REMARKS

ON THE EMPLOYMENT OF DOUBLE EXTENSION
IN CASES OF DISEASE AND INJURIES OF
THE SPINE AND PELVIC JOINTS.*

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THE usefulness of the principle of extension in diseases of the joints, and especially those of the lower extremities, is so generally recognised by surgical authorities at the present time, that anything more than a summary of the benefits derived from it would be superfluous for our present purpose. First may be mentioned the important requirement of absolute rest to the joint and articular bones, which is fulfilled by its use. The muscles which act on the joint and bones are thereby prevented from acting in the starts and spasms which are the usual concomitants of joint-disease, especially when affecting the cartilages and ligaments. Secondly, the pressure on the joint-surfaces produced by the tonic contraction of the muscles is relieved, or almost entirely prevented, so that the vascular system of the diseased or inflamed parts is placed under circumstances most favourable for recovery, and local congestions produced by the unequalled pressure are relieved. Thirdly, the action of the muscles, which tend to produce displacement of the natural position of the bones composing the joint, is counteracted by the direction given to the extension. Lastly, the tension which flexion produces in most joints upon the synovial membrane and the soft parts around is removed, and the irritation of the sensory and trophic nerves by the progress of the disease is diminished to the utmost possible extent. No further proof of the efficacy of the method is needed than the cessation or diminution of pain which results in a few hours after the skilful and judicious application of extension. This is notably exemplified in the treatment of disease of the spine by the suspension or Sayre's method. In most cases, the patient expresses a sense of relief from the local pain and aching while being suspended by the head and shoulders; and the more efficiently this extension is kept up afterwards, the more persistent benefit is, in this respect, experienced.

I have long been in the habit of treating *hip-joint disease* by extension by Gurdon Buck's plan of the stirrup applied by adhesive plaster; the counter-extension being obtained by raising the foot of the patient's bed upon two bricks or wooden blocks, so as to bring into play the centre of gravity of the patient's trunk, acting on the reversed inclined plane, in a direction opposite to the extending weights attached to the leg. I had for some time observed, however, the disadvantage resulting from the one-sided action of the extending force in causing or increasing the obliquity of the pelvis, and, through it, acting unequally upon the muscles and ligaments of the spine. In my efforts to obliterate the forward lumbar curve, which is the invariable result of ordinary coxalgia or hip-joint disease, I found that, by the use of the bed-sheet fastened to the bedstead across the abdomen, the antero-posterior curve (caused by the contraction of the psoas muscle) frequently became a lateral curve from the action of this muscle on the affected side, exaggerated by the effacement of the antero-posterior curve. Again, in those cases in which elongation of the limb with abduction at the hip was present, with depression of the pelvis on the affected side, the effect of extension was only to increase this deformity, and to baffle the observations as to the comparative length of the two limbs. The one-sided extension acted on the spine and pelvic joints like traction on one arm of a balance, quite disturbing the equilibrium and intensifying the abnormal deformity. These considerations had before weighed with me in observing the effect of the use of the long Desault's or Liston's splint, where the one-sided action is very imperfectly modified by the use of the perineal band, which, in my experience, is very rarely effective until its tension becomes unbearably irksome to the patient. The use of a jean sloop, to fit on to the opposite hip and thigh, as recommended by the late Sir W. Ferguson, is better; but is difficult to adjust and keep in adjustment, is irksome to the patient, and liable to be much soiled by the use of the bed-pan, etc.

I thereupon began to use double extension, by applying equal weights

to each limb, so as to balance the pull on each side of the spine. I soon found that when the muscles of the spine, pelvis, and legs were thus placed in *equilibrium*, the patient was made much more comfortable, remained more quietly in position, and could, if necessary, bear even more absolute weight with comfort.

I begin (in a child under ten years) with a weight of two pounds to each foot, the weights being of lead made for the purpose, of the shape of steelyard weights, and provided with hooks above to fasten to the loop of bandage which is attached to the centre of the sole-board.

