

LECTURE IX.

TALIPES.

Talipes Plantaris.—Causes of Talipes.—Treatment.—Indications for.—When to begin.
—How to effect a Cure without Tenotomy.

GENTLEMEN: There is still another variety of the deformity which we have been studying, which must be briefly referred to before passing to the study of the causes and treatment of talipes. It is the form which has been called talipes cavus, but I prefer to speak of it as *talipes plantaris*. I believe that this variety of club-foot is, as a rule, acquired; and that it sometimes results from some other variety already existing, while, at other times, it is the result of direct injury to the sole of the foot.

It is a very frequent complication of other forms of talipes, and consists in a shortening of the plantar fascia, by which the heel and ball of the foot are approximated and the arch exaggerated.

This variety is often mistaken for talipes equinus, and section of the tendo-Achillis accordingly performed. The result is by no means beneficial; the heel is simply dropped to correspond with the anterior part of the foot, and the arch becomes like an inverted U.

CAUSES OF TALIPES.—I do not desire to discuss at length the numerous *remote* causes which have been assigned for the existence of club-foot, and shall only refer to the immediate pathological condition that produces the deformity.

The *congenital forms* are all due to some interference, general or local, with the normal innervation of the part. So much has been generally accepted, but the real nature of this nervous disturbance has been for the most part misunderstood. The prevailing treatment of talipes is based upon the theory that the pathological condition is a spastic muscular contraction. The muscles at fault in any given case have been considered to be those that by contraction would draw the foot into the position which it occupies. Talipes equinus is attributed to a spastic contraction of the gastrocnemius and soleus muscles; talipes calcaneus to the same condition of the anterior muscles of the leg. So in varus, the

tibial muscles, and, in valgus, the peroneals and the extensor longus digitorum, have been considered to be the seat of disease.

The natural therapeutical inference from such a pathological theory was tenotomy, and it accordingly has become a *sine qua non* of treatment.

Now, experiment and observation have fully demonstrated that in the immense majority of cases the pathological change is precisely contrary to that which has been believed to exist. Spastic contraction is the exception, paralysis the rule. The muscles supposed to be in a state of spasm are really contracting with only their normal degree of force, which produces an excessive effect, simply because paralysis of the opposing muscles has destroyed the natural harmony of action which exists between the tractile forces which govern the motions of the foot. I have said paralysis is the lesion, as a rule; I believe, rather, that nearly all cases of congenital talipes, *if examined immediately after birth*, would be found to be paralytic in their nature, and that the spasm, or contracture, found to exist in some cases after a time, is really acquired, and due to irritation or inflammation of the muscles and fasciæ involved, which inflammation is the result of their abnormal position, and consequently secondary to their paralytic cause. Not that I would deny the possibility of such a spinal disease as should cause a tonic spasm of the muscles existing *in utero*; but, if such cases do exist, they must be very rare, and, for myself, I have never seen them.

If any one doubts the paralytic nature of these congenital deformities, let him examine the first case he may meet within a few days after the birth of the child, and he cannot fail to mark the great ease with which the deformity can be reduced and the foot restored nearly or quite to its normal position, if he does not excite reflex contraction by too rapid and violent attempts at reduction.

What has been said above, of the lesion in congenital talipes, is to a great extent true of the acquired form. *Acquired talipes* very generally is due to the various kinds of "infantile paralysis," which are the frequent sequelæ of scarlatina, diphtheria, dention, and many other diseases in which a blood-poisoning exists, or which are attended with great exhaustion. Very many of the cases of this sort give a history of paralysis that originally

involved the whole of the lower extremities, and frequently the upper.

Some cases of acquired talipes, however, are not paralytic in their character: these are occasional cases dependent upon diseases of the spinal cord, in which treatment can be of little use while the originating disease is uncured; cases following direct injury, which has caused inflammation and subsequent shortening and rigidity of muscles and fasciæ; and certain cases in which acquired spastic deformities are added to the paralytic ones previously existing. This last is a very common condition of things, and doubtless has been the chief cause in prolonging the belief in the spastic origin of most of these deformities.

