

# CASES ILLUSTRATING ORTHOPEDIC TREATMENT OF SOME OF THE DISABILITIES RESULTING FROM INFANTILE PARALYSIS.\*

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The time allowed for papers is hardly adequate to permit one to thoroughly go into the details of one case, so numerous are the mechano-anatomical facts in any given case and the procedures adopted in the treatment based upon these facts. While the minds of the orthopedic surgeons in the country have been acutely occupied in studying methods and improving old methods to put these lame children on their feet, they have not been so diligent in presenting the results of their work before general surgeons and general practitioners. I am, therefore, presenting to the section just a few cases average in type, since it is better to see a few things than to hear about a multitude.

Everything in life is relative in value. So are the end results in the treatment of the paralytic. We are confronted with lameness and deformity. The general statement holds true that with the exception of paralytic scoliosis one can entirely correct the deformities and greatly decrease the lameness by surgical procedures of orthopedic nature. That the end result is different in each individual case is true, because in each case the paralysis is different in degree in the groups of muscles involved.

Several simple guides are necessary.

1st. The plan of campaign should look forward to the minimum use of, or preferably the entire removal of apparatus.

2nd. To accomplish this operations should be done upon the skeleton which will enable

the skeleton to take the weight load in a way to remove the tendency to relapse after the deformities have been corrected.

3rd. Tendon transplantation and the insertion of silk stays after the method of Lange are of value. However, no tendon transplantation or insertion of silk or other operations upon the soft tissues will hold unless the skeleton be properly balanced.

For example, in paralytic deformities of the feet no tendon transplantation or other work upon the soft structures would hold the correction, unless the skeleton of the foot be corrected at the same time, and this statement in a general way applies to the knee joint and the hip joint.

4th. Accurate skeleton balancing operations remove the necessity of the use of braces in most cases. However, braces have their periods of usefulness. With a skeleton properly corrected and the work upon the tendons and ligaments and fortifying the joints with silk stays having been done at the same time or afterwards, what muscle is left has a chance to work with the weight falling along the normal axial lines. The muscles that are left have a chance for maximum development from use.

5th. Without prolonged post-operative massage and muscle training in the hands of some one skilled in corrective gymnastics, the operations are largely useless; but if these combinations are worked, each one thoroughly, then results are always gratifying, bearing in mind always the relative value of things. In time from use of the limbs something happens which it is difficult to explain. What seemed to be the faintest muscle power becomes much stronger, very useful in locomotion, and muscle power returns oftentimes where one had not the slightest notion that there was any muscle life after the most careful examination.

## DISCUSSION.

Dr. R. Tunstall Taylor, Baltimore: I have been very much interested and impressed by Dr. Hoke's excellent and valuable paper in regard to skeletal remodeling for paralytic foot deformity, but I do

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not believe it is necessary except in the severer cases of distortion. However, in those presenting a definite bony chock of a marked degree to operative correction after either tendon and muscle transplantation or division of the soft parts, I think we can gain more rapid progress, as he suggests, by an osteotomy or excision of parts of the dorsal bones, rather than wait for a physiological bone transformation to meet new static requirements according to Wolff's law by fixative dressings or braces.

It may be of interest in this connection to give briefly my procedure for paralytic deformities of the lower extremities during the past five years (*American Journal of Surgery*, November, 1911), which has proved very satisfactory in several hundred cases. I call it the "Foot Incision Method," and its aim is to have the transplanted muscle or muscles pull in a straight line, to be mechanically more efficient, from its origin to its new insertion.

If we consider the foot theoretically as having three tendons (the peronei) inserted on the outer side and three (the tibialis anticus, porticus and extensor longus hallucis) on the inner side and one inserted in the heel, any paralysis of one of these groups will cause the unopposed overaction of the other two intensified by weight bearing. Thus paralysis of the peronei results in equinus varus, etc.

By transplantation of one or more of the efficient members of an over-active group to the paralyzed side of the foot we expect a restoration of the normal balance and in many instances a restoration of a useful amount of function.

Thus, for example, in a case of talipes equinus varus, after division by tenotomy of the tendo Achilles, my first incision is made at the insertion of the tibialis anticus, a control suture is put in it, and the tendon is divided. Second, I make an incision over this muscle at the shin, where it is becoming tendinous, and pull the freed tendon out of its sheath. Third, at the ankle on the outer anterior aspect I make another vertical incision over the annular ligament and with a mosquito forceps make a new thecal compartment under it to allow the passage of the freed tendon, which is now brought through the adipose tissue to the annular ligament with hysterectomy forceps. The mosquito forceps is then used to pull it under the annular ligament. Fourth, an incision is then made over the insertion of the peroneus brevis and a small section of bone is removed, at which point the tendon, which has been brought down through the adipose tissues from the annular ligaments, is tightly sutured with fine silk, so that all slack in the tendon is taken up and the foot is held in eversion and over corrected. If such bony deformity exists as to prevent over-correction, the method suggested of skeletal remodeling by Dr. Hoke can advantageously be employed.

In talipes valgus paralyticus the reverse procedure is done, using the peroneus longus tendon preferably, etc. It is essential by this method to pass the tendon through the fatty tissues towards its new insertion for nutritive reasons, for the tendon has been withdrawn from its sheath and we wish also to avoid adhesions which would limit new function by traumatizing the periosteum over

which the tendon now passes. A plaster of Paris cast is worn after the operation for four months, during the latter two of which only is the patient allowed to bear weight on the cast and a suitable covering sandal.

