwick Hospital for Infants, Dr Forster.

Registrar of the Royal Alexandra Hospital for Children, Dr Steigrad, who has at all times given me every assistance, in addition to showing a very keen interest in the work.

To Dr Pickerill and Dr Clarkson for co-operation on numerous occasions.

Royal Alexandra Hospital for Children

To Sister Ives in charge of Clubbe Ward,/whose unfailing assistance, advice and care for these babies has been greatly appreciated.

To the nursing staff of Renwick Hospital, who have taken such a keen interest in this work and in the welfare

of these babies under their care.

To the Matron of Tressilian, who has so capably cared for some of my private cases, both babies and their mothers.

To my personal friend and photographer, Frank Smith, who has assisted me so greatly in coming along as the occasion arose and obtained such excellent permanent records of the work. Also to Mr Perrier, who obtained such an excellent moving picture record of the feeding of the babies.

The writer is indebted to -

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The British Medical Association Library.

The Australian Dental Association Library.

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RENWICK HOSPITAL FOR INFANTS

WEIGHT CHART

RECORD NO. _____ NAME Barbara Russell.

AGE 12½ hours. DOCTOR Bullock WARD Cleft Palate

16 lbs 8 oz in November

here 12 months old

No. of Meals	Ozs. To	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG
	13 lbs.												
	12 Ozs												
	8 Ozs.												
	4 Ozs.												
	12 Lbs.												
	12 Ozs.												
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	4 Ozs.												
	7 Lbs.												
1929	DATE	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	1930

Sucking plate inserted.

This baby's weight remained stationary for 6 months

* When a sucking plate was inserted the baby immediately commenced to put on weight.

Royal Alexandra Hospital for Children
Cases of Cleft Palate Admitted & Discharged

Over a period of 13 years	Cured		Relieved		Unrelieved		Died		Remaining		Total
	M	F	M	F	M	F	M	F	M	F	
1916 to 1928 Inclusive											
1916	6	5	5	1	4						21
1917	8	3	9	6	2	2					30
1918	7	2	3	5	4	1					22
1919	4	2	9	5	1	3					24
1920	3	8	5	2	3						21
1921	4	7	11	4	2	.					28
1922	3	4	7	2	2	1					19
1923	2	.	3	1	1	6					13
1924	2	2	3	4	1	1					14
1925	9	6	10	2	2	1					30
1926	5	12	6	.	4	1					28
1927	14	2	13	11	5	.					45
1928	2	.	17	9	4	3	1				36
Totals	70	54	100	52	35	19	1				331

Of these 206 were Males, i.e 62%; & 125 Females

The death appearing in 1928 was a boy aged 4 years (Cleft palate & Cardiac failure)

Royal Alexandra Hospital for Children

Sydney

CHART—16

Name Mervyn Jaylor. "Cullen Bullen" N.S.W.

Age 4 months. *Date of Admission* 2-4-1930.

Family History 6 other children, present baby one of a twin. all children healthy
Mother aged 31. Twins both boys.

Previous History Fed with spoon on Lactogen previous to admission.

Present Illness: Complete Hare lip and cleft Palate.

Impression of mouth by Dr Dearn. 3-4-30
Operation on lip preformed by Dr Wade. 3-4-30.
Fed with tube over tongue after operation.
Emulsion added to Lactogen with orange juice.
Sucking plate first used. 10-4-30.
Food taken very slowly first day.
Improved greatly second day.

Mervyn Jaylor. Weight at birth. 8 lbs.

On admission at 4 months. 6 lbs 11½ oz.

8th April	weight:	7 lbs. 10 oz.
12th April.	"	7 lbs. 12 oz. Discharged from Hospital.
Writes to say. 29th April	"	10½ lbs.
" " " 21st November	"	18 lbs.

Comparison with brother.

	Cleft Baby	Normal brother.
Weight at birth.	8 lbs.	7 lbs.
Weight 21st November.	18 lbs.	19 lbs.

So that although at four months old, the patient only weighed 6 lbs 11½ oz with use of a sucking plate and the lip operation, he has caught up to his brother's weight.

Royal Alexandra Hospital for Children

Sydney

CHART—16

Name Edward Feeney. 984 Annandale Street, Annandale.

Age 6 weeks. *Date of Admission* 12-5-30

Family History First child.

Previous History Fed with expressed Mother's milk, using a tea spoon

Present Illness: Single Hare lip and Cleft Palate.
Weight on admission 7 lbs 9½ ozs.

Impression of mouth taken by Dr Wearn on 13-5-30
Operation preformed on lip by Dr Vickers on 13-5-30
Fed by tube over tongue after operation.
Sucking plate used on 19-5-30
Baby refused to take breast feeding, shield used without much success, baby taking ½ ozs in 1 hour. Expressed milk taken from a bottle without any difficulty.

Royal Alexandra Hospital for Children

Sydney

CHART—16

Name Dorothy Baldwin 661 Bourke Street Moore Park

Age 4½ months *Date of Admission* 28-4-30

Family History None.

Previous History Fed with Lactogen by spoon previous to admission

Present Illness: Double Hare lip and cleft palate.

Weight on admission. 12 lbs 12 oz.

Impression of mouth taken by Dr Wearn on 29-4-30

Operation preformed by Dr Hipsley on 29-4-30

Tube fed after operation.

Sucking plate used on 6-5-30

Baby fed by bottle, taken very well.

Royal Alexandra Hospital for Children

Sydney

CHART—16

Name Brian Murphy. 200 Mitchell Rd., Alexandria.

Age 1 month. *Date of Admission* 14-4-30.

Family History none.

Previous History Fed by spoon previous to admission.

Present Illness: Complete Hare lip and Cleft Palate.

Weight on admission 8 lbs 15 ozs.

Impression of mouth taken by Dr Weaon on 15-4-30

Operation on lip preformed by Dr Hipsley on 15-4-30

Sucking plate used on 21-4-30

Fed with plate and bottle with success.

attempt made to breast feed baby, without success, as mother had only little milk and was not enthusiastic about feeding baby herself. Bottle taken well.

Discharged on 28-4-30.

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PN Cleft lip /*ic/ in infancy & childhood.

PN WEARN, W. J.
CN University of Sydney. Faculty of ~~Medic~~ Dentistry.
TI The feeding of cleft palate babies
AS / by W. J. Wearn
IM <Sydney : S.n.>, / <1930>
CO 16 leaves ; 35 cm
GN Typescript
GN Title page states: 'notes of a lecture given to the medical and nursing staff of the baby clinics, 22nd October, 1930'.
GN Accompanying paper on the thesis on 'cleft palate' by W.J. Wearn.

BN — IS —

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Reprinted from *The Dental Journal of Australia*, September 1, 1930.

The Immediate Dental Treatment of Cleft Palate Babies

By W. J. WEARN, B.D.S., D.M.D.,

Honorary Dental Surgeon to the Royal Hospital for Women, Paddington; Honorary Dental Surgeon to the Renwick Hospital for Infants, Summer Hill; Honorary Dental Surgeon to Cleft Palate Department of Royal Alexandra Hospital for Children, Camperdown.

SYDNEY
THE AUSTRALASIAN MEDICAL PUBLISHING COMPANY, LIMITED
The Printing House, Seamer Street, Glebe

1930

UNIVERSITATIS BIBLIOTHECA SIDNEIENSIS

The Immediate Dental Treatment of Cleft Palate Babies

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(*Read before the Seventh Australian Dental Congress, Brisbane, Queensland, July, 1930.*)

"Accuse not Nature, she hath done her part,
Do thou but thine."—Milton.

I WOULD like to state at the commencement of my paper, that this subject is of practical interest to every dentist, and I propose, later on, to draw your attention to the very different effects upon the development of the dental arches which result from bottle feeding and from breast feeding of normal, healthy babies, as well as cleft palate babies.

It has been my privilege to study this subject abroad as well as in this country, and on every occasion the surgeon has not failed to open the discussion with the statement that the operation is rendered exceedingly difficult because there is such a little tissue present with which to construct an efficient hard and soft palate. At birth, there is no loss of tissue at all—merely a lack of union, a cleft. Towards the end of the first month of intra-uterine life five processes appear, which converge and, uniting, form the primitive face. The median projection, the fronto-nasal process, grows down from above and unites with two lateral processes, the maxillary processes. This union takes place about the fifth or sixth week of intra-uterine life. The two mandibular processes grow out to meet and, uniting, form the mandibular arch, containing Meckel's cartilage which, ultimately, becomes the lower jaw and lower

lip, while the shelf-like projection, which grows backwards from it, forms the floor of the mouth. So much for the early development of the primitive face. At birth, a cleft palate baby has no loss of tissue, merely a cleft, or lack of union, which fusion should have taken place about the sixth week of intra-uterine life. This model, made from an impression I took of a baby one day old, illustrates the condition at birth.

Our surgeons here operate upon the lip as soon as the baby is able to stand the operation, usually three to four weeks old. Then the

FIG. 1.—Cleft Palate Baby One Day Old.

