SOME EXPERIENCES WITH THE TRIANGULAR FLAP TECHNIQUE IN UNILATERAL CLEFT LIP SURGERY

By Khoo Boo-Chai

Cleft lip (harelip) is a fairly common congenital abnormality and the incidence is on the increase. (Fogh-Andersen 1961). This condition apparently attracted very little attention among the ancient medical writers. No mention of its existence or its surgical repair can be found in either the Ebers or the Edwin Smith papyrus or in the writings of Hippocrates. (460-375 B.C.). Celsus (25 B.C. to 50 A.D.) who lived in the reign of Augustus Caesar, is often given credit for first mentioning the cleft lip and its repair. The validity of this claim has recently been questioned. Rowling (1961) in his paper on pathological changes in Egyptian mummies did not mention any case of the cleft lip. However, the writer recently came across a passage in an ancient Chinese text (Chin Annals 229-317 A.D.) which mentions this condition. It runs as follow: - Wei Yang-Chi alias Chang Tao lived in a city called Jen. (in the province of Hupei). He came from a poor family of farmers but he applied himself diligently to his studies. However, he was born with a harelip deformity. One day, an astute fortuneteller told him saying, "From your physiognomy, I can tell that in time to come you will have wealth and honour." All went well until Wei was eighteen years old when he heard that in the State of Chu there was a certain governor Yin Chung-K'an who had in his service an eminent doctor who was able to cure his type of deformity. He was extremely poor and could not even afford the usual travelling expenses. One day, he met members of his household and said, "With this ugly physical deformity of mine, there is no future for me. What is the use of existing?" He then took with him several measures of rice and was soon on his way to seek a cure.

When he arrived, he presented himself before governor Chung-K'an who, after conversing with him, was very impressed by his good intentions. Yin then summoned the doctor to examine the patient. The doctor having done so said, "I can cure this condition by cutting and stitching the edges together. However after the operation, you will have to rest the affected part for a hundred days by ingesting only thin gruel and moreover you cannot smile or talk. Yang-Chi replied, "What is a hundred days to me when for the sake of a cure I am prepared to remain silent for half my lifetime and to spend the remaining half in treatment." Chung-K'an then gave him lodging in a house nearby and ordered the doctor to treat him with all skill. Yang-Chi actually held his peace for a hundred days and during that period he only ingested thin gruel. Oh what an excellent example of strong determination! (Chin Annals. Book 14 Part 85 Sections 8 and 9). What eventually happened to Wei Yang-Chi will be discussed in another paper (Khoo Boo chai, 1964).

Surgical repair of the cleft lip is one of the most challenging procedures faced by the plastic surgeon. It is also one of the most fascinating because, in most cases, we have to contend with one of the great imponderables — growth. In order to understand the whole problem more fully and intelligently, it is useful to review the anatomy of the cleft lip. (Fig. 1) For convenience of description we divide it into three sections. In the treatment however, these must be considered as a whole and not divorced. They are: - (1) The Alveolus. (2) The Lip. (3) The Nose.

(1) *The Alveolus:* This is either grooved or cleft. If cleft, there is an antero-posterior displacement of the alveolus with the central (medial) part jutting forward and the lateral part lying backward. In those cases with cleft lip and cleft palate, the whole lateral half of the cleft maxilla lies slightly back. In a good many cases, some of the alveolus is missing or poorly developed, usually but not always, that portion carrying the lateral incisor tooth.

(2) *The Lip:*

(i) The lip is both defectively placed and developed. It is shortened vertically on both sides of the cleft but more so on the medial side.

(ii) The Cupid's bow is present but is divided by the cleft.

(iii) The edge of the philtrum is usually clearly seen on the side of the cleft but is shorter than on the normal side.

(iv) On palpation, we find that the lip on the medial side of the cleft is of normal thickness and is closely attached to bone. This portion of the lip is also pushed forward by the displaced premaxilla. The lateral half of the lip is thicker than normal but is less closely fixed to bone.

