REFRESHER COURSE FOR GENERAL PRACTITIONERS

TENOSYNOVITIS AND TENDOVAGINITIS

BY

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Apart from suppurative inflammations of the sheaths of tendons, with which this paper does not deal, there are a variety of painful conditions which custom has loosely grouped together under the term "tenosynovitis." So vaguely is the word used that it has come to mean little more than a painful disability arising in or around a tendon or a group of tendons. The conditions giving rise to it are of uncertain pathology, and therefore more accurate terminology is hardly possible. The commonest, variously known as "non-suppurative tenosynovitis," "crepitant peritendinitis," or "non-specific tenosynovitis," can be quite disabling. It occurs most often in the region of the wrist, usually affecting the long extensor and abductor tendons of the thumb.

Tenosynovitis at the Wrist

In most cases such a tenosynovitis at the wrist starts fairly suddenly and often for no very obvious reason. The symptoms and signs are usually most marked over the radial side of the forearm just above the joint, where the tendons of the long extensor and of the abductor of the thumb come to lie on the radial side of the lower end of the forearm. All tendons which move either around corners or under ligaments are particularly susceptible to tenosynovitis, and on the radial side of the wrist the long thumb tendons cross over each other, and also move through a considerable range round a corner, in tough and unyielding sheaths. The occurrence of disorders caused or aggravated by friction is therefore very likely there.

Other tendons are not immune. The long flat tendons on the back of the hand move through loose areolar tissue (the paratenon), but they, too, have a considerable excursion and are liable to frictional troubles. In front of the wrist the flexor tendons are closely packed under the tight angular ligament, and move round a corner whenever the wrist is flexed or extended, so that they, too, are vulnerable.

It is hardly surprising that the commonest provoking cause of tenosynovitis is repeated unaccustomed movement, either an action the patient has never undertaken before or a familiar movement resumed after an interval. The type of action most likely to produce trouble at the wrist is a combination of gripping and of a twist of the forearm into pronation or supination, due as often to the use of scissors or shears as to the use of complicated hand-controls in machinery. The thumb tendons are especially affected by repeated full movements of the thumb and of the wrist together, as in picking up and laying bricks. The importance of newness of the action is seen in the fact that many patients start to have symptoms on the second day of taking up a new job or of resuming an old one after a holiday or an illness.

Occasionally the condition seems to be due to persistent repetition of some standardized movement which is neither new nor recently resumed, but which has been continued beyond the point of fatigue, especially after one particular strain which was of no great moment in itself. Tenosynovitis may occur in this way in the wrist of a golfer who has checked his stroke and gone on playing despite pain, or in the forearm of someone who has wrenched his flexor muscles in gripping the rail of a bus which has

started suddenly. An isolated injury or strain alone, however, is not a sufficient cause, and many of these patients can give no history of anything likely even to have contributed to the cause of their trouble.

Tenosynovitis Elsewhere

After the wrist, the ankle region is the commonest site for the occurrence of tenosynovitis. Newcomers to treadle work develop it around the tendons of the tibialis anterior or tibialis posterior, in front of or behind the medial malleolus. Recruits to marching get a similar "peritendinitis" higher up the leg. The Achilles tendon is sometimes affected, though less often, but with this tendon great care is necessary. One must beware of the diagnosis of Achilles "tenosynovitis" if symptoms start after a single strain such as a badly taken jump, for such "strains" are often incomplete ruptures of the tendon itself, which, if neglected, become complete all too easily. The Achilles tendon is, however, almost the only one in which such gradual rupture can mimic tenosynovitis, except that tenosynovitis in the region of the shoulder is often associated with complete or incomplete rupture of the tendon concerned, but the syndromes produced around that joint are very different from those of the lesions under discussion here.

Symptoms and Signs

The clinical features of tenosynovitis such as we are now considering are pain, swelling, and crepitus. The condition occurs only in adults.

