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A Course of Lectures ON THE NATURE AND TREATMENT OF DEFORMITIES.

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LECTURE II. TALIPES EQUINUS.

GENTLEMEN,—To-day, I propose to consider one of the most simple of the deformities which we are called upon to treat; viz., talipes equinus; by which is understood contraction of the ankle-joint at right angles, or to its full amount of extension. This deformity owes its name to its anatomical resemblance to the foot of the horse. Many of the cases which present themselves, however, will be found to differ in their anatomical relations, in one respect, from the foot of that animal; inasmuch as the toes are at right angles with the metatarsal bones, therein corresponding with the foot of the tiger or cat. This condition is induced by the act of walking. In its original and true character, the toes are in their proper relative position. (*Vide* Fig. 1.)

A true and complete case of talipes equinus consists, then, in the elevation of the heel to its full extended position, without lateral deviation—the arch of the foot being increased, and the toes extended in position, though contracted in form (Fig. 2), arising from the constant effort exerted by the extensors of the toes to produce flexion of the foot, and from the weight of the body in walking. The metatarsal bones frequently diverge at their anterior extremities, which gives to the front part of the foot an appearance of greatly increased breadth (Fig. 2), and which, during the continuance of the deformity, it actually possesses. The patient is therefore compelled to walk upon the anterior extremities of the metatarsal bones, upon which a cushion or thickened skin is invariably found. The os calcis, instead of lying horizontally, is found to be almost in a perpendicular position—the posterior surface or tubercle looking upwards, the anterior surface downwards. The astragalus lies obliquely in its articular cavity, the head presenting downwards and forwards, and the anterior superior articular surface, from being partially separated from the scaphoid bone by the contraction of the sole of the foot, projects and increases the appearance of the deformity. The cuneiform and metatarsal bones are also changed in position, corresponding with the position of the foot; whilst the phalanges are, as I have mentioned, frequently at right angles with the metatarsal bones. The ligaments on the dorsum of the foot are more or less stretched, whilst those in the sole are in a corresponding degree contracted; depending, as will be hereafter seen, upon the cause of the deformity and the length of time it has existed. The anterior muscles of the foot are kept in a state of extension, those of the sole in a state of contraction—not actually shortened in the one case, or elongated in the other, but at their fullest natural amount of extension and contraction.

This description applies only to a complete case of talipes equinus. (Figs. 1 and 2). These characteristics, of course, vary according to the degree of contraction and deformity, from complete elevation of the heel to contraction of the gastrocnemius simply at right angles.

This deformity is stated by some who have written upon the

subject to be congenital. I can only say that, out of all the cases of deformity which have passed directly under my observation, amounting to upwards of 20,000, I have not met with one congenital case of talipes equinus. In a statistical report which I published in the *Medical Gazette* some years since, 10,000 cases of deformity were enumerated and classified, out

Fig. 1.

Fig. 2.

of which 399 were cases of this deformity, divided as follows:—244 without paralysis; 102 with paralysis of the flexors of the foot and toes, viz., 12 affected in both feet, 22 in the left, 44 in the right, 24 with paralysis of the extensors of the knees also; some with spasmodic condition of all the muscles, some with calcaneo-valgus of the opposite foot, others with paralysis of the deltoid and of the extensors of the hand. The 244 non-paralytic consisted of 37 cases in which both feet were affected, 84 confined to the right foot, 64 to the left; and 82 were of a compound nature, 45 of which were spasmodically affected, viz., 17 in both feet, 12 in the right foot, 11 in the left foot, and 5 in the right arm. Some were combined with talipes calcaneus, talipes valgus, talipes equino-varus of the opposite extremity, and some with lateral curvature of the spine.

Causes. The causes of this deformity are numerous. Irritation produced by dentition; worms; any of the febrile diseases incidental to early life, having for their result a derangement of or interruption to the functions of the nervous system and spinal marrow; wounds in the calf of the leg; rheumatic affections of the ankle-joint; scrofulous disease in the ankle-joint or its neighbourhood, or in the bones of the leg,—these are all frequent causes of the deformity. It also arises spontaneously, without any apparent cause, or, indeed, any inconvenience to the patient, beyond the mechanical impediment occasioned by the contraction of the gastrocnemius muscle, which prevents the patient from flexing the foot in the act of progression, although he retains a certain amount of voluntary power over all the muscles.

