MANIPULATIVE METHODS IN ORTHOPAEDICS*

BY

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Cyriax (1955) has recently drawn attention to the fact that back lesions very often require manipulative treatment. He also mentions that members of the profession have actually recommended osteopathy to their patients (in spite of the G.M.C.'s warning notice).

My interest arose out of a chain of events. Not long after starting to do laminectomies for disk lesions I worked under a surgeon who regularly manipulated backs and necks under anaesthesia. He obtained very gratifying results without producing cauda equina lesions or other noxious sequelae. I then chanced to see a patient with recurrent low back pain and sciatica who was away from home and who showed me what her own doctor did to relieve her. I performed this rotatory manipulation quite gently and with the desired effect. Her symptoms and signs were what I regarded at that time as indicating a disk lesion. Thirdly, a young woman patient came to see me, complaining of pain in the back of the leg which was not severe unless she did certain things, but which had been present on and off for four years since a fall in which she fractured her eleventh dorsal vertebra. She had been treated in a plaster jacket for four months, so there seemed no point in trying this again. Physiotherapy and a corset were of no avail, so, wishing to avoid laminectomy if possible, I manipulated her under an anaesthetic. She lost her pain completely, but only for a week. After further trial of other methods without relief I did it again, with the same result. After the third manipulation, which again relieved her for a short time, it became clear that if she was to be treated by manipulative methods it must be done without anaesthesia. By repeated manipulation at slowly increasing periods she was eventually relieved completely and has since been able to do bending work without pain, even over prolonged periods.

I started manipulating other patients, and found that by these measures I could relieve some in whom other methods short of operation had failed. I also found some surprising results, including the complete relief of a pain localized to the inner side of the knee and associated with some limitation of extension. The more I manipulated the better my results, but there were still failures, and I was interested when one or two of these patients let me know later that they had been cured by osteopaths.

I decided that I must learn more about osteopathy, in spite of my early indoctrination against it, and by chance I met a qualified doctor now practising osteopathy in London. I spent a week seeing his patients with him, and very quickly realized that there was a lot that I could learn from him. I emphasize that I am not an osteopath but an orthopaedic surgeon.

A Fresh Approach to Back Pain

The first thing that surprised me was the way in which he examined a back. He tested each and every joint for movement and tenderness. When he found a stiff joint he examined it for position. I was also surprised to learn that the

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sacro-iliac joint is a mobile joint and that when stiff it is frequently the cause of symptoms. I was intrigued to learn a simple method of testing for its mobility.

Having been shown the technique of localized spinal examination, localized treatment was the logical sequel, and I was quickly shown a variety of methods. The principle is that the joints above and below the one to be manipulated are "locked" by positioning, and force is then applied to the joint, either directly or by using the locked spine as a lever. Needless to say, it is most important that the joint should be moved in the right direction.

Until this visit I had never used manipulation on patients with recent acute back pain, but there seemed to be no definite dividing line, and when I asked I was told that even the most acute cases would respond very well to this treatment. I have since proved this amply to my own and the patients' satisfaction.

What, then, is the acute incident that happens to produce a sudden attack of, say, "lumbago"? Surely not a displacement backwards of a piece of softened disk material (but see Cyriax, 1955). The pressure on the disk in flexion is said to be very high, and if a pathway has been made by a protrusion of disk material there is no doubt in my mind that even if it can be replaced it must protrude again as soon as the spine is flexed. Cyriax (1955) agrees that manipulation can cure these patients. I believe that the cause of the pain is to be found in a derangement of the zygapophysial joints and that this derangement is mechanical in nature. The pain may result from stretching or pinching of the capsule or of adhesions, or from reflex muscle spasm round the deranged joint.

What is a disk protrusion, and what has it to do with the joint lesion? I think this conception of the initial pathological process can perhaps throw some light on problems that have so far been obscure.

The intervertebral disk has no blood vessels: it has only lymph channels. The method of nutrition appears, therefore, to be by an osmotic pump. The osmotic pressure of disk material is high, and with the spine at rest fluid is sucked in. In the erect or, still more, in the flexed position fluid is squeezed out by a rise in the hydrostatic pressure. If relative motion of the vertebra above and below is prevented by the joint derangement and the muscle spasm round it, the pump cannot work and the disk receives no nutriment. Softening follows, and maybe protrusion.

On this theory the degeneration of teen-age disks as well as the delay often seen between injury and protrusion can be explained. This restriction of motion in the zygapophysial joint is the so-called osteopathic lesion.