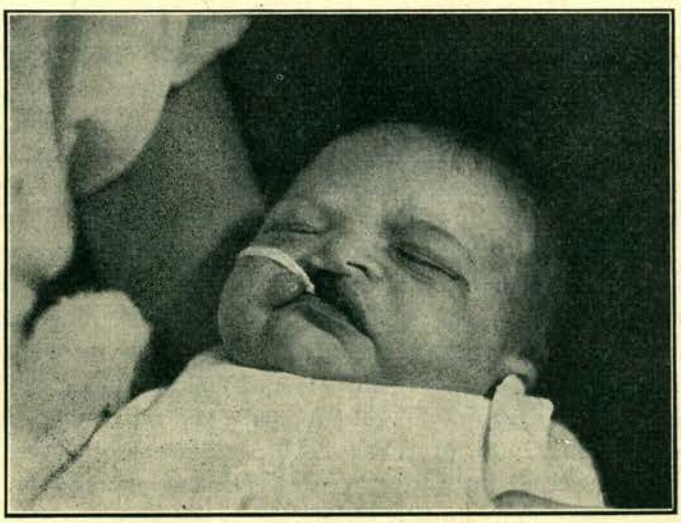

FIG. 2.—Same Baby Fitted with Vela Sucking Plate.

palate is operated upon when the child is at least two years old and not more than three years. Then we find an absolute lack of development of all the tissues—a difficult operation indeed; *but all these tissues were normal at birth.*

The reasons advanced for deferring the palate operation are:

1. At two years of age the baby is less likely to persist in sucking at the stitches.

2. At that age the baby has been taught discipline, and is less likely to persist in crying (crying breaks down the repair).

3. Liquid food has been replaced by solid food which is swallowed without any attempt at sucking, which would strain the soft palate.

4. It is preferable to perform the operation before the child has learned to speak incorrectly.

In England the palate operation is performed at a much earlier age.

Now, we, as dentists, have been trained to study the development of the oral tissues and the dental arches, and our attention has been drawn, time and time again, to the profound effect that proper development of the mouth has upon the general health of the patient. We have been trained to pick out the typical adenoid child, with that pinched appearance about the alæ of the nose. We know that they are mouth breathers; we know just how constricted their upper arches are. Our orthodontists take the case in hand, and, by the scientific application of gentle forces, they expand this upper arch and give the appearance of normal fullness about the anterior nares; and a point I now stress—which I think few of us realize—is that the posterior nares are correspondingly enlarged; thus, the entire respiratory system is improved and the general health of the patient. Of course, the abnormal adenoid tissue calls for surgical attention, but correct nasal breathing must be restored.

The point I wish to emphasize now is that, in a baby, normal development of the mouth and the nose is regulated by the act of *sucking.* When a baby sucks, all the musculature of the mouth (cheeks, lips and tongue) is brought into action. The muscles are strengthened and the circulation of the region is increased. Strong pressure is brought to bear upon the roof of the mouth, which is the floor of the nose, and we find good broad dental arches, and a broad roof to the mouth, in striking contrast to the abnormal high vault. If the healthy baby must be bottle-fed, let us use a bottle moulded on Nature's pattern, as I show here, with a small nipple; the baby's lips grasp the rubber around the nipple and exert a good healthy pressure. The bottle is obtainable at our local stores. This type of teat is not obtainable here; it is called the Poupon teat. Dr. Dreyfus, of the University of Lausanne, sent me a few of them. Contrast with the usual type of feeding bottle and

watch the baby; it soon learns the easy way. I think we must all be born loafers; the tongue is cupped to surround the teat, just exactly as the calf sucks the mother cow.

The baby then presses the teat against the roof of the mouth and expresses the milk, with very little effort. A high vault to the mouth results, with displaced nasal septum, crowded turbinate bones, and lack of development of all the muscles concerned. Have I made this point sufficiently clear, that the development of the nasal cavity in a baby is proceeding along with, and intimately dependent upon, the development of the oral cavity? Suction is a mighty powerful force; when suction is produced in the oral cavity, this means that a negative pressure is created and the immediate result of this is a dilation of all the blood vessels of the part, and the vascularity of all the tissues is thus enormously increased. Now we know that tissue growth depends upon the nourishment it receives from its blood supply. Thus we doubly increase the development—*firstly,* by actual muscular exercise, and *secondly,* by increasing its nutrition. In the nasal cavity we have atmospheric pressure of sixteen pounds to the square inch; suction in the oral cavity gives us a negative pressure, thus the roof of the mouth is drawn downwards, the dental arches are expanded, and there is room in the nasal cavity for the septum and the turbinates. Now, if by incorrect feeding, we contract these plastic tissues, and create a high vault, we may produce a good singer later on; but what happens to the nasal septum? It is buckled out of place, the turbinates are crowded, the whole nasal cavity is diminished in size, and we have laid the foundation for all the nasal troubles that are met with. If we continue thus, we will produce a race with a pronounced nasal twang like our cousins over the sea. How quickly baby finds the difference between breast feeding and bottle feeding; and the lazy scamp soon refuses the more difficult breast feeding for the easy bottle feeding.

My observations have been confined almost entirely to sick babies, and it is about these weak babies that I now wish to confine my remarks. The feeding of a cleft palate baby is a problem indeed. Feeding is hardly the word; rather, it is the problem of "introducing the milk into the stomach of the baby."

This model I show here—Baby Philip R.—came to me in my private practice, aged two weeks, showing a partial cleft of the soft palate only, the lip and hard palate being perfectly normal. It was taking two hours and fifteen minutes each feeding to give the baby his milk with a teaspoon; the mother and her two sisters took it in turns, spoon-feeding the baby; they were exhausted and so was the baby. Then, one hour and forty-five minutes respite and then the whole performance over again. He weighed eight pounds at birth, but had dropped to six pounds

at two weeks. I made a soft vela sucking plate, as shown here (Fig. 3). Baby liked his new made-to-order dummy and sucked his next meal out of a bottle assisted by pressure at first, because he was in such a weak state, and partly from starvation, but, principally, from nervous exhaustion, worn out from all the trouble of feeding. He took two ounces of milk

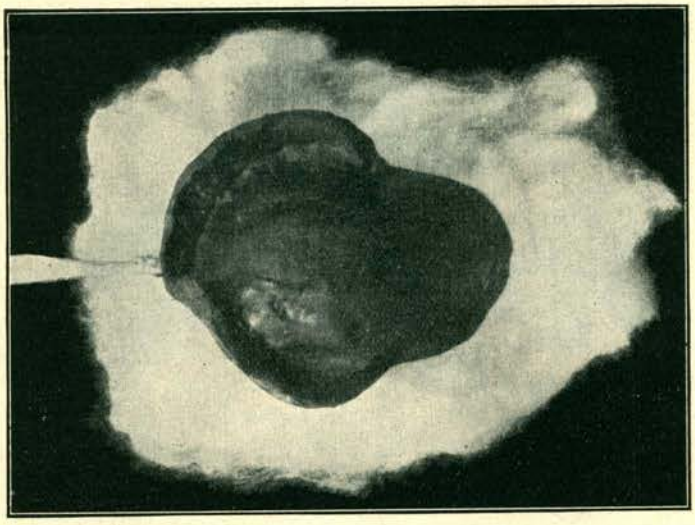

FIG. 3.—Vela Sucking Plate, with tape attached to wire loop; the ends of the wire are embedded in the vela.

from the bottle in fifteen minutes (the normal rate for a healthy baby is about four ounces in twenty minutes). I have had continuous reports of this case. In her last report, 16th June, the mother tells me that baby continues to put on weight; that it is a real pleasure to feed him; that he likes his plate as a dummy so well; that she has a battle to get it out; and that he takes his meal in half an hour.

Baby S., as you will see by the model, presented with a complete cleft palate and hare lip; she came to me as an out-patient at the Renwick Hospital for Infants. I took this impression on the morning of her third day. On the morning of the fifth day, we inserted the sucking plate and I had the satisfaction of giving her just over one ounce of milk out of an ordinary feeding bottle in under ten minutes. We watched her progress as an out-patient; then, in a month she was admitted to hospital and the surgeon with a plastic operation repaired the lip. Now, for a week, baby was pipette fed; then the same plate was used again and here you see her (Figure 4) enjoying her meal—a typical case, eyes closed, fists clenched, legs kicking, muscles working, sucking vigorously. Now I wish to bring out a most important point—this baby was spoon fed for four days on expressed mother's milk

and air, a very indigestible mixture indeed! Half an hour after each meal, baby regularly regurgitated this now curdled, aerated mixture. With the sucking plate in place, and normal feeding, we had no further trouble with baby bringing up her food, but when the lip operation was performed, the plate was not used for one week; baby was pipette fed on milk and air, with resultant regurgitations half an hour after each meal.

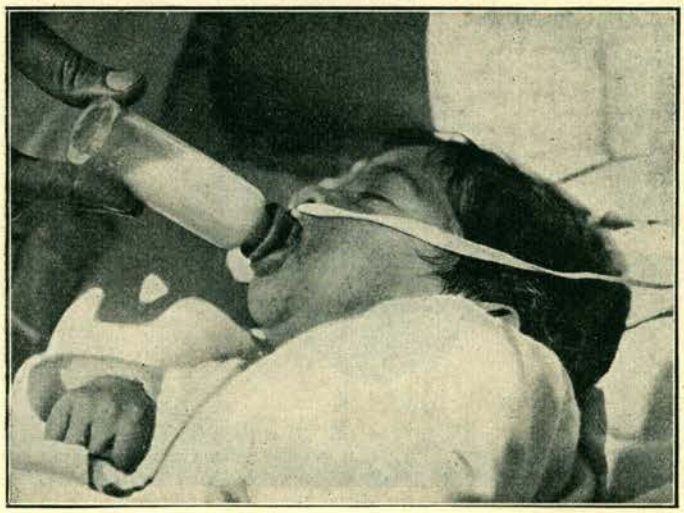

FIG. 4.—Cleft Palate Baby, one month old, feeding happily with sucking plate which was fitted when baby was three days old.

