SPINAL MANIPULATIONS

OPSOMMING

Volgens die skrywer se ondervinding is die enigste goeie rede vir spesiale manipulasie, tussen werwels servikaal drie en luimbaal vyf, 'n poging om die verplasing van 'n klein diskus fragment te reduseer. Dis wat lekemanipulators steeds sonder om dit te besef, vir die afgelope honderd jaar reeds doen en baie noem mee verwerf het. Dit het gelei tot onaanvaarbare hipoteses. 'n Poging is aangewend om 'n geldige anatomiese verklaring vir hierdie sukses daar te stel, in die vertroue dat dokters en fisioterapeute nou hierdie logiese maatstawwe sal aanvaar en in hulle daaglikse praktyk insluit.

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Vertebral manipulation has lain under a cloud all this century. Understandably so; for most medical men have little experience of it. Indeed, many do not manipulate the spine at all. By contrast, many laymen manipulate whoever crosses their threshold. Both these policies are equally mistaken. The proper attitude is manipulation for those likely to benefit, its avoidance for those who will not. This moderate view, however logical, pleases the extremists on neither side. Meanwhile, so much spinal manipulation is carried out in Britain under anaesthesia, for unsuitable lesions, and by untrained persons that it occasions little surprise that many medical men regard it as dangerous or at best useless. However, every doctor knows of patients who have benefited. Clearly the real problem involves the proper selection of cases. Manipulative techniques matters much less. Osteopaths use one set of manoeuvres, chiropractors another, bonesetters a third. In England today, most manipulating laymen are self-styled, never having received any real tuition at all. Yet even these untutored individuals have their satisfied clients.

Can there be the slightest doubt therefore that it is the physiotherapist working with the doctor who is ideally placed for manipulating the cases he sorts out for her?

Two responsibilities lie here:

1. The duty of the doctor to single out all suitable cases and send them immediately to the physiotherapist.
2. The duty of the physiotherapist to have mastered the pre-manipulative clinical examination, and the manoeuvres called for by each different lesion. Here she is in a most advantageous position as regards laymen, who use neither our method of examination nor our techniques, and thus cannot escape avoidable failures.

Cases like that reported from the U.S.A. are not infrequent. A patient who had received thirty chiropractic adjustments without benefit was fully relieved in one single session by a graduate physiotherapist from St. Thomas's Hospital (Coldham, 1975).

Physiotherapy is clearly the profession that would benefit most from the adoption of this policy. They already receive the right patients by the score; now is the moment for applying the right treatment. There is no doubt that this can be done; for this was initiated in 1916 by Mennell and carried on by myself for thirty-five years. Our graduates are esteemed all over the world for this extra knowledge and prowess.

A. Importance of Manipulation

Manipulation of the spinal joints is important to physiotherapists for four reasons.

1. The lesions, though restricted in number, are very common. They provide the commonest reason for a fit man being off work.
2. Manipulation is often immediately successful, providing dramatic relief in one or two sessions. Gratitude and esteem thus remain confined within the medical ambit.
3. The successful manoeuvres are simple to learn, well within the compass of the average student and, could easily be fitted into the curriculum.
4. Every time that a patient relievable by a spinal manipulation visits his doctor, and neither he, nor the physiotherapist, carries this out, a gratuitous advertisment is afforded to layman. Since these laymen claim to cure disorders that manipulation cannot possibly affect, this is harmful to the population in general, since the relieved sufferer spreads erroneous propaganda to his friends, much futile treatment ensuing. The obviously false claims of these men justifiably engender much scepticism, but this must not blind us to the fact that they do have their successes too. Though the diagnosis is often wrong, the treatment happened to turn out right. It behoves both medical men and physiotherapists to study, not layman's failures, but their successes. How did they ever get as far as the laymen, when a few simple manoeuvres by the physiotherapist would have got the patient right?

