SOME POINTS IN THE TREATMENT OF SEVERE TALIPES.

[With Special Plate.]

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THE object of this paper is to recommend a composite operation for the treatment of severe and neglected talipes.

Before proceeding to describe the operation, a few remarks may be made upon the prophylaxis of paralytic talipes and the early treatment of congenital talipes, for the old proverb that "prevention is better than cure" is very true of deformities. Most deformities are either preventable or curable in their early stages by safe and simple means. If these facts were more widely and thoroughly appreciated, there would be fewer hopeless cripples and far less misery and poverty. Many cripples, now hopelessly handicapped in the struggle for existence, would be useful members of society. The ignorance that prevails concerning the proper treatment of congenital talipes is appalling. The parents are commonly told that it is of no use commencing treatment until the child is several months old. The most hopeful time for treatment is thus allowed to pass, and deformities, which are curable by manipulations and simple splints in the first few weeks of life, are allowed to become serious and more or less intractable. Paralytic talipes develops so insidiously that it may appear to be inevitable, whereas it is mostly preventable by simple means. The value and importance of suitable instruments designed to prevent over-stretching of the paralysed muscles and fibrous retraction of their antagonists are not sufficiently realized. The surest way of completing the paralysis of a weak muscle is to over-stretch it, and one of the most important conditions of its recovery is the avoidance of excessive tension.

There is a current belief that instruments of all kinds do not aid but hinder the restoration of function of the paralysed limb. This is by no means true of suitable instruments, provided that their use be combined with well-planned exercises designed to develop the weak muscles, and manipulations for stretching muscles that tend to retract. Too much faith is placed in massage and electricity. They certainly tend to maintain the nutrition of the weak muscles in the early stages of paralysis, but their good effect is often more than neutralized by the neglect of the other and better means which have been already mentioned.

After the talipes has been more or less corrected by simple operation, recurrence and increase of the deformity is exceedingly common because of the want of care in the after-treatment. Without this care operations and instruments are more or less wasted. The after-treatment of hospital patients is peculiarly difficult because of the trouble and expense of getting suitable instruments. The patients often fail to attend regularly for various reasons; they may not take a sufficient interest in their condition; circumstances may make it impossible for them to keep their instruments in repair, and frequently they reappear only when their deformity is obviously getting worse.

Bearing these difficulties in mind, I believe that the operations for talipes in common use are not radical enough. Too much is expected from tenotomies and similar tinkering measures, and too much is left to the after-treatment, especially with hospital patients. It should be our endeavour to anticipate the well-known tendency to recurrence, and to design our operations accordingly, making the patient as independent as possible of prolonged after-treatment by instruments. Such operations need not be mutilating in any sense of the term. On the contrary, they should restore both the shape and function of the foot as far as possible. The false conservatism that prevails may be a survival of pre-septic days when it was dangerous to perform extensive operations for talipes. The operation which I am about to describe is suitable for neglected cases. It is even applicable to severe deformities, which are often regarded as unsuitable for operation other than amputation. For these late cases it is particularly important to secure a

free range of movement, especially of the ankle-joint. This is essential for the development of the muscles which have degenerated as a result of over-stretching and inaction. It is astonishing to notice the recovery of function that may follow the provision of a free range of movement, and the relaxation and exercise of the over-stretched muscles. With time I have gradually learnt to combine a variety of methods in order to be more certain of getting good results, which depend upon the cumulative effect of the various procedures. Some of the steps and precautions may appear trivial in themselves, but the best results are obtained only by making use of every available means. The operation recommended for severe talipes equino-varus may be described first, and the various procedures and modifications of them may then be discussed.

Operation.

