A lecture on loxarthrus, or club-foot / by Thomas D. Mütter.

A LECTURE

ON

LOXARTHRUS, OR CLUB-FOOT.

BY

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PHILADELPHIA:

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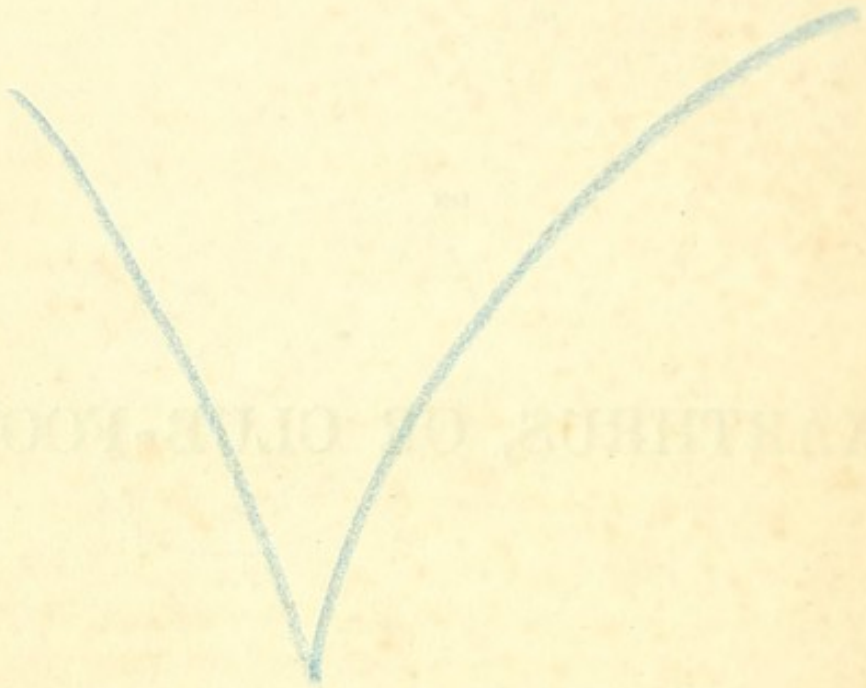

ERRATA.

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LECTURE

ON

LOXARTHRUS, OR CLUB FOOT.

GENTLEMEN:

Among the various deformities to which the human frame is liable, there is probably none of more interest and practical importance than the one that forms the subject of this morning's lecture. Producing great physical inconvenience, while, at the same time, the defect is obvious to every eye, and subject often to the idle and ill-natured remarks of the thoughtless and heartless, we find that at all periods and in every land, it has attracted the attention of the profession; and surgeons, from Hippocrates down to the present day, have considered its pathology and treatment among the most interesting questions of the science. Notwithstanding this, it remained for the present age to witness the promulgation of the only true exposition of the nature of the deformity, as well as the application of its appropriate remedy.

To Thelenius, Michaelis, Reiche of Magdeburg, Meyer of Wurzburg, Holscher of Hanover, Haess of Strassburg, Dieffenbach of Berlin, Pauli of Landau, Delpech of Montpellier, Duval of Bordeaux, Bouvier of Paris, Little of London, Whipple of Plymouth, and especially to Stroymeyer of Hanover, are we indebted for the most important contributions to this department of orthopedic surgery; contributions which I may with safety assert, have

rendered the treatment of *club foot*, as simple and as efficacious, as that of any other remediable disease!

The term *club* or *twisted* foot, is applied to every case in which the foot rests upon the ground, on any other portion than its sole! From this definition it would seem that an almost endless variety of the deformity might exist. The observations of those who have devoted much time to the study of this subject, however, have shown that but *three distinct species*, each of which presents several varieties, are to be met with.

In the *First.* The foot rests upon its *outer* edge, and is directed inwards. This constitutes what the ancients termed *Varus!*

In the *Second.* The foot rests upon its *inner* margin, or a portion of it, and is directed *outward.* This was named by the older authorities *Valgus!*

In the *Third.* The heel is drawn up, and the foot rests either upon the *extremities* of *the toes*, or its *edges* just above them, or upon its *ball.* This defect, from its fancied resemblance to the foot of the horse, has been called "*Pes Equinus*, or *horse foot!*"

Each of these classes includes three or four varieties, the characteristics of which depend upon the degree of deviation of the foot from a normal condition, and will be pointed out to you, after we have considered the *causes* of club foot in general.

CAUSES.

Club foot may exist before birth, or it may be occasioned by causes operating subsequently! To the first we apply the term *congenital;* the second is called *accidental* or *acquired!* With regard to the congenital *predisposing* causes, it must be confessed very little is

known. Some have attributed the deviation to a bad position of the fœtus in utero; others to hereditary predisposition; others, as Duverney, to unequal contractions of the muscles, one set acting more powerfully than the other; others to dislocation of the bones; others, as Velpeau, to a deficiency of Liquor Amnii, as a consequence of which, the uterus contracts forcibly upon the child, and thus causes a more than usual degree of *flexion* of the feet; while Ambrose Paré attributes it to the mother's sitting too much *cross-legged!* by which the uterus is pressed upon, and caused to contract *spasmodically*. All of these opinions are but vague hypotheses utterly unworthy your attention; and it is much better for us to confess our ignorance *at once*, than to waste time in idle attempts to explain a phenomenon utterly beyond the ken of man!

The *proximate* or *immediate* cause of most cases of congenital club foot is now, however, pretty well understood, and the discovery of it is probably due to Michaelis. He contends that in almost every case of this defect, the tendo achillis is too short; as a consequence of which, the heel is drawn up, and the sole prevented from touching the ground. This statement is fully born out, not only by the dissections of others, but also by the success of the treatment which has been based upon it.

ACCIDENTAL CAUSES.

The *accidental* causes of club foot are, for the most part, manifest, although the deformity occasionally makes its appearance, when no explanation of its development can be given! Among the accidental causes may be cited contusions of the joints; sprains, luxations,

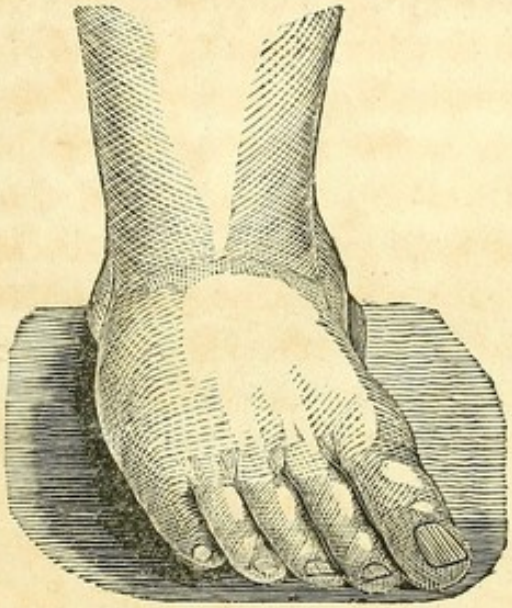
fractures, preternatural laxity of the ligaments, and partial paralysis of the lower extremity. The latter cause is usually confined in its operations to either the very young or the very old; in the *first* it is usually the result of previous convulsion, in the *second* it is an effect of age. The muscles and ligaments being weakened on one side or the other, their antagonists still retaining their vigour, pull the foot towards their points of origin, until at length a complete deviation of the member from its natural position is accomplished. This variety of club is very common among feeble and delicate old persons, and the deviation in almost every instance is *inwards!* It is stated that the celebrated Talleyrand, for the last few years of his life, had his feet so deformed. Sometimes the defect is brought about by individuals who suffer from corns or indolent ulcers about the feet, walking on *one side* of the foot, to save the tender parts from pressure. This becomes in time a fixed habit, and the *muscles*, as well as the other constituents of the *ankle* and *tarsus*, gradually accommodating themselves to their new positions, a perfect club foot may be produced. The gait of an individual who indulges in this habit, becomes of course uncertain and difficult, the centre of gravity of the body being carried considerably beyond the ankle joint, he is obliged to make constant efforts to maintain himself in the erect posture. Finally, diseases of various kinds, as white swelling, scrofula, irritations near the joint, rickets, &c. may cause a deviation of the foot from its natural direction.

You will find, however, that the *acquired* club foot, rarely, if ever, presents the *retraction*, or rather *elevation* of the heel, so constant an accompaniment to the *congenital*. It may exist to a *certain extent*, but it is nothing to be compared with that met with when the

defect occurs at birth. I have met with one or two cases in which the contraction was considerable, but these were exceptions to the general rule.

SYMPTOMS.

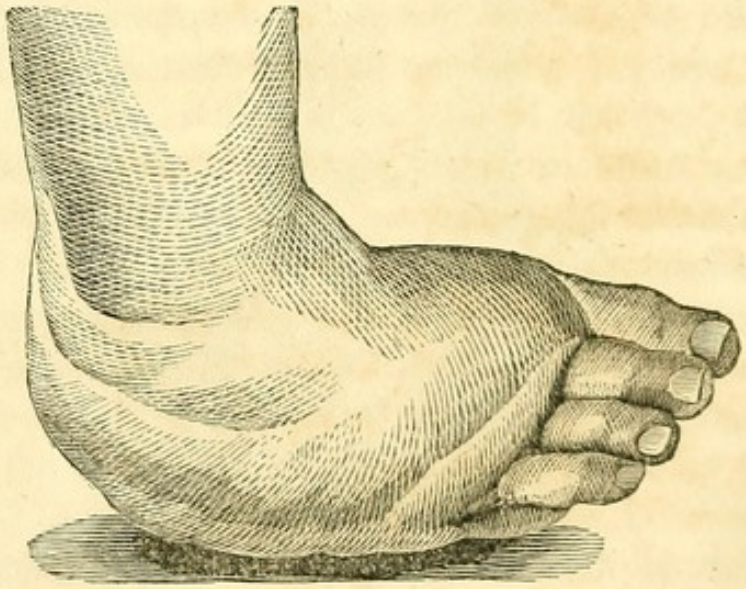
Having thus passed over the *causes* of the different varieties of club foot, we may next describe the appearances presented in each. I have already mentioned that each class presented *three* or *four varieties!* The first, or mildest form of Varus is seen in this cast.



You perceive that nearly the whole sole rests upon the earth, but it is slightly *elevated* along its inner margin. This shows that the chief weight of the body must bear upon the *outer* edge, which presents almost a crescentic form. The inner is also curved, and often presents a superficial fissure about the junction of the tarsal with the metatarsal bones. The external malleolus is well marked, and apparently a little *behind* its natural position, while the internal has nearly disappeared. The

instep too, is nearly *natural* in its shape, which is not the case in the other forms of the affection. I wish you, however, particularly to observe that the *heel* is here but *slightly* drawn up. In the living specimen, if you take hold of the toes and bring them forcibly towards their proper position, while the heel is firmly fixed, the foot may generally be brought nearly to a straight line, and you will also find that the different motions of the tarsal and metatarsal joints are nearly natural. This variety of Varus is often termed the *pigeon-toed*, or "moon foot," and is by far the most susceptible of remedy.

In the *second* variety, the foot rests almost *entirely* on the *anterior* portion of its *outer edge*, as you here see.



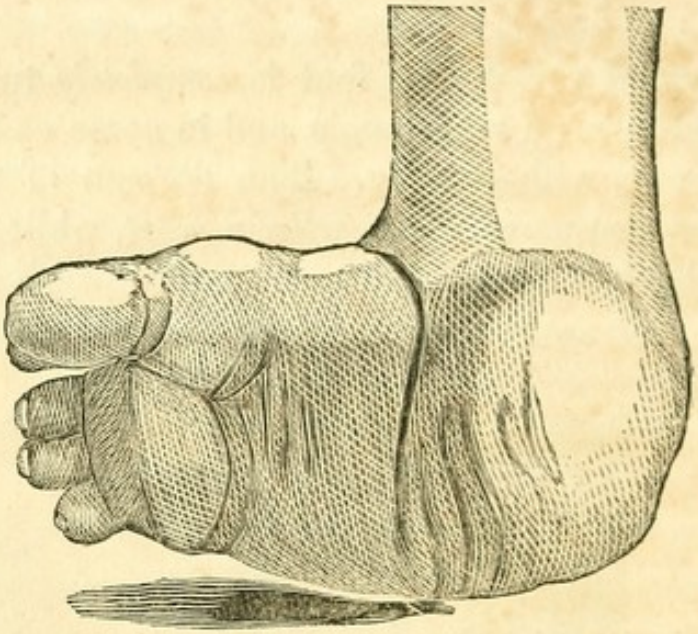
Sometimes the little toe, and the one next to it, assist in supporting the body. The inner margin is also more curved than in the first, the great toe turns in, and the dorsum of the foot is nearly vertical. The external malleolus is very prominent, while the internal has nearly disappeared, and the line of junction between the *foot* and *leg* is for the most part, a regular curve. The heel too is more retracted than in the first, while the motions

of the joints are considerably impaired, and it is impossible to bring the foot to its natural position, by the hand alone. This is one of the most common forms of Varus, not only as a *congenital*, but also as an *acquired* defect.

In the *third* variety the foot is *completely* turned inwards, and forms a right angle, and in some cases, even an acute one, with the leg. The dorsum of the foot presents as you perceive, *directly* in *front*, while the sole is turned backwards.

The *outer* edge is below, while the *inner* is *above*, so that those portions of the foot usually placed in a *horizontal* position, now become *vertical!* The internal malleolus is almost obliterated. The *external* on the contrary, is more prominent than natural, and seems to be placed *behind* and below its usual position! The dorsum of the foot, also presents a number of irregularities, owing to the partial displacement of the tarsal bones, and is more rounded than natural. The *sole* is generally *shorter* than

usual, and is divided by one or more *vertical*, and sometimes verp deep *fissures*, which are owing to an *approximation* of the bones of the inner margin of the foot.



The most interesting feature, however, as regards *practical* bearing, is the position of the *heel*. In *every* case of congenital Varus in the third degree, you will find it drawn *upwards* and *inwards* by the muscles of the calf, and sometimes it is even wanting altogether. From this contraction of the muscles, or shortening of the tendon achillis, the skin just above the heel, is *generally puckered* or *wrinkled*. When the individual has exercised a great deal, we find the outer edge furnished with a large bursa mucosa, the integuments covering which are generally hard and callous. This bursa is a provision of nature to prevent any injury of the bones and ligaments, from the constant pressure to which they are subjected. Often it happens, however, that these bursæ inflame, and give rise to most intense suffering, and they are sometimes exceedingly troublesome during the whole life of the individual! You will generally find the *toes*, more or less deformed, and separated from each other, but after the

deformity of the foot has been relieved, they in a short time acquire their proper positions. In this form of Varus it is impossible to bring the foot to a natural position by the hand, and whenever this is attempted, you will find the tendon achillis, and the fascia plantaris rendered remarkably *tense* and rigid! and sometimes the tendons of the tibialis anticus and posticus.

When both feet are affected, the toes of each are brought almost in contact, and sometimes even pass one another, so that in walking, the individual is obliged to carry one foot over the other, which is accomplished by causing them when elevated, to describe a sort of semi-circular motion. This along with the smallness of the base of sustentation, causes the *gait* to be vacillating and uncertain.

A superficial examination of one of these cases would naturally lead us to suppose, that the defect was not confined to the bones of the feet, but also extended to those of the leg. The apparent *advancement* of the *internal* malleolus while the *external* is carried farther back, would strengthen such an idea. If we examine it carefully, however, we shall find that in almost every instance the bones of the leg are unaffected, and that the change in the position of the malleoli is due entirely to the inclination *inwards* of the anterior portions of the feet. Sometimes we find a slight *inward inclination* of the knee joints, but this has nothing to do with the deformity of the foot, at least in early life.

The condition of the *muscles* of the leg is worthy your attention! At birth, or indeed until the child begins to walk, you will find them presenting a normal appearance in every respect, the leg is as fleshy and well formed, as that of a child whose foot is perfect. But as soon as he begins to walk a change in their size is speedily discoverable. They become smaller and smaller, just in

proportion as he grows older and takes more exercise, until at length they are reduced to mere ribbons, and the limb itself is hardly any thing but skin and bone. Now how is this to be accounted for? Exercise you know generally *enlarges* instead of causing a limb to waste! Dupuytren explains it, when but one foot is affected, by supposing that the child instinctively reposes his whole weight upon the *sound* one, and makes use of it on all occasions; as a consequence of which its nutrition is increased in activity, and it becomes larger than natural. On the other hand, the deformed limb remaining almost inactive gradually wastes away. Although this may be correct in such cases, it does not explain the atrophy of the limbs when both feet are deformed. It is more than probable, that it is attributable to several causes—for example, the *unnatural* position of the muscles, their irregular actions, and the state of rest in which most of them are kept, together with the sedentary disposition of individuals so deformed. These must all exert a considerable influence in its production.

But the atrophy is not confined to the circumference of the limb, it also affects its *length*, a fact first pointed out by Dupuytren. When there is a loss in circumference, the *muscles* generally suffer; when there is loss of length, the *bones* and *ligaments*, and the case is extremely difficult of cure! Dupuytren remarks that he has always met with this shortening after the patient has turned his *tenth* year, although at birth he may have had the limb of the natural length!

ACCIDENTAL VARUS.

In the early stages of accidental Varus, the part presents an appearance somewhat different from that met with in the congenital variety. For instance, the angle of junction with the foot and leg is much more *obtuse*,

there is less displacement of the tarsal bones, and there is also less retraction of the heel. We also find, that in the first nearly *all* the bones of the tarsus and metatarsus are partially displaced, whereas, in the second, the *astragalus* and *calcis* remain nearly in situ! Where the case is neglected, however, or is of long standing, or if the patient has used much exercise, nearly all the characteristics of the congenital variety are present.

DISSECTION.

The appearances on dissection of a case of Varus, depend very much upon the age of the individual affected, and the degree of the deformity. We shall find, however, that at *no age*, and in no degree, is there a complete *luxation* of the bones of the foot, as some would have us believe. A *deviation* from their normal direction, with *partial* separation of the articulating surfaces, is all that we meet with.

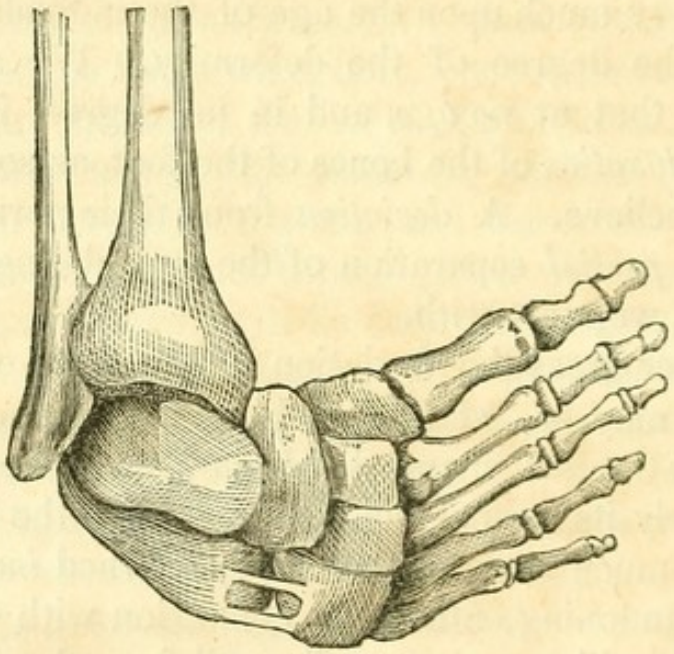
However great the deviation of the *tarsal* or *metatarsal* bones may be, we find both in young and old, the *astragalus* the *least* changed. In young children it maintains nearly its normal position, but when the individual has used much exercise, we find it turned *inwards*, but never abandoning entirely its connexion with the bones of the leg, which are generally well formed.