The weights were then gradually increased by a pound a week, until the *limit of easy endurance* by the patient was reached. At this point it remained during the treatment. I soon found that the forward lumbar curve became much more manageable and sooner obliterated; and I believe that the duration of treatment was thereby sensibly shortened, and the patient thrived better and fed better under the effects of increased comfort. Of course, in an older patient more weight will be borne easily; but I seldom exceed the limits of twelve to fifteen pounds in hip cases.

Although much greater weights than these are spoken of as common in surgical books, even as much as fifty pounds, or even double, in cases of fractured leg or thigh in the muscular adult male applied to one limb, I believe, from my experience of double extension in spinal, pelvic, and hip disease, that, used in this form, much less force is required, and especially in cases of coxalgia. It is not so much the amount of the actual pull which we require in such cases, as to ease off the pressure upon the diseased surfaces. This is, of course, limited by the resisting power of the ligaments of the joint, and may easily be made to do harm rather than good, by increasing the tension in the front part of the capsule of the joint, which MM. Martin and Collineau believe to be the main cause of the abduction of the limb met with in certain cases.

What I look for in double extension are the steadying of muscular action and the prevention of spasm, combined with an equal downward and constant pull, tending to relieve the diseased joint-surfaces, and to remove muscular and atmospheric intra-articular pressure. The whole of these indications tend to the attainment of that physiological rest which is a powerful (if not the most powerful) remedial agent in the treatment of joint-disease.

By keeping the pelvis horizontal to the spine, the various tendencies of the limb to become abducted at one time and adducted at another are quietly, constantly and persistently, and soothingly, checked and regulated by a counteracting influence ever present and always acting in the same direction and extent. The method allows perfect comfort and cleanliness to the patient, and all that requires watching is the effect of the strapping upon the heel and ankle. This point of extension may at each dressing be shifted upwards, and I have frequently employed it at the knee or calf, instead of the ankle and foot, either by adhesive plaster or soft broad leglets and straps. The treatment should be continued so long as the patient's health bears the confinement to bed, and then an apparatus to fix the joint in a straight position and which allows his moving about should be substituted. Of these, one of the best is Thomas's splint; but a cheaper, and, when carefully applied, an efficient, substitute may be found in a plaster-of-Paris or silicate of potash spica bandage, or a cast of leather or millboard, which, when stiffened and dried, may be cut so as to make a movable splint for the hip and thigh.

Another class of cases to which the system of double extension is of great value is that in which the sacro-iliac joint is affected with disease. Although those cases are not so common, yet, during the last few years, have had many under my care.

The early symptoms are apt to be mistaken for those of hip-joint disease. There is the same kind of limping and dragging of the limb, with apparent elongation on the affected side, from sympathetic paralysis of the gluteus maximus, pyriformis, and psoas muscles. This gives rise to a certain degree of obliteration of the fold of the nates, and there is the same deterioration of the general health. In most cases, spasm of the psoas muscle produces a similar tendency to flexion and eversion of the limb that we see in hip-joint disease, and the same effect in exaggerating the forward lumbar curve is observable.

Now here the effect of unilateral extension of the affected limb is undoubtedly injurious, by increasing the elongation of the affected side already produced by the disease. Moreover, the conformation of the pelvic girdle or double arch is such that a one-sided traction, operating through the arch which forms the segment of the circle on the opposite side, goes far to counteract the beneficial result aimed at in relieving the pressure upon the surface of the diseased joint, and strains and deranges the mechanical equilibrium of the pelvic girdle. The application of the perineal band as the point of counter-extension is, of course, in such cases useless and even injurious; useless, because it is placed on the same side of the diseased joint as the extension; and injurious,

* Read before the South London District of the Metropolitan Counties Branch.

because of its pressure in front on the abdominal viscera in the false pelvis, and behind on the posterior supra-iliac spine. Now, in the place of making extension upon both legs which is here advocated, the point of counter-extension is placed in the centre of gravity of the trunk opposite the extremity of the ensiform cartilage, and this inertia or weight of the trunk is brought to bear by raising the bed-foot upon blocks of wood or bricks. These I have frequently supplemented by shoulder-straps, with axillary pads fixed to the rail at the head of the bed, with the addition sometimes of a chin-strap having the same attachment. These I have used, however, more frequently in cases of spinal disease or injury higher up in the trunk, thereby shifting upwards the point of counter-extension.