It is now widely recognized that intervertebral joint derangements can cause dysfunction in somatic nerves, and it seems illogical to deny that the autonomic nerves can be similarly affected. If, however, one admits this the field of possible secondary symptoms is very much widened.

One difficulty in theorizing about the sacro-iliac joint is to find any explanation of the sites to which pain is referred in derangements of this joint. In my experience pain is referred principally to the back, to the groin and perineum, to the inner side of the knee, or to the heel. Sacro-iliac joint derangements are often accompanied by circulatory changes in the leg, which strongly suggests some involvement of the sympathetic.

One of the main reasons for having a mobile spine is to permit the eyes to be turned quickly to any direction. This function involves complicated interaction of spinal joints and muscles. If a joint becomes stuck in other than its normal position compensatory alterations of position of joints at other levels take place. In time this can lead to the production of secondary joint lesions. Lesions in the sacro-iliac joints can be either primary or secondary. The former is the common cause of acute pain in the back and leg after parturition. The latter very commonly follows lumbar joint derangements.

When considering spinal balance it is clearly of interest to know if the legs are equal in length. It follows that a

constant unilateral strain is thrown on sacro-iliac and low lumbar joints if the legs are uneven. It is very surprising to find how many patients with back trouble have legs that are unequal by more than $\frac{1}{4}$ in. (0.3 cm.), and it is equally surprising to find how much some patients' symptoms are relieved by partial correction by a heel lift.

It is clearly insufficient to measure with a tape from the anterior superior spine. The error due to movement of the sacro-iliac joint may be more than $\frac{1}{2}$ in. (1.3 cm.). Examination of both anterior and posterior superior spines in the erect position, with assessment of the heights of the iliac crests, gives a useful clinical appreciation. The only accurate method is to have the pelvis x-rayed with the patient erect and with the feet together and the knees straight. If the cassette holder is adjusted to the horizontal the relative heights of the femoral heads above the lower edge of the film give the difference.

One other structure of the effects of which the explanation is obscure is the sacro-tuberous ligament. This ligament, of course, is one of those bridging—at a distance—the sacro-iliac joint, and is commonly found to be thickened, tense, and tender in patients with chronic low back pain. I do not know what the pathological process is, but if the ligament is pressed on for upwards of half a minute it gradually gives way and in the process an aching pain is often felt in the leg or in the back. Personally I use the technique although I cannot explain its effects, because I find it helps some patients very much.

Methods of Diagnosis

The spine is usually examined erect first. Leg inequality is looked for, the relative positions of the anterior and posterior superior spines is observed, and the mobility of the spine examined in flexion, extension, and side-bending.

The usual neurological examination is then made, but in addition the mobility of the sacro-iliac joints is tested with the patient supine. This is done by using the leg as a lever. When the leg is externally rotated with a little flick with the knee flexed by about 60 degrees and the hip abducted by about 30 degrees the innominate is moved posteriorly on the sacrum. The reverse movement is obtained by internal rotation in neutral abduction and almost full extension. If the sacro-iliac joint is mobile the leg becomes apparently longer and shorter as the first and the second movements are made. The shift should be at least $\frac{1}{2}$ in. (1.3 cm.), and is best observed by comparing the levels of the medial malleoli before and after each movement.

If one sacro-iliac joint is stiff it is essential to discover what its position is. The relative levels of the superior spines have been examined already for this purpose, but confirmation can be obtained from the relative prominence of the posterior superior spines in the prone position.

The patient is then laid on the side and the upper leg is fully flexed at the hip and knee. The examiner uses his abdomen to control the leg, flexing and extending gently while palpating the interspinous intervals with the fingers. By this means it is possible to determine exactly which joints are mobile and which stiff. Interspinous tenderness is also elicited. When the stiff joints have been found the position of the joint can be determined by palpating the transverse processes with the patient still in the lateral position. The transverse process of a bone that is causing trouble will be made more prominent not only by its rotation but by the tender area of muscle spasm over it. If it cannot be felt on the one side the patient is turned over and the examination repeated on the other side.

The joints of the dorsal spine are most easily examined in the sitting position with the legs over the edge of the couch, the hands linked behind the neck, and the elbows together. The patient bends forwards, resting loosely on the forearm of the examiner, who palpates the interspinous interval with the fingers of the other hand. The determination of position is most easily done prone, when with the flat of the finger a bar of what is apparently muscle spasm can be felt overlying the transverse process, and of course rib, on the side that is displaced posteriorly.

The neck is examined in the same position with the examiner standing behind the patient and the forehead supported in one hand while the other palpates the interspinous intervals. In all these procedures it is essential that the patient should relax in order to allow whatever free movement is possible. The rotation in the cervical region is determined by palpating the transverse processes, and can be done sitting, supine, or prone with the head flexed.