The leg and foot are cleansed with the most scrupulous care. A general anaesthetic is given. The leg and foot are elevated for a few minutes, then a tourniquet is applied round the lower third of the thigh, the skin being protected with lint. The tense plantar fascia is divided subcutaneously. The ligaments below the medio-tarsal joint are similarly divided through a puncture placed below the inner side of the joint; meanwhile the fore part of the foot is forced upwards and outwards. An incision about three or four inches long is made in the groove internal to and in front of the lower part of the tendo Achillis. This tendon is transfixed in the anterior posterior direction and cleft for several inches, the extent being determined by the amount of equinus. The inner half of it is cut off the os calcis and the outer half is severed obliquely upwards and outwards from the upper end of the cleft. If necessary the tibialis posticus is divided from the wound. The ankle is forcibly flexed as far as possible. If the deformity be incompletely corrected an elliptical incision is made over the front and outer side of the foot, commencing a little below and internal to the middle of the anterior surface of the ankle and extending downwards, forwards, and outwards nearly to the outer border of the foot opposite the medio-tarsal joint, or about 1 in. behind the prominence of the fifth metatarsal bone. The width of the piece of skin to be removed varies in different cases, but it must be just enough to leave no slack when the wound is closed after the bone is removed. The upper and lower edges of the wound are mobilized a little, care being taken not to cut the musculo-cutaneous nerve. The skin is excluded from the field of the operation by means of gauze pads carefully fixed to the edges. A longitudinal incision is then made through all the soft parts covering the prominence of the head of the astragalus. No tendon need be divided. The capsule of the astragalo-navicular joint is then opened and separated from the head and neck of the astragalus by means of a suitable knife carefully used from within the joint and kept close to the bone. When the head and neck of this bone have been fully exposed they are removed by means of a Macewen's osteotome. The section is made more or less obliquely in two senses, both from above downwards and forwards and from without inwards and forwards. In this way the equinus and varus are diminished. A similar longitudinal incision is made through the soft parts covering the fore part of the outer side of the os calcis. The calcaneo-cuboid joint is opened and a wedge-shaped piece of the anterior and outer part of the os calcis is removed. The tibialis anticus tendon is exposed in its sheath and divided close to its insertion into the navicular and internal cuneiform. An attempt is made to correct the deformity, and if this be impossible, some more bone may have to be removed and some ligamentous fibres lying below the medio-tarsal joint may need careful division from within the joint. When the deformity is over-corrected and the foot is held in this position the tendon of the tibialis anticus is carefully sewn to the dorsal aspect of the periosteum of the cuboid and to the tendon of the peroneus tertius. The sutures are not tied until the foot is brought into the over-corrected position, and with the foot still held in this attitude the overlapping ends of the heel tendon are sewn together with fine catgut. The dorsal ligaments attached to the scaphoid and astragalus may be shortened by means of catgut sutures. The wounds are accurately closed, and the foot is covered with antiseptic dressings and firmly bandaged. The tourniquet

is then removed, and the leg and foot are fixed in a comfortable back splint and footpiece, and well elevated.

Comments upon the Various Steps of the Operation.

In commenting upon the various steps of this operation I wish again to lay stress upon the great importance of perfect cleanliness. There is no doubt that it is a very difficult thing to clean the deformed foot satisfactorily. It needs a great deal of scrubbing with soap and water and the use of ether soap or turpentine. This may be followed by painting with iodine, or, better, by soaking in carbolic solution (1 in 20). The toes are carefully covered before the operation is commenced. The tourniquet is very valuable for these cases, for it not only saves blood but also time, and it enables the surgeon to do far more accurate and clean work. There is no need to take the tourniquet off for the purpose of catching up the vessels before closing the wound.

These peripheral vessels are easily controlled by means of firm bandaging over plenty of elastic dressings, provided that the pressure be applied before the tourniquet is removed and the foot be kept elevated after the operation. This also lessens the pain. There are great advantages in taking the steps of the operation in the order recommended. It is sometimes almost impossible to tell beforehand how much may be necessary for the over-correction of the deformity, but by adopting the order suggested it is quite easy to decide this point and to leave off at any stage when the required result has been obtained. For instance, in some fairly severe cases, resection of bone for the correction of the equinus or varus may prove to be unnecessary after the soft parts have been divided in the order described. It must be remembered, however, that it is necessary to over-correct the deformity, and that a comparison with the passive mobility of the opposite foot is often valuable. Nothing less than the normal range of mobility is sufficient. It is easier to divide the plantar fascia and the plantar ligaments efficiently while the os calcis is fixed by the tendo Achillis. It is difficult to divide the plantar ligaments until the arch of the foot is opened out by first dividing the plantar fascia and then forcibly pushing the fore part of the foot upwards and outwards. In bad cases tendon lengthening is more satisfactory than tenotomy, for non-union with flail ankle may follow the latter when the ends have to be separated more than about 2 in. Further, the tendency to retraction after it is much greater than after tendon lengthening, so that it is a matter of common experience that tenotomy may have to be repeated, whereas tendon lengthening, if properly done, is final. After repeated tenotomies the lower part of the tendon is often found to be replaced by broad and thick sheets of adherent and contracted fibrous tissue. The simple method of cleaving the tendon into two lateral

halves is quite satisfactory. For varus the outer half of the tendon is left attached to the os calcis, and for valgus the inner half. Other tendons are often transplanted with advantage. For instance, a part of the tendo Achillis may be diverted into the peroneus tertius or peroneus brevis. The removal of the head and neck of the