It is really surprising how much air enters the stomach in a meal: a teaspoonful of milk and half a spoonful of air. These two sketches which I exhibit here—copied from X-ray pictures—show the stomach of a baby after a normal meal and the other of a baby after an aerated meal. This question of the aeration of food opens up another interesting subject for discussion from a dental viewpoint. All mouth breathers, class II and class III malocclusion, must swallow great quantities of air.

At this stage it might be opportune for me to answer two questions which I am sure some of you are anxious to ask. Firstly, how does the baby keep the plate up? Well, it is instinct for a baby to suck anything and everything which it gets to its mouth, and these babies do all suck the plate up. If we could all be sure of getting the same suction with our full uppers as I get with all these plates, we should be pleased indeed. The suction is truly wonderful; try and pull one out by the tape, and baby will contest the issue with you.

Secondly, how does the baby tolerate the plate since it goes right back over the soft palate? Well, let this picture tell its story. This

baby was at the Royal Alexandra Hospital for Children in Sydney. This impression I took when baby was one month old—complete cleft palate and hare lip—just prior to the operation being done by the surgeon to repair the lip. The plate was made and used a week later with perfect success. Baby was breast fed, supplemented with bottle feeding; but baby quickly found the difference, and refused to take the breast, preferring the easy bottle feeding. When we came to take the photo, baby was asleep; nurse picked it up, awakened him, inserted the plate (the tape had been taken off) and baby went off to sleep whilst the protographer was focusing up. So you can see the babies do not object to the plate.

This case, Dorothy B., the model of which you will see discloses a complete double cleft palate and hare lip. Baby, one month old, was admitted to the Royal Alexandra Hospital for Children. In this case, the fronto-nasal process had failed to unite with either of the lateral maxillary processes. This duplicate impression which I took just prior to the operation, shows the nasal septum rather well. The surgeon operated, replacing the premaxilla, wiring it into place, and suturing up the lip. I now compared my model with the case altered by the operation. I filled in parts where necessary and then constructed the sucking plate, which we inserted one week after the operation, whilst the wire sutures were still *in situ* in the palate. The baby sucked the bottle well. Primarily spoon fed at home, fed with a tube over the tongue whilst in hospital, prior to and after operation, then quite successfuly bottle fed with sucking plate.

Now the question of age comes in. Experience has proved that for the baby's sake, the earlier a sucking plate is constructed the better, but many of these babies are born in the country and we do not see them until they are six months old. The mention of the word country reminds me of the prevalent idea among the laity, that the mother saw a hare, or had a fright, but, as I mentioned earlier in my paper, this cleft or lack of union occurred six weeks after conception, so the fallacy of such an idea is apparent. Baby Mervyn T. was admitted to the Royal Alexandra Hospital for Children, aged six months; his model shows a complete cleft palate and hare lip. He was one of a twin—he has a normal twin brother—was a very difficult baby to feed in hospital, having to be tube fed. Impression was taken just prior to operation for lip only; then it was stated that he had *never* sucked, did not know how to, and doubt was expressed as to the value of a sucking plate in his case. I made the plate and in due course proceeded to fit the plate when baby immediately commenced to suck my finger. It was not normal feeding time and the ward was a surgical one, so no milk food was at hand. I recalled the incident of the little girl who went to the special

service meeting for prayer for rain in a time of drought; she took an umbrella; the minister asked her why.

The ward sister had reminded me of this incident, but she promptly sent a nurse for a feeding bottle; only water was available, but the baby sucked away at the bottle of tepid water with such evident delight that sister made me take the bottle away, as baby would be spoiled for his next meal—not through a tube inserted over his tongue, but sucked out of a bottle and mixed with the salivary juices. This baby has returned to the country, but I have had two letters saying that the plate is a complete success and baby is putting on weight.

Earlier in my paper I referred to this sucking plate as being a made-to-order dummy or comforter, but do not misunderstand me; I hold no brief for the use of a dummy. Baby may use the plate as a dummy and come to no harm, the tape being pinned to the dress. My instructions are that the plate must *never* be boiled or washed in *hot* water, only tepid water, and then kept immersed in water in a covered vessel.

You will notice that the sucking plates which I show, vary in degrees of softness, depending upon the case, age *et cetera*. When we propose to try breast feeding, I make a little alveolar ridge, harder than the rest, across the front of the plate. Vela rubber is used throughout; dies of pure tin, stainless steel wire for the tape attachment.

Now to summarize. A cleft palate baby is born, and no matter how small the cleft be—excepting a bifid uvula—if the smallest part of the soft palate be cleft, the greatest difficulty will be experienced in introducing milk into the baby's stomach. Clefts always commence at the uvula. We may find that only the uvula is cleft, or only part of the soft palate, and so on, the cleft increasing to involve, finally, soft and hard palates, alveolar ridge and the lip. I do not propose, in this paper, to discuss types of clefts found, but in the few of my cases which I show you now, I show a variety of clefts. I want to impress upon you that the smallest cleft in the soft palate is fatal to the act of sucking; and if the baby cannot suck in a normal manner, it is a most difficult and tedious matter to feed that baby, and the nervous strain upon the baby is very evident.

The various methods in use at present are:

Spoon Feeding.—The baby must be held with the head well back, then a teaspoon of milk is placed in the cavity and, with baby's efforts of swallowing, is mixed with equal parts of air; this mixture, contaminated with the nasal secretions, is, with great difficulty on the part of both baby and nurse, induced to go down. *A pipette* or dropper may be used; some of the milk runs out of the corners of the mouth, the baby pushes its tongue upwards, wipes the milk and air through the nasal cavity, and gravity sends it down (see Figure 5). In each effort to swallow, the

tongue pushed up and separated the two portions of the palate, thus aggravating the condition.

Force Feeding Bottle.—This bottle, as you see, has an ordinary teat at one end and a rubber bulb at the other end. When pressure is exerted, a continuous stream of milk is sent out. Great care must be exercised or

FIG. 5.—Cleft Palate Baby after Lip Operation had Broken Down.

we will choke or drown the baby; but if we hold its head far enough back, gravity will send this aerated, nasal secretion contaminated mixture down. I feel sure that no one here present can realize what a difficult matter this is for the baby. Remember, it is not a normal baby; it is greatly handicapped. As school boys, we have, at some time or another, had a drink of water from a running tap; it is not as easy as drinking from a cup. Perhaps some of you have had a drink from a hose-pipe; it is not easy. But let us put the end of the hose into your mouth, and I ask you to give us an exhibition of how a gentleman can drink, but don't choke and don't splutter it all over yourself, yet you have a normal hard and soft palate. Now, perhaps, you can realize the difficulty the baby finds.

Kelsey Fry, of Guy's Hospital, London, has invented this automatic feeding bottle. Above the teat is a small flap of soft rubber which covers the cleft; the little bulb is fitted with a valve; one compression between thumb and finger propels one teaspoon of milk into baby's mouth; then the nurse waits until this is swallowed, and then repeats the operation. These are the only methods I know of which can be followed by the mother and, of these, the bottle of Kelsey Fry's is the only good one, and it was adopted universally in London.

Finally, a catheter tube may be used, inserted over the tongue; this calls for skilled attention and is only practicable in hospital or when a specially trained nurse is in charge of the baby.

We can justly be proud of the work that our surgeons do for the cleft palate baby, but they work under a tremendous handicap; they should have a good healthy, well developed child upon which to operate, but what do we find? The cleft palate baby is born usually weighing eight pounds. The first model I showed you—Philip R.—had dropped to six pounds at two weeks old. Another case weighed but seven pounds at five months, and every rib was visible. Mervyn T. weighed six pounds fourteen ounces at four months. Patricia W., at three years, weighed fifteen pounds eleven ounces. Why do we find them so poorly nourished, despite all the care that is bestowed upon them? For two reasons, I think. Firstly, they are absolutely exhausted with the nervous strain and effort of feeding. Secondly, such large quantities of air are swallowed with the food that the digestion must be greatly interfered with.

What are we, as dentists, going to do about it? We should no longer sit at our ease and allow these little babies to suffer thus; I feel we are under a moral obligation to be concerned in the matter. I make no claim to be a pioneer in this work, but I have gone further afield in the line set out by others. Kelsey Fry's name, I shall mention later. Brophy's suggestion—a vela flap, on a handle—like our common household fly-swat, is suggested in his book, but I don't think it at all practicable. If there be the slightest irritation in the mouth, baby will not suck freely; therefore, a well-fitting specially made plate is essential.

I have tried Kelsey Fry's hard vulcanite plate, with vela in the cleft, but I do not find it suitable for very young cases.

Before I leave this discussion of the methods used by some people when feeding cleft palate babies, I feel *I cannot strongly enough condemn* the *use of a large, soft rubber teat.* I have been told quite proudly by some, "Oh, we manage quite well, after a time, by using an ordinary feeding bottle and a large teat with a big aperture." The large teat soon forces its way up into, and partially fills, the cleft, thus increasing the cleft and greatly increasing the difficulty of the operation later on.

