"jockeyed" into a false position against our own knowledge of what is right by the purely personal views of some individuals, stimulated perhaps by the activities of a sensational Press.

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THE ROLE OF MANIPULATION IN THERAPEUTICS*

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To-day few members of the medical profession fail to appreciate the value of manipulative treatment and to realize that it can sometimes succeed where all else has proved of no avail. In spite of this recognition, many practitioners are still unaware of the occasions when the aid of manipulation should be invoked, of the conditions to which it should be applied, of the means that should be taken to discover the likelihood of benefit being derived from it, and even of what it actually involves. They will turn for authoritative guidance to the Physical Treatment Section of this Association, and in this discussion we must see that they receive it.

GENERAL CONSIDERATIONS

The first point for discussion must surely be, "What is the meaning of manipulation?" A definition should be easy, but it is not. Hitherto the physical therapist—as distinct from the electrotherapist—has had at his disposal three things:

1. Massage.
2. Passive movement.
3. Active movement { assisted
 { resisted { eccentric.
 { concentric.

Manipulation can hardly come under any of these heads. Dangerous confusion already surrounds the interpretation of the term "passive movement." Surgeons have always spoken of any movement performed for the patient as "passive," even though force has been employed to break down adhesions. The physical therapist considers this interpretation a travesty, and holds that "passive movement" is essentially one in which force has no part, and that it can only be performed when the patient's muscles are in a state of complete voluntary relaxation. The patient must offer no assistance or resistance, and the movement must be performed painlessly, otherwise reflex muscular contraction will offer opposition. Should this occur, the impediment to movement offered by the patient's muscles cannot be overcome by "passive movement." The movement becomes at once a "forced movement." Manipulation finds no place among "active movements," because muscular relaxation is essential to it, just as it is to the "passive movement" just mentioned. Therefore, as a means of opening the discussion, I would submit that a definition of "manipulation" is the act of moving a joint so that an impediment to movement is overcome and mobility is restored.

* Read in opening a discussion in the Section of Physical Medicine at the Centenary Meeting of the British Medical Association, London, 1932.

The second point for discussion arises from the first. "Is it necessary to add a fourth method of treatment to the list of those at the disposal of the physical therapist?" In other words, "Is joint manipulation an art with a special technique, and, in order to obtain proficiency in the art, is there any call for special training and study?" The answer is found in the writings of Wharton Hood, who reports that Hutton, the most famous "bonesetter" of his time, gave as the secret of his successful treatment the slogan: "The twist is the thing." The essential nature of this "twist" was only appreciated by me after years of close study, experiment, and research. The main manoeuvre in this "twist" involves, with each joint, putting it through those movements which are not under voluntary control before attempting to perform those that are under control. As far as I know, the hip-joint is the only one at which all possible movements are under voluntary control.

ILLUSTRATION OF TECHNIQUE

To establish the point, the manipulative technique of one joint may be considered in detail—for example, that of a metacarpo-phalangeal joint of the hand.

The most valuable manipulative movement is tension, whereby the joint surfaces are pulled apart. The manipulator grips the finger with what is known as "the golf-club grip" with one hand, and exerts tension with the other. (The manipulative technique for all joints of the extremities is for one hand to stabilize while the other mobilizes.) Then, with the metacarpal fixed with one hand, the base of the phalanx is moved in an antero-posterior direction on the head of the metacarpal. (A slight degree of flexion is essential.) These two movements, being free from leverage, may be performed with all the strength of which the manipulator is capable. It must then be ascertained that the lateral ligaments are free to allow the movement of the phalanx, and so each is stretched to the full extent. This lateral movement is not one of adduction and abduction, any more than the antero-posterior movement is one of flexion and extension. The aim is to press one side of the phalanx down on the head of the metacarpal, while the other is pulled away from it. Rotation of the phalanx on the metacarpal must be freed, and this is achieved by flexing the distal joints so as to form a hook. The "hook" is then grasped and rotated, first in one direction, then in the other. The two movements of freeing the lateral ligaments and of securing rotation are performed with leverage, and therefore any undue exertion of force will do incalculable harm. This is the reverse of what held good for the two previous movements.

Finally, the movements under voluntary control are reached—namely, flexion and extension, adduction and abduction. It must be remembered that the metacarpo-phalangeal joint is a sliding joint rather than a hinge joint. The base of the phalanx slides round the head of the metacarpal, with the metacarpal origin of the lateral ligament acting as centre and the ligament to the phalangeal insertion acting as radius, to describe a circle. In order to perform flexion without causing damage to any other structure the manipulator must fix the metacarpal head with one thumb and press the base of the phalanx directly forward with the other. If the phalanx is free to move at all it will glide round the head of the metacarpal, and flexion will take place.