The large protuberance which you observe upon the dorsum of the foot, is formed in part by the anterior articulating surface of this bone, which is rendered prominent by the rotation inwards of the os scaphoides. Being covered only by integument, we often find in persons who have walked a great deal, this surface worn away, and flattened, and covered by a large bursa.

The *scaphoid* bone itself, by rotating upon its lesser axis is placed *obliquely* across the extremity of the astra-

galus instead of fitting it accurately. In consequence of this its *internal tuberosity* is carried *upwards* and *inwards* towards the internal malleolus, while its *external* is *depressed!*

The *cuboid* also turns upon its lesser axis, and is separated from the os calcis, instead of accurately fitting its lesser apophysis. This of course would cause the ligaments connecting them together to be much longer than natural, and produce a considerable depression just over the joint, which does not exist in a well formed foot.



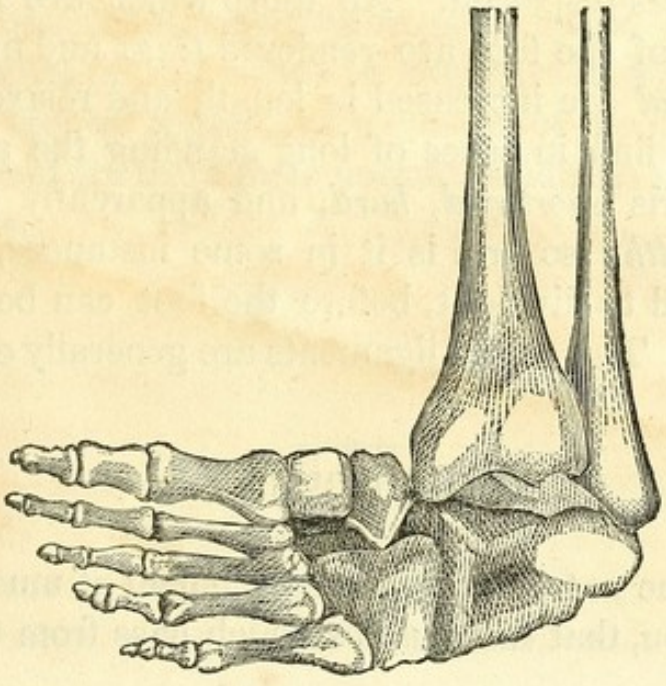
It is chiefly upon this bone that the individual rests his weight, consequently we find it often flattened, and almost always covered by large bursæ mucosæ, while the integuments over it are thickened and callous!

The most *striking* deviation, however, is that of the *calcis.* We find it in almost every case of the second or third degree, so completely turned upon its small axis, that its greater or posterior tuberosity is carried inwards a considerable distance within the internal malleolus,

while at the same time it is drawn forcibly upwards by the muscles of the calf. This elevation of the *posterior* tuberosity, necessarily tends to *depress* the *anterior*, and prevents a perfect articulation of this portion of the bone with the cuboid, as I have already shown; while the articulation between the astragalus and the upper portion of the calcis is also rendered imperfect from the same cause. In many cases the greater turberosity is so much diminished in size, and so forcibly drawn upwards that nothing like a heel exists.

As the necessary consequence of this deviation of the larger bones of the tarsus, we find the three *cuneiform*, the *metatarsal*, and the *phalangeal*, all directed *inwards* and *upwards*, so that the anterior portions of the foot become *vertical*, instead of retaining their usual *horizontal* position!

An examination of the sole of the foot, also exhibits very clearly the change which the respective bones of the *tarsus*, *metatarsus*, and *phalanges*, have undergone. It is much *deeper* than natural, and the heel is not as wide as it usually is, while the anterior portion of the foot is larger.



You will always find that the individual bones are *smaller* than those of a well formed foot of the same age, in consequence of which the whole member is much less in size than it should be. This is especially observable in persons somewhat advanced in life. If you operate on such a foot you need not anticipate its future development, it always remains smaller than natural, but the defect may easily be remedied by a properly constructed shoe. When the person operated on is a child, or youth, the foot generally acquires in time its proper size. It is stated by some, that in all cases of long standing anchylosis of the tarsal or metatarsal bones is present. I have, however, in my own practice, observed but few cases in which this condition of the bones obtained, and I have examined a large number with a view to its detection.

LIGAMENTS.

The ligaments which hold the bones of the foot together in consequence of the deviation of the latter, are more or less displaced. All those which are placed on the *inside* of the foot are rendered *tense* and firm, while the *external* are increased in length and relaxed. You will often find in cases of long standing the aponeurosis plantaris *shortened*, *hard*, and apparently diminished *in breadth;* so firm is it in some instances, that we are obliged to divide it, before the foot can be properly directed! The dorsal ligaments are generally elongated.

MUSCLES.

From the nature of the displacement it must be evident to you, that the muscles which pass from the leg to

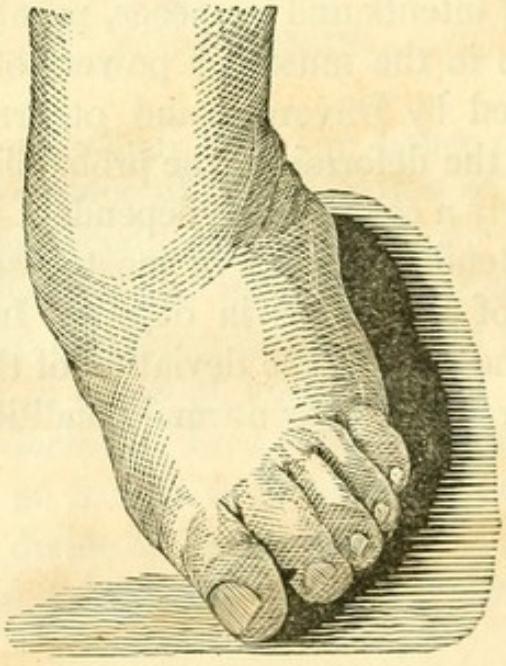
the foot will also be displaced. The two tibials, particularly the anterior, (which is inserted into the base of the metatarsal bone of the great toe,) are so much contracted as to offer a powerful resistance to the eversion of the foot, and often require division before this can be accomplished. The long flexors of the toes, and the adductor of the great toe are also very much contracted. The gostrocnemei, solei, and plantaris, however, as I have already mentioned, suffer more in this respect than any other muscles, and in nine cases out of ten, particularly in cases of long standing, before relief of the deformity can be accomplished, their tendon has to be divided. In the numerous specimens before you, the great degree of shortening to which they are subjected is very well shown.

The *Peronei* muscles, on the other hand are so much relaxed as often to lose their power of contraction, and become, to all intents and purposes, paralytic. This loss of equilibrium in the muscular powers of the limb, has been considered by Duverney and others, as the proximate cause of the deformity; the probability, however, is that it is merely a *consequence*, dependent upon the *shortening* of the tendon achillis in most cases, and simple displacement of the bones in others. In Varus of the first and second degree, the deviation of the constituents of the members from their normal condition is of course much less.

VALGI.

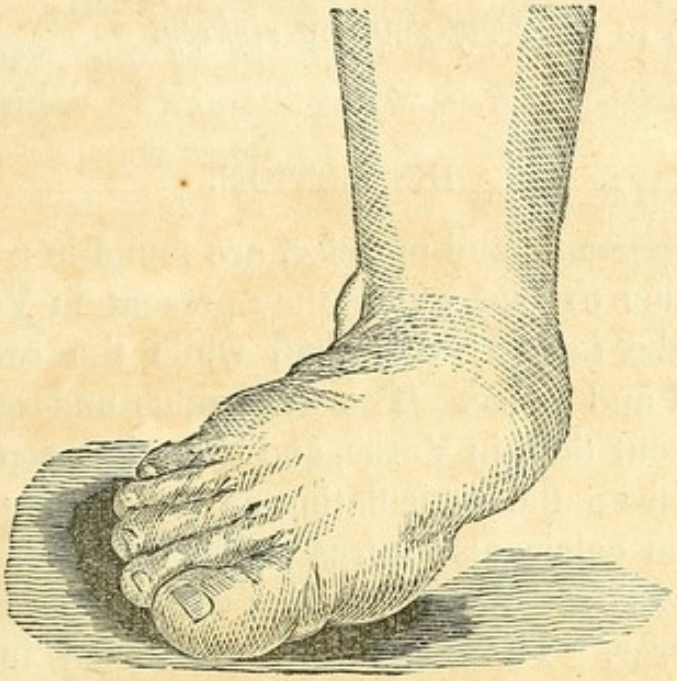
The second variety of club foot, the *Valgus* of the older writers, is characterized by the foot resting upon its *inner* edge, while its *external* is elevated, and presents three principal varieties.

In the first, the foot still rests chiefly upon its sole, but more particularly upon its *inner* edge, and the *ball* of the *great toe*, while the *outer* is *slightly* elevated, and does not touch the earth. The *instep* is flatter than natural, and a considerable depression is met with just *below* and a *little in front* of the external malleolus. The *inner* edge presents a considerable eminence near its centre, formed chiefly by the scaphoid bone, and the internal malleolus is more prominent than usual!



In the second, the foot rests almost entirely upon the anterior portion of its inner edge; the heel is drawn *upwards* and a little *outwards;* the sole forms an obtuse angle with the earth, the internal malleolus, as well as

the projection formed by the scaphoid bone, is more prominent than in the first variety, while the depression on the dorsum of the foot is much deeper. The muscles of the limb are usually very feeble, and the patient has but little command over its movements.



In the third variety, which is very rare, the foot is turned completely out, and rests *entirely* upon its *inner* edge, which causes it to become almost vertical, the sole looking directly backwards, while the dorsum presents in front. The *internal* malleolus is of course very prominent, while the *external* is nearly lost in the depression between the *leg* and *foot!* When this is congenital the heel may be drawn up, but when it depends upon the reception of some injury, as is usually the case, this displacement is not always present.

CAUSES.

Valgus is very rarely a *congenital* deformity, although it is sometimes seen. (I have at the present

time a case under treatment, the daughter of a gentleman residing at 100 South Third street.) It is generally the effect of some local injury, as a sprain or blow upon the ankle; sometimes it is brought about by a paralysis of the muscles of the leg, and occasionally it is owing to preternatural laxity of the *ligaments* of the foot, as is seen in the *scrofulous* or *rickety*.

DISSECTION.

The ligaments, and muscles, are found in a condition very similar to that which they present in Varus, only we find the *internal* extended, while the *external* are shortened and tense. The astragalus undergoes more displacement than in Varus, and there is a separation of its head from the articulating cavity of the os naviculare. The calcis also turns upon its short axis, and looks *outwards*, while its junction with the *cuboid* is rendered closer. The cuneiform are nearly in situ, but they as well as the phelanges assume a more or less vertical position as the deformity increases in degree.

PES EQUINUS.

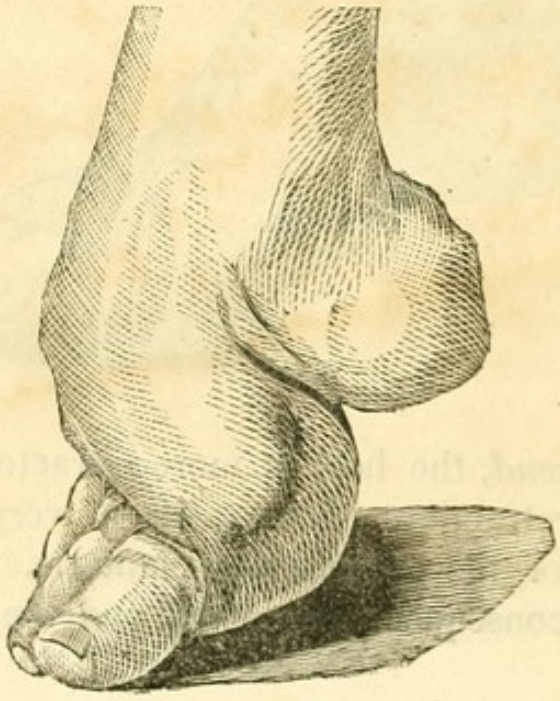
In the third variety of club foot, the pes equinus of the ancients, the foot rests either upon its point, or a little to one side of it, or upon its ball. Like all the other varieties of the deformity, *three* or *four degrees* of distortion are spoken of.

In the *first* there is little or no deformity of the member. The heel is merely drawn up a little by the contraction of the muscles inserted into the os calcis, and cannot be brought to the earth. The ball of the foot, therefore, supports the weight of the body.

In the *second*, the heel is more retracted, and along with this retraction, there exists a very perceptible *contraction* of the aponeurosis plantaris. The sole of the foot is consequently *deepened*, and the whole mem-

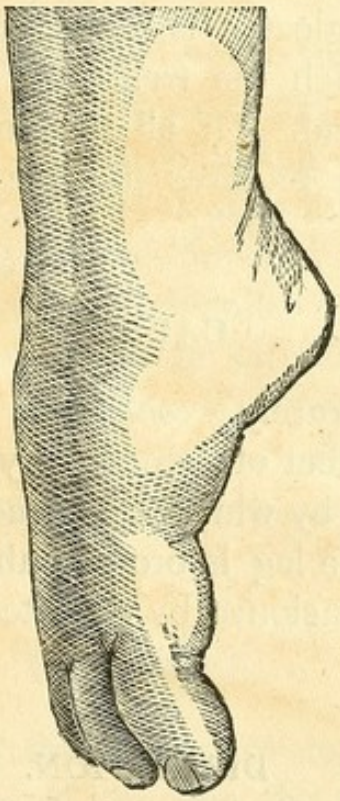
ber is very much bent upon itself. The dorsum of the foot is also more uneven than natural, owing to a partial luxation of the scaphoid bone. The weight of the body is here received chiefly upon the *toes*, which, when the individual has used much exercise, are often displaced or deformed. This is a case before the patient has taken much exercise.

One after the person has walked for a number of years.



In the *third*, the heel is so much retracted, that the foot forms nearly a straight line with the leg, and the heel itself is sometimes scarcely visible. The foot rests upon the extremities of the toes, which yield either to one side or the other, whenever the patient attempts to walk, so that his weight is received not on the toes themselves exactly, but rather upon the inferior portion of the *outer* or *inner* edge of the foot. The aponeurosis plantaris is here generally contracted, and the dorsum of the foot more convex than natural. The integuments just above the heel are usually thrown into wrinkles, from the contraction of the ankle.

A case before much exercise has been taken.



One after many years *use* of the member.

It must always be borne in mind that this degree of pes equinus, if neglected, is readily converted into *Varus* or *Valgus*, by which the treatment of the case will be greatly complicated. Of all the varieties of club foot, it is that, which requires the most prompt measures for its removal.

CAUSES.

Pes equinus is rarely a *congenital* defect. Most commonly it is the effect of some injury about the *ankle*, or *knee*, or *hip* joint, by which a contraction of the muscles of the back of the leg is brought about. Sometimes in children it is occasioned by repeated attacks of convulsion.

DISSECTION.

There is for the most part, no displacement of the bones of the foot, in this deformity, there is merely a sort of rolling off of the scaphoid, from the head of the

astragalus, all the rest are in situ. The ligaments on the front of the foot are extended, while those on the sole are shortened and tense. The muscles, especially those of the calf, from a want of use, gradually waste away, so that the leg is soon reduced to a very small size; but notwithstanding their smallness, they are *firm* and *rigid*. Those of the front of the limb, the tibialis anticus, especially, are elongated and relaxed, but when the foot is properly placed, they soon regain their proper tone and strength, as their defect resided chiefly in their *length*, with no *lateral* inclination, which always renders a proper retraction of a muscle more difficult and tedious.

LIABILITY.

It would appear from the observation of some of the most experienced orthopedic surgeons, that club foot is more frequently met with in *boys* than in *girls*, and also that where but one member is affected, it is usually the *right*. These are questions, however, that require further observations for their definite determination. In double club foot, (that is where both feet are affected) one is always worse than the other, and most generally it is the *right*. The reason of this difference in degree of deformity is not very easily explained.

PROGNOSIS.

The prognosis in this deformity depends very much upon the *complication* of the case, the *degree* of *contraction* of the foot, the *variety* of the defect, the *condition of the bones*, the *age* of the patient, his *disposition* to *submit* to our remedies, and the *character of the cause*.

An ordinary case of club foot cannot be considered in any sense a *dangerous* affection, for although it occasions great physical distress, it never involves the life of the individual. Should it perchance, become complicated with an *inflammation* or injury of the joints, and especially if the individual be scrofulous in his diathesis, symptoms of the most alarming character may be developed, and not only the *joint*, but even the existence of the patient may fall a sacrifice. I recollect a case which illustrates very forcibly this fact. I was requested about twelve months since, to meet a professional friend in consultation on the case of a daughter of Mr. G. residing in Front street. The patient aged about twelve, and presenting traces of a scrofulous taint, had a congenital Varus affecting both feet, but with the exception of the local pains which were developed by walking upon the faulty members, she had never suffered from any disease of the part, until within a month or six weeks of my being called in. About that period she happened to trip in walking along the pavement and fell, spraining one ankle severely, and bruising the other. The family physician was called in, and treated her in the manner usually resorted to in similar cases, but notwithstanding every effort to prevent it, inflammation attacked the sprained joint and when I saw her, had nearly destroyed it. Her general health had also suffered considerably, hectic fever with all its direful accompaniments being present. She was also troubled with a hacking, dry cough, and upon examination with the stethescope, we detected tubercles in both lungs, and in one a considerable cavity—our treatment was of course palliative merely, and our patient sank in a few weeks. In this case the probability is, that had her foot been well formed, the sprain would have been relieved as in any other case, and the formation of tubercles, which was occa-

sioned by the continued irritation to which the system had been subjected for so many weeks, prevented.

The prognosis will also depend upon the degree of *contraction* of the foot. When the individual has taken much exercise the muscles become so much contracted and wasted away, and their tendons so much shortened, that the foot seems to be almost doubled upon itself; the fissure in the sole being remarkably deep, owing chiefly to a contraction of the fascia plantaris, which feels, when an attempt is made to extend the foot, like a strong and dense cord. This is observable in every variety of the deformity, but more especially in Varus. When it is present to any extent, a much longer time will be required for the cure than when a contrary condition of the foot obtains.

The *age* of the individual must also be held in view, when we form our prognosis. It is usually stated that the earlier we commence our treatment the greater will be the prospect of ultimate success; the muscles, ligaments, and even the bones themselves, being just after birth, *flexible* and *soft* and consequently more readily moulded into a proper shape. At first sight this advice appears reasonable enough, but you will find that whenever it becomes necessary from the character of the deformity to employ much force, or divide a tendon, great difficulty will be met with, if you follow it. In the first place, the *integuments* of a new-born child are so extremely delicate, that *excoriations* and often severe *ulcerations* are almost sure to be developed, even when the utmost care has been taken to prevent their appearance, by padding the instruments, and applying them as accurately as possible. We are of necessity then, obliged to suspend our efforts for the relief of the defect, and wait until the foot is once more sound, and apparently able to support the pressure of our bandages without suffering.