I know that physiotherapists are well suited to this work. Confirmation comes from an unexpected source. In August 1974, the chiropractors of Ontario, Canada, petitioned the Minister of Health to prohibit spinal manipulation by physiotherapists. Clearly they were finding them so successful that it was making inroads on their pockets; this is the most cogent compliment laymen have ever paid to a profession ancilliary to medicine.

PURPOSES OF MANIPULATION

Manipulation of joints has three purposes. (No mention will be made of reduction of fractures, dislocations, hernias, etc., since no controversy exists there.)

1. *To break adhesions.* Minor adherent scars may form when e.g. the breach in a sprained ligament unites, restricting its mobility. They can be ruptured by a sharp jerk in the direction of the limitation. In tennis-elbow, the painful scar in the extensor tendon can be snapped by a sudden stretch. Major adhesions severely restrict movement at the joint after, say, immobilisation in plaster for fracture. These require rupture by a strong stretch under anaesthesia.
2. *To stretch out a contracture.* Both congenital and acquired contractures need elongation by gradual increasing sustained pressure. Congenital torticollis and talipes equinovarus are obvious examples; arthritis at shoulder and hip represent acquired capsular contracture.
3. *To reduce an intra-articular displacement.* Here lies the main object but, curiously enough, also the most controversial aspect of manipulation. In general, a physician's first thought when a displacement is found present is the feasibility of reduction. In fracture, dislocation, hernia or breech presentation or indeed a subluxated meniscus at the knee or jaw joint, the advisability is considered at once. But manipulative reduction appears scarcely to figure in medical thought when a fragment of disc is found out of position at an intervertebral joint. Before 1929, when Dandy ascribed sciatica to a disc-protrusion, the disorder was regarded as "sciatic neuritis" for which manipulation would have been absurd. Until 1945, when Key and I separately put forward the concept of a postero-central displacement of a fragment of disc as the

cause of lumbago, this disorder had been ascribed to spontaneous inflammation of muscle. As long as these two mistaken hypotheses remained orthodox, no reason for manipulation could be advanced. Now, however, that our pathological concepts have been accepted everywhere, reason demands logical treatment based on this mechanical aetiology.

By no means do all disc-lesions respond to manipulation. Suitability is based on the size, duration, position and consistency of the displacement. Moreover, the patient's age, occupation and sensitivity to pain must all be taken into account. In the lumbar region, my experience is that two-thirds of all cases of backache, but only one-third of all sciaticas prove tractable that way.

Reduction of a fracture or of a dislocation is ascertainable objectively. By contrast, at a spinal joint, it is a subjective event. It is only with the patient's co-operation that the operator can tell when all the spinal movements have become free, and straight-leg raising has become painless at full range. The patient is examined immediately before the session starts and after each manoeuvre so that the displacement can be watched shifting. The immediate result is ascertained; also, which measure has the best effect. All this knowledge is denied to the manipulator under anaesthesia, who cannot even tell if he is making the patient better or worse, let alone when to go on and when to stop. The reason why it is not possible to be sure in advance which manoeuvre will help most is that examination may well show a displacement to exist, but cannot show if it has emerged from the right, the left or the centre, in other words, in which direction to thrust it back. This is discovered as the session advances, when the effect of each separate manoeuvre is assessed seriatim.

CERVICAL DISC-LESIONS

These present themselves in five different ways and, to add to the confusion, have been given names that distract attention from the actual lesion.

Clinical Examination

This has five purposes. The function is assessed of:

1. *The Cervical Joints.* The partial articular pattern indicates internal derangement. In such a case, of the six active movements, two, three or four hurt; four, three or two do not. Moreover, the pain is usually unilateral, thus indicating that only one side of the joint is blocked.

2. *The Cervical Muscles.* Movement, attempted against such resistance that the joints remain still, discloses the state of each muscle-group in turn.