If, for some reason, the phalanx is not free to slide round, and movement is performed as if the joint were a hinge joint, then the lateral ligament and the posterior part of the capsule are severely strained, if not even actually ruptured; and the tendons of the interossei may be torn.

All this shows the definite and complicated technique needful for the mobilization of a finger-joint. Every joint in the body calls for similar consideration, and a special technique is essential. We are, therefore, as it seems to me, justified in claiming that the art of manipulation has a special technique, and that special study and training are necessary to practise it. Also a fourth method of treatment should be added to the list of those available to the physical therapist.

THE SCOPE OF MANIPULATION

The next point that arises is: "Should the art of manipulation be taught in our medical schools?" The question depends on the answer to another question: "Can benefit be conveyed to our patients by manipulation?"—as, if so, surely it ought to be taught.

It is well, for the purpose of discussion, to divide the joints of the body into two sections: those of the extremities and those connected with the spinal column. At the same time it must be remembered that, wherever situated, a joint remains a joint, and as such is subject to similarity of all pathological conditions. This fact is often overlooked. Synovitis of a knee-joint as a result of injury is a common diagnosis, yet few clinicians seem to consider the possibility of a similar diagnosis in an intervertebral joint in the event of injury to the back.

It is usually admitted that manipulation of the joints of the extremities affords a chance of restoring movement if the full range is demonstrably lost. The manipulation may be successful if:

1. Active pathological processes have ceased and are quiescent.
2. The limitation of movement is due to adhesions.
3. The limitation of movement is due to a locking of two joint surfaces upon one another.
4. The manipulation is performed with a skill that will lay no undue strain on any normal structure, whether an intrinsic part of the joint or not.

The first of these essentials rests with diagnosis, a far from simple matter, and one which always calls for a minute examination of the joint, and often for a wide experience. The second and fourth essentials can be accepted without difficulty. The third raises points which might possibly cause the discussion to be acrimonious. There is a theory held by many that a joint is dislocated if displaced, and that if it is not displaced any loss of mobility must be due to adhesions only. Experiences in everyday life should teach that this view is untenable. Most people have felt a sudden stab of pain in a joint if their strength is exerted to the uttermost when attempting to perform a movement just beyond their power or their reach. They check the movement at once, and, if possible, shake the part involved rather vigorously. If the back is the site of the pain, they will probably wriggle the trunk. Relief is often instantaneous. At some joints, however, this relief cannot be attained voluntarily, as the joint may not be accessible. It is then that manipulation becomes necessary. For instance, a finger can be pulled and a wrist shaken or squeezed by the patient himself, but other joints—for example, those at the base of the second metatarsal—may call for skilled manipulation before relief can be secured.

The only possible explanation seems to be that the joint surfaces have "seized up"—to use an engineering expression—and are freed by the subsequent manipulation. Experience teaches that some joints are more readily subject to this than others—for example, the joint between the proximal and distal row of carpal bones. (This is one common form of "tennis-wrist," which can be remedied instantaneously by manipulation.) The shoulder-joint invariably escapes, but the head of the humerus may instead drop downwards unduly in the glenoid, or it may tend to retain a position too far forward in the glenoid. Should this happen disability will ensue. If the head has dropped downwards there will be pain when any movement is attempted, and sometimes even without movement, and this trouble is one of the common causes of a so-called "brachial neuritis." Abduction and forward flexion become restricted if the head of the humerus does not slip backwards and downwards correctly on the surface of the glenoid, as the upper end of the humerus then impinges

on the under surface of the acromion and nips the synovial surfaces there. This explains why the most important point in manipulation of the shoulder is to press the head of the humerus backwards in the glenoid. It also shows how manipulation can have disastrous sequels if this precaution is disregarded.

IMPORTANCE OF MINOR DAMAGE

If "locking" and other minor lesions can take place within a joint, can they serve as a fertile source of trouble? Can any treatment other than manipulation prove equally efficacious as a remedy?

If a "lesion" of the type we are considering exists we should anticipate that there will be pain and restriction of movement. By manipulation we should, presumably, be able to restore the normal range of movement. Relief from the pain within the joint, whether it was constant or only present on movement, should also follow this restoration as a natural sequence. This hardly calls for discussion, and it should only be necessary to point out that there will be increase rather than decrease of symptoms if the dose of manipulation is excessive, if it is unskilled, or if it is performed in the presence of active infection.