To apply these principles to special varieties of talipes, we must look for the seat of the disease, *not* in the muscles on that side of the leg *toward* which, but on that *from* which, the foot is distorted. In equinus, instead of the gastrocnemius and soleus being spastically contracted, the anterior muscles of the leg are paralyzed. The paralysis is often so extensive, that the only muscle retaining contractility is the extensor proprius pollicis, which, acting alone, at length produces a subluxation of the great-toe. (See Fig. 18.) In calcaneus, the gastrocnemius and soleus are paralyzed; in varus, the peroneals chiefly; in valgus, the tibials, and perhaps the long flexor.

The seat of talipes has always till recently been supposed to be at the ankle-joint. If the ideas expressed in our former lecture, when describing the anatomy of the ankle-joint, concerning the motion possible at the astragalo-tibial articulation, are correct, then the only forms of talipes that could concern the ankle-joint are those where the heel is raised or dropped, equinus and calcaneus. Examination of cases of so-called equinus will satisfy any one that in them (with the exception of the few acquired cases having their origin in a traumatic contraction of the soleus and gastrocnemius) the heel is little if at all removed from, and can easily be restored to, its normal relation to the axis of the limb, there being really a dropping of the anterior portion of the foot; and that, as in varus and valgus, the deformity takes place at the medio-tarsal junction. The deformity of calcaneus, which is dependent upon paralysis of the above-named muscles, does occur at the ankle-joint, and this I believe is the only variety of which this is true.

A further anatomical reason for the truth of this statement regarding the seat of deformity is this: Of the twelve muscles of the leg which move the foot, nine, namely, the tibialis anticus, extensor proprius pollicis, extensor longus digitorum, peroneus tertius, flexor longus pollicis, flexor longus digitorum, tibialis posticus, peroneus longus, and peroneus brevis, have their insertion anterior to the medio-tarsal junction, and but three—the gastrocnemius, soleus, and plantaris—posterior to this articulation, these three muscles having a common insertion, by means of the tendo-Achillis, into the os calcis. It follows, as a matter of course, that any deformity dependent upon an abnormal condition of these three muscles, must have its seat at the articulation moved by them, namely, the ankle and the calcaneo-astragaloid articulation; and that, if any of the other nine muscles be affected, the resulting distortion will be anterior to the medio-tarsal junction.

This inference, drawn from the anatomy of the foot, will be practically confirmed by the observation of the cases which I shall have frequent opportunity to present to you. It is a matter worthy of remark how flat a denial is given to the statements of many standard works upon orthopedic surgery by the cuts with which these very works are illustrated—the description being made to accord with a false theory, and the illustrations being copied from the really-existing deformity.

The *vertical* displacement taking place at the medio-tarsal junction is shown in Fig. 54, which is a reduction from a tracing made by laying the foot upon a piece of paper and carefully carrying a lead-pencil around its contour.

The *lateral* divergence is readily shown by tracing upon a piece of paper the outline of the sole of the first case of varus that presents itself, and comparing the tracing with that of the opposite foot, if it be sound, or with that of any normal foot of similar size. You will find that the deformity does not consist in a twist at the ankle-joint, by which the toes are thrown inward and the heel outward, but that the flexion occurs at the arch of the foot. The heel and posterior part, about one-third of the deformed foot, will coincide with that of the normal one, while the anterior part turns suddenly inward at the middle of the tarsus. (See Fig. 30.)

The resultant complications of talipes are: the effects of in-

flammation or irritation; defective nutrition of the foot and leg; and the effects of pressure in changing the bony structure.



FIG. 30.

Inflammatory action is sometimes set up in the muscles as the result of direct injury; this is very frequently the case with the fasciæ and integuments in the sole of the foot. The result in either case is a permanent shortening of these tissues, which become then one of the first obstacles to be overcome in the treatment. But *contracture* is produced in another way. The muscles that have remained sound, if unirritated, contract only with a normal degree of force; but a constant source of irritation is found in the malposition of the foot. Pressure being made in abnormal directions, and upon surfaces not prepared for its reception, especially if inflammation has heightened the sensibility, causes frequent reflex contractions of the muscles. *Contracture* is the physiological result of this *prolonged contraction*.