(3) *The Nose:*

(i) The tip of the nose is badly deformed because of the spreading of the two edges of the cleft. The rim of the nostril instead of being circular, is flattened almost into a straight line. The alar cartilage on the cleft side is flattened, displaced downwards and backwards. It is often poorly developed. It is interesting to note that with growth, the Asian nostril remains more or less circular whereas in the Caucasians it usually becomes ellipsoidal. (Khoo Boo-Chai, 1964).

(ii) The columella is displaced to the normal side away from the cleft. It looks shorter on the cleft side but this apparent discrepancy in length between the two sides disappears after the operation.

(iii) Like the columella, the lower part of the bridge of the nose is swung over like a pendulum to the side away from the cleft.

There are many ways of repairing the cleft lip and each has its own ardent proponents. However, these methods varied though they be, fall into two broad groups: -

(a) The straight line closure.

(b) Closure incorporating some form of Z-plasty.

The straight line closure is simple and it conserves lip tissue. In skilled and experienced hands it gives fairly good results. However, no matter how skilled a surgeon may be, his best results are limited by the ultimate of the method he favours. The straight line closure has certain shortcomings. (i) Because of the original deficiency of tissue at the lower border of the cleft, the lower part of the lip is usually narrow from side to side. In profile, the shape of the lip is unnatural, being straight from the base of the nose to the edge of the vermillion. (Fig. 2B). (ii) The normally present but displaced Cupid's bow is destroyed. (Fig. 2A). (iii) Those who employ this method do not expect to achieve finality with one operation accepting that secondary work will almost invariably be required. (Holdsworth 1963). Unlike conditions in the other countries, we find great difficulty in pursuading the parents to submit their child to aa second operation unless the deformity is gross. In a recent nation-wide survery, Lewin (1964) found that amongst those plastic surgeons actively engaged in cleft lip work, only 2.8 per cent. (9 out of 315 surgeons) use the straight line method of closure and this is only reserved for the mildest of incomplete clefts, such as grooving of the lip.

In 1949, LeMesurier of the Children's Hospital, Toronto described a new technique using a quadrilateral flap from the cleft side of the lip. In planning the operation, some difficulty is usually experienced with the Cupid's bow because it has to be constructed. A considerable amount of ingenuity and experience is needed to produce an acceptable one. Again in some cases, there is a difference in the growth potential between the two sides which becomes more apparent with the passage of time. Taken by and large however, it is good operation and produces a lip that is difficult to differentiate from a normal one when seen at a distance.

In the fifties, there were further improvements on the flap operation and the advance in technique is so marked that it is now possible to produce a near perfect lip both in function and appearance after surgery. (Figs. 4 - 10).

We operate within the first two weeks of birth provided the delivery is normal and the baby not premature. For these cases we use local anaesthesia as described by Straith (1959) but modified to suit our local conditions. Otherwise, we would like to do our cases at

the age of 3 months, when the baby is well, free from infection and thriving. These are done under endotracheal anaesthesia given by an experienced anaesthetist. Intubation may be difficult in some cases.

The displaced parts of the lip are restored to their normal position and kept in place by a proper distribution of the tissues. It is generally agreed that in unilateral cleft lip, there is no shortage of tissues but there is a definite derangement.

The shortness on the medial side of the cleft is corrected by an incision in the philtrum permitting replacement of the displaced vermillion and lengthening of the lip. The resultant triangular defect is filled in with a triangular flap from the lateral lip element. On the lateral side of the cleft, the lip is also lengthened vertically as a result of incisions which finally produce a Z-shaped and not a linear scar. The size of the triangular flap varies with the degree of the cleft. In complete clefts, we use a big flap and in incomplete clefts a smaller one. Hence, there is greater flexibility in the planning of the operation. All the natural landmarks of the lip are utilised and the important Cupid's bow is preserved. In all our recent cases, we use a specially designed Tangê needle holder. (Tangé 1962). This is held like a pen (Fig. 3) and enables the surgeon to excercise a more delicate finger control which is not found in the conventional type of instrument.