Radiographs are, of course, essential in almost all cases, particularly to determine unsuspected bony abnormalities and leg length. As, however, every joint in the back is examined, the likelihood of missing infective or neoplastic processes is much less than with the orthodox type of examination.

Treatment

The basis of treatment is the replacement into its more normal position of any bone that is causing symptoms as a result of its displacement. It is therefore essential first to know which bone is displaced and in which direction. If a bone is pushed further into the wrong direction the joint is strained more and the symptoms can be made much worse.

The intervertebral joints lock in certain positions, so that they cannot be strained. Full flexion and full extension are the simplest, but are not always suitable. Side flexion with rotation also locks the joints and is most useful. A valuable technique for the lumbar spine is performed thus:

The patient is in the lateral position with the lesion uppermost. The upper part of the body is raised by pillows or by raising the end of the couch, and the shoulder is pushed backwards until the tissue tension can be felt to indicate that the joints above the lesion are locked. The leg is then flexed on the trunk until the tension can be felt to come up to the lesion from below. A thrust forwards on the transverse process then completes the manipulation when combined with a slight exaggeration of the backward rotation of the shoulder and of the flexion of the hip. Thus the upper part of the spine is locked by side flexion and rotation, the lower by flexion. In all these procedures the thrust should be of high velocity but low amplitude, a sharp thrust that is stopped almost as soon as it has begun.

The accurate perception of tissue tension is probably the most difficult part of the whole technique for the beginner to learn. It is essential, and until the art is acquired many patients will suffer unnecessarily, often without receiving any benefit.

Description of other techniques is beyond the scope of this paper.

Results

I regret that I have as yet no figures, and I cannot possibly claim not to have any failures. I am satisfied, however, that my results are much better than they were by orthodox methods alone. I still use physiotherapy, supporting garments, and occasionally plaster jackets for selected cases.

Of particular interest are certain somewhat surprising results, one of which I have already referred to—namely, pain on the inner side of the knee due to sacro-iliac joint derangement. This is often associated with some limitation of extension and a synovial effusion. It forms a most important differential diagnosis of torn medial meniscus because it is very common. I believe it to account for most of the negative explorations of the inner side of the knee-joint. The differential diagnosis can usually be guessed at on the history alone, but unfortunately some patients date the trouble accurately to an injury when "something went click in my knee." The injury is not usually such that one would expect a meniscus tear, and I presume the explanation to be that the click arose in the sacro-iliac joint but was thought to come from the knee because it was to the latter joint that the pain was immediately referred. The treatment is to manipulate the sacro-iliac joint, and the expression on the patient's face is worth watching when the knee will extend fully after the back alone has been treated.

The frozen shoulder is another condition that I have found can be relieved or, if seen in time, aborted. The

joint which is most constantly deranged in this condition is that between the second and third dorsal vertebrae. There is always associated cervical trouble, but I have been driven to the conclusion that trophic changes from sympathetic dysfunction are the prime cause.

Tennis elbow is usually associated with lesions in both dorsal and cervical regions, but for some reason the less localized variety with pain extending to the fingers seems easier to cure.

Migraine in a high proportion of cases, as well as much headache, is associated with upper cervical joint derangements, and can be relieved by their treatment. Disturbance of the sympathetic control of the vertebral artery is a possible mechanism.

The Psychological Factor

Many patients with back pain have a hysterical overlay. This has only too often been encouraged by the well-meaning but misguided remarks of our colleagues who have been unable to find the cause.

Only in a very small proportion is the overlay not relieved by successful treatment of the physical cause.

I can add my own experience of the debilitating effect of chronic back pain. I have had it, and I would recommend it as a very useful lesson to those who would treat the condition in others.

REFERENCE

Cyriax, J. (1955). *British Medical Journal*, 1, 140.

VOLUNTARY SERVICE FOR STATE HOSPITALS

The annual meeting of the National League of Hospital Friends, held in London on March 9, was addressed by Lord Beveridge, who was elected president at the meeting, and by Mr. Iain Macleod, M.P., Minister of Health. Mr. Percy Wetenhall was in the chair.