The effect of talipes, in preventing proper nutrition, is seen in the atrophy of the leg, or entire limb, the smaller size of the foot as compared with its fellow, as well as its lowered temperature and livid color. The atrophy of the leg is due to the paralysis of one set of muscles, and the gradual wasting of the sound ones, from want of the exercise necessary to keep them in proper condition. The same want of exercise will partly account for the arrest of growth in the foot, but mainly it depends upon the diminution of the supply of arterial blood sent to the part, and

the obstruction of the return of the venous blood, caused by the malposition of the vessels of the foot. A hose will carry water a given distance with a certain force applied, when the tube is straight and unobstructed; but the same hose, with the same amount of force, will carry the water a much shorter distance if the tube be bent at an acute angle, and particularly if these angles be increased in number. So an artery, supplying any part, will do it better when in its natural position than it can do when bent around a bone, or bent upon itself, which partially closes its calibre, and by abnormal pressure diminishes the amount of blood flowing through it, within a given space of time. The veins also, by this distorted position, are prevented from returning the blood as freely as natural, thus causing all deformed feet to present the blue and cold appearance spoken of above as so characteristic of them, which is the result of venous congestion.

Moreover, when the disease is allowed to continue till adult life, an actual deformity of the bones of the tarsus occurs. Not only is the normal relative position of the bones changed, but the long-continued pressure in the new position brings about eventually a change in their articular facets. The weight of the body upon these deformed feet aggravates the deformity, till the foot becomes a misshapen mass, covered with callosities, and is sometimes quite inadequate to sustain the body without artificial assistance. Locomotion becomes laborious, painful, or even impossible. We sometimes meet adults with deformity of so grave a character as to make amputation and the use of artificial feet a beneficial change.

Whenever the deformity has proceeded to the degree of altering the shape of the bones, we can hardly hope for a perfect cure; for, however carefully and frequently the deformity be corrected, the bones cannot fail to return to the new articulations which have taken the place of the normal ones, if the artificial means of retention be removed.

TREATMENT.—We are now ready, gentlemen, to study the treatment of talipes.

From the characteristics of talipes above given, namely, the malposition and defective nutrition of the foot, it follows that the prime indications for treatment will be—

1. To restore the foot to its normal position.
2. To assist the nutrition by all the means within our reach,

such as heat, friction, motion, galvanism, injection of strychnine, etc.

Proper treatment should fulfill both these indications; many plans have been proposed that met only the former, and consequently the success attending them has been incomplete. The second can hardly be accomplished at all if the first be neglected.

First, then, of the means to be employed for restoring the foot to its normal position. Whatever method of treatment you decide to adopt, there is an important principle which should govern its application, and this must be taken into consideration at the very outset. The principle is, treatment of congenital club-foot should begin *at birth*. This principle has already been laid down in my book upon club-foot; but, as proof that it has not been announced with force sufficient to attract the attention it justly deserves, I may mention that I have this day received a letter from a very distinguished physician of this city, containing an inquiry with regard to the proper time to commence treatment in this class of cases. *Treatment of these cases should be commenced the instant the child is born.* The busy practitioner may, perhaps, be excused if he shall first see that the third stage of labor is completed, and the necessary duties of the lying-in chamber discharged, but, as soon as these duties are discharged, the feet of the child should receive attention, and the proper treatment be instituted before the medical attendant leaves the house. In cases of *acquired* talipes, the rule is equally important, and treatment should be commenced *immediately upon the receipt of the injury*. Every day, week, or month, that treatment is neglected, diminishes the chances of its success when finally resorted to.

In congenital talipes, if treatment is begun at birth, we may reasonably expect that, by the time the child is old enough to stand, the feet will be so nearly in the normal position that the attempt at walking will complete the cure, rather than aggravate the case, as it will do when treatment has been neglected. In a large majority of cases, if proper attention is paid to the correction of the deformity, from the birth of the child onward, the foot can be made to maintain the normal position without the aid of tenotomy. The importance of this rule and its observance can be seen at once, if for a moment we refer to the most serious obstacles which stand in the way of successful treatment of talipes. The most serious difficulties are those which arise from

the following conditions: 1. Advanced stage of fatty degeneration in paralyzed muscles, due to prolonged neglect of the performance of their normal function; and, 2. Effects of inflammation produced in the muscles and fasciæ by the irritation from walking with the feet in an abnormal position.

Both of these difficulties could be avoided, or greatly diminished, by early attention to the case. This principle of early treatment appears to have been recognized by Hippocrates, who applied proper bandages immediately after birth, in cases of congenital talipes. Why this sound practice should ever have fallen into disuse, it is impossible to say; but certain it is that it was neglected to such an extent that, in the surgical text-books of fifty years ago, the subject is hardly referred to (a slight mention in Bell's "Surgery" is the only reference that I can find in any of the books of that date at my command); and, in practice, so little was done for the cure of club-foot, that within a quarter of a century it was extremely common to meet persons who had all their lives endured this deformity, without ever having undergone any treatment for its relief.