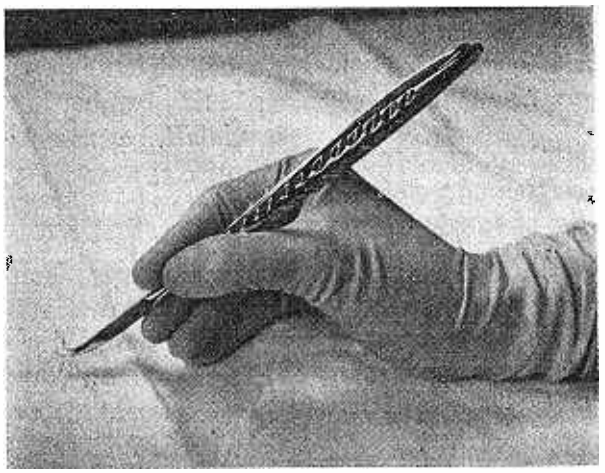


Fig. 3. A specially designed Tangé needle holder which is held like a fountain pen. With this unorthodox instrument all the finer movements are controlled mainly by the fingers and not at the wrist.

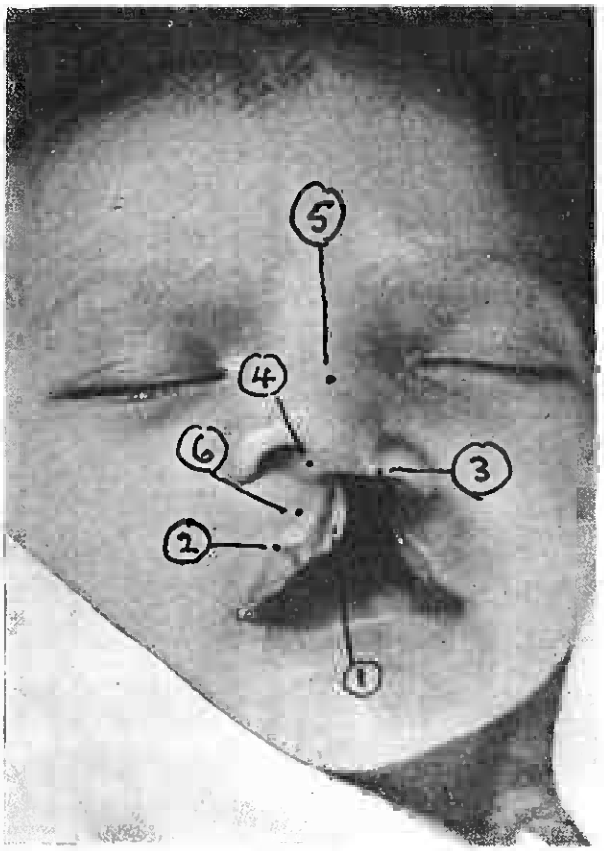


Fig. 1. A 2 weeks old Indian baby with a complete unilateral cleft lip. 1. Alveolus 2. Cupid's bow 3. Nostril rim 4. Columella 5. Bridge of nose 6. Philtrum.

Figs. 2a. & 2b. Patient had a repair of a complete unilateral cleft lip elsewhere. A straight line closure was used. Note absence of a pout giving an unnatural profile. The lip was brought together under much tension as evidenced by the prominent stitch marks. The Cupid's bow is destroyed.

Fig. 4a. **A newborn** with a severe degree of complete unilateral cleft lip. Operation done when patient was seven days old. The nose was also repaired during the primary operation.

Fig. 5a. Cleft lip in Indian **infant** age 1½ years. Note the lip on the medial side of the cleft is pushed forward by the displaced premaxilla.

Fig. 4b. Photograph taken 10 months after surgery. Note preservation of the entire Cupid's bow and the symmetrical nostrils. The slightly thickened vertical scar will be revised when the palate is repaired.

Fig. 5b. Photograph taken 4½ years after operation.

