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SOFT TISSUE LESIONS: LOCALIZATION AND DEEP MASSAGE

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This lecture concerns the use of deep transverse friction as elaborated and taught by Dr. Cyriax, for whom I have had the pleasure to work for eight years.

It is a most accurate treatment for moving parts: tendons, ligaments and muscles. The hand must do its work perfectly, and this work is deep friction applied to, perhaps, a finger's breadth of tissue. It follows that accuracy of diagnosis is essential; hence the title that I have chosen, 'Localization and deep massage.' These two cannot be separated and unless localization comes first, deep massage is useless: in fact worse than useless, since the patient is put to some discomfort to no purpose.

A. Localization

The massage is to be given to a $\frac{1}{2}$ -in., perhaps $\frac{1}{4}$ -in., of tissue; it is imperative that it should be the right $\frac{1}{2}$ -in.

For two reasons the physiotherapist should be able to carry out such localization.

Firstly, the diagnosis may be something in the nature of 'painful shoulder.' Deep massage of this sort cannot be given to a painful shoulder, but only to a 'supraspinatus tendinitis' or 'bicipital tendinitis,' and so on. Therefore such a diagnosis gives to the physiotherapist a responsibility to find the precise cause of the trouble.

Secondly, knowledge of such a system of localization enables the physiotherapist to assess progress objectively (and this should be done at each treatment) or to decide that the original diagnosis was incorrect or incomplete. It is not uncommon, for instance, for a major injury to mask a second slighter one, which only becomes apparent when the first has cleared up. It can then properly be dealt with by the physiotherapist without referring the patient back to the doctor, with consequent saving of time on all sides.

Referred Pain

The character of referred pain, again, makes localization essential; for it is more than likely that where the patient feels the pain is not where the trouble lies. A lesion lying deeply in a particular segment can be appreciated as pain or tenderness anywhere in the relevant dermatome, and lesion and pain are often widely separated.

The more severe the lesion the more distal is the reference of pain likely to be. For instance, mild arthritis of the shoulder joint may give rise to pain only at the upper outer aspect of the arm, whereas severe arthritis may cause pain as far as, and perhaps only in, the lower arm.

The more distal and superficial the lesion, the more accurately is the pain placed, so that if it lies in, for instance, a small muscle of the hand, the patient is likely to be correct when he points to where he thinks the trouble is.

Invariably, however, the diagnosis must be made without palpation. Examination must include all structures from which the pain *might* arise (i.e. all the structures of the segment in which the pain is felt) until one is found to be at fault. Only then may palpation be used, to identify the particular structure and then to find the point of maximum tenderness *in that structure*. Pain and tenderness elsewhere than in the tissue found to be at fault are firmly ignored.

Selective Tension

The diagnosis is made by putting selective tension on each structure in turn, and by asking the patient which tension brings on, or alters, his pain. The patient must be quite clear on this point, which is crucial. The question is not 'Does this hurt?', which may suggest to him that it

should hurt or confuse him with his already existing pain. He is asked, 'Does this affect your pain?', the point being whether there is any aggravation or alteration.

For purposes of examination, the tissues may be divided into two groups, inert and contractile. The *inert group* can have tension put on them by stretching and sometimes by pinching, i.e. by passive movement. It includes capsules, ligaments, bursae and nerve sheaths. The *contractile group* also can have tension put on them by passive movement but it can be done much more effectively by making them contract, i.e. by resisted movement. It includes muscles, tendons and their attachments.

It is very important to define what is meant by passive and resisted movements in this context.

The *passive movements* are done through the whole possible range, since the point is to determine whether there is limitation of movement (and, if so, its proportion) and whether there is pain.

The *resisted movement* is a strong static contraction. If movement is allowed at the joint, it is perfectly true that the muscle is tested but the inert structures round the joint have also been involved, and if pain is felt it is not clear whence it arises. The joint is therefore put into a neutral position so that no question of tension of inert structures arises, and the patient is asked to contract the muscle strongly while the physiotherapist holds him in such a way as to prevent any movement occurring and to make sure that he does indeed use the muscle hard.

A muscle tested in this way may show various things. It may be strong and painful, which suggests a local lesion. It may be weak and painless, which suggests neurological lesion or total rupture. It may be weak and painful, which suggests partial rupture or a gross lesion, such as fracture or neoplasm. Or it may be strong and painless, in which case *it is normal and does not require treatment, however tender or painful it may be to touch.*

Active movements have their own special value in that they test range, muscle power and the patient's willingness to do the movement. They thus provide a rough guide to the state of a joint. If an active movement is attempted at the beginning of the examination and the patient cannot do it, it can then be broken down into its component parts. Range can be tested by passive movement, muscle power by resisted movement. If both these are found to be full and painless it suggests that the trouble lies in the patient's willingness to perform the movement.