On no account should a baby with a complete cleft of the hard palate be allowed to attempt to suck a bottle, *unless an artificial palate has been inserted.* Just place an ordinary teat on any one of my models here, and you will readily see how, in use, it would go up into the cleft and aggravate the condition. Certainly, the baby would learn to suck with it in place, *but at what a cost!*

Kelsey Fry varies his suggested treatment. For babies having partial clefts not involving hard palate, he uses his feeding bottle with a valve at the end and projects a teaspoonful of milk into the mouth, and waits until this is swallowed before propelling another quantity

into the mouth. For babies with complete clefts, he advises making a hard vulcanite plate with soft vela rubber partially filling the cleft.

I have found that vela rubber is much more suitable to the delicate tissues of the baby's mouth where I have fitted a sucking plate. I have treated babies from one day old up to ten months old, and, without exception, baby has taken to the new sucking plate. Moreover, the use of this sucking plate approximates the two halves of the cleft palate. A baby immediately objects to a hard vulcanite plate in the mouth. Being hard, it is apt to cause soreness to the delicate membranes. A hard plate is difficult to insert. My vela plate can be buckled up, inserted without stretching the mouth, then it immediately resumes its correct shape, fits the mouth perfectly, is comfortable, and baby sucks happily.

I now propose outlining my treatment, which has given consistently successful results, but does not widen the cleft. It rather approximates the two halves. The sucking pressure is exerted laterally, and draws the two portions together. I can prove this result with models I have taken from time to time.

Babies are very delicate little patients, and must be handled with extreme caution. The question of shock must be considered with babies for the first week. I have taken my impressions when the baby is but one day old (see Fig. 1), not yet accustomed to the new world in which it finds itself, and such a baby must be handled intelligently by one who is accustomed to the very young. I would like to see you all interested in this work, but when it comes to taking your impressions, I would suggest you get your experience with an older baby. Take a good healthy normal baby, six months old, and get an impression of the upper jaw. Then take another impression and get an accurate impression of the entire soft palate, as well as the hard palate. I use special trays; I have used a teaspoon on occasions, but have made a series of trays adapted to the size of my previous models. Now, the impression *must* go right back to the posterior pharyngeal wall. Remember, I stated that the smallest cleft in the soft palate renders sucking absolutely impossible; therefore, it is quite essential that the impression goes right back to meet the posterior pharyngeal wall in its forward position. Yes, I have to stop the baby breathing, but I must get my impression right back. Only experience will enable you to accomplish this. Use a good composition, not too soft, insert and work into place. When back far enough, breathing will be stopped; then, in a moment, baby will give a spasm, and the musculature of the posterior pharyngeal wall will come forward and push the impression material just far enough forward to leave an air space; this is just as far back as our sucking plate *must* come. I warn you to be careful. Neither choke the baby nor asphyxiate him; if your material be too soft, you will send it down the throat and

choke him; if it be too hard and you succeed in sending it back to the pharyngeal wall, the muscles cannot create a breathing space, and then trouble may be in store for you. At all times, be master of the situation; be prepared to remove the entire impression without any delay, if need be. As soon as the spasm is safely over, normal breathing will be resumed, and I leave the impression in to harden, whilst I adapt the anterior portion.

Once a good impression has been secured, cast up a model; fill in those parts of the nasal cavity and the cleft proper which are necessary,

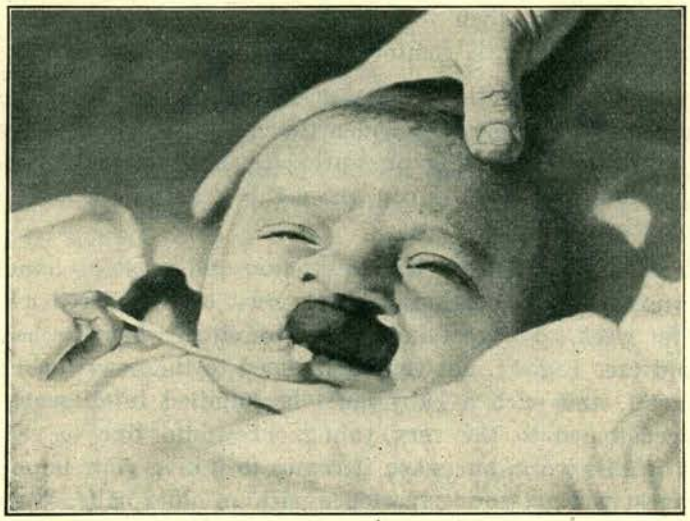

FIG. 6.—Same Baby as Fig. 5, with Vela Feeding Plate in Position—holding the portions of cleft in position—and preventing the tongue from pushing up and separating the palate. The lip operation has since been repeated with perfect success. Baby is always fed with plate in position.

with wax, and then sand casts may be made and pure tin die and counter die prepared. Vela rubber must be used throughout and must be vulcanized between tin. Once a plate is vulcanized, it cannot be polished, filed or sandpapered; any excess must be cut off with scissors and then the edges burned with red hot burnishers to make them perfectly smooth. The hot instrument renders the rubber fluid, when it is easily moulded smooth. A stainless steel wire loop must be embedded in the plate. Vela rubber definitely calls for special handling and has to be vulcanized for six hours—two hours at 240°, two hours at 260°, and two hours at 270°.

I have carried my investigations further afield, but the sphere of interest now passes out of the dental sphere into the territory of the oral surgeon and so will be the subject of another paper. If I have

succeeded in arousing your interest—in however small a degree—I will feel rewarded for the tremendous amount of work which this subject has demanded. We, as representatives of the dental profession, claim that we are specialists. We expect the medical profession to regard us as specialists just as they regard the ear, nose and throat man, or the skin man. Yet, how easy it is for us to sit back and do our routine work and make up our income tax returns and be satisfied! I may merit your derision as an idealist, but I do think that if we set our standards accordingly, our medical and surgical colleagues would value our co-operation in its sphere.

In conclusion, I wish to place upon record my indebtedness to Dr. Kelsey Fry, of London, whose work I studied in 1923 at Guy's Hospital. He designed a special force feeding bottle with a vela apron over the teat. In collaboration with Dr. Gillies, he outlined a new departure in cleft palate operations. Also, Dr. Pitts, who interested me in his department at the Great Ormond Street Hospital for Sick Children; his clinic included children of all ages. The work was planned to correct the position of the teeth and to improve the power of mastication after the surgeons had completed the task of closing the palate.

I thank you all for your kind attention and I would gladly welcome any criticisms.

Report of Clinic.

Two cleft palate babies from the Children's Hospital, Brisbane, were shown. The first, aged three months, had a complete cleft palate and hare lip. The baby was very weak, weighed but eight pounds nine ounces, was very fretful and spent most of its time crying. The baby was taken around and everyone present was given a good view of the palate, as the baby cried continuously.

(I saw this baby first on Friday afternoon, July 4th, and took an impression of its mouth. On Tuesday, 8th July, I fitted my specially constructed sucking plate. On Thursday, 10th July, it was shown at the clinic.)

When the mother was brought in, the sucking plate was inserted, and baby immediately sucked its meal quite well, without any interruption or crying at all. An ordinary feeding bottle was used. The baby was far too weak to consider breast feeding.

The other baby was ten months old, had lived quite a chequered life. Great difficulty had been experienced in nourishing the baby, and it was always "troubled with wind." It had always been spoon fed. This baby weighed nine pounds at birth, on 4th September, 1929. At three weeks of age, it was sent away from the hospital, as it was too

weak to undergo an operation for the lip, weighing only seven pounds. The mother had great difficulty in keeping the baby alive with spoon feeding.

At two months old, hospital authorities said baby was still too weak. At six months of age, it was again admitted to hospital, but operation not done, baby still too weak. At eight months of age plastic operation for the lip successfully performed; 2nd July, readmitted for my treatment; 3rd July, I took impressions; 4th July, a sucking plate was inserted, and baby spoon fed quite successfully, no milk coming out through the nose, and no air being swallowed. The baby evidently enjoyed its meal with the plate in position, and did not object to being watched by the members of Congress.

Further Technique.

Since writing the above paper, I have received several requests to give, in fuller detail, my laboratory technique for constructing my sucking plates. Briefly it is this: First of all, specially constructed trays. Take an impression of the hard and soft palate of a healthy normal baby, aged five months. Cast up plaster model. On this model, construct a wax form to make a tray, to include working parts and soft palate. Take this wax form off, embed in a box of loosely packed sand, French chalk the sand surface, put on top the second half of sand box. Rest a wax sprue former on the crest of the ridge. Fill in with casting sand, separate the two boxes, take out wax form, replace the two halves of sand box, carefully pull out the sprue former and pour in molten tin. I now bend the sprue over and use it as a handle for my tray. Now, when you have taken your impression with this special tray, make a plaster model of your cleft palate. Now take pink wax, and fill in all the cleft cavity, so that your model is complete as it should be in a normal baby. Now put some tinfoil over the wax surface to prevent wax from sticking, when waxing up the plate. Now take a length of stainless steel wire and make a loop, to be embedded in the plate with the loop to project, so as to enable a piece of tape to be affixed to the finished plate. Roughen the ends of the wire which are to be embedded in the plate. This is most important, as rubber will *not* adhere to the polished surface of stainless steel. Now set the loop on one side of your bench, and wax up a plate form to cover the entire hard and soft palate, and going right back to the extreme border of your impression.