At the expiration of this period the patient wears a suitably built-up shoe to prevent a recontracture of the soft parts or a recurrence of the deformity for many reasons.

Dr. Hoke closes: The moving picture is the test of the stability of the work, and since we have been using the moving picture it shows our failures as well as our successes. (Pictures continued.)

This was a paralytic valvus. No moving picture was taken of him, unfortunately, beforehand, but I want to show his end result. (Applause.) There he is walking, and, by the way, that is only two and a half months after he was taken out of plaster. To my mind, the main thing about this work is the skeleton balance. I notice that thing does not work. It has been reported before orthopedic societies for numbers of years.

This (picture) was a paralytic equinus, but those cases are not brought before the association to show the end results. Do they or do they not relapse if you do not balance the skeleton? In my own work I was never satisfied until I began, in 1909, to develop the skeleton balance.

Now, that (picture) is not a perfect end result, but in the paralyzed child, if you can get the foot even that straight and let it alone thereafter and let it walk and develop the muscles, a year or two later that child will be very greatly improved.

This is the woman 34 years old that you saw the slides of. She is lame, of course. Her pelvis is tilted and her thigh muscles are badly damaged. She has very little muscles in the calf, yet she walks quite well without any braces or crutches.

Here is a paralytic club foot. Now, the whole work on this woman occupied but about three months, and one operation was done upon the skeleton, put up in plaster for a month. At the end of that month the second operation was done; she was in plaster for a month, was then given a little massage and muscle training, then turned loose, and this is one year after having been turned loose. You see, she has pretty good poise.

This child was operated on last January. This next picture is the same child. The light was bad the day she came in. You can see the difference in the size of the legs, though she has a very good gait.

Now, this was a child both of whose legs were entirely paralyzed. He came in about six months after paralysis, and you see there the effort to walk after one year of massage and muscle training.

As I stated, something seems to happen to those children if you get their muscles pretty well balanced and massage and exercise them. It really looks as if this was the best she could do with braces at the end of that time. It looks as if new nerve tracts developed. The muscles improve where there is very little power, and in two or three years afterwards you have muscles where you have no idea there would be any muscles.

Of course, she is frightfully lame, from a normal viewpoint, but from a total paralysis being able to get around that good is something.

Dr. John Dunlap, Washington, D. C.: I think the most important part of the work is the muscle training afterwards. A great many of these cases have been done by surgeons who, when the operation was completed, thought the work was done. The work is only started when you have completed your operation. You have got to develop those muscles, otherwise the condition is going to recur.

## HARE-LIP SURGERY—ESSENTIALS IN THE PRODUCTION OF SCARLESS INCISIONS.

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These remarks are confined to the apparently insignificant details usually slighted by the master writers upon the subject of hare-lip and cleft palate surgery. These writers naturally stress the necessity of considering the ultimate results of speech detail and control of bony growths. It seems that within recent years these details have been emphasized at the expense of skin plastic results.

An unsightly lip scar is frequently glaring evidence of the neglect of minor details in successfully obtaining correction of speech defects. It is not the purpose of this paper to do otherwise than emphasize all that has been written by the masters relative to the essentials of lip formation, correction of nostril defect and the like. These details are replete in the literature and have no place in this discussion.

In presenting our method of attempting the scarless incision we present no claim of originality other than systematizing the details of various operators, and trust we may stimulate a renewed attention to the prevention of unsightly scars in otherwise successful corrections of labial defects. We have drawn extensively on the writings of Dr. G. V. I. Brown, of Milwaukee.

### PREPARATORY TREATMENT.

Most cases may well be prepared for post-

operative treatment by education in feeding from the spoon or medicine dropper for several days, and in this manner eliminating post-operative action of the lip and palate muscles. Older children should be taught to cleanse the mouth frequently with mild antiseptic solutions for several days before operation.

Adhesive plaster strips may be applied for several days to coapt the cleft edges, in this manner largely eliminating post-operative tension upon the suture line. The child accommodates itself to a diminished respiratory inlet and becomes accustomed to the presence of the post-operative tension dressings.

### INCISIONS.

The numerous incisions devised suggest the choice of an incision suitable to the peculiarities of the individual case. Wherever possible such incisions should be hidden in the floor of the nostril and should not involve a paring of the mucous membrane. Cases involving the mucous membrane require the careful paring at the exact junction between the mucous membrane and skin with no sacrifice of mucous membrane or skin tissue until the completion of the final sutures. Incisions in the red mucous border of the lip should be made at an acute angle to the white skin line and, if possible, end in a teat-like projection at the center of the lip. A double line in the red border can be evolved with a little ingenuity in cases of double hare-lip.

Paring of the cleft must prepare buccal surfaces of greater area than those on the skin surface. Care in these details obviate the thinning of the lip along the suture line. Conservation of a pared tissue over the cleft edges obviates the production of an unsightly notch upon the corrected labial border. Paring is best performed by a razor-blade instrument supplemented by the angular manicure scissors.

### RELAXATION.

Successful repair of labial defects rests largely upon complete relaxation of tissues. Curved scissors and a blunt dissector loosen