In the second, the *legs* of a very young child are so *short* and *clumsy* that it is almost impossible to maintain a proper apparatus. It is constantly slipping, and of course can exert little or no influence upon the deformity, for the removal of which it is applied. The constant *flexion* of the limbs, and the frequent necessity for changing the child are likewise obstacles to a proper action of our apparatus.

In the *third*, the *nervous* system of very young infants is so susceptible, that the slightest causes are often sufficient to throw them into convulsions, or bring on fever. In a child of Mr. A., upon whom, in its third week, I applied my apparatus, after having previously divided the tendon Achillis in both feet, I was obliged to stop the treatment after the lapse of a day or two, in consequence of its fretting itself into a fever. There was probably not much suffering in this case, because I took great pains to make the bandages as soft as possible, and there was no excoriation; but the mere confinement of the feet was sufficient to cause great disturbance of the whole system.

For the reasons just stated, then, I always, when it is in my power to do so, postpone the commencement of the treatment until the child is five or six months old. When from any cause, however, it becomes necessary for the treatment to be undertaken at an earlier period, you must recollect what I have told you relative to the difficulties of the case, and be prepared for overcoming them if possible.

We should never, provided the case be under our control, permit it to remain unremedied longer than the second year, for after this period the difficulties of the treatment are astonishingly increased. In proportion as the child advances in years, the *muscles* and *ligaments*

offer greater resistance, and the articulations of the foot and ankle become stiff and unyielding.

Two questions, bearing upon this portion of our subject, here naturally present themselves. They are, first, What age is *most* favourable for undertaking the treatment of a case of club foot? Second, At what age may we consider the deformity as beyond the reach of art?

From my own experience, I should say *decidedly*, that the *most favourable period* ranges between the sixth and eighteenth months. The integuments at this age are sufficiently firm to bear the requisite degree of pressure without suffering, while the *muscles*, *ligaments* and *bones*, are all susceptible of being easily brought to their normal position. I have also found, that when the child has been allowed to pass this period without treatment, the next best period ranges between two and eight; after which the case becomes more and more difficult, as year is added to year.

Before the great influence of the tendon Achillis in these cases was recognized, and before the benefit resulting from its section was believed in, the period at which it became useless to undertake to cure club foot, was variously stated. The majority of authorities, however, fixed it at between eighteen, and twenty-five; some few professed to have accomplished cures in individuals of greater age; and when the defect consisted merely in a retraction of the heel, it was said, that age offered little or no obstacle, and persons forty, forty-five, and even fifty years old, were reported as being perfectly relieved.

It is almost impossible, however, to arrive at any definite conclusion upon this point, as so much depends upon the temperament of the individual affected, as well as upon his mode of life. I have recently treated a

woman forty years old, who from the laxity of her fibre, and the sedentary life to which she had been accustomed, was cured in four weeks less time than a boy of fourteen, whose robust health and active life had rendered his muscles and ligaments firm and unyielding. I am, however, disposed to look upon *mere age* as a matter of but little moment in forming our prognosis. We must direct our attention almost exclusively to the condition of the *foot*, and if every thing here is favourable, we may operate almost at any age. Cases are reported in which cures have been accomplished in persons seventy and eighty years old. It is only, however, by the division of the tendon Achillis, or the tibialis anticus tendon, or both, or other tendons if necessary, that cures of persons much advanced in life can be accomplished. There is no *possibility* of stretching the tendons here, which you know may be affected in the very young.

Our prognosis will also depend upon the condition of the *joints* of the foot; if any of these are anchylosed, or rather, if any that are essential to the proper movements of the foot, it will be useless for us to attempt a cure, even by a section of the different tendons. I wish you to bear this in mind, for sometimes the case at first sight wears a most tempting aspect, and you feel disposed to make an effort to relieve the patient of his deformity. Should you attempt the operation, however, you will most assuredly fail, and bring contempt, not only upon yourselves, but upon our science.

The *variety* of deformity is likewise a matter of importance. As in the Pes Equinus, there is simply in *many* cases but an elevation of the heel, there is little or no difficulty, provided the joints are sound, in affecting a cure, and that too in a very short time, by the division of the tendon Achillis. When, however, it is com-

plicated with a *lateral inclination* of the toes, (either outwards or inwards,) a longer period of time, and a more complicated treatment will be required.

Varus in its first and second degrees is also easy of remedy; in its third, it is often very difficult to manage, and *always* requires a longer time than any variety of Pes Equinus.

Valgus being generally the result of some mechanical injury, by which the *bones* as well as the soft parts have been made to suffer, may be considered the most unfavourable variety of club foot. Where it is *congenital*, however, I have succeeded in relieving it without much difficulty.

The prognosis is also very much modified, by the disposition of the patient to submit to our remedies. I have repeatedly met with great difficulty in this respect, and was near failing in the accomplishment of a cure, by the unwillingness of my patient to adhere to the necessary treatment for a sufficient length of time. In such cases, *firmness* on your part is absolutely essential. Yield a single point, and you may be foiled in your attempt to relieve the defect.

You will always be questioned by the friends of the patient, or by the patient himself, respecting the *time* it will be necessary for him to remain under treatment. Be cautious how you commit yourselves. It is utterly *impossible* for any one to say *positively*, that he will cure the case in this or that time. We may, however, form some estimate of the *probable* period, by the character of the deformity. A simple Pes Equinus at *birth*, by a division of the tendo Achillis, may be cured in from a week to ten days. If neglected until the individual has somewhat advanced in life, from four to eight weeks will be necessary, and in very old cases, even longer.

Congenital Varus in the first degree, treated directly

after birth, or a few months after, may generally be relieved in two weeks. At a later period it will require from six to eight weeks, unless we divide the tibialis anticus tendon, when from four to six weeks will sometimes be sufficient. In the second and third degrees, treated shortly after birth, *without* a division of the tendon, from *three* to *four months* are required; if neglected until the child is *four*, *five*, *six*, *eight*, or *ten* years old, from *four* to *twelve;* and if it has been allowed to run on untreated to *puberty*, is often irremediable.

When treated by *dividing* the tendo Achillis, in the early months, or even for the first two years, about three or four weeks will be sufficient; when the patient is between the ages of *two* and *ten*, from *six weeks* to *three months;* and at *puberty* from *two* to *six* months.

Valgus, if congenital, and in the first degree, may generally be cured in from *three* to *four* weeks, in a child. In the second, from *four* to *eight* will be requisite. As I have never treated a case in the *third*, I cannot make any statement relative to the time required for its relief.

DIAGNOSIS.

There is no affection of the foot with which the deformity under consideration can be confounded, with the exception, perhaps, of that retraction of the heel so often met with after injuries of the hip, and which bears some relation to Pes Equinus in its first and second degrees. The history of the case, however, should always be sufficient to distinguish the one from the other.

TREATMENT.

From the tedious and often troublesome nature of the treatment required in most cases of club foot, as well as its usual failure of success in those of any standing, this

defect, except in its earliest stages, has been yielded by most practical surgeons to the management of a few individuals, who from choice or necessity, have directed their attention exclusively to orthopedic surgery; or to the instrument makers alone. The latter, with but few exceptions, being utterly ignorant of the principles which should guide us in its treatment, have often, by their malpractice, occasioned the greatest distress, and even endangered the lives of their patients. The former, actuated in most instances by a desire of gain alone, but too often degenerate into mere quacks, conceal their plans of treatment, and though often successful, as was the case with Venel of Switzerland, Jackson of London, Verdier of Paris, and many others, have done nothing by which the profession has been in the slightest degree benefitted. Within a few years past, however, surgeons of eminence have been induced to direct their attention to the subject, and as a consequence, we have obtained not only a correct pathology, but also a successful and easily understood method of cure.

The treatment will of course vary with the *variety* of the deformity, and the *age* of the patient. There are several general indications, however, which you will do well to fix in your minds.

Recollecting that the defect resides, in almost every instance, in a *shortened* condition of the tendon Achillis, to which is sometimes added a similar state of other tendons of the foot, and that there is neither *complete luxation*, nor any *disease* of the bones present, it will readily occur to you that the *first indication*, and decidedly the most *important*, consists in the application of such measures as shall most speedily bring these shortened tendons to their proper length. Unless this end be accomplished, it will be in vain to expect any thing like a removal of the deformity.

The second indication is also one of much moment, and consists in the *retention* of the foot in its proper *position* after the tendons have been elongated, or rather during our efforts to accomplish this end. The *heel* should always be kept *firmly* fixed, during the whole treatment, and unless attention be paid to this point, rest assured that you will be foiled in your attempt to relieve the defect.

The third indication refers to the establishment of a proper degree of *tone* in the muscles and ligaments of the foot, after the member has either partially or entirely regained its normal shape and position.

The fourth indication consists in the application of a proper shoe or boot, by means of which the foot may be *permanently* retained in its proper position. You must always recollect, that the foot remains for weeks, or even months after the operation, *weak*, and often *rigid* in its articulations, although all traces of deformity may have disappeared. In consequence of this, there is a disposition in the muscles of the limb to return to their original irregular action, as soon as the apparatus by which they were kept in their proper position is removed, and unless you counteract this tendency by appropriate measures, the tendons will soon be reduced to nearly their original length, and your operation will prove of no benefit whatever.

You should invariably inform the patient or his friends of this circumstance, so that the treatment requisite to insure complete success may be readily submitted to as long as it may be deemed necessary.

The fifth indication refers to the *preparation* of our patient, and is considered by some as one of much importance, when we propose to divide the tendons. *Rest*, *frictions*, *low diet*, and *warm bathing* of the feet, with the view of producing relaxation of the ligaments, are the

measures usually recommended. For my own part, ever since I have had much experience in the treatment of this defect, I resort to nothing of the kind; and so far from employing warm baths, I consider their use as fraught with ill consequences. They determine a much larger quantity of blood to the feet than is ordinarily distributed upon them, and thus increase the risk of inflammation after the performance of an operation; they also render the integuments so delicate that even the slightest degree of pressure will cause excoriation; and so far from relaxing the tissues, they render them more *rigid* and *unyielding*. I do not hesitate to assert, that I have never used the warm bath, either as a preparatory measure, or for the purpose of cleanliness in the subsequent treatment, without having cause to regret it, and for the reasons just given. I repeat, that I very rarely resort to any preparatory measures. Rest for a day or two, a mild laxative, and a light diet, are useful, when the patient is of gross habit, somewhat advanced in life, or just from a journey, which always renders the system more or less irritable. Under ordinary circumstances, I commence the treatment at once, and so far at least, have had no cause to find fault with such a course.

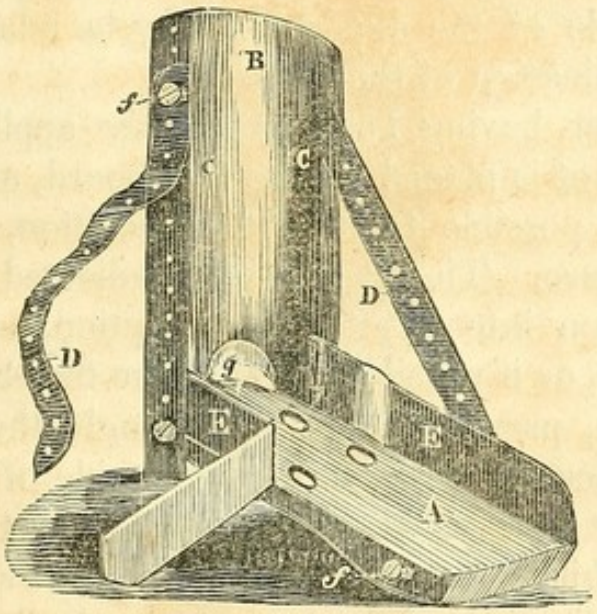
Keeping these indications in view, let us now proceed to speak of the plan of treatment best adapted to each variety of the defect; and the better to enable you to understand it, we shall take up each variety, and consider the method of management to be employed when the case is met with at *birth*, or within the *first* year; between the ages of *one* and *six;* and finally, at *any* age *subsequent* to the sixth year.

Let us suppose then, that you are called to a case of congenital Varus in its *first* degree. If possible, for reasons already assigned, you postpone the treatment

for some months; but if, from the circumstances of the individual, or from any other cause, you find yourself obliged to undertake the cure at once, what is the best method of procedure? In this form of Varus, you recollect, the *heel* is but slightly, and often not at all elevated; there is merely an *inversion* of the tarsal and phalangeal bones, caused by a shortening of the tibial tendons; the first indication is limited, therefore, to the application of such a measure as shall overcome this *inversion*, and bring the foot to its *natural* position. At this early age you will find the tendons readily yielding to the employment of *simple pressure* properly directed, and unless the deviation is *remarkably* great, nothing else will be here required for the accomplishment of a cure. I have in but a *single* instance found it necessary to divide the tendon in this degree of Varus at this age. By what apparatus then, will this pressure be most effectually applied, and with the least pain? Almost every surgeon, if asked this question, would describe to you some contrivance of his own, better calculated, in his own estimation, to ensure success, than that of any professional brother. Following the example then, with all due deference to the notions of others, I shall show you mine, and not take up your time with a description of the "thousand and one" mentioned by others. If you keep the indications in view, however, you can always make a contrivance for yourself, provided a proper apparatus be not at hand. Thus you may succeed sometimes, by using Dupuytren's apparatus for fracture of the fibula; applying it, however, on the *outside* of the limb, instead of the inside. Broad adhesive bands, made to envelope the foot, and then fastened to the leg, so as to evert the former, have also succeeded. The apparatus which I employ, consists of a simple gaiter, (to surround the ankle) to which is

attached along its inferior margin four tapes, intended to pass through holes or mortices in the foot-board of the machine,

and of a simple machine, a cut of which is shown.



A, Foot board, with four holes in its posterior third, intended for the tapes of the gaiter.

B, Leg-board, which extends as high up as the knee joint.

CC, Pads, to prevent the pressure of the board upon the muscles of the leg.

DD, Straps, by which the angle of junction between the foot and leg-boards may be varied at pleasure.

EE, Iron splints, of a height proportionate to the size of the foot. The external is hollowed out near its posterior extremity, so as to receive the bursa mucosa, always present in cases of any standing, and which is often extremely painful when pressed upon.

The inner is divided and furnished with a hinge, so that the instrument may be applied without difficulty to any case, however great may be the degree of inversion.

FF, Two pegs or screws for the attachment of the straps.

G, Opening in the leg splint, through which the position of the heel may be ascertained.

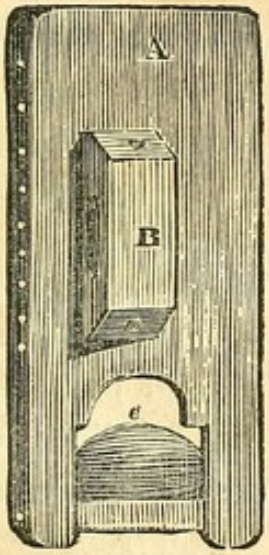
The junction between the foot-board and leg-splint is made either with a quadrant joint, or a simple hinge, so that the angle of the apparatus may be adapted to the angle of inclination of the foot.

The gaiter having been previously applied to the ankle, the foot is placed on the foot-board, and brought as nearly as possible to its natural position, by well directed pressure. The heel is then adjusted accurately in the position intended for its reception, and made to approximate, or if possible, to touch the foot-board. The gaiter tapes, previously passed through the mortices, are next securely tied on the underside of the board. An assistant now holds the leg and foot in their proper positions, while the surgeon, taking a narrow roller, begins its application at the toe, and gradually forces the anterior portion of the inner splint, against the inside of the foot; and then continues upwards, until the *whole* apparatus is enveloped, and *firmly* secured. When properly applied, there is very little pain from the use of this contrivance; and from its shape, there is not much danger of *slipping*, an occurrence always to be guarded against, as it is sure to do harm.

I have generally removed the apparatus every day,

for the purpose of bathing the foot in *cold spirit* and water, and applying friction calculated to *stretch* the shortened tendon. With the exception of this removal, the instrument is to be worn night and day, so long as it may be required.

When both feet are affected, you will always find, after the application of the splints, that they still continue to *look inwards*. To obviate this difficulty, I make use of a cross bar, (of a length proportionate to the age of the individual) which is made to fit by its extremities, into a morticed cleat, with which each leg piece is furnished. It is attached to the back of the splint, and about its middle.



A, Splint. *B*, Cleat. *C*, Opening to ascertain position of heel.

In the application of the rollers, when this bar is to be used, we should be careful to leave out the cleats; if this be neglected, the apparatus will have to be loosened in order to apply it.

This simple contrivance has answered perfectly in my hands, not only for the cure of congenital Varus, but also

for those cases of this defect met with at more advanced ages, where it has been necessary to divide the tendons. I also employ a modification of it in Valgus.

After, by the use of this measure, the foot has been brought to its proper position, it may be prevented from returning to its original shape, by a common high quartered shoe, made stiff on the inside. This is to be worn until all tendency to relapse has been done away with. In the first degree of Varus, you will rarely find occasion to use the straps for altering the angle of the foot board, the heel generally coming down flat upon it; in case, however, it should be slightly elevated, we can act upon the toes, and through them upon the heel, by simply taking up a hole in the straps, *daily*, until the defect is overcome.

Let us suppose, again, that you were called to a case of this degree of Varus, in a person between the *first* and *sixth* year. The same indication still obtains, but the mode of treatment varies somewhat according to circumstances. If the child has never walked, the same apparatus, and the same general management will suffice, except in cases of extreme rigidity of the tibial tendons. Where the child is beginning to walk, however, we substitute for the splints, which are clumsy, a shoe, constructed upon principles derived chiefly from Scarpa and Delpech. You recollect, the inclination of the foot here, is such, that it is impossible to force it into a shoe with a straight sole, or if we accomplish this end, the pain is so acute that the child will be unable to bear it, for any time. To obviate this difficulty, and to accomplish our object gradually, Delpech contrived a shoe with a sole divided near the centre, and so regulated by a rack, that it could be turned inwards so as to accommodate itself to the angle of the foot, and be there fixed. Every day or two, the angle was changed, until

the foot was brought to its proper shape. In some cases this answered very well, but it was found to exert very *little force* in a given time, and the cases in which it was used, required a tedious treatment.

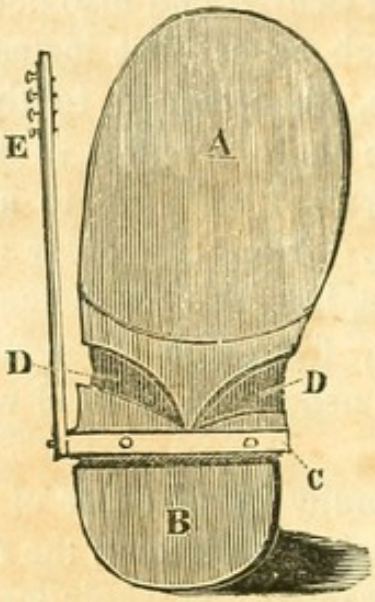
The celebrated Scarpa had also detected the principle indication in such cases; but instead of *dividing* the sole of the shoe, he attached to the outer leg-splint, (with which these shoes are always furnished) a *spring*, which passed forward *obliquely* to a little beyond the point of the foot. Along its outer surface, there were hooks, or buttons, intended for fastenings to straps that crossed the foot, from the inner margin of the sole. The spring was nearly on a level with the sole of the *foot*.