Patterns

If movements are tested in this way, various patterns emerge, of which the following are some of the most typical:

1. All passive movements hurt and may be limited in a proportional manner. Resisted movements are strong and painless. This suggests a lesion of the cuff of inert tissue about the joint, i.e. the capsule, and is what is found in various sorts of arthritis.

2. Some passive movements are painful and perhaps limited. Others are full and painless. Resisted movements are strong and painless. This suggests ligamentous strain. Those movements which stretch or move the ligament are affected, the others are not, nor are the muscles.

The same pattern may indicate internal derangement, when there may be disproportionate limitation of movement and a history of recurrence.

3. One resisted movement hurts, others are painless. The passive movements are full and painless. This is typical of injury to a muscle or tendon.

4. All movements hurt. This suggests a gross lesion outside the scope of this lecture, or psychogenic disorder where the patient is interpreting effort as pain. It is true that with an acute joint lesion all the resisted movements may be found to hurt as well as the passive ones, but in such cases the passive movements reveal such marked articular signs that no mistakes can be made.

5. Painful arc. This suggests that the injury lies in a position where it can be pinched between two bony points. Anatomy shows where this is likely to be.

6. Pain on extreme of movement. In addition to this being caused by an inert structure on the stretch, it may also be due to nipping of a structure between two bony points.

Negative responses during examination are as important as positive ones, since it is only when some movements are found painful *and others painless* that a pattern emerges at all. Thus, to find that resisted extension of the wrist hurts at the elbow tells the examiner nothing at all. If resisted extension hurts and resisted flexion does not and all movements at the elbow are full and painless, then only does it begin to look like a lesion at the elbow of the common extensor tendon of the wrist, i.e. a 'tennis elbow.'

At this moment, and at this moment only, when the injury has been localized to a particular structure, is palpation, confined to that structure, relevant and useful. It identifies first the tissue involved and then the point of maximum tenderness in this tissue. Treatment is directed to this spot.

B. Deep Massage

As has been said, deep friction of the sort under discussion is used in the treatment of injuries to the moving parts of the body: injuries to tendons, muscles and ligaments. It would be reasonable to suppose that deep massage to the

site of such injuries would aggravate rather than cure. In fact, this is not so, and we believe this to be because the treatment follows the orthopaedic principle of maintaining movement while healing takes place. By movement the painful structure is freed from adhesions either present or in the process of formation, and healing takes place without the painful scar that causes persistent symptoms.

The friction is given transversely to the structure being massaged, since this has been found in practice to be most effective. It appears that in this way therapeutic movement is best achieved; a tendon sheath is smoothed off against the tendon, a ligament is freed from adherence to underlying bone and one muscle bundle is mobilized upon the next.

Invariably numbing occurs, usually to such an extent that the patient will say that he thinks the physiotherapist's finger has shifted to another spot. This phenomenon is presumably caused by intense local hyperaemia and consequent increase in the destruction of Lewis's P-factor, which is responsible for pain. It explains why this treatment can be given to acute lesions and, while uncomfortable, is by no means intolerable.

Technique

General remarks. The massage is given usually for 15-20 minutes and is repeated as soon as increased tenderness has worn off. This generally means treatment two to three times a week; daily is almost certainly too often; once a week may not be unreasonable. It is continued until the patient has full painless function and then stopped, however much local tenderness there may be on palpation. It is explained to the patient that this tenderness is an aftermath of injury and treatment which may take a week or two to clear up and is unimportant.

About one to three or six to eight sessions are required, depending on the severity or duration of the trouble. There should be a steady improvement from the beginning, and



Fig. 1. Friction to anterior aspect of trapezio-first-metacarpal joint.



Fig. 2. Friction to inner aspects of quadriceps expansion.



Fig. 3. Friction to upper part of peroneal tendons.

unless this occurs the accuracy of treatment or of diagnosis comes into question and both should be reassessed.

Acuteness is no contra-indication. For instance, acute crepitating tenosynovitis of the thumb tendons and recent sprains are two of the conditions that respond best. Naturally in acute lesions, where the intention is to prevent adhesions forming rather than to break them up, massage does not have to be given with full force and might consist of 10–15 minutes fairly gentle friction, gradually increased in depth until 1–2 minutes of deeper friction can be given at the end. Effleurage is given first, wherever oedema prevents the physiotherapist's finger from reaching the right spot.

Physiotherapist's position. This type of massage is exacting and it requires some practice before it can be kept up without fatigue. The physiotherapist should sit, and be so placed that her arm remains as nearly as possible in a restful position. She should then identify the structure to be treated by careful palpation. The muscles of finger or thumb then maintain pressure on the lesion while the muscles of wrist, forearm or shoulder draw the hand to and fro and produce friction. In this way effort is distributed.