There is often a tendency to overlook the fact that any trouble within a joint is liable to cause serious interference with the joint-sense, and therefore with co-ordination of muscle movement. This is demonstrated in cases of pain in the joint at the base of a metatarsal, which may lead to a limp and most ungainly gait, and so upset the co-ordinated movement of most of the joints of the body. Apart from the remote effect, the evil of the disturbance of joint-sense must be borne in mind, though the importance of the defect varies with different joints.

The importance of dealing with minor lesions within a joint from the point of view of the future of the joint is also a point worthy of consideration. I suggest that any lesion of any joint adds, as it were, to the age of the joint, and so serves as a factor predisposing to the onset of the changes usually associated with advancing years. Expressed colloquially, this means that any joint lesion tends to "wear out" the joint, and the expectation of healthy life within the joint is reduced. The reduction depends on the severity and duration of the "lesion."

JOINT LESIONS AND REMOTE EFFECTS

We now come to one great controversial point—the extent to which we ought to express to our medical colleagues the conviction that remote effects are associated with joint lesions. This can be considered under four headings:

1. Pain referred elsewhere than to the joint.
2. Remote effects from the pain.
3. Effects in relation to the joints of the extremities.
4. Effects in relation to the joints of the spinal column.

Arthritis of the shoulder, or adhesions within the shoulder-joint, may cause widespread pain and aching throughout the upper extremity. This pain is often erroneously attributed to neuritis, and the symptoms are similar to those caused by the dropping of the head of the humerus downwards in the glenoid (as previously mentioned). This trouble is often encountered after the prolonged wearing of a sling if the olecranon has not been supported.

A patient with a painful wrist will often complain of pain "shooting right up the arm" on certain movements, while one suffering from a form of "tennis-arm" involving one of the radio-ulnar joints may feel referred pain in the other. It is now widely, though unfortunately not universally, accepted that a common form of pseudo-sciatica owes its origin to a lesion of the sacro-iliac joint, and it is common knowledge that pain in the

knee may be referred entirely from arthritis of the hip. It should be safe to presume that pain may be referred from lesions of joints in other situations. This opens up a very wide view of the possible origin of many obscure aches and pains. Thus, assuming the presumption to be correct, we find at once a possible explanation of the origin of occipital pain. It can be referred along the great occipital nerve as the result of irritation within a joint high up in the cervical region. It might be referred along one of the branches of the superficial cervical plexus, if the next sections of the spinal column are involved—a common cause of auriculo-temporal "neuralgia." If the irritation is lower down in the joints of the spine the pain may be referred along any of the nerve trunks that go to form the brachial plexus, and if lower still the intercostal nerves are involved.

THE SPINAL COLUMN

Here we also reach the area of the costo-vertebral joints, and movements of these joints are of a most complicated nature. Any lack of co-ordination in the pull of the extrinsic muscles of respiration may lay undue strain on one of these joints and cause a locking. This is a little recognized, though real, cause of pleurodynia—purely traumatic in origin. A most undue strain must also be placed on these joints after fracture of the ribs. The result must be that, as with joint strain in other situations, a traumatic arthritis is established, a reflex immobilization is enforced, and adhesions form. This is a logical explanation of the persistence of the pain and disability after these injuries, and it follows that it can only be relieved by treatment similar to that prescribed for the injury should it occur within a knee or shoulder—namely, manipulation. The manipulative treatment of a traumatic pleurodynia offers an excellent example of the "five-minute miracle cure."

As we proceed lower still we find a possible cause of pain, not only in the lower part of the back, but also in any of the various plexuses throughout their wide distribution.

Variations at the lumbo-sacral junction are so numerous that it is impossible to standardize the normal limit, but certainly a completely sacralized transverse process of the fifth lumbar vertebra must be placed outside it. It is said that this and similar conditions cause no symptoms. This is true in many instances, yet I have seen an x-ray photograph showing a definite arthritic change in the false joint between a sacralized transverse process and the ala of the sacrum. This should indicate the possibility of pain being referred to this point.

I have given an account elsewhere¹ of the rare chance afforded me to examine post mortem a case in which persistent pain had followed accident. There was a greatly enlarged transverse process of the fifth lumbar vertebra on one side, and the proof seemed incontrovertible that this was the cause of the man's pain and disability. He had been a good and active general labourer all his life till the time of the accident. After that it was plainly impossible for him to work at all with the condition present as shown at the time of death. Even a minute degree of rotation with the spine extended caused a nipping of the soft structures between the transverse process and the sacrum. Prior to the accident the ligaments had without doubt limited movement, and nipping was impossible; but, as a direct result of the injury, there was a relative increase in mobility, which permitted this incapacitating nipping to take place.