3. *The Cervical Nerve Roots.* Monoradicular palsy indicates a disc-protrusion, Neuralgic amyotrophy, neuroma, secondary neoplasm, neuritis, pulmonary sulcus tumour set up weakness in wholly different patterns.

4. *The Spinal Cord.* Whether the pyramidal deficit is caused by a disc-protrusion or not, objective signs of spinal cord involvement wholly contra-indicates manipulation.

5. *The Upper Limb.* This may well contain a separate lesion causing pain in the arm. Evidence is sought at the same time as the upper limb is examined for root-weakness.

Radiography

None of this vital information is obtainable by inspection of radiographs, or even myelograms. A displaced fragment of disc within an osteo-arthrotic joint is often just as reducible by manipulation as one in a radiographically normal joint. Every time a physician pays excessive attention to a few harmless osteophytes, projecting moreover anteriorly where they menace nothing, and warns the physiotherapist not to manipulate, he is creating one more opportunity for a layman to score. The only reliable basis for a decision on whether to manipulate or not rests on careful and informed evaluation of clinical data.

By contrast, normal radiographic appearances must not be allowed to lull the manipulator into a false sense of security; since chordoma, myeloma, neuroma and early secondary neoplasm do not show up at first.

Clinical Types of Disc-Lesion

1. *Acute Torticollis.* This is the analogue at a cervical joint of lumbago. The young patient wakes with his neck fixed in a posture of gross deformity. Marked limitation of one rotation and one side-flexion movement is found; the other four movements are of full range.

Reduction is secured in patients under thirty by manipulating during strong traction only in the direction of full range. When this measure has secured as much improvement as possible, the patient lies down and his head is pushed over more and more in the direction of limited range. It may well be one or two hours before full range is restored by this means. In patients over thirty, manipulation during traction, first in painless direction, then in the painful, suffices.

2. "*Scapular fibrositis.*" This is the unfortunate name that has been given to cervical disc lesions causing, as they usually do, pain felt in the muscles about the scapula. The lesion is neither scapular nor is it caused by inflammation of fibrous tissue. Clinical examination shows that the passive, but not the resisted movements of the cervical spine bring on the pain, thus showing its cervical articular origin; and that the resisted movements of the scapula are neither weak nor painful, thus exculpating the structure about the scapula. In other words, positive signs at a joint of the neck are corroborated by negative signs from the circumscapular tissues. One such muscle, shown to function perfectly, often contains a tender area, misnamed "trigger spot", "myalgic area", "fibrositis". This is a secondary phenomenon, as anyone can confirm who manipulates the neck. This shifts the alleged lesion from muscle to muscle instantly, and all tenderness ceases as soon as painless range in each direction has been restored to the affected spinal joint. It used to be the fashion to infiltrate these tender spots with procaine; nowadays a steroid injection is given into the wrong spot instead. Medical men are accustomed to cervical lesions causing scapular pain and accept this extra-segmental reference. Reference to the pectoral area is rare, but when it does occur, diagnoses like angina may be reached. When now a layman manipulates the neck and relieves this symptom, both he and the patient may well imagine that this measure has cured some obscure form of heart disease.

Physicians must be on the look-out for such cases, for they strengthen the assiduously fostered idea that lay manipulation cures visceral disease.

Manipulation during traction is simple and usually completely successful in one or two sessions. The distraction relieves pain, by removing the centrifugal force of compression, thus enabling the patient to relax; it doubles the width of the joint (Cyriax 1954) thus giving the fragment room to move. It also exerts centripetal force on the displacement both by suction and by tautening the posterior longitudinal ligament. Finally it disengages the facet joints, thereby allowing more movement at the intervertebral joint. It is a remarkable fact that osteopaths crowd the facets together when they manipulate — they mistakenly call it "locking" — whereas displacements move more easily when the articulating surfaces are brought as far apart as possible. They are proud of this jamming, blissfully unaware that by doing so they much diminish the likelihood of success. Here must lie the reason why semi-experienced physiotherapy students, using distraction techniques, may well secure full reduction when experienced laymen forcing the joints together before applying their thrust, have already failed. It certainly explains why they need so many more sessions of manipulation than do St. Thomas's graduates.