Pain is the earliest symptom. At first it is produced only by movement of the affected tendon or tendons, but later it can become almost continuous, very tiresome in bed, and so greatly aggravated by movement that reflex muscle spasm is produced and a subacute arthritis simulated. *Swelling* remains localized if the condition is affecting tendons with a definite sheath, such as those immediately in front of or behind the wrist and the ankle. Where it affects the peritendinous tissue of tendons which have no sheath, the swelling is diffuse. Higher up the forearm, on the back of the hand, and in front of the leg above the ankle one does not, therefore, expect localized swelling. *Crepitus* always occurs after the swelling, and is often best felt proximally to the true tendon sheath, rather above the swelling. This is to be expected, for the swelling is due to fluid, and where an appreciable amount of fluid has accumulated there is not much friction and therefore little crepitus. At the wrist the crepitus is described as "leathery," and over the Achilles tendon as "silky."

Prognosis

The course of tenosynovitis is a little unpredictable. In cases involving the long tendons of the thumb symptoms may last for weeks. In any case and at any site treatment is imperative, as there is a strong tendency for untreated or badly treated cases to become chronic, with acute exacerbations every time the patients resume work. Correct treatment can certainly prevent this.

Treatment

At the wrist, whichever tendons are affected, the aim of treatment is *restriction* of movement. *Abolition* of movement (absolute rest) is harmful, for muscle wasting and

weakness result from this and make relapse more likely when work is resumed. Moreover, complete immobilization of the wrist, the thumb, and the fingers all at the same time does more harm than is often realized, for the stiffness may persist many weeks after the splint has been removed, and the treatment thus becomes more crippling than the disease.

The degree of immobilization required can be obtained by the use of strapping, or, better still, of a detachable splint which is removed once a day for full active movements without strain. The splint must, of course, be a well-fitting one, preferably made of a light waterproof plastic material. It must be made specially for the particular patient under treatment. Alternatively, a removable plaster cast will do, or even a complete plaster if it does not include the digits. The wrist may be fixed, but the fingers must not be immobilized. Strapping, if used instead of a splint, is satisfactory if it is generously applied. A whole roll of 3-in. (7.6-cm.) elastic adhesive strapping is needed for each case. It should be applied from the knuckles up to a short way below the elbow, leaving the digits quite uncovered. At least six thicknesses should be applied over the area of the swelling, and the strapping should be changed as soon as it becomes loose. Generous firm bandaging over wool is also satisfactory.

It is as well for a sling to be worn for the first two or three days only. Then it must be discarded, and the hand should be used as much as possible, with the splint on, of course.

Massage plays no part in the treatment of this condition. Neither heat nor cold applied to the surface helps at all. Counter-irritants are equally useless, but there is perhaps something to be gained from the use of short-wave diathermy as well as splintage.

In patients whose tenosynovitis dates from taking up a new job, the importance of training is to be stressed. This is particularly true in young soldiers with peritendinitis in the anterior compartment of the leg, for the very fact that they complain at all indicates that their morale is low and that their need is training, not treatment. Most people regard such symptoms as a trivial and transient penalty for unwonted exercise in boots, a penalty paid, indeed, by most inferiorly trained amateur footballers after the first game of any season. The only persons who complain much are those who are using such symptoms to express their dissatisfaction with their conditions of life.

Chronic Tenosynovitis

A properly treated tenosynovitis should be cured in three weeks. If symptoms persist despite correct treatment, investigation is necessary. Chronic tenosynovitis may have a serious significance, though this is not usual. The swollen tendon sheaths in serious diseases such as rheumatoid arthritis and the tuberculous "compound palmar ganglion" are not likely to present as a simple tenosynovitis in the first instance, and confusion with serious disease very seldom arises. The association with rheumatic disease is, however, close enough for one to recommend the use of salicylates in any case of tenosynovitis which has no very obvious cause and which is resisting treatment. Authors of textbooks made much of the associations between tenosynovitis and allergy or gonorrhoea. These impress us less than they did our fathers, but the association with gout is more important and may call for consideration. Oxaluria also may be a factor maintaining chronicity in some cases. Syphilis as a cause of chronic tenosynovitis is certainly uncommon and is probably usually missed.

Most chronic cases start quite differently from the usual non-specific tenosynovitis, and they tend to produce a different end-result. In time they develop either a persistent distension of the tendon sheaths with fluid or a nodular or fibro-fatty enlargement of the sheaths. The first type of chronic disorder often gives the patient surprisingly little trouble.