In cases of disease of the upper lumbar or lower dorsal vertebra, or their joints, I believe that I have secured considerable benefit to the patient by the adoption of double extension, combined with aspiration of the abscesses which form, frequently leaving persistent sinuses, which usually go on from bad to worse, and too often cause despair to the surgeon, and inevitable death to the patient. In such cases, persistent extension in the recumbent posture has, as far as I know, not been hitherto tried by the surgeon. Of course, this method, in order to produce any good whatever, and in fact not to produce harm, must be applied equally to both legs. The system introduced by Professor Sayre attempts to effect a certain amount of extension as a continuation of the effects of suspension by the head and shoulders; but my experience of this method (undoubtedly the best hitherto adopted in supporting the trunk by lateral pressure, and modifying, if not altogether preventing, horizontal and lateral motion) does not lead me to think that any appreciable amount of longitudinal extension is kept up. It certainly does not answer well in those severe cases in which the recumbent posture is absolutely necessary in the treatment. The amount of the weight applied to the legs in the cases I have treated has not been great, sufficient only to give relief, and not to cause discomfort to the patient. Relief it certainly does give in the great majority of cases; and it does so, I believe, by protecting the diseased surfaces from the pressure produced by the contraction (spasmodic or otherwise) of the powerful spinal muscles, which are affected just as the muscles are which act upon the joints of the extremities, and produce the startings of the limb with which surgeons are familiar. We thus insure as great an amount of physiological rest to the diseased spinal structures as the problem before us will permit.

Lastly, the brief limits of my design permit me to mention only another class of cases, to which I have applied, I believe, for the first time, double extension to the legs. In a case of fracture of the lower lumbar vertebra, produced by a fall from a great height, and attended by complete paraplegia, I placed the patient on a water-bed, raised the foot of the bedstead on two blocks of wood eight inches deep, and applied gradually as much weight to the legs, by two of Buck's stirrups, as the patient could bear comfortably. The idea was, as in the cases of diseased spine, to take off from the fractured surfaces, by continued persistent and gentle extension, the pressure of the powerful longitudinal muscles of the spine, and to ensure as far as possible the apposition and rectilinear direction of the fragments of the broken spine itself. If we consider the effect of the simplest movements of the head and arms upon the spinal structures, and not less the effect of the movement of the ribs in coughing, sneezing, and even in ordinary respiration when the trunk is in the recumbent posture, or when we are floating in water, it will not be difficult to understand how this gentle and persistent extension acts on these structures when injured. The use of a water-bed does not prevent it; nay, in spite of its advantages in other respects, such as the prevention of bed-sores, and in the use of the bed-pan, the movement of the fractured surfaces upon each other is necessarily increased by the rolling and billowy motion of the water consequent upon the least effort of the patient, and produced even by the mere effort of respiration. Now, combined with the water-bed (so necessary in the treatment of these cases), we can very easily employ the system of double extension which I have advocated, and thus counteract to the utmost possible extent the injurious movement that I have mentioned. Again, in these cases there is always a tendency for the pelvis and buttocks to sink into the water-support, and thus to give a bend or curve to the trunk at the point of fracture. This is in a great measure counteracted by the extension, in the vertical direction of the body, by the action of the weights and pulleys. Double extension in such circumstances produces much the same effect as horizontal traction upon the body of the swimmer who is being taught to float by his instructors, by traction upon his head and legs.

I have found that patients express themselves as comfortable under its action, and I feel sure that, when properly and judiciously applied, double extension mitigates suffering and places the patient, as far as mechanical measures can, in a position most favourable for recovery.