3. "*Brachial Neuritis.*"

There are many reasons for pain and paraesthesia in the upper limb, but the common cause is a disc protrusion compressing a cervical nerve-root; if so, the lesion is neither brachial nor a neuritis.

If no root palsy is present when the upper limb is examined and the spinal cord conducts normally, reduction is often still possible provided that unilateral radiation to the arm has lasted less than two months. If a root palsy has supervened and muscle weakness is apparent, manipulation always fails and spontaneous recovery from pain (three to four months since the brachial pain, not the scapular pain, started) and from the muscle paresis (six to eight months) must be awaited. Manipulation is also apt to fail when one or more of the neck movements provoke the pain down the upper limb, and when the symptoms appear in the reverse of the usual order, i.e. paraesthesiae in the hand, then aching in the limb, then scapular pain.

In Britain a very annoying situation exists. In cervical root-compression, the pain in the scapula and arm goes on getting worse for two to three weeks. During this time, the patient's physician prescribes ever-stronger analgesics. By the third or fourth week the pain is at its worst, and lack of progress leads to reference to hospital. There examination reveals the root-palsy, confirmed by electro-myography. Physiotherpy, traction or a collar is prescribed, all in vain. At the end of two months, just when the symptoms are about to wane, the despairing patient takes himself off to a lay manipulator. Since his treatment starts at the same moment as spontaneous subsidence of the pain, manipulation twice a week for, say, six weeks coincides in time with the advent of spontaneous recovery. Again, both the manipulator and the patient mistakenly ascribe to the manipulations. How is either to know?

4. *Acroparaesthesia.* Bilateral root-pressure may set up pins and needles in both hands together with only vague aching in the upper limbs. (Differentiation between the thoracic outlet syndrome and a bilateral carpal tunnel syndrome may present difficulty.)

Manipulation may help. Often the disorder proves intractable, but the symptoms are never severe.

5. *Posterolateral Sclerosis.* Evidence of pressure on the spinal cord contraindicates manipulation. Pins and needles in the hands and feet (or postural vertigo indicating basilar ischaemia) are not an absolute bar, provided the lay methods are avoided; these are dangerous and death has resulted. Strong manual traction without rotation may succeed and in my hands no lasting harm has resulted. If the apex of the spur compressing the spinal cord consists of a fragment of cartilage, manipulation during strong traction can still shift it. If the point is osseous, manipulation must fail and the prevention of paraplegia due to compression of the anterior spinal artery is now laminectomy.

Prevention of cord pressure is feasible. The osteophyte arises in the first place by traction on the posterior longitudinal ligament from a postero-central bulging of the disc. The periosteum at the edge of the vertebral body is elevated and bone grows to reach its limiting membrane. The prophylaxis of an osteophyte increasingly menacing the spinal cord is to have carried out manipulative reduction years ago.

HEADACHE

There is one type of headache that physicians often fail to recognise — that arising from the ligaments about the occipito-atlantoid and atlanto-axial joints. These joints are developed within the first and second cervical segments and therefore refer pain along the relevant dermatomes in the usual way, i.e. to the back of the head (C1) and the forehead (C2). The patient is an elderly man (women are almost immune) who describes occipito-frontal headache every day on waking. At first it has eased by midday, later by the afternoon; it never lasts all day. At his age, some elevation of blood pressure may be found present. The headache is attributed to that, the more so since the radiographs of the upper neck show no more osteophytosis than anyone that age often has. One session of manipulation of the neck during traction nearly always affords full relief lasting at least a couple of years. The layman may cure this type of headache. If so, again both he and the patient understandably, but mistakenly, take for granted that high blood-pressure has been relieved. This not uncommon misdiagnosis provides renewed "evidence" that manipulation cures visceral disease.