The whole hand should move. Massage by finger movement alone cannot be strong enough and will quickly produce strain, as will massage with the hyper-extended finger. The best position is with the finger or thumb slightly curved at every joint, or with the terminal interphalangeal joint flexed while the proximal interphalangeal joint and the metacarpo-phalangeal joints remain extended. Either method ensures that the strain is taken by the flexor tendons, which are soon trained for this, and not by the joints.

Various positions may be used depending on the extent or position of the injury and the shape of the physiotherapist's hand; the thumb may be laid along the structure; the thumb tip may be used; the index may be reinforced by the middle finger or vice versa; the thumb and fingers may be used in opposition.

Physiotherapist's finger moves with the patient's skin. The physiotherapist's finger moves as one with the skin and subcutaneous tissue upon the damaged structure. No friction may occur between finger and skin, since the latter then very quickly becomes damaged, and once this has occurred there is nothing to be done but wait for it to heal. The skin must be watched vigilantly and immediately there is any suggestion of slip, for instance because of sweating, treatment should be stopped and the skin washed and dried, or treated with surgical spirit. If it is very sensitive, treatment may have to be modified. Occasionally a little subcutaneous bruising may appear, but this is no contra-indication and will clear up as soon as treatment is finished.

Sweep. Friction must be given with sufficient sweep. Each stroke must reach right across the site of the lesion in order to produce the mobilizing effect of the treatment, and depth is no substitute for this. A deep friction without sweep has a 'boring' effect which is very painful and does not cure.

Depth. Although sweep is its most important component, the massage has to be deep enough to reach the lesion, and in deep-lying structures this requires all the strength of the physiotherapist's hand. As has been stated, recent injuries may not require the vigour of massage that is necessary for chronic ones. Invariably, treatment is begun gently, and it is only after a few minutes, when the numbing effect has come into play, that friction is given to the proper depth.

Common Types of Lesion: Their Individual Treatment

Tendons. These are treated by friction alone. The patient is told to rest, in that he should avoid the painful movement as far as possible. The part is not immobilized.

For treatment tendons with a sheath are put on the stretch so that the tendon forms a firm base around which the sheath is rolled during friction. This type of lesion gives some of the best and swiftest results. Tendons without a sheath are simply treated in the position where they become most accessible.

Muscles. Minor muscle tears are treated by deep friction followed by active off-weight exercises.

The muscle is put into a relaxed position for treatment so that the physiotherapist's fingers can get into it adequately in order to mobilize it internally.

Ligaments. The aim in treating a ligamentous injury is to maintain or regain full range of painless movement at the joint.

With a recent sprain there is usually a traumatic arthritis with marked limitation of movement and oedema. The latter is dealt with, if necessary, by effleurage followed by friction. This does not have to be very forceful, but must be deep enough to move the ligament on the bone, and this leads to a marked increase of range with less pain. This is immediately endorsed by passive and active movements and the patient should leave with movement appreciably increased and understanding that he should try to maintain this.

With chronic strains the problem is to break adhesions which have been present for some time. Only a minor degree of limitation is likely to be present. Friction is given deeply, followed by rupture of the adhesions by a short, forced, passive movement. It is not usually necessary to give exercises to maintain range, since the injury is a cold one and the adhesions do not tend to re-form.

For treatment in both cases the limb is put into a position where the ligament is accessible. If two extremes of range are possible, friction and movement are carried out in both; for instance, at the medial collateral ligament of the knee, firstly the ligament is massaged in and moved towards flexion, and then towards extension.

Additional Remarks

The treatment is uncomfortable, but much more so in the hands of a student than when the physiotherapist becomes expert. Experience leads to much swifter results, and although the physiotherapist may then give the friction much more deeply, she also gives it much more comfortably. Some of the ways in which this is achieved are that the fingers learn a lively appreciation of the structures they are on, use the pad rather than the tip, cling to the structure being treated without dragging uncomfortably on the skin, and never 'bore' or dig in.

With practice the treatment becomes effortless and requires no concentration, but the hand never becomes casual.

Conclusion

This lecture is concerned to say two things.

Firstly, a precise localization is essential before this type of massage can be effective. A system for carrying out such localization has been evolved and it is suggested that it may well be used by physiotherapists whenever the doctor is prepared to place this confidence in them. In effect, such confidence would say, "I am satisfied that this patient has a lesion suitable for physiotherapy. You are more than a technician. Localize and treat it."

Secondly, it reaffirms confidence in the usefulness of massage, which at present lies under a cloud, and in the physiotherapist's main weapon—a strong, disciplined and thoughtful hand.

Reference, Cyriax, J. *Textbook of Orthopaedic Medicine* (1954).

The Photographs illustrating this article are from Dr. J. Cyriax's *Textbook of Orthopaedic Medicine*. Vol. II. 1955 ed.

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