Now, embed the wire loop in such a way that the loose ends are well covered and the projecting loop will not cause any irritation to baby's lips. Now cover the surface of the wax with a sheet of medium weight tinfoil (heavy, chemically pure tinfoil); then burnish carefully

over the entire wax surface, taking care to get the tinfoil right to the edge all the way round. Now take off the model and invest upside down; that is, tinfoil side down, in the plaster in a flask. The wire loop is held by the plaster. Apply a separating medium to the plaster and pour the other half of the flask. When set, separate, boil out very carefully, using plenty of boiling soda water to remove all traces of wax. Now, pack strips of vela rubber carefully under the free ends of the wire to make sure that the wire is well covered. Try out, and when satisfied that there is sufficient vela rubber, place a sheet of celluloid between the halves of the flask, press slowly to position, and vulcanize for six hours. When finished, cut off excess with scissors, and burnish edges with hot instrument. Then soak in a lysol bath. This bath also corrects the sticky "tackiness" resulting from burnishing the edges. Then wash thoroughly in running water.


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DISCUSSION FOLLOWING PAPER BY DR. WEARN AT

ROOMS OF BRITISH MEDICAL ASSOCIATION

MONDAY, 3rd NOVEMBER, 1930.

CHAIRMAN: I am sure we have all been extremely interested in this paper read by Dr. Wearn. I have seen some of these babies myself. I have seen them sucking with these plates in, and the fuss they make when the plates are removed. Are there any remarks that members would care to make? Dr. Wearn is very desirous that his work should be criticised or commented on, and discussion will help him.

Dr. Coppleston: I would like to thank Dr. Wearn for his address, which has been admirable, not only in regard to the subject matter, but also for the manner in which he presented it.

There are three points which I would like to mention.

Firstly, I understand in this procedure that he regards the operating portion as really Gillies' operation that is, that the whole attention should be paid to the soft palate, and that the hard palate should be mainly closed by prosethetic apparatus.

Secondly, I would ask how this apparatus remains in a new born growing child. As that child develops, its mouth gets larger, which necessitate additional new plates.

The next thing that appealed to me is the fact that Dr. Wearn illustrates, a principle which one can really anticipate from what we have seen in these cases that is, that the palate develops in an extraordinary manner, and the function of the palate is brought forth.

Lastly, in regard to heredity, I was amazed to hear Dr. Wearn say, (or I understood him to say) that he did not

think that heredity was the main feature in regard to these palates. In the first place, it seemed hard to me to believe that any question of feeding or dieting of the mother of these children can be of importance. As he says, they are strong healthy children, well nourished in every other way.

Next, these children frequently show associated abnormalities. I have seen the figures regarding that supernumerary fingers and toes, and also dislocation of the hip. I have always believed that in cleft palate families the laterals were very frequently either not formed at all, or ill formed, and I understand on good authority that in cleft palate families, very frequently there was a cleft palate in one member, and that other members frequently showed cleft palate indications or ill formed or missing .

Dr. Vickers: I want to thank Dr. Wearn for his paper to night. I think it shows us some of the really original work he has done, and which he has well developed. In presenting to us his paper, he shows us the reasons for his theories, and gives us an opportunity of discussing them.

Secondly, I want to say that he has absolutely convinced us that the dentists play just as important a part in cleft palate children as the surgeon. The dentist is absolutely indispensable. I am quite convinced that to attempt to close the hard palate is wrong, because you prevent the approximation of the soft palate to the rosterior pharyngeal wall, and that is the most important thing that you have got to do.

As regards feeding and speech—closing the cleft surgically is not necessary. The dentist can make a better hard palate than you can obtain surgically, and it wont defeat the object that you have started to obtain: that is it will not shorten the soft palate.

In regard to feeding children and babies, the ones that you get a few days old take quite readily to the plate. There

is no doubt about it that with the plate they do take the bottle, and they do get the whole of th ir milk very well. The other methods of feeding children with cleft palates are with the bottle, pipette, tea spoon, and the tube. The method with the tube over the back of the tongue in good hands and with experienced nurses, can be done satisfactorily, and in a short time, but very few mothers can tackle it adequately, so that this method is only in use in hospitals with careful management. There are good reasons for believing that the bottle without the plate is undoubtedly damaging to the cleft palate, because the teat does widen the cleft. The method of feeding with a spoon is unsatisfactory even in the best of hands. In addition the baby swallows a lot of air. With a good fitting plate babies and young childr take the bottle satisfactorily. When a bit older, say 18 months it takes longer to educate them to the use of a plate, but when they take it, it is satisfactory.

In regard to the method of using the plate after the operation, we have not seen enough ofthis yet to know its value, but I am sure that it is well worth a trial. There have been too few cases so far to say. I am quite convinced that a number of breakdowns are due to inefficient surgery. I think the movement of the tongue against the stitches, and the sucking, must be a big factor in a great many instances in causing the tissues to break down. The wearing of this plate by babies is the greatest advance in the feeding of children with cleft palates that has so far been made, and as Dr. Wearn pointed out, any possible narrowing of that cleft in later life is of great value.

In regard to wearing a plate after the operation, which is the other factor he has brought out, his ingenious little devices with mechanical soft palate, seem so satisfactory that one feels that he has to pay attention to anything that Dr. Wearn says about soft palates.

I think we owe Dr. Wearn our very best thanks for coming along and giving us this very original and instructive address

Dr. H. Poate, (on extreme right facing platform): As one who knows very little about the subject, I feel quite confident in making a few remarks.

First of all, I would like to express my own gratification with the subject matter presnted to us tonight. As you know, one of the ideas in the formation of this society was that we should have new and original work brought before us, and when Dr.Vickers introduced me to Dr. Wearn, I suggested that this would be an admirable subject to bring before our members.

The great feature about it, to my way of thinking is its original work, and it is done by one of our own Fellows, and deserves the support of the medical profession. (Applause.)

I have listened with great interest to many theories that he put forward, and the one that struck me most was that the wearing of this apparatus had the effect of closing the width of the cleft, and that the little projection forward tended to bring those two portions of the lip together. I would ask whether Dr. Wearn has done any experimental work in regard to the develop ment of the lip is there any tendency towards the narrowing of the aperture, and I wondered as to whether it would not be wiser for the surgeon to defer the period of operation on the lip to a stilllater period, when the child was more fully developed, and had a better bulk of muscular tissue to work upon than would be the case by operating on that patient at three weeks.

When I was a student, it used to taught that the risk in early operations on the lip was in making the muscles of the face too narrow to some extent. The idea was to prevent that cleft widening as the child grew older, and that was why it was necessary or advisable for the lip to be operated on at an early date, but with the use of this apparatus it seems to me that necessity now no longer arises, and it may be advantage to defer the operation provided the apparatus produces the results Dr. Wearn claims for it.

The other thing that struck me was it stands to common sense that the wearing of an apparatus of that character by increasing the muscular effort, and directing that along normal lines, must tend to p event the widening of the fissure in the palate, and may possibly induce some attempt towards closure. Has Dr. Wearn noticed, or has he any records to go on as to whether that is a fact, and to whether there has been actual closure, and if so, how much.

Thirdly, there is the question of the result of the use of the post operative plate. He mentioned a couple of cases of Dr. Vickers'. Has that proved satisfactory in preventing any breakdown of the palatal operation.

Dr. Hipsley: I would like to thank Dr. Wearn for his exceedingly interesting paper this evening, and forthe demonstrations he has shown us.

To my mind, there is no doubt that the most important thing in the treatment of cleft palates cases lies in the nutrition of the child. We see so many cases brought to us where the infants have been 8 lbs. at birth and have fallen to 5 or 6 lbs. It has been my practice in the past in these cases to send the children to Tresailian, and mothers say they have been exceedingly successful there in increasing theirweight until the children are well enough to operate on.

I have tried this device of Dr. Wearn's in several cases, and it has certainly been very useful.. I have been astounded at the progress the babies have made with these little plates in position. Dr. Wearn mentioned that he was always under the impression that these cases occurred among the poorer classes, but he has been surprised to learn that that is not so. I can assure him from my experience that they all seem to occur in the very poor classes. Certainly one sees very few of these cases outside the Children's hospital.

Of course hitherto dentists have been able to help us in the direction of these cases by applying dental obturators.

Certainly this little device is far more important in that way, and applied to very young infants, an improvement in the sucking certainly adds to the development of the child, tends to improve the lips, and the operation is rendered very much easier, and is more likely to be successful.

I do not agree with Dr. Wearn in saying that the hard palate had better be left. I think there is not the slightest doubt that the proper thing is to operate on both hard and soft palates. One will get a far greater number of successful results, and if one leaves the hard palate, I cannot see how that is going to lengthen the soft palate. If you operate on the soft and leave the hard, it will still be a short soft palate. Dr. Harvey Sutton was saying that the operation should not be delayed until the child is two years of age. I do not think Dr. Harvey Sutton has done any of these cases, or he would not ask that question. It simply means that it is impossible to unite them successfully before they are two. Brophy in his operation merely wires the maxillae together. He does not actually unite the whole cleft. He unites the cleft temporarily, but he hopes by approximating the macillae by wires to render the operation easier at a later stage. It is impossible to get a successful result in children under 18 months, and any operation at that time only makes another operation more difficult, or impossible. Two years is really the earliest time at which you should attempt to close the cleft palate, and the later it is done the better, Of course, I was surprised to hear him say that none of the children he had examined had been able to speak correctly. That is an observation on which we must rely, but still we do see some cases that are operated on at two years, and some of them speak quite correctly. I must say that a few, or perhaps a big percentage have a difficult; in articulating properly merely because the soft palate is fore shortened, and in speaking, it never touches the hard palate.