LORD BEVERIDGE said that the League concerned itself not only with helping hospitals and their patients but with patients suffering from chronic illness who were or could be treated in their own homes. It did so, not merely to save expenditure on hospitals, but because such patients, given reasonable home conditions, were likely to be much happier in familiar surroundings. The problem was to extend the possibility of medical and nursing treatment outside the hospital by means of assistance of various kinds. He appealed to women who were not fully occupied otherwise to serve as home helps. The problem of the chronic sick, with which was linked the problem of the infirm aged, was assuming larger and larger dimensions. In another quarter of a century there might well be ten million old people in this country. The need for help for such people, not only in household jobs but in the provision of companionship and occupation, would become more and more pressing.

The general practitioner, Lord Beveridge continued, had a great part to play in all this. If he could be made responsible for seeing that these domiciliary patients not only had the necessary medical and nursing care but everything else for their comfort and welfare, in which the co-operation of the local authority might have to be enlisted, it would be an ideal arrangement. Notwithstanding the existence of the National Health Service there remained a wide sphere for voluntary action, the great merit of which was that it was not tied down by regulations and Acts of Parliament.

The MINISTER OF HEALTH, in a brief speech, said it was not known exactly how many Leagues of Friends existed in the hospital world, because many were not affiliated with the National League and many hospitals had such voluntary bodies but working under other names. He was sending out a questionnaire to the heads of all hospitals in the country in order to find out exactly how much voluntary effort was going on, and the Ministry would not be content with progress in this field until every hospital had its own local body of devoted voluntary helpers. His impression was that they were much nearer the goal than might be supposed.

Whenever he visited a hospital in any part of the country he made it a rule to ask about the associated voluntary effort, and it was very unusual to find a hospital which had not some organization of this kind. It had been suggested to him that he might send out new instructions to hospitals about enlisting voluntary service, but he did not think that much could be done by circularization; it must be left to local initiative.

One of the great opportunities for service still open in the field of voluntary effort, said Mr. Macleod, was in the treatment of the chronic sick, and it might be that the Leagues of Hospital Friends could do something to mitigate the difficulties in providing home helps and in assisting in general domiciliary treatment. The treatment of the mentally sick found us still in many ways out of date in our thinking and in our laws. There was still amongst unenlightened people an attitude towards the mentally ill that they must do all they could to change. There were special difficulties because mental hospitals were sometimes remote and difficult of access, but they must not rest content until mental hospitals no less than others were covered by "friendship." The Leagues should set themselves not to supplant but to supplement other agencies, such as the Red Cross and St. John and the W.V.S. They should not be too precise in their work. For example, a hospital might be prevented from providing some amenity because it had to install new treatment facilities, and it was here that the Leagues of Hospital Friends came in.

Nova et Vetera

DR. EDWARD HARRISON, OF HORNCastle, AND THE LINCOLNSHIRE MEDICAL BENEVOLENT SOCIETY*

The year 1954 marks the 150th anniversary of the foundation of the Lincolnshire Medical Benevolent Society. The society owes its origin to the indefatigable zeal and crusading spirit of a pioneer medical reformer, Dr. Edward Harrison, of Horncastle, Lincolnshire. Born in Bankfield, Lancashire, in 1766, of an old Lancashire family, he qualified in Edinburgh, and practised medicine for many years in Horncastle (later in London), and became an outstanding figure in the history of medicine, whose fame extended far beyond the boundaries of the county.

In 1820 he published a treatise† on "Remarks upon the different appearances of the back, breast, and ribs, in persons affected with spinal disease, etc." He wrote various other works during his lifetime, and his main interest was clearly in orthopaedics. He survived until his 79th year—no mean achievement for the times—and the medical tradition of the family was carried on by his nephew, Richard Harrison.

Edward Harrison's interests were not by any means wholly confined to medical reform and orthopaedic surgery, for he carried on a busy general practice, and was one of the honorary physicians of the Horncastle Dispensary, founded in 1789. Horncastle in those days was a thriving and important country market town, as readers of George Borrow will recall.

In addition to these other activities Dr. Harrison maintained a large house in West Street, Horncastle (still used as a doctor's residence), and, finding it unnecessarily commodious for his needs, he conducted there a small private mental asylum. He seems to have been a man not only of catholic medical interests but also of indefatigable energy. In the opening years of the nineteenth century he devoted much of his time and characteristic zeal to a crusade designed to raise the status of the medical profession, which had fallen to a low ebb, particularly in the remoter provinces.

*Extract from an address delivered by Dr. Allan H. Briggs, Mayor of Lincoln, at the 150th Anniversary celebrations.

†His name thus became associated with Harrison's grooves or sulcus, but it is now contended (see Naish, J., and Wallis, M. R. E., *British Medical Journal*, 1948, 1, 541) that the grooves were first described by Dr. Edwin Harrison (1779–1847), physician to the St. Marylebone Infirmary.