astragalus and the fore part of the os calcis is better than the resection of a wedge on the outer border of the foot, because it is more efficient and interferes less with the insertion of tendons, and therefore with the natural functions of the foot. The tarsectomy is usually done too far forward, whereas the head and neck of the astragalus forms the keystone of the arch, so that a limited and oblique resection produces a very striking degree of correction of the deformity (see Figs. 1 and 2, and 7 and 8). The mobility of the medio-tarsal joint need not be seriously interfered with if care be taken to preserve the articular cartilage of the

navicular and cuboid, and to adopt massage and movements in the after-treatment. Complete astragalectomy is not nearly so efficient in correcting the deformity, and it has the serious disadvantage of shortening the limb. This is especially to be avoided when congenital talipes is unilateral, and in all paralytic talipes in which the paralysed limb is already a good deal shorter than its fellow. In my experience, the removal of the head and

neck of the astragalus and the fore parts of the os calcis is far more efficient in correcting the varus than taking a wedge from the side of the body of the astragalus within the ankle-joint. Moreover, the method which I have described does not interfere in the least degree with the mobility of the ankle-joint, which is the most important joint to preserve in the foot. It may be said that the foot is shortened by the operation which I have described, but this is not true, as shown by the actual measurements taken before and after operation. The removal of bone from the convexity of the arch, and the division of the

plantar fascia and plantar ligaments, allows the arch to open out so much that the foot is lengthened. Malleotomy is apt to disturb the stability of the ankle-joint.

Modifications.

When the deformity is the extreme equino-valgus so often seen in infantile hemiplegia, the incision is a longitudinal one over the prominence of the head of the astragalus, and only the head and neck of the astragalus need be removed. The section of the bone is oblique, so that the base of the wedge removed is above and internal, instead of above and external as for the correction of equino-varus. It is not wise to remove any of the os calcis, for this would exaggerate the valgus deformity. In certain paralytic cases an attempt may be made to get bony union between the astragalus and navicular, the os calcis and the cuboid. In these cases, therefore, it is an advantage to

Fig. 5.—N. W. Side view after operation. Note the scar on the front and outer side of the right foot a little below the ankle. The left foot was not so severely deformed, only requiring tenotomies.

Fig. 6.—N. W. Front view after operation. Note the slight over-correction of the deformity.

DESCRIPTION OF SPECIAL PLATE.

Fig. 1.—I. R. Severe talipes equinus, cerebral monoplegia. Note the length and obliquity of the fore part of the astragalus and the elevation of the heel.

Fig. 2.—I. R. The foot shown in Fig. 1 six weeks after operation. The head and part of the neck of the astragalus have been removed and the heel tendon lengthened. It was not necessary to excise a portion of the os calcis, and the articular cartilage is preserved. Note the gap between it and the astragalus, and the correction of the deformity. The anterior group of muscles have gained power, and the range of voluntary movement is extensive.

Fig. 3.—N. W., aged 26. Side view before operation. Progressive and extreme talipes equino-varus due to spina bifida. Note the bunions and corns.

Fig. 4.—N. W. Front view.

Fig. 7.—N. W. Talipes equino-varus due to spina bifida. Side view. Note the extreme equinus and cavus. The patient was bedridden from sloughing sores under the heads of the metatarsal bones. Note the bending downwards of the head and neck of the astragalus.

Fig. 8.—N. W. After excision of the head and neck of the astragalus and the fore parts of the os calcis, lengthening of the heel tendon, and so on. Unfortunately the picture is not taken from the same side of the foot as Fig. 7.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 7.

Fig. 8.

remove the articular cartilages of the navicular and cuboid and to take particular care to get and to maintain accurate bony apposition. When the tibialis anticus is completely paralysed it is hardly worth while to transplant it, and in certain patients who have been already submitted to multiple tenotomies for congenital talipes, the tendon may not be long enough for transplantation into the cuboid, but the gap may be bridged by means of silk threads.

For the accompanying illustrations of two of my cases I am much indebted to the photographer at Guy's Hospital.

A CASE OF WRY-NECK FOLLOWING INFANTILE PARALYSIS: TREATMENT: RESULT.

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THE following case of torticollis I hope may prove of interest in that the etiological factors concerned can be stated with reasonable certainty, and that it illustrates the importance of after-treatment in maintaining, and even increasing, the benefits derived from surgical interference.

N. H., a girl aged 12, was brought to me in November, 1909, suffering from deformity of seven years' standing. Her condition at that time is well shown in the accompanying photographs (Figs. 1 and 2). The head was markedly deflected to

Fig. 1.—Front view before treatment. Note the shortened sternum on left, and facial atrophy on right side.