I again thank Dr. Wearn for his exceedingly interesting paper

Dr Harvey Sutton - see next page

Dr. Flynn (in front dark(: I would like to ask Dr. Wearn what is the result of the development of the sinuses to the

Dr Harvey Sutton. The device seems to be a most ingenious and excellent one. No doubt one of the great troubles in these hare lip and cleft palate children has been the way in which the conditions break down. It is generally accepted that heredity does play a part in the history of these children. I think a careful perusal of records shows that hare lips and cleft palates are often hereditary if you go back for a generation or two. It is no good going only to the father or mother and immediate relations - we want to go much farther back than that, at least two generations and include the whole family tree. Karl Pearson shows that in about 60% of cleft palates there was a distinct hereditary history.

What I do not understand about the operation is why we have not been able to get greater success with regard to speech. Every cleft palate child I have seen who has been operated on in Australia has had defective speech. I think the postponement of the operation to two years of age inevitably means defective speech. Once a child has started to speak in the cleft palate style, no surgical remedy for defective speech will have any marked result. If this device could be given the child before it speaks, it would have a better chance of tackling speech. I am sure if surgeons defer the operation till the child is two years of age, they will make quite certain that the child will have defective speech. I cannot quite understand why bringing the hard palates together should be the slightest disadvantage.

In reference to Dr Hipsley's remarks, it is possible that through re-education by a competent teacher of phonetics may overcome the difficulty. All I can say is that such a successful result is the exception and not the rule.

development ofhare lip and cleft palate? Possibly putting in this little rubber business causes greater development. It may alter the antrum and produce a large development of the antra and push the roof of the palate down. I am only asking for in formation. It is a matter that I think Dr. Vickers might known something of. Dr. Wearn spoke about the rubber plate keeping the field moist after the operation. It struck me that making a few holes in it would let any moisture out. I think it might be worth trying. I would like to heartily congratulate Dr. Wearn on his paper.

Dr. Poate (same as top of page 4.): In view of the remark of Dr. Harvey Sutton, when I was over in England in the early days I was very interested in Lane's work in this matter, and he used to say that he never saw a failure. Sir Anthony Bowlby who was President of one of the homes for crippled children or deformed children used to say that if any one liked to go along he would show them Lane's failures, because Lane always refused to see them again.

Dr. R.A. Green: Is it possible for a child to be breast fed with one of these appliances?

CHAIRMAN: I have been very interested in the work for some time, and Dr. Wearn has very kindly allowed me to watch the development of his work, and I have been extremely interested in it. I have seen some of the babies, and the way they are able to take the bottle is really amazing to me.

With regard to the introduction of toxin materials and the development of embryos we can produce most extraordinary deformities, in fish particularly. The introduction of toxic materials has produced some amazing deformities, so that there does not seem any real improbability in the introduction of some toxin material or some diet having an effect particularly as hesays the condition was often associated with other deformed effects which one can produce in some of the lower animals by toxin foods and diet.

Then inregard to the use of the plate, 20 years ago, when I

was a resident in Royal Prince Alfred Hospital, Dr. Hinder had a case of cleft palate, constantly breaking down. In that case he anticipated to some extent the rubber arrangement by sewing a piece of thick rubber down across the palate on both sides. I do not remember the result.

I am sure we are all extremely obliged to Dr. Wearn for the very interesting way in which he has put his results before us, (which have produced a very interesting discussion,) and the admirable results that he has obtained from this original piece of work. We welcome his address very much, and I am sure that I express the opinion of all members present when I say that we are very much obliged to him for his presentation. (Applause.)

Notes of a Lecture given to the Medical and Nursing Staff of the Baby Clinics 22nd October, 1930.

THE FEEDING OF CLEFT PALATE BABIES.

By W.J. Wearn, B.D.S. D.M.D.,

Honorary Dental Surgeon to the Royal Hospital for Women, Paddington; Honorary Dental Surgeon to the Renwick Hospital for Infants, Summer Hill; Honorary Dental Surgeon to Cleft Palate Department of Royal Alexandra Hospital for Children, Camperdown.

Many of the ladies here tonightmust have wondered what a mere dentist could possibly know about the feeding of babies; dentists do sometimes have babies as patients.

I once had a baby a day old brought to me by a nurse. It had been born with one lower tooth fully erupted, and as the tooth was obviously in the way and would have interfered with breast feeding, I extracted it.

But I mention this only in passing it is not my subject tonight.

I propose to show you through the whole range of cleft palate work, because it must prove a subject of interest to you and I thought I would maintain your interest better if I showed you first of all the very end result of all our work.

Some patients from my private practice have very kindly consented to come along here tonight to show you the appliances that I have made for them.

This lady, in the very first case, had a cleft of the hard and soft palates. Several operations were performed and now you see her, surgically a success. The uvula is a normal size. The soft palate is joined but you will se it is only half its normal size. It is very scarred, not soft and flimsy, but, almost hard. The hard palate is joined, but had one perforation leading to the nasal cavity.

I made this appliance for her, a gold plate, carrying a few teeth which she had lost. This plate covers in the perforation in the hard palate. Then I hinged on to the plate a solid little bar which runs back over the soft palate and finished up just past the uvula. On to the end of this bar I fixed with two bolts and nuts, a hollow obturator to fill exactly the space left by the shortened soft palate. This obturator goes back almost to the posterior pharyngeal wall.

The physicology of this region can be most simply illustrated by referring to a junction railway station with our brain in the signal box to work the levers.

We have two cavities or inlets and two outlets. Food and liquids are taken into the oral cavity and the lips are closed. The liquid can come out again through the nose or go down the wrong way into the air passages, or down the right way through the oesophagus.

Let me point out in this diagram, the relationship between the nasal cavity, the oral cavity, the oesophagus and the larynx.

Here is the nasal cavity bounded posteriorally by the muscular wall of the posterior pharyngeal wall and below by the soft palate. The soft palate cannot be stretched but it is raised upwards, and the pharyngeal wall is contracted and comes forward to meet the soft palate.

So, in a normal case, the nasal cavity is thus completely and effectively blocked off.

But, in the case of this patient, her soft palate is now so short, that no matter what muscular efforts she makes, she is unable to block the nasal cavity off from the oral cavity. Therefore the need for the making of this appliance.

The obturator goes back so far as to leave just a breathing space, which space is immediately blocked off and closed when the posterior pharyngeal wall contracts and comes forward.

When the patient is eating, she finds no difficulty whatsoever in swallowing because the bolus of food simply pushes up the obturator, the hinge working very easily.

When the appliance is in the mouth, you will notice that the obturator moves with the soft palate, and conversely, if you take a pointer and push the obturator upwards, it carries the soft palate up with it.

The patient has now been wearing the appliance for six months her speech having greatly improved.

Now let me refer for a moment to another patient I have here.

Thelma had a complete cleft palate and hare lip. A plastic operation was performed when Thelma was a wee baby, on her upper lip, which is now joined, but she still has complete division of the hard and soft palates.

When I extracted an upper molar tooth for Thelma about three months ago, she bled out through her nose before the blood came out through the mouth. Thelma could not blow out a match because the air chose the alternative channel and half coming out through the nose dispersed that coming out from the mouth.

Now with this appliance in place I have separated the two cavities and you will see Thelma quite easily blow out this match.

It is now quite possible for Thelma to speak correctly and well, just as well as you or I can speak. Yes, I mean that. Just as well as soon as she has learned how to form her words.

Her appliance is totally different in design from the first one I showed you it is the standard type of appliance which I have been making for the patients who have not had any surgical operations performed upon the palate. I made this appliance early this year and it was worn quite successfully, but I now propose making a new type, with a hinge, Pickerill method, called by him, a bar velum. If any of you wish to see the case later on I will be pleased to show you at my consulting rooms as soon as I have finished constructing the appliance.

I will never forget a joke that was played on me at Guy's Hospital, London, by Dr. Kelsey Fry, seven years ago.

Dr. Kelsey Fry is, like myself, only a dentist. We earn our bread and butter by taking the decay out of people's teeth and inserting fillings. Sometimes we have to extrace the teeth and then the public say we put in false ones. So we are only dentists.

After some weeks intensive cleft palate work, Kelsey Fry said to me, "Look here, Wearn, we are both sick to death at the sight of clefts. Let us get right away somewhere and have some afternoon tea and I want you to meet a very nice little girl friend of mine".

Well, we went together. The cakes were good and I enjoyed them.

The girl was certainly quite entertaining and conversed quite freely with us both, but towards the end of the tea party when offering me another cake she faltered on the "C" and, bursting into tears, said to Kelsey Fry, "There you are, Doctor I knew I would disgrace you."