Irritation with Disturbance of the Nervous System. When talipes equinus arises from either of the three first-named causes, it is occasionally associated with paralysis or spasmodic contraction of the corresponding upper extremity, as shown in the statistical report. The majority of the cases, however, are those in which the muscles of the calf alone suffer by contrac-

tion. There are some in which the anterior tibial muscle is the only one paralysed. The balance of power being, under these circumstances, destroyed, the extensors appear to contract upon themselves, and thus produce the deformity.

Not unfrequently the first cause has been an attack of hydrocephalus, upon recovery from which the flexor muscles of the foot and toes are found to be perfectly paralysed or interrupted in their functions. I have in some cases had opportunities of witnessing the origin of the deformity. The history is as follows:—The parents of the child notice the frequent tripping and falling of the child from any slight impediment or irregularity on the surface trodden upon. They also notice a divergence of the toes, or, as they term it, increasing breadth of the front of the foot. If you request them to lead the child across the room in these cases, you will notice that the moment the opposite extremity to the one affected is carried forward beyond the perpendicular position of the body, the heel of the affected foot is perceptibly raised from the ground, and the toes unduly diverge from each other, by the increased pressure thrown upon the front part of the foot, and the inability to flex it, owing to the incipient contraction of the gastrocnemius muscle. If the leg be kept extended, it will be found, upon examination, that the foot can be forcibly flexed to its full extent; but, upon withdrawing the hand and setting the foot free, the gastrocnemius will immediately contract upon itself and draw up the heel. Upon making inquiry, you will generally find that the child is suffering from irritation consequent upon dentition, or from the presence of the small thread-worms.

In these cases, I have had the gums freely lanced; calomel, scammony, and jalap, administered for relief from the worms; stimulant embrocation applied throughout the whole length of the spinal column, and attention paid to the general health; applying to the foot tin splints, bent somewhat beyond a right angle, to counteract the tendency of the gastrocnemius to contract upon itself. I have in many cases followed up this plan of treatment for months; but, although the contraction was at its commencement, the results have been unsatisfactory, except in a very few instances. Division of the tendo Achillis must be had recourse to, and then all tendency to contraction ceases, if proper precautions be used.

Some years since, Dr. Stromeyer, to whom we are indebted for the introduction of this new mode of treatment, visited this Hospital, when a slight case of the kind just alluded to was placed on the table for operation. I consulted him upon it. He advised the use of the hot bath night and morning, together with general treatment, stating that he believed that would cure the child. This advice was followed, out of respect to so distinguished an authority, but with no satisfactory result. I afterwards divided the tendon, proceeded cautiously with the after treatment, and succeeded in perfecting the cure.

These cases are instructive and important; for it appears that, although there is not decided and permanent contraction, yet the tendency to contract is permanent, and will inevitably produce complete equinus, if no efforts are used to prevent it; and also that, as a rule, general means are insufficient. Within the last few weeks, I found it necessary to operate upon a child with this slight form of contraction, after having for six months tried general means without success. The temporary increased length given to the tendon by the operation in these cases, and the consequently weakened state of the gastrocnemius, although only continuing for a time—i. e., until the tendon has resolved itself into the permanent condition—appears to admit of the anterior tibia exercising its full functions, thus restoring the balance of power between the flexors and extensors of the foot; at least, this is the only satisfactory inference I can draw.

Irritation consequent upon a Puncture or other Wound in the Calf produces at times an active and continuous contraction of the gastrocnemius muscle, which terminates in this deformity, without any apparent loss of power in the flexors of the foot, or any interference with the efforts of the will, so far as can be discovered. This does not shew itself at the time the injury is inflicted, nor until the patient has to all appearance recovered from the immediate effects of the wound, attention being then drawn to it by the inability experienced to flex the foot. This also, if neglected, slowly and certainly terminates in complete talipes equinus, the inherent motion of the ankle-joint remaining unimpaired.