Tuberculous Tenosynovitis.—The suspicion of tuberculosis can arise in any chronic case. Tuberculous tenosynovitis is, however, insidious and relatively painless in its onset. In contrast with the non-specific type we have been considering it favours flexors rather than extensors at the wrist, and, though extensors are not immune, the characteristic lesion of this disease is the compound palmar ganglion. At the ankle, tuberculosis favours the peroneals and the extensors of the toes rather than the tendons on the medial side of the joint. Tuberculosis of tendon sheaths is, of course, always blood-spread and an active focus is present and can often be found elsewhere in the body. The tendon-sheath disease usually produces enlargement of the regional lymph nodes by the time the patient seeks advice. Tuberculosis is, however, always a deceptive disease, and if real doubt exists it would be wise to make a biopsy of the lymph nodes or of the tendon sheath itself.

Tenosynovitis and Rheumatism.—Chronic tenosynovitis of the Achilles tendon, with swelling extending often visibly some distance up the tendon, is to be watched carefully. It is often an early indication of an otherwise unsuspected rheumatoid arthritis. Any nodular thickening beneath the tendon, in the region of the Achilles bursa, is especially suspect. The patient must be carefully questioned about swelling or pain in any other joint. Simple, non-rheumatic cases of tenosynovitis in this region respond well to elevation of the heel by $\frac{1}{2}$ or $\frac{3}{4}$ in. (1.3 to 1.9 cm.), firm strapping of the affected area, and the removal of the stiffener from the back of the shoe, but, if the swelling persists despite this, a rheumatic background must be suspected.

Tendovaginitis: De Quervain's Disease

Tendovaginitis, in which the trouble lies in part at least in the fibrous tendon sheath and not in the inner synovial lining, is usually seen in one of two forms—as stenosing tendovaginitis or as trigger-finger or trigger-thumb. The first of these, stenosing tendovaginitis at the radial styloid (De Quervain's disease), is much commoner than is often thought. On the radial side of the wrist-joint, over the styloid process of the radius, two tendons lie in a shallow groove lateral to all the extensor tendons of the wrist and fingers. They are the tendons of abductor pollicis longus (extensor ossis metacarpi pollicis) and extensor pollicis brevis (extensor primi internodii pollicis). For $1\frac{1}{4}$ in. (3.1 cm.) over the lower end of the radius they are covered with a tough unyielding ligamentous sheath, from which they emerge at the level of the wrist-joint. The complicated movements which can be carried out simultaneously by the thumb and the wrist bend these tendons about to an unusual degree; it would appear that friction can produce at the same time a thickening of the tendon in the sheath, a reaction in the synovial lining, and a variable degree of thickening of the tough fibrous sheath itself, which becomes thickened as much internally as externally. A thick tendon in a thick sheath moves even less freely than ever, and pain is produced.

This condition, described by De Quervain, a pupil of the great Theodor Kocher, occurs only in adults. It is much commoner in women than in men. The pain may radiate widely, down the hand and up the arm, even to the shoulder. It is made worse by "straightening the thumb" (abducting the thumb) against any resistance, and especially by pulling the hand over to the ulnar side or by twisting the wrist so that the affected tendons are pulled at an angle to the sheath.

The one outstanding physical sign is localized tenderness just over the radial side of the lower end of the radius about $\frac{1}{2}$ in. (1.3 cm.) above the tip of the styloid process. This tenderness is usually pathognomonic, for the only condition which could produce similar localized tenderness would be a fracture of the base of the radial styloid, when there would be a completely different history. Diagnosis is therefore easy, and it is usually made even easier by the presence of a palpable and often visible swelling due to thickening of the sheath (Fig. 1).

Treatment is as easy as diagnosis. If the tendon sheath is opened at the point of tenderness and slit open over its full length of about $\frac{1}{2}$ or 1 in. (1.3 or 2.5 cm.), cure is certain. The amount of thickening in the sheath often surprises the operator, but once the sheath has been completely divided it opens enough to allow the tendons free movement and

FIG. 1.—Stenosing tendovaginitis at the radial styloid (De Quervain). The drawing shows the position and the size of the swelling in a rather severe case.

plenty of room. The only things which can lead to a poor result are bad surgery or abnormal anatomy. The operation must be done under a general anaesthetic so that a pneumatic tourniquet may be used to give a bloodless field, for the surgeon can then make a precise job of what he is doing. He can certainly avoid the terminal branches of the radial nerve, which lie in the field and which can cause great pain if they are included in a stitch.