Fig. 2.—Back view before treatment. Note elevation of left shoulder, curvature of spine, shortening of left leg, and partial obliteration of gluteal fold.

the left, owing to shortening of both heads of the sterno-mastoid; and there existed considerable facial asymmetry, the cheek muscles, and even the jaw-bone, being under-developed on the right side—that is, on the side opposite to the contracture.

This much was visible to the casual observer, but a complete examination revealed further deformities which a clever dress-maker had more or less successfully concealed. An effort of Nature to keep the eyes as level as possible had resulted in the raising of the whole shoulder-girdle on the left side, with accompanying hypertrophy of the trapezius. The cervical spine was convex to the right, and compensatory curves existed in the dorsal and lumbar regions. Nor was this all. The left leg showed 2 in. of relative shortening, principally above the knee, and the circumference of the thigh muscles was about the same amount less than that of their fellows.

History.

The history of the case, as given by the parents, ran as follows: The child, born perfect in every way, had completed her fifth year before anything wrong was noticed in the neck and face. About this time she began to carry her head somewhat on one side, a tendency which increased as she grew older. *Pari passu* there occurred a gradual deformity of the face, until finally the appearance shown in Fig. 1 was reached.

The parents were inclined to blame a fall on the head for the disfigurement, and it was only after careful questioning that I was able to elicit an account of the attack of infantile paralysis, which I believe to have been the real cause. It appears that shortly after her fourth birthday—that is, nearly a year before attention was called to the neck—the girl suffered from an attack of "fever"; and when, after a few days, the "feverishness" passed off she was found to have almost lost the power of walking. This was put down to general weakness consequent on her lowered condition, and as she soon began to improve, medical aid was not called in. Later on, the parents noticed

that the left leg was shorter than the right, but it does not seem ever to have occurred to them that the child had had anything in the nature of a "stroke."

I concluded that the shortened sterno-mastoid, the facial atrophy, and the under-development of the left leg were all due to one and the same cause—namely, an attack of paralysis of lower neurone type occurring about the age of 4. The fact that the muscle on the right side, over-stretched though it was, nevertheless reacted fairly well to the faradic current, made me hopeful that a good permanent result might be obtained by suitable measures.

Treatment.

An extensive open tenotomy was performed, in the course of which it was found necessary to divide the whole of the clavicular as well as the sternal attachment of the sterno-mastoid. No fixing apparatus was used, but during the healing of the wound the child lay with a sandbag on either side of the head. Within a month I commenced gentle faradic stimulation of the muscles on the right side, and in another fortnight the patient was allowed up. Faradization was continued for three months for about ten minutes twice daily, and was directed not only to the sterno-mastoid but also to the trapezius and to the atrophied cheek muscles. At the same time suitable exercises were prescribed, and I directed the parents to see that these were kept up for some years.

Figs. 3 and 4 show the condition six months after the operation. The possibilities and limitations of such cases are well illustrated. The permanent curve of the cervical spine causes the head to slant towards the right and the shoulders have an unequal appearance. Nevertheless, a comparison of Fig. 4 with Fig. 2 will show that the scapulae have been levelled and that the dorsal and lumbar scoliosis has almost vanished.

Infantile paralysis as a cause of wry-neck does not seem

Fig. 3.—Front view after 6 months' treatment. The face is unfortunately slightly blurred, but still the photograph shows less asymmetry than in Fig. 1.

Fig. 4.—Back view after treatment. Shoulder blades are now level, and spinal curvature absent, except in cervical region.

to have received the attention it deserves. Many standard textbooks do not even mention it in their account of the etiology of torticollis. That it was the determining factor in the case above described there can, I think, be no reasonable doubt; and I have personally come across three other instances in which the history and appearance pointed to a similar origin, although corroborative evidence in the shape of an affected limb was lacking.

A mild attack, which would leave a limb practically as useful as before, may have serious consequences if it damages the spinal accessory and other cranial nerves. A comparatively trifling loss of power in the sterno-mastoid of one side can, by a slow but sure process, produce permanent deformity. By reason of its weight and anatomical position at the top of the vertebral column, the head is susceptible to the slightest change of tone in its supporting muscles; and a lateral deviation, once started, tends to progress at an ever-increasing rate. It is probable that in most cases, as in the one under discussion, the fault is due to over-action of sound muscles; but it is also possible that here, as elsewhere, fibrous degeneration and contractures on the injured side are sometimes responsible. The imperfect development of part of the face is no doubt the result of degenerative changes in certain neurones of the facial and trigeminal nerves, being in fact exactly parallel with the wasting of an arm or leg from similar lesions in the spinal cord.

The principles governing prognosis and treatment in a case of torticollis due to lower neurone palsy are identical