It should then be possible, if other opinions coincide with mine, to reverse the old dictum that an enlarged or sacralized transverse process of the fifth lumbar vertebra is of no diagnostic importance, and to proclaim it as a

potential cause of trouble after accident. It should also throw light in a dark corner of manipulative work, and disclose a reason for possible disappointment in a case which otherwise might appear favourable for manipulation. If this condition is present, injudicious handling will inevitably increase any symptoms, but the risk is obviated if the manipulation is performed with the pelvis flexed on the trunk. This limits the scope of the manipulation, but if the precaution is ignored disaster will follow.

THE "WONDERFUL CURE"

Manipulation as a possible means of relieving symptoms other than pain is ground full of pitfalls and danger. The worst danger is erroneous diagnosis. Pain in the right iliac fossa, for example, may be due to sensitiveness of the ligaments on the anterior aspect of the sacro-iliac joint. Should the tension on these ligaments be relieved by manipulation, the pain will disappear, and the patient will broadcast the wonderful "cure," of what had been diagnosed elsewhere as "chronic appendicitis." In this case the pain has been cured, but not the "appendicitis," as this did not in fact exist.

The confirmed believer in osteopathy will fly to an osteopath for everything, even if her child may be suffering from such a complaint as German measles, and—*mirabile dictu*—recovery takes place rapidly. Nothing will convince this mother that the recovery follows manipulation in spite of the treatment and not because of it. This applies to many other so-called "cures." It is amazing, as well as humiliating, to reflect that any treatment has to be excessively bad before it will interfere with the wonderful recuperative power of Nature. Healing and cure are the works of Nature. It is sometimes within our power to assist Nature and hasten recovery, or even to render recovery possible by removing influences that might retard or prevent it; but restoration of function is nothing else than release of natural processes from disabling interference. To review manipulation in this light there can be no doubt that it can, in suitable cases, be successful in removing, or providing a remedy for, the disabling interference.

A child labelled "kyphosis" may be sent to the physical treatment department at hospital, and after a few weeks the mother will report that it "has lost that dreadful cough." The "dreadful cough" will always prove to have been of the asthmatic type. This suggests that the immobility of the joints of the thoracic spine may have been the cause of the irritation of the sympathetic which gave rise to the cough, and that restoration of mobility removed the source of irritation. It puts within the bounds of possibility the common claim of the osteopath that at least one of the varieties of asthma can be remedied by manipulation. It also shows that the irritation and severity of symptoms can be reduced even when more definite "cure" cannot be attained.

Occipital neuralgia may be referred from a lesion of the cervical spine. When severe it may be associated with a feeling of nausea akin to migraine. This pseudo-migraine can be cured or alleviated, and the frequency of the attacks reduced by manipulation. The degree of benefit derived is directly proportionate to the degree of pseudo-migraine superadded to a true migraine.

A spasmodic torticollis is sometimes due to irritation within one or more of the joints of the cervical spine, and may be amenable to manipulative treatment, particularly if the complaint started as a direct sequel to accident. I have seen one case in which spasm of the diaphragm was associated with a sudden loss of mobility of the third cervical vertebra. The occurrences were simultaneous during sleep, and the spasm was relieved as soon as mobility was restored by means of suspension.

¹ *Backache*. J. and A. Churchill.

PITFALLS AND ERRORS IN DIAGNOSIS

Pain may radiate along the intercostal nerves round the chest wall, not only from a lesion in the costo-vertebral joints, but also as the result of disordered mobility in one of the intervertebral joints. Should this "lesion" exist at a level at which the corresponding intercostal nerve passes underneath the breast, pressure on the breast will mean pressure on the chest wall, and will cause pain. It frequently happens that this pain in the chest wall is confused with pain in the breast itself, and may be diagnosed as being due to chronic mastitis. It may even be hinted that operation is essential lest the "mastitis" should prove to be a pre-cancerous condition. The victim who is cured by manipulation of this pain in the chest wall is convinced, not unnaturally, that she has been cured of mastitis, and even, perhaps, saved from cancer. Actually the mastitis did not exist; or, if it existed, caused no symptoms. The intercostal distribution, lower down, passes over the front of the abdomen, and frequently pain referred along one of the nerves which supply the abdominal wall is mistaken for pain within the abdomen. If the symptoms are derived from one of the nerve trunks that supply the area over the stomach they may be attributed to indigestion. The conviction may be strengthened by a practitioner's diagnosis of dyspepsia. The usual medicinal and dietetic remedies are tried, but the pain persists. In despair the patient may seek relief by manipulation, and will receive it. Thus we have another "wonderful cure of indigestion." Had the initial diagnosis been correct, manipulation would have been the first principle, and not a last, when prescribing measures to relieve the symptoms.