There is generally in all cases of Varus, of the first degree, a tendency to walk upon the *toes*, and where the heel is at all retracted, the whole weight of the body is borne by the anterior and outer portions of the foot. To overcome this tendency, and to bring down the heel, Scarpa suggested the application of a *spring* within the sole, or upon it in some cases, which acted only upon the anterior parts of the foot.

The proper indications here seem, therefore, to have been clearly understood by both Scarpa and Delpech, but they employed different measures for their accomplishment.

I have, myself, made use of a shoe, in which the principles of both Scarpa and Delpech are combined, and have much reason to be pleased with its action. I wish you to understand, gentlemen, that I claim no great merit for this apparatus, it is not in reality an *invention;* nor do I claim to be the *first*, to have so applied the *principles* of the surgeons just referred to; and I wish you to recollect, whenever you see a shoe constructed upon the plan which I now show you, that Scarpa and

Delpech deserve the merit of the *principles*, although others may *modify* them as much as they please. The annexed cut represents the sole of the shoe:



A, Anterior portion of the sole, formed of a steel or iron plate, and covered with leather. Its angle of lateral inclination may be varied at pleasure.

B, Heel, also of iron and leather.

C, An iron plate, the extremities of which terminate in the leg-irons, which extend sometimes as high as the knee, in others up to the thighs, and in others above the hips.

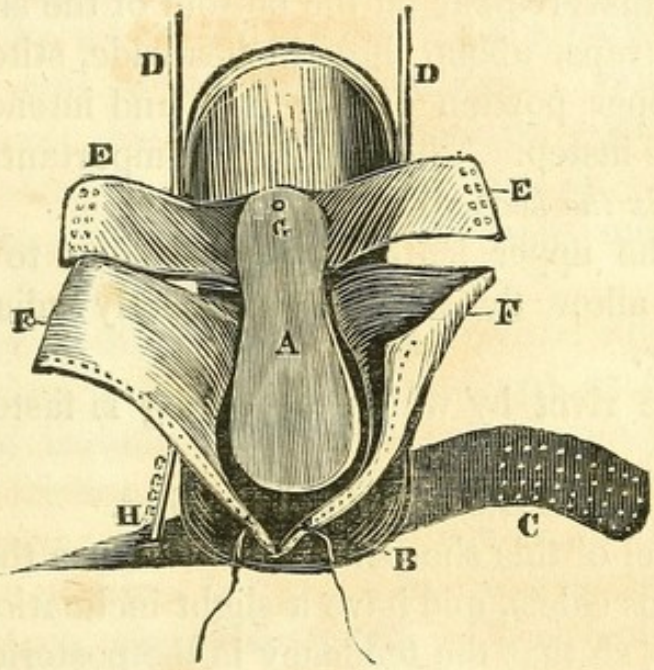
D, The tongue of the sole plate. This tongue is riveted to the heel-plate, but so loosely that it admits of free motion between the latter and the sole.

E, The lateral spring of Scarpa, furnished near its anterior extremity with buttons for the straps which *everts* the toes.

In this instrument, you perceive, I have dispensed with the *rack* of Delpech.

It is important for you to recollect, that iron or steel sole and heel-plates are in almost every case, essential

to the proper action of the shoe. Unless they are employed, the leather, not being of sufficient firmness to resist the unnatural inclination of the foot, will warp, and the shoe thus becomes in a short time, not only useless, but even hurtful. The front or upper portions of this shoe are shown in this cut:



A, A steel spring, the width of the sole of the *foot*. It is rivetted loosely, though *firmly*, to the heel-plate, and may have its *lateral* inclination *varied at pleasure*. It does not, however, follow the motions of the sole, but requires a separate regulation. Its *angle* of elevation varies in different cases; about thirty-five degrees will generally give it force enough. Its *length* will also vary with the case; it should always be a little longer than the foot, but never so long as to touch the leathers of the shoe. A space of at least half an inch, should be left between the extremity of the spring, and the point of the shoe, in order that the former may move readily upon its pivot.

B, Toe of the shoe.

C, A broad leather strap, stitched *strongly* to the *sole*, and furnished with four rows of holes. This is the everting strap, and is passed over the foot, and fastened to the spring on the outside of the shoe.

DD, Iron splints, which pass up the leg to any height it may be deemed necessary, and are connected by the transverse bar on the bottom of the shoe.

EE, Straps, about three inches wide, stitched firmly to the upper portion of the heel, and intended to lace across the instep. These are very important, inasmuch as they *fix the heel.*

FF, The upper leathers, divided down to the toe, in order to allow the foot to be properly adjusted upon the spring.

G. The rivet by which the spring is fastened to the heel.

H, Spring on the outside of the foot.

The heel of this shoe should reach above the tuberosity of the os calcis, and have a slight inclination *inwards*, as it rises, so that the tendency in the posterior portions of the foot, to slip upwards, may be guarded against.

To apply this apparatus, the child should be placed in a sitting posture, and the foot, previously covered with a stocking, then placed upon the spring of the shoe, the leathers having been previously widely opened, (as is seen in the cut.) The leg-splints are first to be fastened by their appropriate straps, and then the heel is to be attended to. This should be forced as far back against the heel-piece of the shoe as possible, in which position it may be retained by the straps. To prevent excoriation, I generally place some cotton wadding between the lacings of the straps and the instep.

The heel having been properly fixed, we next *invert* the sole of the shoe, and also the spring, until they cor-

respond exactly with the inversion of the foot. We then lace the leathers as closely as possible, in order that the foot may be kept in contact with the spring.

Lastly, we pass the *everting* strap across the foot, and fasten it. We allow the foot, for the first day or two, to remain at its original degree of inversion, in order that the patient may become accustomed to the use of the apparatus. After this, we gradually tighten the straps, by taking up a row of holes daily, until the foot is brought to its natural position. When this is accomplished, this apparatus may be removed, and another, which I shall show you directly, or even a common shoe stiffened on its inner side, substituted in its place.

Like every other contrivance for the cure of club foot, this shoe should never be removed, except for the purpose of bathing the foot in cold spirits and water, and using frictions. To be of any use, it must be worn night and day. The patient of course, is not confined to any one position, but is allowed to exercise as freely as he finds it agreeable to do. When both feet are affected, and there exists any inclination inwards of the knee, it is sometimes necessary to attach to the apparatus just described, transverse bars, between the *legs*, and also between the *feet*, similar to those I shall presently show you.

But, suppose you are called to a person of an age more advanced? I do not hesitate to advise a division of the tibialis anticus tendon, and if necessary, that of the tibialis posticus, in *all* such cases. You may, it is true, in persons from six to twelve, or fourteen, and even older, succeed in time, in the accomplishment of a cure, by pressure alone; but the treatment will prove both *tedious* and *painful*. In *adults*, it will be but a waste of time and trouble to attempt this object, while the ten-

dons just mentioned retain their original integrality; failure will, almost *to a certainty*, be the result.

In cases of any standing then, I advise you, *first* to divide the tendons on the inner side of the foot, close the wound in the integuments immediately with a piece of adhesive plaster, then place the foot in the apparatus employed in the first instance in all cases of Varus; and after the member has been brought as nearly as possible to its normal position, apply the shoe already described, and allow the patient to take exercise. Lastly, put on a shoe stiffened on its inner side, which the patient may wear as long as it may be deemed requisite.

In Varus of the *second* degree, the heel, you recollect, is always more or less elevated, while the contraction of the tibial tendons is always greater than in the variety just spoken of. The indications in its treatment are therefore a little more complicated, though they are essentially similar to those pointed out as obtaining in Varus of the first degree, when the heel is elevated.

Should you be called to a case of this form of Varus, occurring at birth, or within the first year, you will generally be able to effect a cure by means of the machine already described; but you will find it *absolutely essential* to employ the straps by which the angle between the foot and leg-boards is regulated. These should be daily tightened until this angle becomes a *right angle;* until this is accomplished, the angle formed between the foot and the leg will continue too obtuse for the patient to make free use of the member. As the tibial tendons are often quite rigid, it will be neces-

sary to keep up lateral pressure, for a longer period than is usually required in the first degree of Varus. A common shoe, stiffened on the inside, may be applied as soon as the heel is brought down, and the lateral inclination of the foot overcome.

When the case has been neglected until after the first year, we find the difficulties materially increased; and although we may succeed in effecting a cure by the apparatus *alone*, a tedious and troublesome treatment is sure to be required. In consequence of this, I have been in the habit, especially when the child is five or six years old, of dividing the tendon Achillis as the first step in the management of the case. By this measure I succeed in the course of a week or ten days, in the accomplishment of what, *without* it, would require months to effect; namely, the depression of the heel. The elevation of the heel being the greatest obstacle to the reduction of the foot to its proper position, if we remove it, the subsequent treatment becomes exceedingly simple. The tendon Achillis having been divided, in the manner I shall show you directly, we close the wound with adhesive plaster, adjust the gaiter, and apply the usual apparatus. This is to be worn as long as it may be deemed requisite, when it may be succeeded either by a common stiffened shoe, or if the child is old enough to walk, by the more complicated one described above. I have not as yet found it necessary to divide the tibial tendons at this age.

When called still later, say at any age after the sixth year, there cannot be a question relative to the nature of the treatment. Do not, I beg of you, waste time here in the employment of apparatus alone, but divide the tendon Achillis *at once*. This done, make use of the measures just recommended for the same defect in younger persons; and if perchance you should be resist-

ed, as you will occasionally be, by the tibial tendons, and fascia plantaris, divide them also.

It is in Varus of the *third* degree, however, that we meet with most difficulty in the accomplishment of a cure. Such is the contraction of the tendon Achillis, the tibial tendons, and the fascia plantaris, that even *at birth*, we find mechanical measures *alone*, almost invariably failing to do any good. The tendons at this early age, it is true, are susceptible of elongation, from the operation of a well contrived apparatus, but the pain which such an apparatus inevitably occasions, and the length of time requisite for the attainment of the object desired, but too often wear out the perseverance and patience of both physician and parent, and the child is frequently abandoned to its fate.

I wish you, gentlemen, to mark what I state upon this point. It has been said by some, who certainly could never have heard my opinions upon this subject, that I stated publicly to the class, that cases of Varus in the third degree could *not be cured*, even when treated immediately after birth, by apparatus alone. Such a statement I have never made; and for the simple reason, that I know cases of this nature *can be cured* by machinery alone. I have seen others effect this object by such measures, and I have often succeeded in the same thing myself.

But the *possibility* of making a cure by apparatus alone, is not the question to be determined. We want to know what plan of treatment is the *best*—what plan causes the *least suffering*—what plan results *most frequently* in cure? This is the question; and ample experience has proved most clearly to my mind, that a

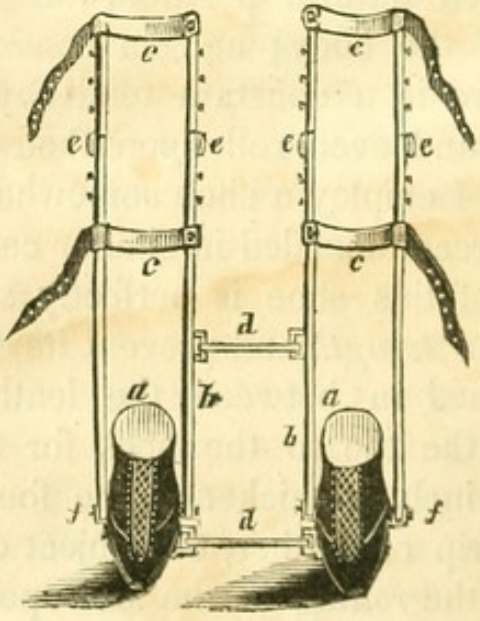
division of the tendons in fault is by far the *safest*, as well as the most successful method, even in the youngest subjects.

If, then, you should be called to an infant labouring under this defect, do not hesitate, if you treat him at all, to divide the tendon Achillis. This, in most cases, will be sufficient to place the foot in a favourable condition for the use of an appropriate machine; the tibial tendons, as well as the fascia plantaris, *generally*, readily yielding after its division. The subsequent treatment is precisely similar to that recommended for Varus of the second degree. In children between the *first* and *sixth* year, the same plan of treatment is to be instituted, with this exception, that after the heel has been brought down, and the tendon united firmly, which generally occupies about ten days, the child, if old enough to walk, may put on the shoe constructed on the principles of Scarpa and Delpech; and after it has accomplished the object for which it was applied, a common stiffened one. It occasionally happens, however, in children, and sometimes even in adults, that the ankles remain for several weeks after the feet have been brought to their natural position, too weak to support the weight of the body; and in consequence of this weakness, there is a constant tendency in the *feet* to turn inwards, and even roll upon their outer margins. In such cases, I employ a shoe somewhat different from those usually recommended in similar cases.

The sole of this shoe is perfectly straight, and in order to give it *strength* and prevent its warping, a steel plate is stitched in between the leathers. Its *outer* margin, from the toe to the heel, for the distance of about half an inch, is thickened the fourth of an inch, by a simple strip of leather, the object of which is the prevention of the *rolling* of the foot upon its *outer* mar-

gin. It is also furnished with instep straps, which start from the heel and lace in front of the foot. The upper leathers of this shoe, should always be divided down to the toe, so that the foot may be properly adjusted.

The leg-irons need not, as a general rule, extend higher up than the bulge of the calf; sometimes, however, when the knee joints are weak, or when the inclination inward of the whole member is considerable, we carry them to the middle of the thighs, or even to the pelvis. This inward inclination of the legs and feet, is, however, more effectually guarded against by the transverse bars which pass between the inner leg-irons, and between the toes of the shoes. These parts are so attached that they possess only *horizontal* action, and while they serve to separate the members to a proper distance, they force the patient to move his feet in parallel lines. It is highly important to attend to their correct attachment; for if they are allowed any *upward* motion, the patient will be sure, when his feet are elevated to take a step, to turn them in. The bar-mortises should, therefore, be just large enough to allow of free horizontal action to the bars.



aa, Shoes lacing from the toes up.

bb, Leg-irons, extending up to the middle of the thighs.

cccc, Straps and buckles for attaching the irons to the limbs above and below the knees.

dd, The horizontal bars intended to keep the feet and legs sufficiently separated.

eeee, Joints opposite the knees.

ff, Joints opposite the ankles.

When first applied, this apparatus is often exceedingly troublesome to the patient, from the limited motion which it permits; but in a few days this wears off, and long before it is proper to remove it, its use is no longer attended with inconvenience. How long it should be worn, depends entirely upon the disposition to inversion of the feet. In persons somewhat advanced in life, or who are old enough to regulate the motions of their limbs, a few weeks is generally sufficient; while in children, it will sometimes be required for a month or two.

When the case has been neglected until the individual is advanced in life, the difficulties to be encountered in its treatment are of the most serious character. Here a division of the tendon Achillis, rarely, at least in my hands, proves sufficient; generally, the fascia plantaris, the tendons of the tibials, and often those of several of the toes, require the same operation. It is impossible, however, to lay down any positive rule, with respect to which tendon requires section in such cases; you must be governed entirely by the peculiarity of the one under treatment, and divide every tendon that seems to prevent the accomplishment of our object.

You are not, however, to divide them all at the same time, for fear of exciting too much irritation. I commence always with the tendon Achillis, as the depression

of the heel is the chief object to be attended to, and place the foot at once in the extending apparatus. In the course of ten days, if it seems necessary, I divide the tibialis anticus, and sometimes the posticus, which generally enables me to bring the foot nearly to a straight position. Should this not be accomplished in ten days more, I cut the fascia plantaris, and act pretty forcibly upon the anterior portions of the foot, while the heel is firmly fixed, in order to prevent its reunion.

You must not expect, gentlemen, that *thirty days* will be sufficient, in these old cases, for the period of treatment; for although at the expiration of this time the foot should be much improved, yet it will require a month or two more, and sometimes longer, for the *bones* to get into their proper positions, and for the ligaments to accommodate themselves to their new situations. It will not be necessary, however, as a general rule, to confine your patient to the horizontal or recumbent posture during the whole of this time; as soon as the soles of the feet can be made to look towards the earth, it will be best for him to attempt to walk, even although the heels should remain a little elevated. Exercise, more speedily than any thing else, brings the member to a normal condition, both of shape and action.

It is in these cases that we have to contend with excoriations from the pressure of the instruments; with irritation of the synovial membranes from a binding of the bones upon them; with œdema of the cellular tissue of the foot and ankle, from the action of our bandages or straps; with pains in every joint of the foot from the bones settling into their new positions; and often with cramps of the muscles of the leg. Great care, on the part of the surgeon, is required to overcome these difficulties. The instrument should be carefully padded, and daily removed; the irritation of the

synovial membranes may be reduced by leeches and cold applications; the œdema of the ankle and foot, by frictions with stimulating liniments; the pain in the joints being dependent on a mechanical cause, can only be relieved by keeping the feet at rest; while the cramps may be treated by opiates.

I have never, as yet, seen the constitutional disturbance so great as to require much attention. I have never been obliged to bleed a patient, and very rarely to diet or purge him. Should any excitement take place, it must be treated on general principles. When the patient begins to walk, I always employ the shoe so frequently alluded to as that constituted on the principles of Delpech and Scarpa, with or without the transverse bars, as the case may or may not require them. This is to be worn as long as it may seem necessary, when a common stiffened shoe, or the weak-ankle shoe, already described, may be substituted for it.

It is in such cases, too, that we have to contend with great muscular debility of the legs, the muscles, as I have already mentioned being often reduced to mere ribbons. To promote their development, and overcome this debility, frictions, cold bathing, and as much exercise as possible, are to be resorted to.

In Valgus, the same general principles are to be pursued.

In the first degree, when it occurs at birth, Dupuytren's apparatus for fractured fibula may be applied, (as in the accident for which it was contrived) on the *inside* of the leg, and the foot forcibly inverted; or we may use a machine similar to that recommended in

Varus, only placing the *hinge-splint* on the *outside* of the foot-board. After the *eversion* of the foot has been overcome, we may apply a common shoe, stiffened on the *outside*.

In Valgus met with between the first and sixth year, the same treatment will generally answer; but should the tendon Achillis offer much resistance, which it sometimes does in those cases in which the heel is slightly elevated, it should be divided. The tendons on the outside of the foot usually yield without difficulty as soon as this is effected.

Although I have never met with a case of Valgus of the first degree in persons advanced in life, the indications are so simple in all such cases, that the treatment would offer no difficulty to any one in the habit of managing similar defects. If machinery alone should prove inadequate to the proper inversion of the foot, the *tendons* in fault ought to be at once divided, and the subsequent management conducted on general principles.

In Valgus of the *second* and *third* degrees, we must be governed entirely by the peculiarities of the case. In infancy, machinery alone will generally prove sufficient to depress the heel and invert the foot. When the individual is between one and six, it is often necessary, especially in the third degree of Valgus, to divide the tendons in fault. In persons still older, it will be useless to attempt the cure by mechanical measures alone, the tendons in *every case* should be severed. In all such cases I would employ the apparatus already alluded to, as being a modification of that employed in Varus; and when the patient begins to walk, a shoe with the sole divided so that it might by lateral inclination be made to accommodate itself to the foot, might be employed until a common shoe could be worn.

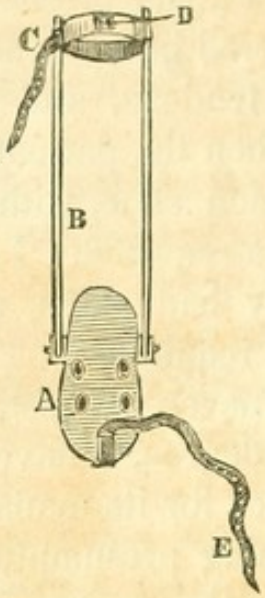
The only case of Valgus presenting the second degree, which has occurred in my practice, readily yielded to a section of the tendons, and the employment of extension; so that when the patient was in a fit condition to walk, a common shoe, with leg-irons up to the knee, was all that was required. I can easily conceive, however, that in very bad cases, a more complicated contrivance would be required.