How can the deformity be cured without the aid of tenotomy?

The best means of cure would be constant manipulation, and the retention of the foot in a proper position by the hand of an attendant. This, however, is unfortunately an impossible plan of treatment, although I have known cases in which a faithful nurse has very considerably diminished the deformity by constant handling. No instrument can ever have the delicate adjustment, the nice application of power, without doing injury, which the human hand possesses; and the degree to which any apparatus approximates the hand in these respects is the measure of its excellence.

Still, much can be done by the hand before the dressing, or instrument which may be selected, is applied, or during the intervals when it is removed for readjustment. The manipulation should be made in the following manner:

Take the foot in the hands and rub it gently with a shampooing motion. Hold it firmly in the hands, and gradually press it as nearly as possible into its normal position. While this is being done, the foot becomes quite white. When the limit of the patient's endurance is reached, the foot should be allowed to fall back as it was before, and to rest for a few minutes. The operation should then be repeated, and after several repetitions it will

be found that, with very little discomfort to the patient, the foot can be brought nearly, or quite, to its normal position. The manipulations should not be continued so long, or used with so much force, as to excite inflammation or reflex contraction.

Again, the foot should never be retained, by any dressing, any nearer to a normal position than can be done *without* endangering free circulation. When, therefore, you apply the first dressing, you may not be able to restore the foot to its normal position, but must be content with a partial restoration, one which will permit a free and unobstructed circulation in the parts.

At the second dressing, the foot can be restored still nearer to its normal position, and yet permit free circulation; and thus you will go on, step by step, until complete restoration has been obtained.

If the foot is restored at once to its normal position and held there by some apparatus, regardless of a free circulation (indicated by the color of the toes), sloughing will probably supervene, and your treatment will be delayed for a considerable time. The shampooing friction of the muscles should be very thoroughly applied, and, in addition, they should be lightly whipped with the fingers transversely to their fibres. If a muscle be struck so that the blow falls in the direction of the fibres, the contraction produced is far less than if the blow be received transversely; the object being to awaken the paralyzed muscles to action, the latter method is far preferable. These manipulations, by drawing a large supply of blood to the part, very much increase its nutrition. They should be repeated daily if possible, and I consider them of so much importance that I greatly prefer those forms of dressing which do not interfere with these and other kinds of accessory treatment.

LECTURE X.

TALIPES.

Treatment (continued).—Methods of Dressing.—Splints.—Adhesive Plaster.—Barwell's Apparatus.—The Author's Club-Foot Shoe.—Crosby's Substitute for the Shoe.—Neil's Apparatus.—Case.—Talipes Varo-Equinus.

GENTLEMEN: To-day we will continue our study of the treatment of talipes by describing some of the methods of dressing that may be employed for correcting the deformity without having recourse to tenotomy.

To describe in detail the various plans which have been suggested would occupy too much time. I shall mention only the principal ones, which are really valuable, and, as briefly and clearly as possible, point out the indications for, and objections to, each plan.

The simplest of all is the ordinary *roller-bandage*. If the patient be taken while the case is yet recent, by bringing the foot as near its proper position as possible, and carefully bandaging it to retain it there, and by constant observation and readjustment of the dressing, a cure may sometimes be effected. There are very considerable objections to this plan of treatment, viz.: it is applicable to a very limited number of cases; it is very liable to get out of order, and therefore demands constant care; it has, moreover, an objection, in common with all which permanently cover the limbs by bandages, or splints, that it interferes with the necessary application of frictions and galvanism.

The *gypsum bandage* possesses the advantage over the last plan that it does not change its form; the limb is as securely locked as in a vice. In the details of its application, quite a considerable variety exists—some preferring to first bandage the limb, and then to cover the bandage with the gypsum mixed with water; others, to fill the meshes of a loosely-woven cotton roller-bandage with the dry powder, and to moisten it after it has been applied; and others, again, to make from woolen or cotton cloth a covering to fit the leg, and to apply to this the plaster. These varieties are, however, immaterial; the property which gypsum possesses, of "setting" when wetted, is the essential one to bring into operation. The objections to this plan are, the weight of