THORACIC DISC-LESIONS

These also present under misleading names, e.g. fibrositis of chest wall, muscle strain, pleurodynia (because a deep breath hurts), intercostal neuritis. Diagnosis is not difficult if thoracic disc-lesions are kept in mind. The influence of posture and exertion on the pain is manifest in the history. The difficult cases are those with a primary postero-lateral onset, the root pain felt in the anterior thorax or abdomen coming on without previous backache. Exhaustive examination of visceral function naturally reveals no abnormality, and such patients are often dismissed as neurotic, or alternatively, with some vague label such as "gastritis" or "chronic cholecystitis" is applied. A. T. Still, the founder of osteopathy, describes how he had pain in the region of his own heart, which ceased with a click during pressure at his mid-thoracic vertebrae. In this type of case the pain is often wrongly ascribed to some vague visceral disorder, and the layman once more cashes in on our mistake. Obviously vertebral manipulation relieves, not visceral disease, but those pains actually of spinal origin that have been mistakenly attributed to a viscus. Neither patient nor non-medical manipulator realises that, nor would it suit the latter's book if he did have doubts.

Examination

This comprises eliciting:

1. *Articular Signs.* The partial articular pattern indicates internal derangement. Some, but not all, of the six movements prove painful.

2. *Dural Signs.* Neck-flexion and scapular approximation draw the dura upwards and increase the thoracic pain.

3. *Root Signs.* Though root pain felt as a rule along the lower costal margin is common, neurological deficit is rare and suggests a neuroma rather than a disc lesion.

4. *Cord Signs.* If evidence of pyramidal pressure exists, manipulation is wholly barred; laminectomy should be considered, and the sooner the better.

Articular signs accompanied by dural signs clearly indicate a posterior disc-displacement, since the dura mater lies behind the joint. Manipulative reduction during traction is usually very easy.

LUMBAR DISC-LESIONS

Here, too, the situation is obscured by many different names for the same disorder — pulled muscle, lumbago, sciatica, sacro-iliac strain, sprung back, lumbar or gluteal fibrositis, spinal arthritis or spondylosis. The same phenomenon that is so conspicuous at the neck — extra-segmental reference from the dura mater with a secondary localised tender spot within the painful area — occurs also in lumbar disc-lesions. Since a postero-central disc-protrusion bulges out against the posterior ligament far enough to compress the dura mater, remarkable areas of reference are reported by sufferers from acute lumbago, e.g. to one or both groins, to the lower

abdomen, up to the lower posterior thorax. When the referred pain overshadows local pain, it is not unknown for a low lumbar disc-lesion to be mistaken for chronic appendicitis, since the way the dura mater refers pain misleadingly (Cyriax 1975) is not recognised by most doctors. Clearly, spinal manipulation may well relieve such a pain in the iliac fossa, and the mistaken notion of a lay manipulation curing visceral disease is once more strengthened.

Detailed diagnosis is most important; for it is by no means enough merely to state that a lumbar disc-lesion is present; its duration, size, position, consistency and stability have all to be correlated with the patient's occupation, age and sensitiveness. A small cartilaginous displacement should be reduced by manipulation; a small nuclear protrusion should be reduced by daily traction. If the protrusion is large, neither method is applicable and the desensitization of the nerve-root at the point of impact by the induction of epidural local anaesthesia or a sinu-vertebral block is the treatment of choice.

Examination

Four data are sought:

Articular Signs. These comprise: 1. visible deviation; 2. limitation of movement in some directions but not in others. In early disc-lesions a painful arc, usually on trunk-flexion, is often present. The partial articular pattern indicates internal derangement.

Dural Signs. Lumbar pain produced by neck flexion and bilateral limitation of straight-leg raising indicates that the mobility of the dura mater is impaired on stretching from above or below. When, in sciatica, the straight leg is raised as far as possible, neck-flexion may increase the root pain, again as the result of pulling on the tense nerve-root via the dura mater.