Relief from pain on the opposite side, which may quite easily, but wrongly, have been attributed to the gall-bladder, may add to the number of patients who are alleged to have been cured of gall-stones by means of manipulation.

The immense reputation gained by unqualified practitioners for their power to cure a variety of ailments by manipulation is thus largely attributable to errors in diagnosis by members of our own profession. The prolonged administration of internal remedies designed for the relief of dyspepsia and gall-bladder troubles (to quote but two common examples), in cases where such troubles do not exist, especially if irritants are used in the form of aperients, can only present potentialities for definite harm. The fact of leaving off the remedies may lead to an improvement, which is then placed to the credit of manipulation.

The discussion which follows should show the answer to a very important question. "Should our fellow practitioners be encouraged to consider the possibilities of pain being referred along a nerve trunk, or via the sympathetic, in all doubtful cases, or in cases where ordinary medical treatment has failed?" Also, it should help us to answer two other questions: "Should the coming generation—that is, students in medical schools—be drilled to accept the possibility that pain can be referred from a proximal source of irritation to any point along the distribution of a nerve or its sympathetic connexions?" "Should they be taught the importance of examination of the spinal articulations in complex cases, and should they be instructed in the special art of examination of the spinal movements, and in the correction of any discovered defects?"

UNEXPLORED FIELDS

I do not propose to enter into the wider possibilities of the effects of manipulation, as the subject is too difficult

and obscure. My knowledge, and perhaps my skill as a manipulator, is inadequate for the task. There are, however, facts which provide material which should make us furiously to think. For instance, "What is the meaning of the paralytic ileus which is so frequent a sequel to severe injury of the chest wall or to fracture of the ribs?" It is commonly considered to be due to over-stimulation of the sympathetic. There is a possibility that irritation of less severity at any level throughout the spine might produce symptoms less grave, and that the irritation may be caused by a joint lesion and so be amenable to manipulative treatment. What other explanation is there for the fact that so many patients volunteer the information that manipulative treatment has been efficacious in relieving constipation, or in correcting menstrual irregularities, or in reducing flatulence? Sometimes patients experience a sensation of warmth and well-being in a part that hitherto has felt cold and lifeless. These effects of manipulation of the joints of the spine are too common to be merely accidental, or the result of individual idiosyncrasies. We open up a wide field of possibility if manipulation of the spinal joints can influence some of the manifold ramifications of the splanchnic sympathetic system, by relieving some source of local irritation. The same can be said in relation to the other sympathetic nerve ganglia.

Possibly we do not always honestly try to sift the truth from the claims made on behalf of manipulation. Our minds are perhaps warped with prejudice, and we are apt to dismiss the story told by patients with a sneer, which almost amounts to a thinly veiled insult to their intelligence. Their claims are based on personal experience, and there may be some hidden truth yet to be revealed when study of the sympathetic nervous system has advanced far enough to include the effect of irritation of the sympathetic nerve supply to the joints on other ramifications of the sympathetic nervous system. Perchance one of a future generation may read what has been said to-day, and, with a full knowledge, marvel at our ignorance.

We, as physical therapists, are only sowers of a seed; it is for us to work with such knowledge as we possess, leaving to others the completion of the work we have begun. Prejudice and wilful blindness to facts will lead us nowhere. We may at present have no explanation for certain facts, yet let us remember that bitter bark was used universally in the treatment of malaria long before anyone had thought of quinine, and before the malarial parasite had been isolated. Twenty years ago joint manipulation in the extremities was wellnigh anathema, yet now it is recognized as a legitimate branch of medical practice. Possibly another twenty years will see general recognition of the therapeutic value of manipulation of the joints of the spine.

Physical therapists are bound to realize more than their colleagues in other branches of the profession the truth of the fact that "God helps those who help themselves," and we must still be willing to "scorn delights and live laborious days" of patient study and hopeful research if we are finally to achieve full knowledge of all the possibilities that physical treatment may yield. We are only doing our duty if, when we hear of a new claim put forward for manipulation, we receive it with doubt until the claim has been tested and failed to be found wanting either in reason or fact. But "blind unbelief," which will not listen, reason, or inquire, is nothing more than pigheadedness. As long as we continue to refuse to our patients the treatment by which they can receive relief at the hands of others, so long shall we play into the hands of the unqualified practitioner.