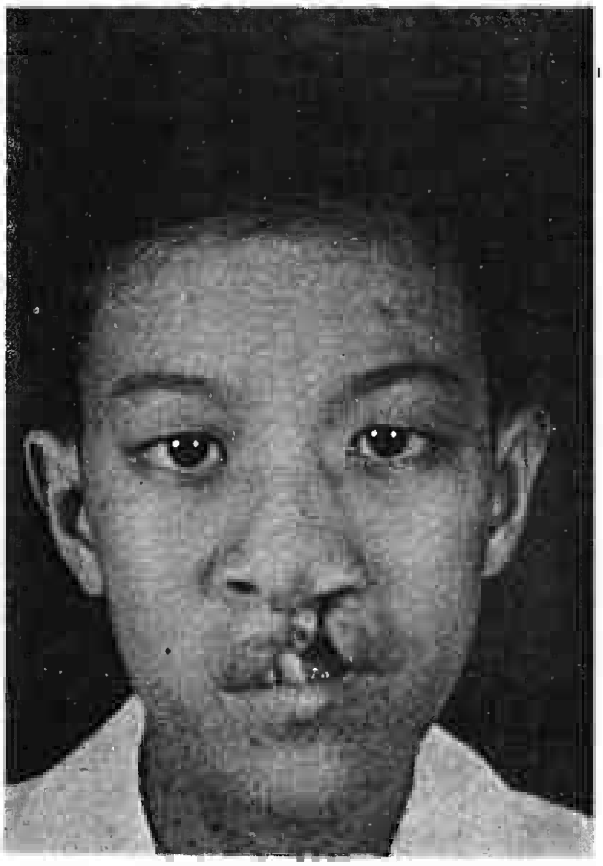
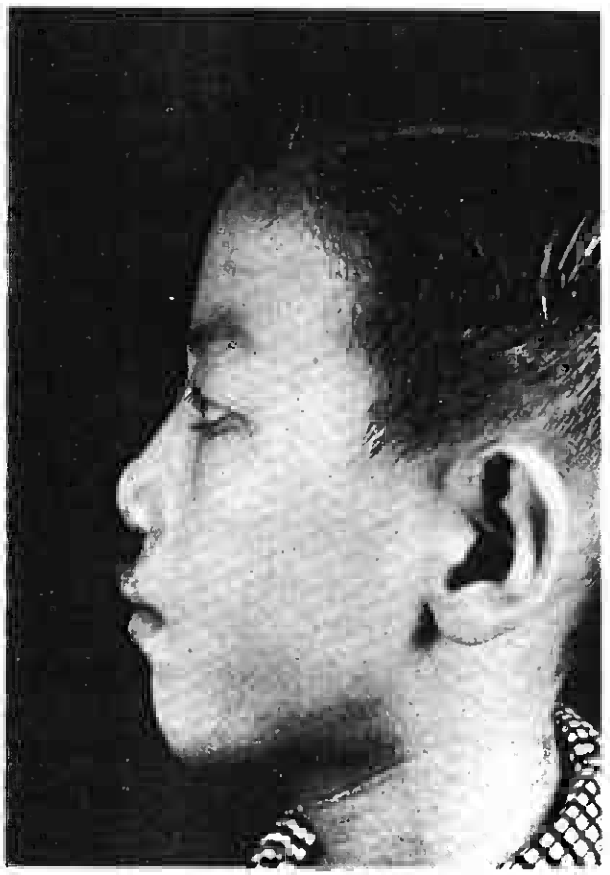


Fig. 6a. Unilateral cleft lip in a boy age 12 years. The Cupid's bow is not well defined. The nasal tip is also depressed.



Figs. 6b & 6c. Photographs taken 1 year after operation. In correcting the nasal tip the bilateral alar rim incision is joined by a transverse incision at the base of the columella. This gives a better exposure of the alar cartilages. Also note the pout which is a feature of every normal lip.