Nerve-root Mobility. At the third root, this is tested by prone-lying knee flexion. Disc-protrusion at the fourth or fifth lumbar level may compress the fourth lumbar to second sacral nerve-roots. Their mobility is assessed by straight-leg raising. The fourth sacral nerve does not reach the lower limb and cannot be stretched.

Nerve-root Conduction. Muscle weakness, impaired reflex and/or cutaneous analgesia indicate a degree of protrusion too great for manipulation or traction to be practicable.

Radiography

Choice of treatment in disc-lesions rests on what is found when these four essential elements in clinical evaluation are correlated. None of these findings emerges from inspection of a straight radiograph nor is appreciable help afforded by positive or negative myelographic appearances.

MANIPULATION

In any displacement throughout the body, the physician s first thought is the feasibility of reduction, by himself or by the physiotherapist. In the past, for some reason obscure to me, this reasoning was thought not to apply to the spinal intra-articular cartilages, though it was orthodoxy at the knee or jaw. This gap in logic on our part left the field wide open for laymen, who have achieved quite a reputation with patients on the strength of a few simple twists. This should now cease.

Manipulative reduction should be carried out as soon as the diagnosis of a reducible disc-protrusion has been reached. Immediate reduction saves the patient pain and economic loss; saves insurance companies money and the likelihood of long-drawn-out litigation; and saves the doctor and physiotherapist time.

Manipulative reduction then is performed at once unless a contra-indication is found on clinical examination.

Contra-Indications to Lumbar Manipulation

These are:

1. *Not a Disc Lesion.* Clearly manipulation is pointless unless a reducible lesion is present.

2. *Danger to the Fourth Sacral Root.* Any complaint of weakness of bladder or rectum or of perineal, testicular or saddle paraesthesia suggests severe stretching of the posterior longitudinal ligament. If this should rupture during manipulation, massive protrusion of the whole disc may result, leading to severe bilateral sciatica and damage, possibly permanent, to the innervation of the bladder. In such cases laminectomy is urgently required.

2. *Hyperacute Lumbago.* Most cases of lumbago respond very well to manipulation. However, in a few cases the patient is so fixed that the slightest movement provokes such sharp stabs of pain that the attempt becomes unthinkable. If so, epidural local anaesthesia is induced, whereupon the displacement impinges against the now-insensitive dura mater and all pain ceases for the time being. Spontaneous reduction is aided during this period of painless mobility if the patient lies prone for as long as the anaesthesia lasts.

3. *Pregnancy.* During the last month manipulation is impracticable. During the first four months, prone pressures as well as the rotation manipulations are quite safe.

4. *Neurosis.* Very nervous patients, or those who, owing to a legal suit pending, have to maintain disablement, are not suited to manipulation.

Manipulation Useless but not Harmful

1. *Too Large.* Reduction is impossible when the protrusion is larger than the aperture whereby it emerged. Sciatica with signs of impaired conduction at one or two nerve-roots (muscle paresis, loss of reflex, cutaneous analgesia) show that reduction is impossible. These patients should have the root desensitised by the immediate induction of epidural local anaesthesia. Gross lateral deviation of the lumbar spine maintained by sciatic pain (Cyriax 1954) often calls for laminectomy, all conservative treatment being apt to fail. But one epidural injection is usually worth trying.

2. *Too Long.* When root-pain has lasted six months or more, in a patient under sixty years of age, the attempt is almost sure to fail.

3. *Too Soft.* Nuclear protrusions require one to three weeks' daily traction for 30 to 45 minutes, at a distracting force of 80 lbs (minimum for a frail woman) to 200 lbs (for a large strong man.) The treatment is entirely painless (Cyriax, 1950). It should never be used for acute lumbago with twinges, which is made much worse. There exist eight different positions of the patient on the couch and, in a difficult case, the physiotherapist tries out the various postures until the effective one is ascertained (Cyriax, 1975). If any pain is caused, something is wrong; and if no painless position can be found, the case is unsuited to traction.