She was one of his recent cases, wearing an obturator, Certainly she was not a hare lip case, or I would have noticed the scar at once.

Otherwise her speech was almost perfect. She could say "Cake" or "Kick" but did not quite have the confidence. She admitted having had toothache once. then, she said toothache, cake, quite easily.

Let me illustrate this point.

I am quite sure there are a number of people here who will say they cannot swim, yet you can all walk. I see no difference.

The human body naturally floats in water, unless you are foolish enough to struggle and fill your air passages full of water. You have merely to tread water quietly and you can keep afloat indefinitely. Then you can propel yourself along with your hands, windmill fashion.

It is all a question of confidence.

Just so with cleft palate patients. Once they have had an apparatus fitted scientifically which makes it possible to block off completely, at will, the nasal cavity, then training, care and confidence are all that are necessary.

I have shown you these two cases just to get you all interested in the baby side of the question. I also wanted you to know just what could be done, because you come into such close contact with the mother that a big responsibility rests upon your shoulders, and I mean to put it there in two minutes.

Thank you Thelma, for coming along. I won't keep you any longer, because I want to talk about babies now and you are no longer a baby.

Now for some of my little babies.

Here is little Fay Shillington, She came under my care when she was just three days old. I took an impression of her mouth and made her one of my sucking plates. In the meantime, Fay was troubled with wind and she vomited up her meals about half an hour later.

Can you guess why?

One teaspoon of milk and an equal amount of air makes a very indigestible mixture.

Well, on the fifth morning I inserted her sucking plate, and I fed her with an ordinary feeding bottle. She sucked an ounce in ten minutes and from that day forward, she sucked quite well, with no further gastric disturbances.

When she was a month old, she was quite a well nourished baby and a plastic operation was performed to repair the upper lip.

Now again for one week, Fay was spoon fed, wind troubled her as before and she vomited up her meals. But when the plate was brought back into commission, baby sucked again quite happily and forgot all about her digestive troubles.

I did not need to make her a new plate, I simply cut off with a pair of scissors the anterior projection which had filled in the deficiency in the lip. So the plate that I made when Fay was three days old lasted her quite well for four months. Then last month I made her a new one though it was not really necessary as she was doing quite well with the first one.

Now look at this little baby.

He was a month old when I took his impression just before

the operation was performed to repair his lip. Here is the plaster model I made of his little mouth. Then I constructed his sucking plate, making sure that it would not interfere with his new lip.

When I put his plate in, he was able to suck, certainly his lip was stiff after the operation but we were able to breast feed him partially, supplementing with bottle feeding. But it did not take the lazy young scamp long to find out how much easier bottle feeding was and he demanded his choice. Now he is such a discerning young man that he will refuse to open his mouth for his bottle until he has first been given his sucking plate.

I have made these sucking plates for babies one day old, right up to ten months old, and I have never had a failure. The only child I ever had give me trouble was three years of age and was mentally deficient.

I do not propose to go into the developmental side of this subject, beyond stating that intrauterine life normally lasts nine calendar months, and at about the end of the sixth week of this life the five buds or processes of the primitive face are joined together.

The transformation of the relatively flat embryo is due in the first instance to the rapid extension of the median part of the area, as contrasted with the slower growth of the margins.

You will see that the later modelling of the various parts of the embryo is due to different rates of growth in the different parts of the embryo.

In the first model, note that the embryo is quite flat.

In this next model, the folding over of the head end is shown.

You will notice the embryo is entirely devoid of limbs, the limb bud appearing about three weeks after conception.

In the next model, at the head end, you will notice five buds or processes have appeared. These buds grow out, and meeting join to form the mouth and nose.

I wish to draw your attention particularly to three of these processes. This is the Fronto nasal process, which grows downward to meet and unite with two lateral processes.

This union is completed about the sixth week of the interuterine life.

If one of these lateral processes fails to unite with the Fronto nasal process, we find that the baby has a single cleft palate and hare lip.

If BOTH lateral processes fail to unite with fronto nasal process, we have a double cleft palate and hare lip, the fronto nasal process protruding straight out in front.

These wax models show the various stages in the development very clearly.

So this cleft or lack of union is defined at this very early stage. That is all I intend saying about the embriology of the condition.

But I want you to understand clearly that the cleft, or lack of union, occurs at a very early stage.

Medical authorities cannot agree upon the cause of cleft palate.

I have heard many and various theories. But please never encourage the idea that i has been caused by a fright or by seeing a hare, or by looking at some unpleasant object, because I can definitely say that it is not.

Now a cleft palate baby is born and this where I want to put a lot of responsibility upon each and every one of you.

It must be a temendous shock and disappointment to the mother to see her little baby's face. Quite healthy baby other wise normal weight but the little face. Now you should and you must, treat the matter very carefully. It is not a freak. Certainly it is not quite normal. The neighbours and friends will certainly regard it as an object of curiosity and talk about it the psychic effect upon the mother is disastrous. You must deal wisely and firmly with the matter. Assure the mother that a simple plastic operation will correct the lip and with intelligent care baby will grow into a sturdy child.

You may think I am labouring this point, and I have not yet told you anything about the feedin of the baby, but I do feel very strongly on this point.

We have got one little baby girl under ur care at Renwick Hospital brought to our Hospital when she was about 12½ hours old. She is nowtwelve months. The parents were so upset at the time that they have positively refused to come and see her again. Twelve months is a long time. Here is her photograph. Barbara is the pet of the Hospital. She possesses the most adorable pair of eyes any girl could wish to have. Perhaps if one of you had cared for Barbara's mother, you could have saved for her the love and affection of her mother, instead of allowing her to be regarded as a repulsive baby.

Now I told you that these babies weigh eight and nine pounds at birth, but I can turn up Hospital records.

One weighed seven pounds at birth, at seven months weighed six pounds. After I made her a sucking plate her weight was more than doubled in two months. To weigh six pounds at six months is an average weight for cleft palate babies, who weighed only 5 or 5½ pounds when over two months old.

Many of these babies you would think, came from a famine stricken country. All their bones are visible. Why is it? For two reasons, I think. Firstly, nervous exhaustion. Baby should spend about twenty minutes over its meal. I have known it take 2½ to 2½ hours to feed a cleft palate baby, then 1¾ hours respite and then the whole performance over again. If I were to take the strongest one of you here tonight and to start giveing you your breakfast at 8 a.m. with a teaspoon, and to so prolong it that we finished at 10.30 a.m., then 12.m.d., started again and finished at 2.30 p.m., then started again at 4.p.m., and prolonged it till 6.30.p.m., you would be a physical wreck in a very short time.

Secondly, the tremendous amount of air which baby swallows during the difficult task of feeding, greatly interfers with its digestion. Just you try and swallow a mouthful of water without closing your lips. That is just exactly what a cleft palate baby has to do.

Here are some X ray photographs I had taken of a cleft palate baby two days old before and after a meal of one ounce of milk.

It's little baby stomach is distended right up with three times as much air as milk. How could you expect any baby to thrive on such a mixture.

METHODS AT PRESENT IN COMMON USE FOR FEEDING THESE BABIES.

1. Spoonfeeding. A teaspoon of warm milk is put in baby's mouth. The head must be held well back or the milk will come back through the nose. Babymakes valient efforts to swallow. Gravity sends the milk down. It is most important to pause after putting a teaspoonful of milk into the baby's mouth until you are sure that it has been swallowed and that the baby has taken a breath, before repeating the process. Then frequent pauses must be made to sit the baby up to get rid of the wind.

Anybody who has ever watched a cleft palate baby being fed must have noticed how distressed the baby is by the enormous amount of air it swallows. Just look at these X ray pictures of a baby two days old. First picture taken just prior to feeding. The outline of the stomach is marked out with ink. The baby was carefully spoon fed by a nurse who is used to this work and who knew that I was having the baby X rayed again immediately after the meal.

The pictures shows three times as much air as milk in the stomach.

Often times, after half an hour has been spent in carefully spoonfeeding such a baby, suddenly the whole meal is vomited up, and, exasperating as it must be to the nurse, what a trial it must prove to the baby.

You all know what our nose is for. Sometimes it is an ornament, sometimes not, but it has two main uses. (a.) It is a strainer or sieve. It collects all the dust out of the air, which we breathe in. (b.) It warms the air to body temperature.

Now I have no desire to be crude, but there are times when it is necessary to speak plainly.

You have all been trained. I have been into your diet kitchens and I have always felt out of place. I see your Spotless uniforms, cleanliness carried out to perfection, and I feel that a vacuum cleaner should have been put over my clothes and over my shoes before I entered the gauze door. That is one side ofthe picture.

Now the other. Go out of doors on a dusty day blow your nose look at your handkerchief and just see how much dust your nasal cavity has strained out of the air you breathed in.

Well, now watch a cleft palate baby swallow a teaspoonful of the milk you have so carefully prepared. Watch the tongue wipe this milk through the nasal cavity. You may well shudder now, but you feed the young baby with an aerated mixture contaminated with the nasal secretions and dust and expect him to thrive.

But you don't ex ect it, do you? Because you know that these babies do not thrive when spoon fed. The milk was at the correct temperature when spoon feeding was commenced, but it takes a long time to spoon feed baby, and the milk gets stone cold when spooned out.

2. FORCE FEEDING BOTTLE. This is obtainable in Sydney.

Ordinary teat at one end rubber bulb at the other. It projects a continuous stream into baby's mouth.