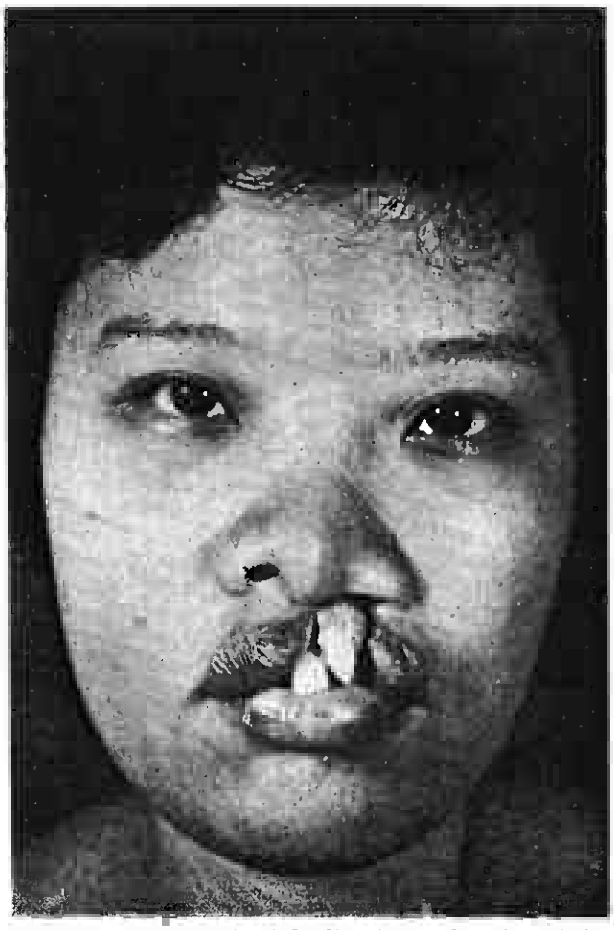


Fig. 7a. Unilateral cleft lip in a female adult age 25 years. Note the thick vermillion and marked displacement of the premaxilla. All her teeth are in good condition. Also note that the lower part of the bridge of the nose is swung like a pendulum away from the cleft.

Fig. 7b. Photograph taken 2 years after surger A vermillionectomy was done 6 months after tl primary repair to produce a better looking upp lip. Note that the lip is full and loose having normal forward thrust of the lower border. She now engaged to be married.

Fig. 8a. An incomplete cleft lip in a 3 month old infant.

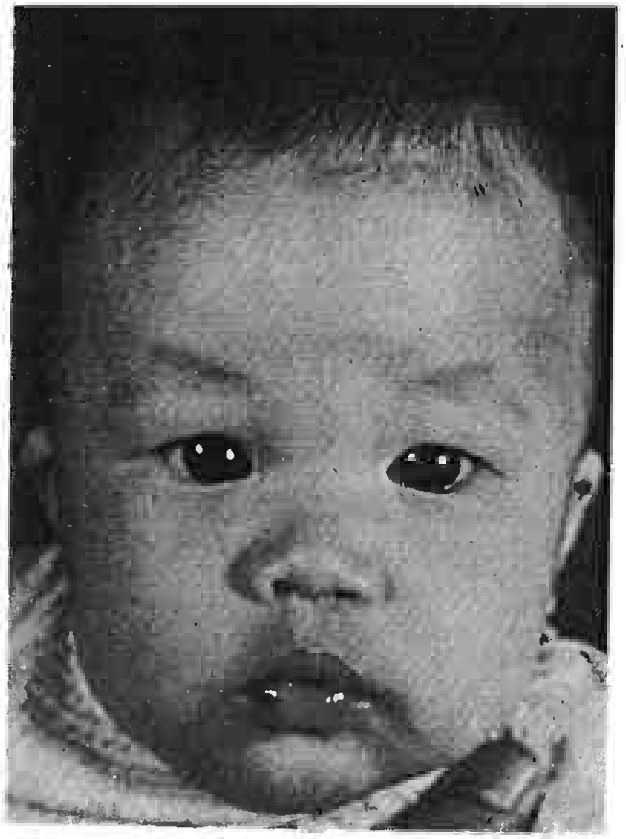


Fig. 8b.

Fig. 8c.

Figs. 8b. & 8c. Photograph taken 4 months after operation. Note preservation of the philtrum. The upper lip retains its normal configuration during muscle action.