MANIPULATIVE TECHNIQUES

The manoeuvres themselves are not difficult to master. The important point is a low couch, about 36 cms high, so that the operator's body weight can be used to reinforce the power of the arms. This is particularly necessary when a small physiotherapist is faced with a large man, and explains why a strong layman using a high couch may fail yet one of my young physiotherapists succeed.

The family doctor, if he has time, should carry out these manoeuvres as soon as the clinical examination is completed. But a session of manipulation may well take half-an-hour; hence this work is best performed by the physiotherapist.

This policy proved successful and popular (both with the patients and the physiotherapists) during my forty years at St. Thomas's) and should be adopted all over the world. The patient remains under medical supervision throughout and is treated by trained ethical personnel.

All that need be done now is for doctors to recognise suitable cases at once and for physiotherapists to equip themselves to treat accordingly. Neither presents the slightest difficulty, merely the exercise of a little goodwill.

SUMMARY

In my experience, the only good reason for spinal manipulation between the third cervical and fifth lumbar vertebra is an endeavour to reduce a displacement of a small fragment of disc. This is what lay-manipulators, still without realising it, have been doing for the past hundred years and have gained much kudos thereby. This has led them on to untenable hypotheses. An attempt is made to substitute a valid anatomical explanation for these successes, in the hope that doctors and physiotherapists will now accept these logical measures and incorporate them in their daily practice.

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The Value of Deep Transverse Frictions in Sports Injuries with particular reference to the knee

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Deep transverse friction is an invaluable treatment for sports injuries. However, when this type of massage is being carried out, it must be given to the exact spot and in the correct way; it is of no use to look for the tender area and to massage there. One must examine the patient, find out which tissue is at fault and then look for tenderness along *that* structure. The friction must then be given transversely to the tissue, not longitudinally.

AIMS OF DEEP TRANSVERSE FRICTIONS

1. In muscular lesions the aim is to mobilise the muscle by separating the adhesions between the individual muscle fibres that are restricting its mobility towards broadening each time it contracts. The muscle must be kept fully relaxed during the friction.

2. In ligamentous lesions, the objective is to move the ligament to and fro over adjacent bone in imitation of its normal behaviour and thus maintain its mobility.

3. When a tendon has a sheath, crepitus may be present indicating roughening of the tendon sheath. Deep transverse friction smoothes the gliding surfaces. During the transverse friction the tendon must be kept taut. In tendons without a sheath, deep transverse frictions break up scar tissue at the insertion of the tendon into bone or scar tissue within the tendon.

TECHNIQUES OF DEEP TRANSVERSE FRICTIONS

1. As mentioned earlier, the right spot must be found.

2. The physiotherapist's fingers and the patient's skin must move as one. If movement takes place between the patient's skin and the physiotherapist's fingers, then the massage reaches only the skin and not the tissue at fault, and will also give rise to a blister.

3. The friction must be given across the fibres composing the affected structures, i.e. transversely.

4. The friction must be given with sufficient sweep.

5. The friction must reach deeply enough. It is more effective to massage deeply for a few minutes than to go on indefinitely with gentle massage.

6. The patient must adopt a suitable position which ensures that the tissue is either taut for a tendon sheath or relaxed for a muscle. If the structure to be treated is ordinarily out of reach of the physiotherapist's fingers, then a position must be adopted whereby the tissue becomes accessible, e.g. the supraspinatus tendon at the shoulder. The arm is put behind the patient's back whilst the patient is in the half-lying position, thereby fixing the arm in adduction and medial rotation. In this position, the tendon can be easily felt as it passes from the base of the coracoid process directly forwards over the head of the humerus to the greater tuberosity.