I have seen mothers exerting a continuous steady pressure on the bulb, and the baby making frantic efforts to gulp it all down.

Supposing you put a hose pipe in your mouth and turn on the water tap, you will find it hard work to swallow thewater, and yet you have a normal palate. Of course, your skill and training will manage this much better but mothers do not always manage as well.

3. AUTOMATIC FORCE FEEDING BOTTLE. When I was in London Kelsey Fry had made up an automatic feeding bottle with an ordinary teat at one end and a ball with a valve at the other end. One compression of the bulb between thumb and finger would propel one teaspoonful of milk into the baby's mouth.

4. ORDINARY FEEDING BOTTLE. Now I know that I am going to hu. somebody's feelings, here. Some nurses told me that they have managed quite well to bottle feed palate babies by using a large, soft teat, with a very large hole the milk practically ran out and baby sucked a bit. Now I feel I cannot strongly enough condemn this pernicious habit. Four sets of professional people are interested in cleft palate patients at three different stages oftheir existence. You, as trained nurses, are interested with the physician. In the care of the baby and its nourishment. Later on, the surgeon taken charge. Finally the dentist, who has to care for the teeth, correct the occlusion of the teeth, and where necessary, construct an apparatus such as I showed you for my first patient.

Now what does the surgeon need? A good, healthy patient, well nourished. Look at these models here. The palate is divided into two segments. The Surgeon has to unite these with a plastic operation. The greater the space between these segments, the more difficult is the problem for the surgeon. What part do you play?

You cannot sit on the fence. You either assist or render more difficult for the surgeon what is perhaps one of the most difficult operations that a surgeon is called upon to perform.

A physician, a baby specialist, not in Sydney so none of you know him, told me that he always managed quite well by using a large teat, and when I placed such a teat against the cleft of one of my plaster models, he was astonished when I showed him just how he widened the cleft and rendered the surgeon's task more difficult.

I only mention the physician here because I do not wish to hurt the feelings of any member of the nursing profession, but I feel sure that if you once realized the end result that we are striving for with cleft palate patients good occlusion, good appearance perfect speech and no inferiority complex you will be able more intelligently, to take your share in the work.

You all saw that my second little patient suffered with an inferiority complex afraid to hold her head up, afraid to be seen afraid to speak. Her teaches at school tell me she is always the same, yet I have never had one moment's trouble with Thelma as a patient. I have extracted difficult teeth for her X rayed her mouth, and put in fillings and we are quite good friends. We understand each other perfectly because she knows that I do cleft palate work, but with the world at large she thinks that they regard her differently. So you see, I am back again to my old point. A plea for intelligent, sympathetic treatment for mother and child.

I will never forget attending to a little baby at it's home.

The baby was three months old, very weak and miserable. The lip operation had been a failure and had broken down because the baby was in such a weak, miserable state and there was an absolute lack of tone in the lip muscles.

A little sister aged about four, and a little brother about six, stood beside the cot. When I paused in my work to look up, I saw tears trickling down the cheeks of both children not fright, but real sympathy. It brought a lump into my throat but taught me a lesson.

Now to return to our theme. Please don't ever widen the cleft by using a big teat which baby pushes up into the cleft with it's tongue every time it sucks.

Talking about sucking, it plays a tremendous part in the development of the mouth and nose of a normal baby, when baby is breast fed. But when the common type of teat is used on a feeding bottle, I think a very different thing happens.

Your Director, Mr. Morris, agrees with me that breast feeding calls for much more exercise upon the part of the baby than does bottle feeding, and that is one reason why babies very soon learn which is the easier method and will refuse breast feeding when they know they can have a meal out of a bottle. When a baby is being breast fed, it grasps the breast tissue with its lips, cups the end of it's tongue around the nipple and sucks. The suction produces a negative pressure in the mouth. This widens the roof of the mouth and creates a well developed mouth and a normally developed nose. I still think that faulty methods employed in feeding babies, as well as habits of thumb sucking and tongue sucking play a part in creating an abnormally high palate, but your Director, Dr. Morris points out that habit is not the sole cause.

I can now show you models in which the palate is so high and narrow that it would be impossible to get even a baby's thumb in. I hope at a later date to be able to read a paper on some of the factors concerned with incidence of high palates.

5. PIPETTE OR DROPPER. A Glass Dropper is often used. The milk is expelled into the baby's mouth. Care must be taken that the milk is not dropped too far back in the mouth where it would cause irration and coughing and perhaps vomiting. The method is akin to spoon feeding.

All these methods may be used by the mother or the nurse.

6. CATHETER TUBE FEEDING. This method can only be used by a skilled nurse. Take the funnel of a glass syringe and attach a small rubber catheter. See that the catheter is quite firm and that the bore is large enough to enable food to pass through freely that is, without blocking the catheter. Run water through the funnel and catheter to make sure that the bore is clear.

Have ready on a plate, covered mug containing nourishment mug of water, jar of glycerine to lubricate catheter, catheter and funnel.

Everything must, of course, be perfectly clean.

Have baby in bed, propped up slightly on a pillow, one nurse at left hand side of bed steadying head with the right hand and holding the baby's hands with left hand.

Second nurse standing at right side of bed, taken the funnel in the left hand with catheter attached empty holding lubricated catheter in right hand, gently insert it over the tongue taking care to keep catheter away from lip sutures, till there is a gurgling sound in funnel, which is a sign that the catheter is in the stomach. Wait a fewseconds till baby becomes accustomed to tube, then pour a little water into funnel to make sure that there is no blockage with mucus and that catheter is not in the trachea, then proceed with the feeding. When finished, pinch catheter between finger and thumb and withdraw quickly. Do not leave baby immediately, as he may vomit and become asphyxiated. Prop him up and hold the lower jaw if he is inclined to vomit. There is sometimes a difficulty in tube feedingas the tube becomes blocked with mucus if this should happen the tube will have to be removed, cleaned and reinserted. The tube may be inserted through the nostril if only a single hare lip but it is much safer to feed over the tongue.

Finally, I would like to interest you in my method of feeding cleft palate babies, I like to get them when theyare one day old, take and impression of their mouth, and construct a perfectly fitting soft sucking plate. Babies like these plates.

They regard them as made to order dummies. With them in place they can suck quite normally.. If thebaby befairly strong it can be breast fed but if the baby is weak, then it will have to be bottle fed. But up to the present, I have not failed to get a baby to bottle feed quite successfully as soon as the plate is inserted.

With my plate in place, the baby drinks ~~them~~ air without dust, without nasal contamination. The baby sucks the milk at it's will, is not forced to swallow just so much milk and as often as the mother cares to put it in it's mouth and so is happy and contented. Look at this photograph of baby S.. dringing quite happily. Baby will immediately commence to put on weight, is more contented, and is an altogether different child. He is then soonready to stand an operation for the lip when the plate is left out for one week then I cut off the anterior projection of the plate which baby now continues to use as before.

Another important fact is that with normal healthy erercise the muscles of the mouth, lips and cheeks are developed andgrow and the two halves of the cleft are drawn together.

Contrast this with the methods of feeding when the rubber teat is forced up into the cleft, widening the gap.

You will doubtless feel that I have spoken at length about every other method of feeding cleft palate babies and told you nothing about my own method, butreally when I have made the sucking plate to perfectly fit the baby's mouth, then a child can insert the plate just as any child can put a dummy in the childs mouth.

To illustrate my point, you all saw the baby from Renwick Hospital, which we showed feeding at 8 o'clock (we altered the hour of feeding to day so that all would be able to see baby being bottlefed tonight.

This baby was admitted to Renwick when it was one day old. I took an impression of its mouth that day, the following day I took a group of final year dental students from the University to see the Cleft palate cases.

After all had seen the baby, I inserted the plate; baby just sucked it inot place, then I handed an ordinary feeding bottle to one of the young men (I am quite certain it was his first experience in feeding a baby) but he found no difficulty whatso ever in feeding this cleft palate baby two days old.

I relate this incident, for the same reason that I asked the Student to feed the baby, to drive home to you all the absolute simplicity of feeding the babies, once they have been fitted with a sucking plate.

Of course Sister had a nurse standing by, who took over the feeding of the baby, once I had demonstrated to my students all that I wished.

All these babies when fitted with sukking plates on the first day, continue to thrive steadily; in striking contrast to two babies a month old who came under my carerecently, and whose weight had droppea to 5½ lbs.

Both had been spoon fed from birth; poor miserable little specimens of humanity they were indeed.

Then with the sucking plate in place, the baby is fed just as any ordinary baby and so you see all the trials and difficulties of feeding these babies should now be a thing of the past.

I feel that my words have not been spoken in vain tonight if I have shown you just what important issues are at stake, and just how you can assist the Surgeon, or on the contrary.

I am sure that once you fully appreciate the endresult that we are striving to attain, it will enable you to more intelligently care for these babies.

Lecture given at the invitation of the Director of Maternal and Baby Welfare.

Seven patients were shown one baby two weeks old, with complete cleft palate and hare lip.

Dr. Margaret Harper and Fr. Petherbridge, spoke of having seen these sucking plates successfully used for some time past.

Dr. Sydney Morris proposed a vote ofthanks to the speaker.

Dr. Wearn will welcome any communication from members of the nursing professions on the subject of cleft palate work.

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