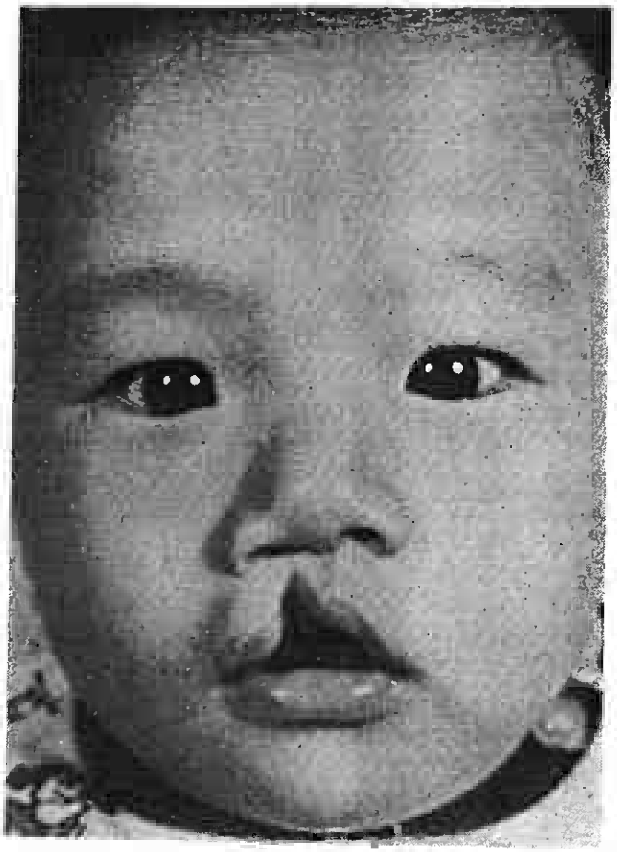


Fig. 9a. An incomplete cleft lip in a 7 months old infant. Note asymmetry of the nostrils with the collumella being displaced towards the normal side.

Fig. 9b. Photograph taken 3 months after operation. Note symmetry of the nostrils and the important Cupid's bow is preserved. The vermillion is smooth and uniform throughout.

Fig. 10a. An incomplete cleft lip in a 14 years old Chinese schoolboy. Note the well marked but disjointed Cupid's bow. The lip on the lateral side of the cleft is slightly longer vertically.

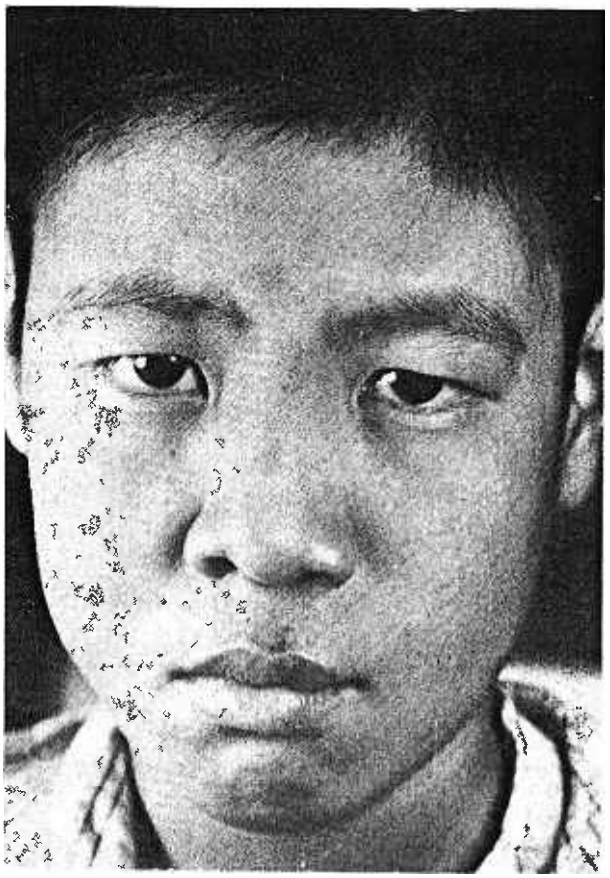


Fig. 10b. Photograph taken 10 months after surgery. During the primary repair a small wedge of lip tissue was removed from under the left nostril to shorten the vertical height of the lip. Note the well formed Cupid's bow.