There is no reliable conservative treatment. Those who refuse operation can be cured by time, but it takes a long time. They are usually subjected to many weeks or months of plaster-of-Paris splintage or strapping, or both, but the credit for cure should be given to time. Operation, on the other hand, gives cure which is, both immediate and certain.

Trigger-finger

Tendovaginitis over the palmar aspects of the metacarpal heads can produce a rather similar but much more dramatic syndrome—a “trigger-finger” or “trigger-thumb.” This disability is due to a thickening of the tendon rather than of the sheath; the title “tendovaginitis” is really quite incorrect. Some swelling of the affected tendons is usual in the disorder at the radial styloid already described, but in the lesion found over the metacarpal heads the thickening is localized as a well-marked nodule which is big enough to get trapped in a practically normal tendon sheath. The nodule develops in one or both flexor tendons just where these tendons enter the finger. The powerful flexor muscles can usually pull it through the sheath quite easily, but when they relax it is found that the extensor mechanism is not strong enough to pull the nodule through the sheath in the reverse direction. This means that the finger stays flexed (Fig. 2) until considerable force is

FIG. 2.—Trigger-finger. The position in which the finger is locked.

FIG. 3.—Trigger-finger due to rupture of the extensor expansion. Note the very different position of locking from that in Fig. 2.

applied, usually with the other hand or by another person. A determined passive pull will be found to overcome resistance with a considerable snap, after which the finger extends fully and easily. The snap or click and the sudden free movement which follows it have earned the name “trigger-finger.” In really severe cases flexion may be blocked in addition to extension, the finger being locked

in a semiflexed position from which it can be moved only by passive force strong enough to produce the characteristic click.

The only diagnostic difficulty lies in recognizing that the obstruction lies on the *palmar* side of the finger, anterior to the metacarpal head. The patient often insists that the click is on the back of the finger, and, as extension is the movement usually blocked, the doctor sometimes seeks for an explanation on the extensor side of the affected finger. This difficulty should not arise, for the nodular thickening of the flexor tendon produces a lump which can be felt very easily in the palm just proximal to the base of the finger.

There is one type of trigger-finger in which the lesion does lie on the back of the digit. This consists in an avulsion of the middle slip of the extensor expansion from the back of the base of the middle phalanx. This is much less common than the flexor tendon variety, it never affects the thumb, it follows a well-remembered injury, and it produces a completely different disability (Fig. 3). The sufferer from this lesion has difficulty in keeping the finger fully extended at the proximal interphalangeal joint, and when he flexes the finger (not when he extends it) there is a snap as the two lateral slips of the extensor expansion jerk sideways over the head of the proximal phalanx. There is, of course, no lump.

Trigger-thumb

Trigger-thumb is much commoner in infants than in adults. It is the only one of all these disabilities which ever occurs in children. The mother notices that the baby's thumb or thumbs cannot be extended beyond about 150 degrees without a pull, a jerk, and a click. Often the thumb cannot be flexed without a similar jerk. The thumb is held flexed into the palm, sometimes apparently completely locked, and the mother fears that the use of the thumb will be impaired for ever. The pathology is the same as in trigger-finger, and a considerable lump is always palpable in the flexor tendon of the thumb just in front of the first metacarpal head.

Treatment of Trigger-finger and Trigger-thumb

Again, the only reliable treatment is by a small operation which gives an immediate, certain, and permanent cure. The tendon sheath is exposed through a transverse skin incision (Fig. 4) in the line of the appropriate skin crease in the palm or at the base of the thumb. The exposed sheath is then slit longitudinally (preferably to one side of its midline), the nodule exposed (Fig. 5), the finger moved, and freedom of movement demonstrated. Only the skin should be sutured. This operation is better done under a local analgesic so that the patient can move the finger actively while the wound is open, thus demonstrating the completeness of cure or the need for further slitting of the sheath. In very small babies the operation may safely be postponed, but there is no reason why it should not be done before the second birthday. A local analgesic is hardly suitable for such patients, however.

My thanks are due to Miss J. Perry for the diagrams.

Next Refresher Course Article.—“Empyema,” by Mr. T. Holmes Sellors.

FIG. 4.

FIG. 5.

FIG. 4.—Trigger-finger. The position of the skin incision for operative cure of a case involving the fifth finger. FIG. 5.—Findings at operation. Note the thickened nodule in the flexor tendon just anterior to the metacarpal head.