Although I have never, as yet, treated a case of Valgus in the third degree, I have, nevertheless, ventured to lay down rules for its management. There is, however, I trust, nothing presumptuous in this; for understanding, as I do, the proper indications in such cases, the most efficient remedies are readily inferred.

We have lastly to speak of the proper treatment in Pes Equinus.

In this form of club foot the indication is generally extremely simple; the defect residing almost exclusively in the tendon Achillis, its elongation is nearly all that is required to effect a cure, except in cases of long standing.

The first degree, where the heel is but slightly elevated, when met with at birth, may always be cured in a short time, by the use of a properly contrived stretching apparatus, which should be worn day and night, until the object in view is attained. The instrument which I employ, is exceedingly simple. It consists of a footboard furnished with four mortices, through which the tapes of a gaiter are passed; of a strap attached to its point; of leg-irons which extend to the knee, and of a buckle attached to the anterior portion of the strap of the leg-irons.



A, Foot-board, which is attached to the leg-irons by a wire joint, so that its angle of inclination may be varied at pleasure.

B, Leg-irons passing up to the knee.

C, Strap to attach the leg-irons to the limb.

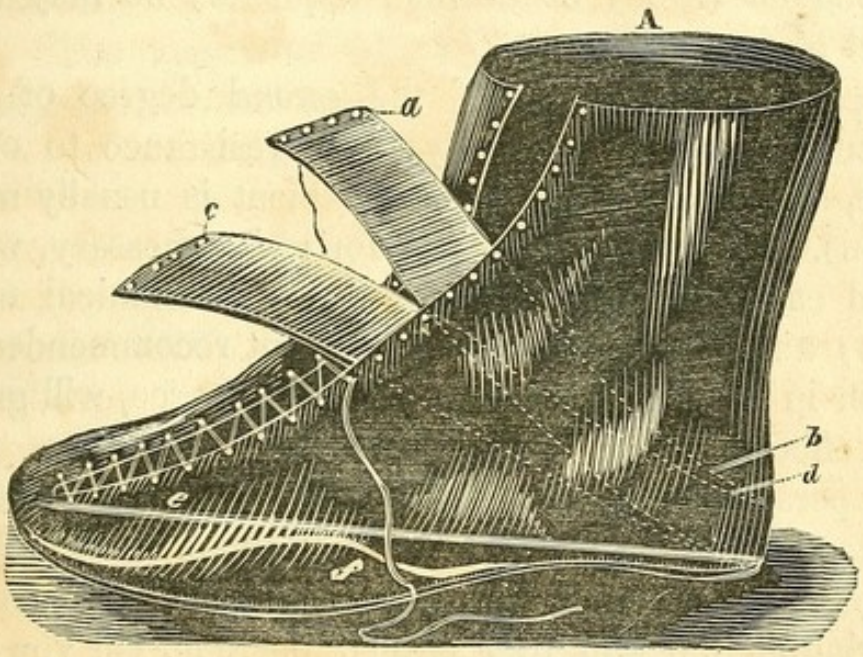
D, Buckle intended for the toe-strap.

E, Toe-strap, by which the toe is elevated.

The gaiter having been adjusted to the ankle, we place the sole of the foot *flat* upon the board, and fasten it down by tying the tapes securely. We next fasten the strap of the leg-irons, and then pass the toe-strap through the buckle. Every day or two we take up a hole, and as we elevate the *toe*, it is evident the *heel* must descend. This simple contrivance answers perfectly, when the force to be applied is not very great. Having brought the heel down, we employ a straight shoe furnished with instep straps, which should be worn day and night by the child, until all tendency to retraction of the tendon Achillis has disappeared.

In children between the ages of one and six, the same apparatus will answer in time; but I would not hesitate in such cases about the division of the tendon in fault. It should be severed at once, and in the course of ten

days the child may begin to walk, in shoes furnished with instep-straps, to keep the *heel down* in contact with the sole. When a person is advanced in life, and labours under this degree of Pes Equinus, he can only be relieved, *in a short time*, by a section of the tendon Achillis. Cases are reported, in which the spring shoe of Scarpa, the sabot of Venel, and other contrivances have, with much suffering, and after a long time, brought down the heel; but do not, I beg of you, subject your patients to any such treatment; divide the tendon in all such cases. After its division, you may employ the simple stretcher just described, and when the parts are sufficiently united, and the heel down, give your patient a shoe such as I now show you.



A, A common high quartered shoe, fitting closely around the ankle, and lacing from the toe up.

ab, Left instep strap.

cd, Right instep strap. These straps are stitched firmly to the heel of the shoe, and are intended, by lacing across the instep, to keep the *heel* down in its place.

e, A steel spring the width of the foot, and *nearly* the

length of the shoe, which is rivetted to the heel, and passes forwards at an angle of about 35 degrees.

f, A supporting spring, intended to give strength to the former, it may be introduced or not, as the surgeon sees fit. It is only in very obstinate cases that I have employed it.

We make use of these springs to keep up a continued action upon the *toe*, by which the disposition to retraction, always present to a greater or less extent, in the tendon Achillis, is overcome.

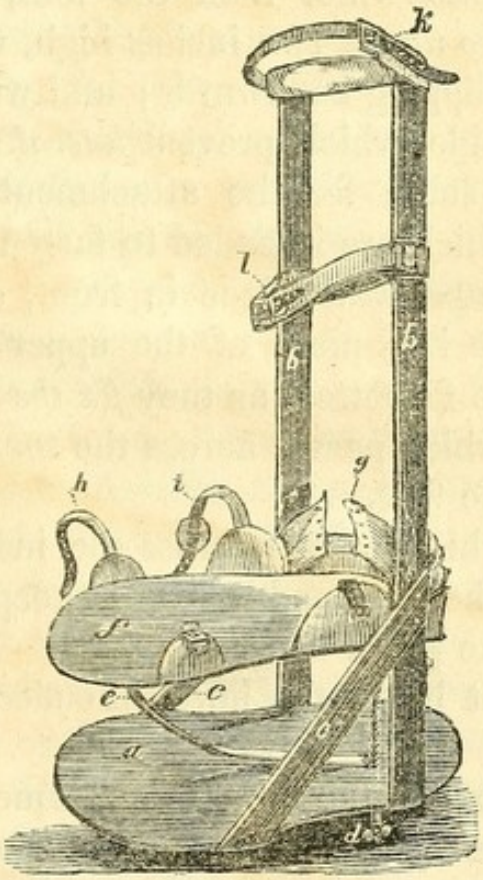
The merit of having *first* employed a similar contrivance, for the accomplishment of this purpose, is due, I believe, to Scarpa; and I show you only a modification of his apparatus. In these shoes the patient may walk as long as it may be deemed requisite; he may then resort to a common one.

In the management of the *second* degree of Pes Equinus, we have generally more resistance to overcome, and consequently our treatment is usually more tedious. I have never, as yet, found it necessary, when called early, to apply any thing but mechanical measures; and in such cases, the treatment recommended as proper in the early stages of the *first* degree, will generally effect a cure.

In persons between the first and sixth year, I would advise you not to waste time in attempts to *stretch* the tendons; for although this, sooner or later, will succeed in bringing the foot to a proper position, yet you will save your patient much suffering, and yourself much trouble, by their division. The subsequent treatment is precisely similar to that recommended in *old cases* of the *first degree*.

When called to a case, somewhat advanced, you must calculate upon a tedious treatment. To effect a cure it is essential to divide the tendon Achillis, and often the fascia plantaris, which is here remarkably

dense and rigid. It is in these cases too, that we are so often obliged to divide the tendons of the *toes*, some of which are almost invariably so much distorted, that it would be impossible to employ a proper shoe, until they are brought to a more normal position. In these cases, I have also found, that the simple stretcher already described, did not possess sufficient force for the elevation of the toes; and besides this, it is necessary, from the great deformity of the foot, to employ a more complicated apparatus than a gaiter, to fix it upon the foot-board. It is, moreover, of great importance, in cases where it becomes necessary to employ much force, to have an apparatus so constituted that it may be *regularly* and *gradually* kept up, and increased or diminished at will, without deranging the whole dressing. The apparatus which I show you, and which is of my own invention, fully answers all these purposes.



a, An iron plate, the eighth of an inch in thickness, and a little longer than the foot.

bb, Leg-irons, extending to the knee.

cc, Strips of iron about an inch wide, which serve to strengthen the attachment between the leg-irons and lower plate.

d, A screw, which, passing through the lower plate, is firmly attached to the heel of the upper, and is so threaded, that when we force the nut *on*, the heel is necessarily depressed. The advantage of this screw consists in the *regularity* and *steadiness* of its action.

e, A strong steel spring, which passes upwards from the heel of the lower plate, and is intended to act upon the *toe* of the upper, while the *heel* is *depressed* by the screw. The strength of this spring must, of course, depend upon the nature of the case.

f, An iron plate, of the dimensions of the lower. It should be a little wider than the foot, and furnished with a *heel-piece* about two inches high, which prevents the heel from slipping backwards; and with side pieces, two on each side, which prevent *lateral* slipping of the foot, and also serve for the attachment of the straps and buckles, which are intended to fasten it securely.

g, Instep-straps, which lace in front, and are firmly stitched to the heel-piece of the upper plate. These should never be forgotten, as they *fix the heel.*

h, A strap which passes across the toes, and laces on the inside of the foot.

i, A strap which passes across the instep, fastens on the inside of the foot, and assists in keeping the sole in contact with the plate.

k, Strap just below the knee, intended to attach the leg-irons.

l, One just below the calf, for the same purpose.

The tendons having been divided, the wound closed,

and the gaiter adjusted to the ankle, we next place the foot upon the upper plate, which, in order that it may accommodate itself to the inclination of the sole, must be *depressed* in *front*, while the *heel* is allowed to *ascend*. We then tie the gaiter tapes beneath the upper plate, by passing them through mortices, or even by carrying them over the *sides* of the plate. Next, lace the instep-straps, and buckle those which cross the anterior portions of the foot; finally, fasten the leg-irons. The foot is thus firmly secured, and we commence at once the depression of the heel, by turning the screw until the patient complains of uneasiness; we then fix it at this point. The next day another turn of the screw may be given, until by degrees we bring the plates to the relative position, shown in the cut. The angle formed between the foot and leg, will have become by this time nearly a *right* one, and the patient will have pretty good use of the member in a very short time.

This apparatus should only be removed for the purpose of bathing the foot; and wherever there is much pressure, cotton wadding, or an air cushion, must be placed between the skin and the instrument. After it has accomplished the end for which it was employed, the shoe with a spring on the sole may be substituted for it, and worn as long as it may be deemed necessary.

In Pes Equinus of the third degree, (Talapes Equinus Verus of Mr. Little) occurring at birth, I advise you to divide the tendo Achillis at once, and employ afterwards the simple stretcher already described.

In the same defect, met with in children between the first and sixth year, the tendon should also be divided, and in the course of two or three weeks, the child made to walk in the spring shoes already described, until the retraction of the heel is entirely overcome. For the depression of the heel, the apparatus just recommended for infants may be employed.

When the case has been neglected until the individual is advanced in life, the treatment recommended in similar cases of the *second* degree of Pes Equinus, must be employed.

In all these cases, the usual general treatment, such as frictions, bathing, &c., is to be pursued.

I have said a good deal about the division of tendons, but have not as yet explained to you *precisely* why we divide them; nor mentioned the changes which take place, not only in the tendons themselves, but also in the surrounding tissues, after the division of the former.

The first, and most important indication in the treatment of club foot, you have already been told, consists in the application of such measures, as shall most *speedily* bring the shortened tendons, (the chief cause of the defect) to their proper length. In the young and feeble, well *regulated* and *continued* extension will often proves ufficient to effect this object; but when, instead of such patients, we have to deal with the aged or robust, in nine cases out of ten, it fails, and for the following reasons:

First. In the old and vigorous, the tendons have become so rigid, that no common force will be sufficient to overcome the difficulty; and although they apparently yield for the first few days, the extending effort becomes so painful, that the patient cannot bear it, and the operation is abandoned.

Secondly. In similar cases, this extension often acts as a *stimulus* to the muscles of the leg, producing repeated, and often violent spasms, or cramps, which create so much suffering, that the individual rarely submits for any time to our treatment.

Thirdly. In some cases it is *impossible*, from their extreme rigidity, to stretch the tendons, even although the patient be willing to submit to our measures.

It was to overcome these difficulties, that the division of the tendons was proposed, and it would appear that veterinarians had long been in the habit of performing a similar operation in contractions of the feet of horses, before it was attempted upon the human subject. You must not imagine, however, that a mere division of the tendons will be sufficient to effect a cure. On the contrary, were we to leave our patient without doing any thing else, so far from benefitting him, he would be even worse off than before. The tendons are divided merely to place the parts in a favourable condition for subsequent efforts on the part of the surgeon.

The opinions of those who have devoted much time to this operation, differ materially with regard to the proper treatment after the division of the defective tendons. Some, with the celebrated Stromeyer at their head, recommend the extremities of the divided tendon to be at once placed as nearly as possible in contact, and retained in this position until they are reunited and healed, when the apparatus for modeling the foot may be applied. It seems somewhat paradoxical to advise the *division* of a part, and then its *immediate reunion*, for the accomplishment of a given object; but this apparent contradiction in practice, is done away with, when we recollect that the substance by which the tendon reunites, differs materially in its nature from common tendinous matter. Being composed almost entirely, after the lapse of a day or two, of coagulable lymph, in a state of imperfect organization, the cicatrice yields from the application of extending force, like a piece of putty, and may be stretched to any desirable length. The extensibility of

this new matter effectually prevents the transmission of force to the muscles of the leg, and thus spasmodic resistance is prevented. Although this practice has the sanction of high authority, and although it has repeatedly effected cures in my own hands, I am, nevertheless, from *experience*, induced to give the preference to the method introduced chiefly by Pauli, of Landau, and Bouvier, of Paris. Instead of attempting to reunite the tendon, they bring the foot down at *once* as nearly as possible to its proper position. Although these gentlemen have the credit of this practice, it was, nevertheless, employed by Lorenz and Reiche, long before; and has always been the custom among veterinarians, who cut the tendon and bring down the hoof at once. The objection urged against this plan of treatment, viz: that there is danger, especially in old cases, of no ultimate reunion of the tendon, is utterly untenable; because ample experience has proven that this union *invariably* occurs, even when the extremities of the tendon are separated two or three inches. In my own practice, I have repeatedly seen this take place.

The great advantage which it possesses, is in the saving of *time;* although there is also *less pain* when the heel is depressed, as far as possible, *immediately* after the operation, than where this is postponed for two or three days. I am fully convinced that I might have cured several of my patients in *one half* of the time employed, had I pursued the former, instead of the latter method.

The process set up by nature for the restoration of the continuity of the tendon, is precisely similar to that which she employs for the regeneration of any other tissue, with the exception perhaps of bone. In the first place there is an effusion of blood, (caused by the operation) which soon coagulates between and around the extremities of the divided part, and sometimes is

extravasated to some distance into the adjacent cellular tissue. In a few days the colouring matter is absorbed, and coagulable lymph, the true bond of union in wounds, remains in its stead. In time, this is converted into a *modification* of fibrous tissue, by which the tendon is permanently united; for there is never a reunion by proper *tendinous* matter. The cicatrice is sometimes larger and sometimes smaller in diameter than the tendon which it connects; but I have never as yet found it too feeble to serve all the purposes for which it is required. You will also find more or less adhesion between the tendon and the surrounding parts, so that when the patient begins to walk, he complains of *stiffness* in the ankles; and if you examine the part when he takes a step, you will perceive, that instead of gliding freely, as it usually does, in a sheath, the tendon is almost immovable. In proportion, however, as the tissues are relaxed by exercise, this inconvenience disappears, until at length it is not perceptible. Like all other cicatrices, there is a tendency in this to *contraction*, which, as I have already told you, must be carefully counteracted by appropriate measures. These remarks are applicable, not only to the tendon Achillis, but also to every tendon that may be divided, in the treatment of a case of club foot.

The operation of dividing the tendon Achillis is exceedingly simple, and productive of little or no pain; there is, nevertheless, considerable diversity relative to the *precise* manner in which it should be performed. Lorenz, who first divided this tendon, made a cut through the integuments and it, from *behind forwards*, closed the wound, and brought down the heel at once. Michælis also divided the integuments, but instead of severing the tendon completely, he cut it about *half* through, and left the rest to be gradually extended.

Sartorius made an incision along the back of the tendon, opened its sheath, and then divided it on a director from *before backwards*, and immediately brought down the heel as far as possible. Delpech was the first to simplify the operation, by dividing the *tendon only*, leaving the skin over it untouched. He passed a narrow knife, *before* the tendon, through and through the leg, so as to cut the skin for about an inch on each side; he then divided the tendon with a convex-edged bistoury. Instead of bringing down the heel, he *extended* the foot, so that the tendon might reunite, and postponed until the *twenty-eighth* day, the extension of the cicatrice. Stromeyer, who has probably done more for the operation than any one else, introduces a narrow knife about two inches long, with a convex cutting edge, about one or two inches above the insertion of the tendo Achillis, between it and the bone, the edge of the knife being turned towards the *former*, and pushes it on until its point comes out on the other side; being careful, to make the cutaneous wounds as small as possible. The heel is then forcibly depressed, the edge of the knife brought against the tendon, which separates with a *snap*, and the operation is completed. As soon as the snap occurs, the instrument is carefully withdrawn, through the wound made by its introduction. The tendon is then united, and extension commenced, on the tenth day in adults, and the fifth in children.

There are two objections, and as I think, serious ones, to this mode of operating; the first is, the danger of wounding the posterior tibial artery, which is often directly in the track of our incision; the second is, the risk we run of getting the point of the knife entangled in the fibres of the tendon, when only a portion of them can be divided. As the success of the

operation depends almost entirely upon the *complete division* of the tendon; this is of course a serious objection to the Stromeyerian method. I must, however, in justice remark, that the operation performed agreeably to this plan, is preferred by many skilful operators to any other.

Mr. Whipple of Plymouth, operates as follows: "The foot being extended as much as possible, the integument *posterior* to the tendon is pinched up about two inches above the os calcis, in order to separate it from the latter, when a narrow-bladed knife, with a rounded cutting extremity, is passed from within obliquely downwards and outwards, between the integument and tendon; and as soon as the point of the knife is felt under the integument, and on the outer side of it, considerable flexion of the foot is made by an assistant, the point of the knife being at the same time depressed, so as to bring it in contact with the tense tendon, when by firmly depressing and withdrawing the instrument, the object is instantly effected. This is made evident by the sudden jerk with which the heel is brought down, in some instances two or three inches, as in cases of talapes Equinus. The knife should be passed from the *inside outwards*, for this reason: Should you depress the point more than is necessary to divide the tendon, there would be no risk of wounding the posterior tibial artery, which would be the case were you to introduce your knife from *without inwards;* and it is essential to depress with some force, or you leave undivided some fibres of the tendon most remote from your puncture, and have to introduce the knife again, (not a little embarrassed at your own bungling,) for the purpose of dividing them. However, although the point of your knife be dipped some distance anterior to the edge of the tendon *externally*, in order to secure its division, this will not be necessary *internally*,

as, the moment you feel your object effected, you discontinue the pressure on the knife, and withdraw it carefully, so as not to enlarge the integumental opening."