Rheumatism is the next of the causes mentioned as producing this deformity, as well as many other non-congenital deformities, as I shall have to mention. Contraction, when arising from this cause, is found to commence during the active stage of the disease, and seems to be produced by the instinctive

efforts of the patient to keep the joint at rest. The gastrocnemius muscles are thus kept in a state of constant contraction, and the flexors of the feet, by the same efforts, are kept constantly relaxed, by which all motion is prevented, and the pain attending this affection is of course thereby mitigated or greatly relieved. The extensors become, therefore, permanently contracted, which is not discovered until the patient is able to stand or take exercise, when the heel or heels are found to be elevated, with total inability to flex the ankle-joint. In these cases, the integrity of the joint suffers by thickening of the synovial membrane, or greater or less alteration in structure, offering an obstinate resistance to the restoration of the natural position of the foot, even after the resistance of the contraction of the muscle has been overcome by the operation; and even after the foot is restored to its normal position, great difficulty is met with in the endeavour to restore motion, requiring the most unremitting perseverance and attention. The muscles or nerves themselves do not appear to suffer beyond the contracted state of the gastrocnemius, neither during the attack, nor at any period subsequent to it; for, after the removal of the contraction by operation, the voluntary powers over the muscles remain unimpaired. In fact, the deformity may be said to be produced by the exercise of those very powers, as we know the less a joint attacked with rheumatism is subjected to pressure, the less painful it is, and it is only by preserving the extended position of this articulation that this object can be attained, inasmuch as the astragalus is kept very nearly out of the articular cavity.

The next cause is *Scrofulous Disease in the Joint or its neighbourhood, or in the Muscles of the Calf or Tendons of the Leg*. Here, again, the instinctive efforts of the will are the remote cause, and the cicatrix or cicatrices the immediate cause. Many patients have applied with disease in the neighbourhood of the ankle-joint, producing effusion into the joint by irritation or inflammation of the synovial membrane. The joint is kept by the patient perfectly passive in the extended position, hence, again, arises contraction.

In some instances, all the muscles surrounding the joint are kept in a state of active contraction, even with very slight symptoms of disease; so much so, that upon examination you would be led to suppose that they were all permanently contracted, for you can neither flex nor extend the foot, which disguises the real nature of the case. This is also occasioned by the efforts of the patient to prevent motion of the joint in walking. A person recently consulted me respecting his son, a boy aged eight years, in whom this condition of the muscles existed, with very slight swelling of the joint. Upon examination, no trace of motion could be discovered, from the extreme rigidity of all the muscles surrounding the joint. I ordered absolute rest, the leg to be kept in a horizontal posture on a couch—poultices and warm coverings to be applied to the limb. In five weeks, the muscles resumed their passive condition, rendering the cause perfectly evident, viz., disease in the joint.

It is important that this peculiarity in connection with the disease should be borne in mind, as at first sight you might be induced to divide the tendons, which would remove the rigidity of the muscles undoubtedly, but that effect would be but temporary; for as soon as the patient used the foot, the disease would again become a source of pain and irritation, and a second contraction inevitably result. It illustrates, however, one mode by which contraction of the muscles takes place, viz., that these constant instinctive efforts of the will, if not relieved early in the attack by local and general treatment, terminate in permanent contraction. Such a case occurred to me many years since, in a patient aged twenty years, who had suffered from childhood; and in his case I was compelled to divide every tendon surrounding the joint, with the exception of the flexors of the toes.

When scrofulous disease affects the joint itself, a permanently stiffened condition of the joint must be the result. You can, however, keep the foot at right angles during the time the restorative process is going on, and thus secure the position most favourable to the patient. I have had many cases (young patients) in which the most frightful disease existed, affecting the articulation, and in some the metacarpal bones, in which amputation had been recommended, all of which have yielded to treatment, and have been cured of the disease by rest, warmth, attention to the diet and general health, occupying, it is true, from two to three, and even four years. I mention this, in order that you may be induced to hesitate before you condemn the limbs of young patients to amputation, as is too commonly done; for, from an experience of years, I am convinced that it is an unnecessary step.

[To be continued.]