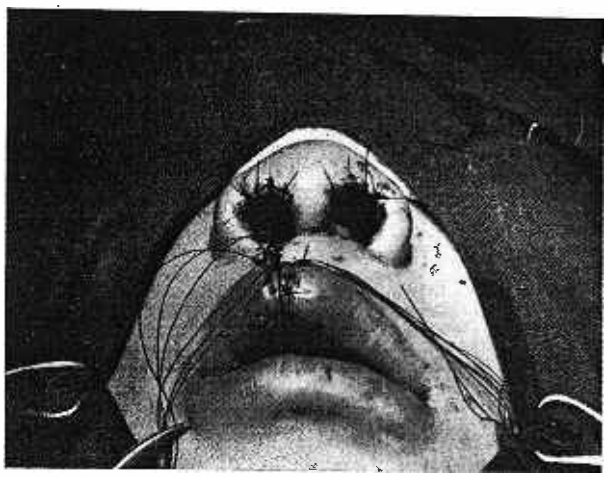


Fig. 11. Photograph taken on completion of primary repair for a right complete cleft lip. The displaced alar cartilage is properly positioned and the nostril floor repaired. Note the symmetrical nostrils.

The associated repair of the nose poses one of the most difficult problems in cleft lip surgery. To do or not to do — that is the question. Plastic surgeons the world over are divided into 2 camps on this question of touching the nose during the primary repair of the lip. The writer is inclined to agree with Victor Veau who wrote, "Our role in the newborn is to create conditions of development as close to the normal as possible." With increasing experience and confidence, we now rotate and advance the displaced alar cartilage during the primary operation so that it is in normal anatomical position relative to its fellow. Thus properly placed, we expect it will grow normally. The nostril floor is also repaired.

In all our cases, we use horse-hair sutures which are left long to facilitate removal. The lip is stitched in two layers. Appropriately placed key sutures take in the skin and muscle layer and the intervening skin is closed with very fine interrupted horse-hair sutures which are removed on the 3rd post-operative day. The Key sutures stay in until the 7th post-operative day. The mucosa is stitched with interrupted 4 - 0 plain catgut. We do not use the Logan's bow, neither do we encourage giving a routine antibiotic cover. However, we pay much attention to wound toilet especially after each feed. As soon as the baby comes round, we give 5% dextrose in half normal saline by a rubber tipped syringe. Hydration is important in the Tropics.

Although nowadays it is possible to restore the lip to very near normal both in function and appearance, there are still many unsolved problems in cleft lip surgery. There is the question of restoring bony continuity of the alveolus (and palate if it is also cleft) by means of bone graft. This problem is being studied by the Continental surgeons. The pre-operative shift of the displaced maxillary segment by mechanical appliancies is receiving the attention of a number of clinics both in the United Kingdom and the United States. Bony movement under these circumstances is guided and predictable and this is designed to give optimal alveolar arch alignment before lip surgery. We are doing our small bit by studying the epidemiology of the cleft lip and cleft palate in this part of the world.

SUMMARY

1. An interesting passage on cleft lip from an ancient Chinese text is translated and documented. This may well be the earliest record of a surgical repair of the cleft lip.
2. The technique of the triangular flap operation as performed in our clinic is described. A specially designed Tangé needle holder is used in all our recent cases.
3. Some of the problems associated with the cleft lip deformity are mentioned.

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魏詠之，字長道，任城人也，家世貧素而躬耕，為事好學不倦。生而免缺，有善相者謂之曰：卿當富貴。年十八。聞荊州刺史殷仲堪帳下有名醫能療之。貧無行裝，謂家人曰：殘醜如此，用活何為？遂齎數斛米而上以投仲堪。既至，造門自通，仲堪與語，嘉其盛意，召醫視之，醫曰：可割而補之，但須百日進粥，不得笑語。詠之曰：半生不得語，而有半生，亦當療之，況百日邪！仲堪於是處之別屋，令醫善療之。詠之遂閉口不語，唯食薄粥。其厲志如此！

晉書第十四冊卷八十五列件八至九頁。