"By this means," continues Mr. Whipple, "you pass your knife across a relaxed tendon, which, when rendered tense, is brought up to meet the edge of the instrument, and therefore more readily divided than when you pass your knife between it and the deeply seated muscles. Another objection to the latter plan with me is, that the tendon is in such close contact with the integument, that you run a great risk of dividing, or partially dividing the latter, which, from the years of contraction to which it has been subjected, is rendered exceedingly tense when the foot is flexed. In upwards of thirty cases which I have examined, I have found no exception to this. Again, where the toes are the points of support, the tendon will be found nearly embraced by the integument, as in the corresponding tendon in the horse, though certainly not to such an extent."

Mr. Whipple also divides the tendon *obliquely*, while most other operators cut it *directly across*. The reasons of Mr. W. for this practice, are ingenious; but ample experience has proven, that a *direct division* of the tendon is as frequently followed by a proper re-union, as when the *oblique section* is performed. Mr. Whipple assigns the following reasons in favour of the latter mode: "*First*, By so doing you have a larger surface for nature to carry on her operations on. *Secondly*, you have the obliquely divided tendon in nearer approximation, and thereby secure a firmer ligamentous bond than in the transverse division; and, *Thirdly*, the application of the instrument does not separate the lips of the wound; a desirable point, as the sooner it heals, so as to prevent the escape of lymph, the better." The puncture is closed by adhesive plaster, and the stretcher at once applied.

Bouvier of Paris, who received a prize of 6000 francs for his Essay on Club Foot, divides the tendon by making but one opening in the integuments, and that on the inside, so as to admit a very fine probe-pointed bistoury, to pass across in front of the tendon, while the foot is moderately flexed. He then, with the convex edge of the knife, cuts across the tendon, and immediately applies the apparatus for maintaining the foot in a state of complete flexion.

Pauli, of Landau, a surgeon of considerable eminence, performs, I understand, the Stromeyerian operation; and after the wounds have healed, brings the foot down, and instead of using an apparatus similar to those usually employed for this purpose, makes a mould of plaster of Paris, around the foot, which he allows to remain undisturbed for several days; it is then broken and a new one taken, and in this way the foot by degrees is brought to its proper shape. The practice of dressing fractures in this way, to which your attention has already been called, originated with the Egyptian surgeons of centuries ago, and is not a modern invention, as some would have us believe; Pauli is the first who has employed it in cases of club foot.

The operation which I prefer is precisely that of Mr. Whipple, with the exception, that instead of dividing the tendon *obliquely*, I cut it *directly across*. The latter method I prefer, inasmuch as it is more easy of execution, (although both are simple enough,) and the tendon when divided, separates with an *audible snap*, which enables us at once to detect its complete division.

The patient having been prepared, when this is necessary, by rest, diet, purging, &c., for the operation, it is performed as follows. If the individual be a child, he may be laid across his mother's lap; if older, he should be placed flat on his face upon a bed or table; an as-

sistant steadies the limb, while the surgeon grasps the foot with the right or left hand, as the case may be, and forcibly extends it, so as to relax the tendon and the integuments covering it. He then passes from *within outwards* a narrow convex-edged bistoury, about one or two inches above the os calcis, and between the *integument* and *tendon*, until its point gets beyond the outer margin of the latter: the foot is then suddenly *flexed*, which brings the tendon against the knife, previously turned upon its edge, and with very little pressure upon the instrument the operation is completed, which is generally indicated by the *snap*, and by a *sudden jerk*. As soon as this is perceived, and not until then, the knife is withdrawn in the same way in which it had been introduced. The little wound is then closed by adhesive plaster, the stretching apparatus applied, and the subsequent treatment conducted as I have already indicated. Whenever it seems necessary to divide other tendons, the operation is to be performed upon a similar plan; make but *one* puncture, and divide them directly across, and then begin to extend the parts *at once*.

I might, next, say something about the *dangers* of this operation, but gentlemen so far as I have been able to learn, there are *no dangers*. The opponents of the division of tendons to overcome deformities of different kinds, daily preach to us of tetanus, of sloughings, of erysipelas, and even of death, but their fears are idle. There is no case upon record, in which, when the operation has been properly performed, and *no other cause* operating to produce dangerous symptoms, serious consequences have resulted. In the case of the person operated on by Delpech, who was several months in recovering, it is evident that all the distressing symptoms to which he was subjected, originated in the manner in which the operation was performed. Inflammation may supervene, it is true, even

when the operation has been properly performed, but in no case have I heard of its resistance for any time, to the action of proper remedies. Tetanus has never, in any case reported, been present as a *direct* consequence of the operation. I have understood from a friend who performed the operation in one instance, that slight tetanic symptoms supervened; but in this case the boy was exposed to both *cold* and *wet*, and the probability is, that the tetanic affection was the result of the last mentioned causes, rather than of the operation. The idea that this operation would be likely to bring on tetanus, has its origin in the well known fact, that *punctures* or *lacerations* of tendons often occasion this disease, but the nature of the wound is here altogether different. Others have feared a division of the posterior tibial artery, but as I have already explained to you, there is no danger of this, provided the operation be properly performed. I think, gentlemen, that I have a right to make these statements, inasmuch as I have divided for different affections, between *fifty* and *sixty* tendons, and have *never*, as yet, *met with the slightest bad symptom of any kind.* I would, however, advise you in giving your prognosis in such cases, to leave some way of escape for yourselves in the event of disagreeable symptoms supervening. An individual may die, you know, from a prick of his finger, or from wounds equally trifling; you should, therefore, let such a *possibility* be borne in mind, when your opinion is asked relative to the dangers of the operation in question.

I have already told you that this operation is a very simple one; but you will occasionally be not a little annoyed after its performance, at finding the heel (when the tendo Achillis has been divided) still forcibly resisting our efforts for its depression. This arises from the thickness of the *sheath* of the tendon, and before we can accomplish our object this *must* be divided, especially if the

patient is somewhat advanced in life. I have been obliged to perform the operation in three or four cases: the last one was a child of Mr. Creass, to whom I was called by Dr. Ruan, one of our most eminent practitioners. You can generally detect the existence of this condition of the sheath, by passing your finger along the back of the tendon until you reach the point of its division, at which, instead of meeting with a considerable depression, as is usually the case, you will find a *firm* and *resisting* substance; not of course, as firm as the tendon, but sufficiently so, to be readily detected. This may be divided by passing the knife generally employed for the section of the tendon, through the wound made in the integuments for this purpose. I always examine the foot on the morning *after* the operation, when if the sheath seems to offer much resistance, I immediately divide it. I make this statement, with a full knowledge of the importance set upon preserving the integrity of this sheath, by Mr. Bouvier, who contends that it is chiefly concerned in the reproduction and proper modelling of the new tendon.

As the division of tendons for the cure of different deformities is now occupying the attention of the profession in all countries, it may not prove uninteresting to you to learn something of the history of this operation, with reference to its introduction in the management of club foot. Notwithstanding the fact that it was performed in 1784 by Lorenz, of Frankfort on the Rhine, whose case is reported by Thilenius, its extensive promulgation is due to Michælis, who clearly demonstrated its utility in 1810. It should therefore be classed among

the *modern* improvements in surgery; indeed, it seems to have been almost forgotten from the time of Thelinius up to the period at which it was revived by Michælis. Even after this, it was again partially abandoned, chiefly through the influence of the celebrated Professor Langenbeck, who opposed it with the greatest bitterness. No one else in Germany seemed disposed to protect an operation opposed by such authority, and it was nearly abandoned, until after its performance by Delpech, of Montpellier, in 1816: for reasons well known to the profession this surgeon never operated a second time.

In 1830, the celebrated Stromeyer, of Hanover, directed his attention to the subject; and by careful investigation and ample experience, he, in a short time was able to *establish* the division of the tendo Achillis in club foot, upon a basis which, I may with confidence assert, is destined to be as enduring as the profession of surgery itself! By and by, other surgeons were induced to perform the operation; and among them Rieche of Magdeburg, Meyer of Wurzburg, Holscher of Hanover, Dieffenbach of Berlin, Haess of Strassburg, Pauli of Landau, and Roux, Duval, and Bouvier of France, all of whom met with such success, that it was at once placed upon the list of the "*successful*" operations of surgery. From Germany and France, its fame soon spread over Europe, and in no country was it more cordially received than in Great Britian. Whipple, Liston, Little, Keate, and many others have done it ample justice, and fully established its reputation. With a spirit which but too often shows itself in the good people of our "fatherland," however, its German descent has been questioned. Mr. Liston declares that "the division of tendons for the cure of deformity, is by no means a new proceeding, and that it was frequently resorted to by many

of the olden surgeons, among whom were John Mekran, and Mr. Sharpe, who practiced nearly a century since. He admits, that so far as regards club foot, *Delpech* deserves the credit of having introduced it.

Mr. Keate, of St. George's Hospital London, goes farther and says, that "it is an old discovery newly revived, which he had thirty-five years ago often seen put into practice." The settlement of this question is, however, a matter of but little *practical* importance. For my own part, I am disposed to give the merit of the discovery to the Germans; and for the simple reason, that we have no mention made in any of the old English works, of such an operation.

It was in 1835, just five years after Stromeyer had published his report on the subject, that the operation was *first* performed in the United States of America. Dr. James H. Dixon of New York, claims to be the operator in this case. Strange as it may seem, he has never, so far as I have been able to find, reported his case, or the means by which the cure was attempted. A statement was promised, some time since, but has not, I believe, made its appearance.

Professor N. R. Smith, of Baltimore, was the next to undertake the operation, and in 1836 performed it *twice*, successfully. Dr. Detmold, of New York, to whom we are indebted for a most interesting report upon the subject, is probably the next who performed it successfully. His first operation was done in 1837; since which, he has treated, as I understand, a number of cases with complete success.

My friend Dr. G. W. Norris, comes next to Dr. Detmold. He operated in 1838, but from his report of the case, failed in the accomplishment of a perfect cure, although the patient was much benefitted. The failure here arose in all probability from the defective apparatus

employed; for the operation (which I witnessed) was performed in the most skilful manner.

A few days after Dr. Norris's operation, I performed my first; since which I have treated twenty-eight cases, a larger number I believe than has occurred in the practice of any other surgeon in the country; with the exception perhaps of that of Dr. Detmold, who, I am told, devotes much time to this branch of surgery.

Within a few months past, Dr. Walter, of Pittsburg, Professor G. McClellan, and Dr. Fox, of this city, have performed the operation, but as the cases have not as yet been reported, with what success I cannot say. From the reputation of these gentleman, however, I have no doubt but that we may anticipate a favourable result. I am not aware that any other surgeon in the United States has undertaken the operation; if so, I trust he will set down my omission of his name to any thing but a desire to treat him with neglect.

I have thus, gentlemen, in a hurried sketch it is true, endeavoured to point out to you the nature of club foot, and the best mode of treating it. I trust, that what I have said will be sufficient to excite you to the investigation of this most distressing deformity; and it will afford me much pleasure to afford you every facility in my power. My cases, as well as the various apparatus employed, may be examined by any of you who feel disposed to take an interest in the subject.

REPORT OF CASES.

CASE I.

About the 1st of June, 1838, I was requested by my friend, Dr. Moehring, to visit in consultation, a daughter of Mr. Bacon, who from her birth had been affected with double Varus in the *third* degree. From the history of the case, as given by the mother, it seems that she had been treated immediately after birth by a surgeon who applied an apparatus of his own design, but which, from its producing no amendment, was soon laid aside. The surgeon himself was also requested to give up the case, which he did, and *pronounced it incurable.* She is now about six years old, of a nervoso-sanguine temperament, and perfectly well formed in every part, save the feet and legs; the former of which present the marks of a well developed case of Varus in the third degree, and are furnished on their outer margins with large bursæ mucosæ. The heels are but partially developed, and at least one inch and a half from the floor when she is placed in the erect posture. The tibiæ are also considerably distorted, the superior external articulating surfaces being thrown *forwards*, while the calves of the legs have almost entirely disappeared. From the looseness of the articulations of the knees, the patient, when forced to support herself in the erect posture, presents a most awkward appearance, from the inclination *backwards* of the whole inferior extremity. The articulations of the tarsus and metatarsus were much more rigid than those of a well formed foot, and it was impossible to bring the foot into a straight position by any force calculated to effect this object. Notwithstanding the great deformity of both feet, the child was remarkably active. From the nature of the defect, it was obvious, that all the usual methods of cure would prove useless, and a division of the tendines Achillis was therefore determined upon.

On the 20th of June, in the presence of Drs. Moehring, Horner, J. K. Mitchell, J. Vaughn Smith, U. S. Navy, Goddard, and J. Howard Smith, U. S. Navy, the operation was performed in the manner already described. A uniting bandage was then applied, and the feet, supported in an elevated position, were ordered to be kept constantly wetted with cold water, as recommended by Stromeyer, in order to prevent inflammation.

The operation occasioned but a moment's pain, and was succeeded by no excitement of any kind, the patient sleeping well, enjoying the light diet to which she was restricted, and being as cheerful as her companions.

In eight and forty hours the external wounds had healed, and we applied an extending apparatus. From the faulty construction of this contrivance, and the remarkable tenderness of the integuments, considerable irritation was occasioned; and we were obliged on the third day, to remove the dressings entirely, and to place the feet on pillows, and apply emollient poultices to the inflamed parts; a mild aperient was ordered, and the diet restricted to vegetables and fruit. With the assistance of her father, a gentleman of much mechanical ingenuity, I contrived an apparatus somewhat similar to the one referred to as that employed at present, immediately after the operation, into which her feet were placed. This answered perfectly, and was employed throughout the treatment, until she began to walk. The dressings were generally taken off once a day, and the feet bathed with cold whiskey, or bay rum and water.

The heels having been brought into their proper positions, we next attempted to bring about a proper inclination of the legs, and at the same time give her the use of them. To accomplish these objects, the feet were placed in *straight shoes*, similar in construction to those already described, and leg-irons such as are commonly employed in cases of *weak ankles*, attached to them. Although this contrivance supported her in the erect posture, yet when she attempted to walk, the inclination of the toes inwards was such as to prevent her moving with any degree of steadiness. To obviate this difficulty, I placed a horizontal bar between the leg-irons, and another between the toes. These, although allowing her to walk briskly, nevertheless prevented any more active exercise, while they effectually prevented inclination of the feet either inwardly or outwardly. Having worn this apparatus for six or eight weeks, it was found that the distortion of the tibiæ had nearly disappeared, and that the feet were perfectly well formed. It was accordingly dispensed with, and high quartered shoes, stiff on the inside of the toe, and with an iron plate between the sole leathers, (intended to prevent their warping,) substituted for it. These shoes she has worn constantly up to the present time, (October,) and with great comfort. She experiences no difficulty in walking or running, and her deformity has been effectually relieved.

This case was the first operated upon, and from the imperfect character of the instruments employed, more tedious in its treatment than those subsequently met with.

CASE II.

On the 21st of June, 1838, I was requested to see the child of Mr. F. L. Smith, who from its birth had laboured under double *Varus* of the third degree. It is now about four years of age, and, with the exception of the deformity of his foot, remarkably well shapen.

From the appearance of the foot, I determined at once to divide the tendines Achillis; and accordingly on the 25th inst., in presence of Mr. Smith, Dr. Albright, and several medical students, the operations were performed. The tendons were then brought together by a uniting bandage, and the parts kept moist with cold water. After the lapse of forty-eight hours the stretching apparatus was applied, and the heels brought down a few lines; nothing of interest occurred during the subsequent treatment, and at the expiration of the *seventh* week, a perfect cure had been made.

CASE III.

About the 1st of July, 1838, Mr. Levi Davis, a poor man, requested me to attend his daughter Catharine, aged fourteen, who in consequence of an abscess of the ham and upper portion of the calf of the right leg, laboured under permanent retraction of the Gastrocnemei muscles. The heel was drawn up two inches and a half, and she rested the weight of her body on the ball of the foot; the muscles of the leg were not only wasted, but in one or two places where the abscess had been opened, adhered to the bone. The fascia plantaris was very much contracted, so that the foot was materially shortened.

Notwithstanding the unfavourable condition of the whole member, and the want of proper comforts about the patient, I determined to undertake the case; and therefore on the 6th inst. performed the usual operation, in presence of her father and several medical students. The uniting bandage was employed, and on the morning of the third day the extending apparatus put on. From the rigidity of the muscles, as well as from the adhesions which bound them to the bone, I found great difficulty in the depression of the heel, but by gradually and steadily working at it, I found that in ten weeks after the operation she could place it upon the ground. It required at least three weeks more to bring about a free motion of the muscles of the calf, during which period she wore the shoe for Pes Equinus, and had the parts daily rubbed with an olea-

ginous mixture. She finally recovered, and was a few days since, when I saw her, *perfectly well*, walking without a cane, and able to do with comfort a large share of the house-work of the family.

I am fully convinced, that at least two weeks were lost in this case by our permitting the tendon to re-unite before we attempted the depression of the heel. I now know that it should have been brought down *at once*, which would have prevented to a great extent, the muscular resistance with which we had subsequently to contend.

CASE IV.

It was sometime in July, 1838, although I do not recollect precisely the date, having lost by an accident my notes of the case, that I was asked by my friend Dr. Moehring to visit the child of Mr. Ashman, residing in 11th street near Locust. This child was affected in both feet with Varus in the third degree, (the Talapes Varus Verus of Mr. Little,) and only two weeks old. From the very great retraction of the heels, I proposed that the tendines Achillis should be divided, to which Dr. M. consenting, the operations were performed.

The child apparently suffered but little from the operations; and although it fretted a good deal for the first two days while the uniting bandages were applied, yet there was no fever, and little or no local excitement. The extending apparatus was put on as usual, on the morning of the third day; but although it was carefully padded, and carefully applied, excoriations, swellings, and much constitutional disturbance was the consequence. I nevertheless persevered for several days, but finding the disagreeable symptoms unabated, I finally determined to stop the treatment, and wait until the child was older.

Some may condemn me for allowing any other than *dangerous* symptoms to deter me from persevering in my attempts; but the sufferings of the child were such, that it would have been a piece of sheer cruelty had I gone on with the case. I therefore, thought it best to rest satisfied with what I had gained, and postpone the perfect cure, (which can always be effected before the child will require its feet) until my patient was better able to bear the requisite degree of pressure. But besides this, I have known, in more than one instance, convulsions and even *death*, produced by a perseverance in attempts to straighten the feet of very young children by pressure alone; and not choosing to wait until such results should be produced, I stopped the treatment while the child was still in safety.

CASE V.

Dear Sir—Not expecting a report of the case, placed under our care by you, would be called for, no record of its progress was kept. We shall therefore have to detail the circumstances connected with it as accurately as can be done from recollection.

You performed the operation for club foot on George Morris, a child of sixteen months old, between the 16th and 20th of July, (as near as we recollect,) in the presence of Doctors Moehring, Hawling, Bouchelle, and Pope, and Messrs. Eaton, and Henry. The heel, previous to the operation, was drawn up towards the calf of the leg at least an inch and a quarter, the toes turned inwards and upwards, and the child stood altogether on the outer margin of the foot.