CERTAIN VARIETIES OF CARDIAC NEUROSIS.*

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THE interest connected with cardiac neurosis appertains chiefly to its diagnosis and its etiology. The diagnosis must be made upon evidence partly negative and partly positive; whilst the cause of the affection will be determined by the personal history, and by an acquaintance with the special influence upon the heart of certain agents—medicinal, dietetic, and moral.

The term "neurosis" as applied to the heart is not strictly synonymous with "nervous palpitation"; the latter implies excessive action of the heart, permanent or recurrent; whilst "neurosis" means nervous derangement, and therefore includes every kind of simple disorder of function of the organ. It corresponds to the now discarded title of "functional disease of the heart".

The various causes of neurosis of the heart are anæmia, hysteria, hypochondriasis, dyspepsia, the gouty diathesis, debility from exhausting disease, rapid growth, or the excessive use of mercury, exhaustion from physical labour and protracted anxiety combined, intestinal worms, excessive mental strain and anxiety, worry and loss of sleep, shock, masturbation, the abuse of tea or tobacco, and the habitual use of opium in large quantity. To the last mentioned seven causes only I propose directing attention in this paper.

Under these heads, since the early part of last year, I have noted twenty-eight cases, viz.: hard study and anxiety, 2; worry of business and loss of sleep, 4; mental shock, 1; sexual abuse, 3; excessive use of strong tea, 4; excessive use of tobacco, 2; habitual use of opium, 1; sexual abuse, tea and tobacco, 3; sexual abuse and tea, 3; sexual abuse and tobacco, 2; abuse of tea and tobacco, 1; want of exercise and hypochondriasis, 1; fatiguing exercise and hypochondriasis, 1; in all, 28.

The ages of the patients ranged from fifteen to forty years; seven were under twenty years, fourteen between twenty and thirty years, and seven from thirty to forty years inclusive. Twenty-three were males, and five females. The average age of the males was a little over twenty-five years, and that of the females slightly over twenty-four. None of these patients were treated in hospital; they all belonged to the middle and upper middle classes, and several of them were students.

The general symptoms were a fear or a "certainty" of the existence of "disease of the heart", and an apprehension of sudden death; a feeling of stoppage of the heart's action; sharp pain at the heart; the sounds of the heart audible to the patient in bed; apprehension of loss of reason; a feeling of prostration, sinking, and as if "going to die"; flushing; sudden "jumping" of the heart, with pain in the head and tinnitus; fits of nervous palpitation and dyspnoea occurring frequently in bed, and starting out of sleep; a sensation on standing up as of "fluid rushing to the head"; "tension" of the head; chills; mydriasis; flatulence; abrupt or hammering impulse of the heart; præcordial thrill; local arterial throbbing; venous hum in the neck; small and rapid pulse.

The symptoms and signs of special significance were great and sudden variation in the rate of the pulse, without irregularity, in the sitting or recumbent posture; absence of palpitation and dyspnoea from physical exertion; a metallic or ringing quality in the sounds of the heart; reduplication or prolongation of the first sound, or a faint bellows-murmur accompanying it; reduplication of the second sound.

I have elsewhere described, under the title of "rhythmical irregularity", sudden changes in the rate of the heart's action from emotional influence, as especially characteristic of cardiac neurosis (*vide Diseases of the Heart and Aorta*, page 160). In several of the cases appended to this paper, examples of the phenomenon in question will be found. The rate of the pulse, whilst the patient is at rest in the sitting or the recumbent posture, may undergo sudden and repeated changes in the course of one minute, varying from six to ten beats within four consecutive periods of five seconds. The changes are abrupt, but the pulsation in each series is strictly rhythmical. Irregularity of the heart and pulse of this kind is especially characteristic of neural derangement from the toxic action of tea or tobacco, or from onanism; it is obviously the result of emotional disturbance of the co-ordinating function of the vagus.

To palpitation and derangement of the rhythm of the heart from these causes, Percival, Corrigan, Stokes, Walshe, Da Costa, Flint, and

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