After the division of the tendon, a slipper, having a piece of tape attached to the heel, was placed on the foot, and firmly secured by the tape being carried up and fastened to a belt above the knee, and by a roller carried around the foot and up to the same point. This dressing was allowed to remain forty-eight hours. At the expiration of this time it was removed, and a machine, similar to the one used in your first case, applied.

At the end of two weeks, or three at the farthest, the heel was down, and the foot flat. The apparatus was re-applied daily by one of us until near the middle of September. As it was of no farther use, it was taken off by your request, and a stiff shoe applied. Thinking our attendance was no longer required, we discontinued our visits.

To gratify our curiosity in regard to the case, we visited the child not long since, and found him walking about with apparently a great deal of ease; the toes were still inclined *slightly* inwards. We were informed, however, by the parents of the child, that "he was improving rapidly."

During the whole period of our attendance, the child was free from sickness of any sort, and no inflammation resulted from the bandage.

Yours, truly,

JAMES MCDOWELL TAYLOR,
A. S. GRISWOLD.

CASE VI.

Letter from Mr. Elkin.

Dear Sir—Agreeably to your request, I send you a statement of my case. I was born with what you told me, from my description,

was called Pes Equinus. Numerous efforts have from time to time been made to relieve the defect, but until I had the tendon which elevated my heel divided, nothing has ever produced the least benefit. When I applied to you, my right foot was so much deformed, that I rested it almost entirely on the ball, while the heel was elevated about *three* inches. In walking, I was obliged to use a block of this height, which fitted under the heel; and another, not as high, was placed in the toe of the shoe. I suffered much from a large corn on the instep, and another on the under part of the heel. On the day before the operation was performed, I reached my twenty-second year.

On the 18th of July, you severed the tendo Achillis, and then united it again by means of a bandage, which you allowed to remain on for two days. You then applied an iron machine which forcibly depressed the heel. Every day you removed this apparatus, and bathed the foot with cold spirits and water, and rubbed it well. The tendon in the bottom of the foot seemed to prevent your getting on as rapidly as you wished, and in two weeks after the first operation, you divided it near to the middle of the sole. The deep fissure which had heretofore existed at this spot, was almost immediately lessened in depth; and the foot lengthened out considerably. You continued to stretch the tendon of the heel, and daily bathed and rubbed the foot. In about six weeks more you got me upon my *feet*, the heel of the right foot having come down as much as you wished; but as my ankle continued weak, and the angle between the leg and the foot was not as acute as you desired, you made me use a shoe with leg-irons, and a spring on the sole. There were also two straps, which laced in front of the instep, and prevented my heel from rising up. This I continued to wear for some weeks longer, until, as you said, "there appeared to be no disposition to contraction, in the bond of union which existed between the extremities of the divided tendon." The whole treatment occupied about sixteen weeks, at the expiration of which time, I walked with the greatest ease, and without even the assistance of a cane.

You ask me to state the *character*, as well as the *amount*, of pain I suffered. So far as the operations are concerned, I may with safety say, that the pain was scarcely *worth mentioning;* it probably equalled that occasioned by a smart cut of the finger, but it was over in an instant. The subsequent stretching of the tendons, especially that of the heel, was painful; and I also suffered much from pressure on the corns, until you used the air cushions, when it was greatly relieved. I, moreover, had considerable pain in the ankle joint, when I began to walk, somewhat similar to that occasioned by a slight sprain. Every thing of the kind has, however, long since disappeared, and I am at the present time, as well as any body in my "understanding!"

Believe me, my dear Doctor, I feel most sincerely thankful for what you have done for me; and rely upon it, that no pains shall be spared on *my part*, to make the result of the case known. Mr. Edwards will call on you, with his son, in the month of March or April.

Yours, most truly,

P. L. S. Elkin.

Baltimore, Feb. 1st, 1839.

The operation in this case was fully successful, but I am confident, that had I brought down the heel *at once*, the cure would have been accomplished in about half the time.

CASE VII.

On the 21st of July, I was requested to see the daughter of Abel Thomason, aged two years, who from birth had laboured under what its mother called a "pointing of the toes." Being exceedingly poor, the parents had never applied to a physician, and of course nothing had been done for the child. When I was called in she had never walked, but crawled about the floor with great activity. The case was one of talapes Equinus in the *third* degree, and so perfect, that scarcely a vestige of heel on either foot was to be found.

On the 23d instant, in the presence of her father, and several medical students, I divided both tendons, brought them together again, and retained them in contact, by an appropriate bandage, for two days. I then applied the simple stretcher which I employ in such cases, and commenced the depression of the heel. In *four weeks* I put on a pair of straight shoes, with instep-straps, and encouraged her to walk. Although timid at first, she soon acquired confidence, and in the course of a few weeks time presented no trace of the deformity, either in the feet, or in her gait.

CASE VIII.

A poor labourer, by the name of Hunter, brought me his son, a lad nine years of age, and requested me to "do with him as I pleased,"

provided I thought any thing could be done for the relief of his deformity. He presented a well marked case of congenital Varus in the third degree, affecting both feet. He had already been treated by several physicians, and one or two quacks. One of the latter told the father that he had a *salve* with which he could cure the boy in a few weeks. After greasing the feet twice a day for three weeks, he sent in his bill, $30, and declined any further treatment of the case.

On the 24th of July, I divided the tendo Achillis, in each foot, and then brought them together according to the recommendation of Stromeyer. After the lapse of forty-eight hours I applied the apparatus for this defect, and began the extension of the cicatrices. In ten weeks the cure was complete.

CASE IX.

Mr. Joseph Val, a respectable mechanic, brought me, about the 1st of August, 1838, his daughter Rosa, aged six years and four months, affected with acquired talapes Equinus, in the second degree, of the *left* foot. It appears that Rosa is a delicate child, and very often affected with slight attacks of rheumatism. About two years since, she had a violent attack of this disease, which was confined to the left lower limb. On her recovery it was seen that she no longer had the power of bringing down the heel of the left foot, and when attempting to walk she limped like one with a luxated hip. Her physician, a gentleman of known skill, employed a variety of means for the purpose of relaxing the muscles of the thigh and leg, but without the slightest benefit resulting. When I saw her, the heel was drawn up about *two inches*, and she walked on the ball of the foot. The fascia plantaris was contracted and firm. With the exception of these defects the foot was perfectly well formed. The muscles on the back of the leg were reduced to mere ribbons, while those of the thigh were also much wasted. Notwithstanding the unfavourable aspect of this case, I nevertheless proposed the division of the tendo Achillis, to which her father consented. On the 3d of August I performed the operation, in the presence of several medical gentlemen, and brought the tendon together in the usual manner. On the second day, I applied the apparatus for Pes Equinus in young subjects, and conducted the subsequent treatment upon the plan recommended for such cases. In *twelve* weeks the cure was perfect, and she walked with the greatest ease and comfort. Her parents have since moved to the west, and I have recently heard that she still continues to do well.

CASE X.

On the 14th of August, Mr. Hendrickson, of Virginia, requested my assistance for his nephew, Charles Hendrickson, aged fourteen, a remarkably vigorous boy, affected with Pes Equinus of the third degree, of both feet. From some reason or other, the case had received little or no attention since his birth, and the feet were exceedingly deformed. The heels were elevated about three inches, and he walked as persons with this defect generally do, on blocks fitting under the heels. The fascia plantaris in both feet, but particularly in the *right*, was contracted and firm, while the flexor tendons of the toes were also very much shortened. As he was in full health, I thought it best to prepare him for the operation by diet, rest, and slight purgation. On the 18th inst., I divided the tendo Achillis in each foot, and *brought down the heels at once.* The simple stretcher was applied. On the 25th inst., I divided the fascia plantaris of the right foot, by which I gained a good deal. On the 30th, I cut the flexor tendons of the great toe on each foot, and that of the little toe of the right.

Nothing of interest occurred in the subsequent treatment, and on the 12th of November he went home perfectly cured, though still wearing the shoe for Pes Equinus.

CASE XI.

On the 9th of September, I was requested to visit Miss L., of Reading; who from her birth had suffered from double Varus of the third degree. She is at present eighteen years of age, and in the enjoyment of perfect health. Although her parents had consulted several eminent physicians, the case was considered so desperate, that no one seemed disposed to undertake its management, and it was therefore allowed to take its "own gait," up to the present time.

The feet now present all the characteristics of a well marked case of this form of Varus. The fascia plantaris, and the tibial tendons, are rigid, while the tendo Achillis is closely embraced by the integument. On the 12th inst., in the presence of Dr. Thomas Harris, Dr. J. V. Smith, and Dr. J. Howard Smith, of the U. S. Navy, I divided the tendo Achillis in each foot, and then brought them together by the usual apparatus. The feet were then placed upon pillows, and ordered

to be kept moistened with cold water. No pain, no inflammation, no bad symptom of any kind, succeeded the operation, and on the morning of the third day, I applied the stretching apparatus.

In about six weeks I divided the tendon of the tibialis anticus in the right foot, which enabled us to bring the member much nearer its proper position. Nothing of interest occurred in the subsequent treatment, which was conducted in the usual manner. About the middle of January she left the city, wearing the shoe constructed on the principles of Delpech and Scarpa. The right heel is still a little elevated, and the weight of this side rests chiefly upon the *outer margin* of the foot. The left heel is completely down, and the foot almost straight. She is thus vastly improved, and although not as yet *perfectly* cured, this event will I trust be ultimately attained. I consider her still under treatment, and report the case merely to show the little danger to be apprehended from the operation, in persons somewhat advanced in life.

In this case, the folly of treating a patient with with what is called "*tenderness*," was fully illustrated. Instead of forcing her to submit to the requisite degree of pressure, I would often indulge her in the loosening of a strap, and the result was, that I obtained in *four months*, what in similar cases I have accomplished in as many weeks. I also lost time in uniting the tendons before I commenced extension. I have repeatedly, since this case, effected *perfect cures* in individuals much older, in just *one half* the time, by bringing down the heels *at once*, and treating them with proper firmness.

CASE XII.

Joseph King, aged twelve, was brought to me on the 14th of September, by his father, a poor man residing near the Schuylkill, and placed under my charge, for a lameness of the *right* foot. From the history of the case, it seems that Joseph was born well formed in every respect; but when about three years old, a pot of boiling water was accidentally overturned, and its contents thrown upon his little sister and himself. Both were severely scalded, and Joseph was near dying. In time he recovered; but from the extensive cicatrices about the right leg and foot, it was impossible for him to bring his heel to the ground. It was elevated about two inches. He walked with the assistance of a cane, up to the time at which I saw him; but from neglecting the foot,

the toes had *turned out*, so that he walked on the *anterior internal* portions of the member. He had, in short, all the marks of *Valgus* of the second degree. On the 15th instant, I divided the tendo Achillis, and brought the heel down as far as possible, by the apparatus employed in such cases. In *eight weeks* from the day of operating, he walked without a cane, and in a straight shoe, stiffened, however, on the outside. The cure was perfect.

In this case I had some difficulty in passing the knife between the integuments and the tendon, owing to the existence of a firm cicatrice, which glued them, as it were, to each other. I was also obliged, on the 16th instant, to divide the *sheath* of the tendon, which offered considerable resistance to the depression of the heel.

CASE XIII.

James Austen, a poor puny youth, eighteen years of age, residing in the western part of Virginia, called to see me on the 14th of September, 1838. He was born with Varus of both feet, and presented at the time he called, the marks of this defect in the third degree. The feet were, however, very flexible; there was scarcely a joint in his body indeed, which could not be twisted and turned in almost any direction. Being in good circumstances, he had been subjected to various treatments for his deformity, but so far it had resisted every effort.

On the 16th, I divided the tendines Achillis in both feet, in presence of his father and mother, and Mr. Davis, student of medicine, who accompanied him from Virginia. The heels, almost of their own accord, immediately descended an inch or more, and in the course of *five weeks time*, he returned home, cured.

I could not help remarking at the time, to several of my medical friends, how utterly useless it was to consider *mere age*, as a contra indication to this operation. Here was a young man, (eighteen years old,) cured in about the time, or even less, that is required for children of six or seven. Miss L., (Case XI.) with the same defect *precisely*, was operated on just four days before, and she is even now under treatment; this shows the influence of *habit of body*, upon the result of the operation.

CASE XIV.

James Irwin, the son of a respectable person in the northern part of Virginia, was born with Varus of both feet. Soon after birth, the physician in attendance treated the case by adhesive bands, Dupuytren's apparatus, Physick's shoe, &c., but failed in the accomplishment of any good: and after a few months the case was given up as hopeless. He is now eight years old, of a sanguine temperament, and remarkably intelligent. No case of a similar deformity has occurred in his family.

All the appearances present in a case of well marked Varus in the third degree, exist here. I therefore determined to perform a section of the tendines Achillis, which was accordingly done on the 16th of September, 1838, in the presence of Dr. Twells, of Virginia, and the boy's father. The apparatus was at once applied, and the heels brought down as far as possible. The usual treatment was pursued up to the tenth day, when I divided the tendons of the tibialis anticus in both feet, and the fascia plantaris in the right, in consequence of the resistance to eversion of the foot, which existed to a remarkable degree. The wounds were closed with adhesive plaster, and the feet placed in the splints. For fear of inflammation the pressure was not kept up, to any extent, until after the lapse of the first twenty-four hours, when it was applied as usual, *gradually* and *constantly*. Daily frictions, with oleaginous embrocations, were employed for the remainder of the treatment, which occupied two weeks more. At the expiration of this period, the straight shoes were applied, and he was allowed to run about. On the *thirty-fifth* day after the operation, James was allowed to return home, there remaining nothing of the deformity, but a slight inversion of the toes, which will be removed in the course of a few weeks more.

CASE XV.

About the 20th of September, I was consulted by Mr. G. A. W., aged twenty-one, for a lameness with which he had been affected from birth. From an examination of the affected foot, (the right,) it appeared that the original defect was *Pes Equinus*, of the second degree; but in consequence of improper treatment, it had been converted into *Valgus* of the second degree. (The cut given as a specimen of this form of the disease, was taken from this foot.) The patient suffered much inconvenience in the pursuit of his avocation, (farming,) and was

often obliged to give up work for a week at a time. The dorsum of the foot was very much deformed, and the fascia plantaris, a good deal contracted. The heel was elevated *two inches* and *a quarter*, and the inner margin of the ball of the foot covered with a bursa.

On the 24th of September, in the presence of Doctors Bailey and Davidson, and several medical students, I divided the tendo Achillis, and applied a splint precisely similar to the one used in Varus, with the exception, that the *hinged splint* was placed on the *outside*, instead of the *inside* of the foot-board. He was kept in the horizontal posture for four weeks, and then allowed to get up. In the mean time, the heel had been brought down, and the eversion of the foot nearly overcome; a straight shoe stiffened on the *outside* was then applied, and at the expiration of the *sixth* week he went home, relieved of the defect, but still wearing his shoe.

From the rarity of this defect, the above case possesses peculiar interest, and clearly proves, that the chief difficulty, even in acquired Valgus, at least this form of it, resides in the shortness of the tendo Achillis.

CASE XVI.

James R. Smith, a young man of twenty, labouring under double Varus, of the third degree, a carpenter by trade, and enjoying perfect health, applied to me on the 2d of October, 1838, and requested that the operation, of which he heard so much, might be performed, for his relief, inasmuch as he found it exceedingly difficult to pursue his ordinary avocations. Both feet were very much distorted; but, as is usually the case, the *right* more so than the left.

On the 5th inst., I divided the tendo Achillis in both feet, and brought down the heels as far as possible at once. The *right*, however, resisted so much, that the next morning I introduced the knife, and divided the *sheath* of the tendon. The depression of the heels was then continued for ten days, and with very perceptible advantage; but thinking that I might get along faster, I divided the fascia plantaris, (which had offered very great resistance to my efforts,) in both feet. On the 15th of November, I got him upon his feet, in a pair of straight shoes, furnished with leg-irons up to the knees. From the inclination inwards of the knee joints, when he attempted to walk, the toes of each foot were considerably inverted; to overcome this, I made use of the transverse bars between the legs, and also between the feet, which

answered the purpose perfectly. He continued the use of these instruments until about the last of December, when he put on a pair of common straight shoes, stiffened on the inside, and having a plate of iron stitched in between the sole leathers.

I forgot to mention that the defect was congenital, and had been repeatedly treated by different surgeons on the old plan.

CASE XVII.

On the 8th of October, Richard Henton, a poor man, brought me his little son, aged four years, affected with double congenital Varus, in the second degree. I felt disposed, from the slight elevation of the heels, to resort to mechanical measures alone, but inasmuch as such a course would necessarily occupy more time than in the other, and also prove more painful, I decided upon the section of the tendines Achillis. I accordingly performed the operation in the presence of Dr. George, of New York, and Dr. J. H. Henry, of Vermont. The heels were brought down at once, and in three weeks, the patient was running about in the common apparatus for stiff ankles. At the expiration of the sixth week, from the day of operation, the cure was complete.

CASE XVIII.

Mr. T. J. Armstead, of New Jersey, requested me to visit his child, whom he had brought to the city, for surgical advice. He is now eleven months old, and labours under congenital Varus of the first degree, in the left foot, and of the same defect in its third, in the right. Nothing has ever been done for his relief. I saw him for the first time on the 10th of October; and on the 12th, in the presence of his father, and Dr. Craige, I divided the tendo Achillis of the *right* foot, and brought down the heel at once. For the left, I applied the usual apparatus for such cases, (see cut page 39.) Every thing went on very well for some time; but strange enough, (for I have never failed in any other case of the same kind when this apparatus has been used,) the left foot still inclined inwards, and whenever I attempted to evert it,

the tendon of the tibialis anticus was rendered very tense, and seemed much firmer than it usually is in children of this early age. I therefore determined to divide it, and accordingly did so, in about two weeks after the operation on the right foot. The wound was closed, and the same apparatus re-applied; in *ten days* time the foot was *perfectly* straight. The right required about two weeks more for its perfect relief.

CASE XIX.

About the 15th of October, Mr. T. R. Knowles, of Vermont, aged 24, applied to me, to be treated for acquired Varus of the *left* foot. It would appear from the history of his case, that he was born with Pes Equinus of the third degree, but from neglect, and using much exercise, the original defect had been converted into partial Varus, (see cut, page 26.) The heel was drawn up almost two inches, and the fascia plantaris was very much contracted. The dorsum of the foot was also much more convex than natural, and he had a large bursa on that portion of the foot upon which he chiefly walked.

I advised immediate division of the tendo Achillis, which, as he at once consented to it, was performed on the 18th of October. The heel descended almost half an inch at once, and the foot was placed in the extending apparatus. On the 28th instant, I cut the fascia plantaris, by which I gained a good deal. On the 1st of December, I applied a common weak-ankle shoe, with instep-straps, and leg-irons to the knee. In a few days afterwards he left the city for Vermont, and I received a letter about the middle of January, in which he states "that he walks without a cane, and is *perfectly well!*"

CASE XX.

On the 18th of October, 1838, a poor man, named John Dickman, brought me his daughter Martha, aged 12, affected with acquired Varus of the third degree, involving both feet. From John's account, it appears that the defect was occasioned by a severe attack of bilious fever, to which the child had been subjected when only four years old. On her recovering from this disease it was found that she could no longer bring her heels to the ground, and she was obliged to resort to crutches.

She walked with the assistance of these instruments for some months, when it was found that her feet turned in, and she began to rest her weight upon their inner margins. By degrees this inconvenience increased, until at length a complete case of Varus, with all its characteristics was developed. She was then able to get along without the crutches. On the 21st instant, I performed the section of the tendines Achillis, and brought the heels down at once. Two weeks after, I separated the tibialis anticus tendon of the right foot, which as usual was the worst of the two. There was some inflammation after the latter operation, but it yielded to the usual remedies, without any difficulty. During its presence, I was obliged to suspend my extending means, and thus lost almost a week. Nothing of any peculiar interest subsequently occurred, and at the expiration of the third month, Martha was perfectly cured. I saw her a few days since, wearing a pair of common shoes, and perfectly well in every respect. I was obliged when she first began to walk, to employ the shoe constructed on Delpech's and Scarpa's principles.

CASE XXI.

Philadelphia, January 21*st*, 1839.

Dr. Mütter.—According to your request, I make the following statement of the condition of my feet, and their treatment at various times.

I was born reel-footed—that is, my feet turned square in, the toe of each foot pointing directly towards the other leg, so that when I walked, my feet passed *over* and *over* each other; I walked upon the edges of my feet, only one toe upon each foot (the little one) touching the ground. When I was about ten years of age, steel springs were applied to my shoes to draw my feet from their inward inclination. I wore the springs about twelve years, and then laid them aside, having no farther use for them; I am now twenty-six years old. While using the springs, and since that time, I walked upon my toes, my heel resting upon a block three inches high; I had also a block in the toe of my shoe, against which the front of my foot rested. It was thought, that if my toes were drawn out by the springs, walking upon them would bring the heel down; but when they were drawn out, they were directly under the leg, so that my whole weight came upon the toes, and there was no strain upon the tendon, by which the heel was pre-

vented from coming down. I could work my ankle joint so as to move my foot up and down, that is, backward and forward, a little, though very little. You undertook to cure me, and commenced on the 12th of November last, by cutting the tendo Achillis of each foot just above the heel;—on the 14th, you applied pressure to my feet to draw the heels down, and force the toes up;—on the 20th, you cut the fascia plantaris in the bottom of my right foot;—on the 8th December you took off the apparatus on account of the pain I suffered. From that time until the 25th of December, nothing was done to my feet except poulticing several places that had become sore from pressure;—on the 25th of December, you cut the tendo Achillis of my right foot above the heel a second time, and put on the apparatus again, in about a week the heel of that foot was down; the left foot being then still too sore to admit of pressure; the apparatus was afterwards applied, and that heel also was brought down in about a week. Three days ago, I put on shoes, and with assistance walked across the floor; to-day I went into the street, so that I have been confined exactly *ten* weeks. The time has been prolonged by my feet becoming sore, in consequence of which you were unable to proceed in the cure: had it not been for these sores, it is very probable that I should have been able to begin to walk in five or six weeks, as the apparatus was only applied between four and five weeks to bring the heels down. I suffered pain in three places, viz., the corns on the bottoms of my feet, the bones of my ankle joints, and the insteps, which last were made sore by the pressure of the straps over them. The pains in the insteps and ankle joints I could bear without much difficulty, though they were sometimes sufficient to deprive me of nearly all sleep for the time; the longest continued pain in the ankle joint lasted about two days. By far the most and severest pain that I have suffered, came from two corns, one on the bottom of each foot, the parts upon which I formerly walked. When pressure was applied to my feet it came immediately upon these corns, causing a severe burning sensation; in a few weeks the pain became so violent that the apparatus had to be taken off my feet: poultices were then applied to the corns, and we found that there were blood-blisters under them; the skin came off, and a piece of dead flesh came out of each of them. I know not how much, if any, pain I should have had in the same places, had not those corns been there. I might almost say that I have had no pain from the tendons; for as to the cutting, which seems so dreadful to some, it is very trifling as far as pain is concerned; there is a stinging sensation as the knife passes through the skin—how great is the pain, any person, who has ever cut his finger, knows full well. There is about the same amount of pain, though of a different kind, when the knife passes through the tendon, but it is all gone in a minute or two.

I have sometimes felt a slight pain in the tendon, for a short time, when considerable pressure was applied to my foot.

I have thus endeavoured, as far as my memory serves me, to give you a full and correct statement. In hopes that you may have equal success in other cases, I remain,

With grateful respect, yours, &c.,

JOHN HENSHAW.

This case is one of much interest. The pain of which the patient complained, was occasioned, as he states, by the presence of two corns upon which the plate of the instrument rested. The age of the individual, the great deformity of the feet, and the difficulty experienced in the application of pressure, render the case of Mr. Henshaw, in truth, remarkable. The cut given under the head of Pes Equinus, in the *second degree*, to represent the effect of *exercise* upon such a defect, was taken from Mr. H. Mr. H. returned home a few weeks since, wearing the shoe for Pes Equinus, furnished with leg-irons as far as the middle of the thighs; although nearly well, I do not consider him as perfectly cured. He is still under treatment, which I trust will ultimately accomplish the object desired.

CASE XXII.

Mary Ann McLoon, aged forty.

Dr. Mütter performed the operation on the *left* foot of this person on the 24th of November, in the presence of Drs. Potter, and Gegan, and Messrs. Henry, Mackensie, Moore, and myself. The age of the patient was thought unfavourable to the success of the operation, but no anchylosis existing, and at the earnest desire of the patient, Dr. Mütter performed the operation for the second degree of Varus. The tendo Achillis being severed immediately above its insertion in the os calcis. The foot was turned obliquely inwards, forming with the tibia an angle of about forty-five degrees, with its internal margin much elevated, the heel was drawn up about an inch and a half, the weight of the body was sustained by the external malleolus, and the outer edge of the small toe. The leg was wasted away to less than half the size of the other. The wound was closed by means of adhesive plaster, and thus left.

November 25th.—Dr. Mütter applied the usual apparatus for the reduction of the heel; the foot at the same time being pressed outwardly by means of bandages.

November 26th.—The apparatus was removed, and the foot was found to be materially changed; the bandages were renewed, and pressure exerted towards the farther reduction of the os calcis.

November 27th.—The apparatus was removed, the tibialis anticus and posticus rubbed with sweet oil, with a view to their softening and ultimate extension, the apparatus again applied, and pressure exerted.

November 28th.—A slight inflammation had taken place from the pressure of the bandages; the bandages were again applied; soap cerate being applied to the inflamed parts.

November 29th.—The dressing removed; the only pain experienced, from the pressure of the corns against the foot-board.

November 30th.—The os calcis was found to be reduced an inch; the angle of the obliquity was also much lessened; the dressing was renewed.

December 1st.—The corns required dressing with a bread and milk poultice; not much pressure could be exerted.

December 2d.—The dressings were removed; the patient was able to flex and extend the foot to a considerable degree; before, incapable of exerting those motions.

December 3d.—The ankle joints were somewhat inflamed; these were treated with soap cerate, and the former dressings removed.

December 4th.—The union of the tendon was thought to be nearly complete, it wanting but little of the true firmness; the dressings was removed.

December 5th.—The corns, from their pain, prevent much pressure from being exerted; the dressings were renewed.

December 6th.—The calcis was found to be reduced more than an inch; the dressings of yesterday were repeated.

December 7th.—A greater pressure could be exerted upon the heel to-day, the corns being mostly free from pain; the foot could be brought by a slight pressure, to its true position.

December 8th.—The union of the tendon was thought to be firm; the foot was dressed as usual.

December 9th.—A poultice was again applied to the corns, which from their continued pressure upon the foot-board, were much inflamed; a slight pressure was exerted.

December 10th.—The dressing the same as on yesterday.

December 11th.—The dressing of yesterday removed.

December 12th.—The pressure again exerted; the position of the foot nearly true.

December 13th.—A considerable pressure exerted.

December 14th.—Pressure exerted still.

December 15th.—The corns required dressing with a poultice, but the pressure upon the heel still kept up.

December 16th.—A moderate pressure exerted after the application of the poultices.

December 17th.—Foot dressed as usual.

December 18th.—Foot dressed as on yesterday.

December 20th.—The dressings were not removed on yesterday. To-day the corns were found much inflamed; they were treated with poultices. The cure of the foot was nearly complete.

December 21st.—The corns required care; the foot was bandaged snugly.

December 24th.—A moderate pressure was exerted to-day; the corns were poulticed during the last two days; they were considerably inflamed.

December 25th.—The apparatus was removed; the corns were again poulticed; the cure of the foot was thought nearly complete, but for the inflammation of the corns.

December 29th.—For the last three days the corns have been poulticed; the one situated on the small toe, being one of the former places of support for the body, has suppurated and broke.

December 31st.—The corns have been poulticed; the inflammation is waited for to apply the shoe, and thus complete the cure.

CORNELIUS C. VAN WYCK.

This case proves conclusively, that *mere age*, should not deter us from operating. The treatment here, although *painful*, was nevertheless, in a short time successful. The patient is not, however, as yet, permitted to walk without the everting shoe, and of course her case is still under treatment. I consider the cure as certain.

CASE XXIII.

Charles Edward H., an unusually fine child, was born with Varus of the left foot, in rather an aggravated form. Various methods were early resorted to, to remedy the deformity, with but partial success. At the age of twelve months, when he began to walk, the foot when brought to the ground, was twisted so as to rest upon the outer and upper surface, while the sole was curved upwards almost to a right

angle with the leg. The toes were pointed upwards and inwards, and the heel considerably drawn up by the rigid contraction of the extensors of the foot. Believing the case a fair one for the new operation for club foot, with the consent of the parents, the child was placed under the care of Dr. Mütter. He determined on a section of the tendo Achillis, which he accomplished in a very skilful manner, in the presence of a number of gentlemen interested in the operation, but with little or no inconvenience to the infant. It is now six or eight weeks since the operation, and I believe, from present appearances, that the result will be successful.

W. H. Klapp.

The operation was performed in the presence of Drs. W. H. Klapp, Egbert, and Clark, and several medical students. The cure was retarded by difficulty in obtaining a proper shoe, and by a severe attack of fever, for which he was treated by Dr. Klapp. The ultimate success of the operation, I consider as certain.

CASE XXIV.

Mr Owen's child, aged eighteen months.

December 15th. Dr. Mütter performed the operation for the third degree of Varus, on both feet, in the presence of Drs. J. K. Kearney, and Dillard, U. S. Navy, Drs. J. Bell, and W. H. Klapp, Mr. F. Brown, Mr. Schively, and myself.

The appearance of the feet was perfectly healthy, they were turned obliquely inwards, with the internal margin much elevated at an angle of about forty-five degrees; both heels were considerably elevated; the left three quarters of an inch, the right rather more. The operation was performed, the wounds being closed by adhesive plaster; the usual apparatus was applied, and the heels in a great measure reduced to their true level, and confined by bandages.

December 16th.—The feet and legs not being swollen, the bandages were not removed.

December 17th.—The bandages remaining firm, and the limbs not swollen, the apparatus was not removed; the child appeared to suffer no pain.

December 18th.—The bandages were removed; the heels are nearly on a true level, and the obliquity inwards of the feet is greatly

diminished. No inflammation had taken place, and considerable pressure was exerted, with the view to the complete reduction of the heels.

December 19th.—The feet were dressed, and a moderate pressure exerted.

December 20th.—The feet observe nearly their true position; the dressings were renewed.

December 21st.—The ankles of both feet were slightly inflamed from the pressure of the bandages; the dressings were renewed.

December 22d.—The left heel is reduced to its true position; the right nearly so; the union of the tendons seems complete and firm; flexion and extension of both feet, which before could be produced but in a slight degree, is now nearly perfect; the bandages were again applied.

December 23d.—All inflammation has subsided, and the pressure was again exerted.

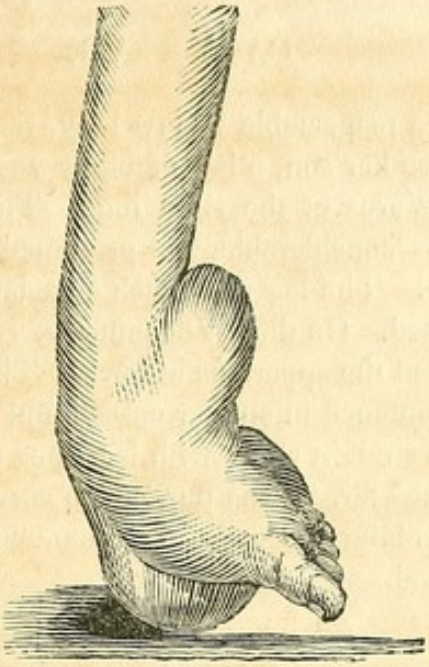
December 24th.—The dressings were renewed.

December 25th.—The *tenth* day after the operation, the cure may be pronounced complete; flexion and extension of both feet is perfect, and the feet observe their true positions; the union of the tendon is complete and firm; the child has the free and natural use of both feet.

CORNELIEUS C. VAN WYCK.

CASE XXV.

On the 18th of December, I was requested to attend the son of Mr. J. K. Earles, who had "a deformed foot." It appears that the boy, (who is now about ten years old) was born with a Pes Equinus of the third degree, involving the right foot; which from a variety of circumstances, had been neglected up to the period at which I saw him. When he began to walk, it was found that instead of yielding *laterally*, as is usually the case, or continuing a case of Pes Equinus, the toes turned directly *backwards*, so as to bring the *dorsum* of the foot in contact with the earth, constituting the Talapes Dorsalis of Mr. Whipple. The foot was very much contracted, and the fascia plantaris remarkably strong. The dorsum, as is seen in the cut, was very convex, and those portions upon which the weight of the body was received, covered with a large bursa mucosa. The leg was very much wasted, and the muscles rigid.



On the 20th I divided the tendo Achillis, and applied the simple stretcher for Pes Equinus. Notwithstanding the great deformity in this case, the patient was enabled on the 12th of February, to return to New York, so much benefitted, that he walked very nearly on the *sole* of the foot. The heel was elevated about half an inch, but as he wears the spring shoe, for Pes Equinus, I have no doubt but this defect will ere long be eradicated.

This is the only case of "*Talapes Dorsalis*," that I have ever seen; and indeed when my lecture was delivered, I could hardly conceive the existence of such a defect, although it had been mentioned by Mr. Whipple. I did not, therefore, allude to it. Its treatment, though necessarily more *tedious*, than that of the other forms of this kind of club foot, is not more complicated, and should be conducted on general principles.

CASE XXVI.

On the 22d of December, Mr. G. R. N. requested me to attend his son Thomas, aged 18 months, affected with simple Varus, of the second degree. Various attempts had been made to bring the feet to their proper position, but without success. On the 24th instant, I divided the tendines Achillis in both feet, and on the 1st of February, the cure was complete. The usual treatment was pursued.

CASE XXVII.

Mrs. T. F. G., a respectable widow lady, requested me on the 28th of December, to see her son, a lad of eight years, who from his birth had suffered from Varus of the right foot. The defect, from the long use of the limb was considerable, and presented all the marks of Varus in the third degree. The leg was much emaciated, and the knee joint considerably inverted. On the 1st of January, 1839, I divided the tendo Achillis, and applied the apparatus at once. The subsequent treatment was that usually pursued in similar cases; and on the 25th instant, he began to walk in a straight shoe, with leg irons up to the *thigh*. They were carried up thus far, for the purpose of correcting the defect of the knee. He is still obliged to wear this shoe, but the prospect of ultimate success is good.

CASE XXVIII.

Jane Crees, aged three years and eight months. On the 30th of January, 1839, Dr. Mütter, in the presence of Drs. Ruan, Hays, Worsham, and several medical students, operated upon the right foot of this child, for the third degree of Varus. The leg was considerably wasted, with the foot turned obliquely inwards at an angle of forty-five degrees; the os calcis being drawn up about an inch and a quarter from the true plane, and the external malleolus forming the base of support for the limb. The tendo Achillis being divided, the wound was closed by means of adhesive plaster, and the usual apparatus applied for the reduction of the os calcis.

31st January.—The apparatus was removed; the sheath of the tendon was found so firm as to prevent the reduction of the os calcis, Dr. Mütter therefore divided it, and the apparatus was again applied; considerable pressure was exerted by means of bandages, towards turning the foot out.

February 1st.—The apparatus being removed, no inflammation was found to exist, and the foot, after being rubbed, was bandaged tightly.

February 2d.—The bandaging was renewed after the foot was rubbed and bathed with cold spirits; a slight excoriation of the instep, caused by the pressure of the bandages, being found to exist.

February 3d.—The dressing of yesterday was repeated.

February 4th.—The os calcis was found to be reduced half an inch;

the obliquity inwards of the foot, from the action of the bandages, was much lessened; the foot was bathed and bandaged tightly.

February 5th.—The foot was dressed as before.

February 6th.—Being the seventh day after the operation, the position of the foot is found much altered. The child has suffered very little inconvenience from the application of the apparatus, and very slight excoriation has existed. The foot was dressed as usual.

February 7th.—The same treatment observed to-day.

February 8th.—The foot is daily improving, under the joint action of the bandages and apparatus.

February 9th.—The os calcis has been reduced three quarters of an inch. The foot, by slight pressure on its internal side, can be brought to nearly its true position. The bandages were renewed.

February 10th.—The foot dressed as usual.

February 11th.—The action of the apparatus is still kept up.

February 12th.—Dressed as before.

February 13th.—Being the fourteenth day after the operation; great improvement has taken place during the last week. The pressure is still to be continued with the view to the farther reduction of the os calcis.

February 14th.—Treated as usual.

February 15th.—Treated as yesterday.

February 16th.—No alteration in the treatment of the foot; rubbed and bathed daily.

February 17th.—Dressed as before.

February 18th.—The heel was found so near on a true level, that the common weak-ankle shoe was put on the foot, and thus perfected the cure. The foot, by slight pressure on its internal side, can be brought to its true position, and the heel has been reduced very near an inch. Very little inflammation has existed, and the child has suffered little or no inconvenience from the mode of treatment.

February 19th.—The shoe having some slight imperfection, caused considerable pain to the child, it was therefore taken off and the apparatus again applied.

C. C. Van Wyck.

This case is still under treatment—prospect of success excellent.

RESUMÉ.

From this report it appears, that in 28 cases,

21 were congenital,
7 were acquired.

—

19 of Varus in its different degrees.
2 of Valgus in its different degrees.
7 of Pes Equinus in its different degrees.

—

19 occurred in males.
9 occurred in females.

—

16 in which both feet were affected.
12 in which only one.

—

8 in which the *right* was deformed.
4 in which the *left*.

—

2 in children between birth and the first year.
9 in children between the first year and the sixth.
16 in persons between the sixth and thirtieth year.
1 in persons between the thirtieth and fiftieth year.

—

20 perfectly cured.
8 under treatment.

—

1 was cured in from ten days to four weeks.
9 were cured in from four weeks to two months.
10 were cured in from two months to four months.

So far then, I may say, that I have not *failed in a single case.* Should those under treatment prove unmanagable, the circumstances under which the want of success occurred, shall be faithfully recorded. It will be observed, that I have classed the Talapes Dorsalis, under the under the head of Pes Equinus, although it might be given a distinct place. I have done so here, because the case was *originally* one of the latter defect.

NOTE.

Dr. Togno employs a shoe constructed on the principles of Delpech and Scarpa, which differs in some respects from mine. He has employed it I understand, for a number of years. I have tried it in one case; and apart from the *inclination* of the *leg-iron*, (for there is but one) and the *want of a covering to the foot*, it answered very well. I was obliged, however, before applying it, to cause the *leg-iron* to be *straightened*, and a short one to be placed on the *inside* of the *limb*.