EMERGENCIES IN GENERAL PRACTICE

SPRAINS OF THE LIMB JOINTS

BY

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The term "sprain" may be defined as a tear, partial or complete, of the joint ligaments and capsule. Sprains include conditions which are easy to diagnose and to treat, and others which offer difficulties even to the most wary. Gissane has shown that even in minor injuries the soft tissues may suffer extensive tearing. This should not obscure the obvious fact that most sprains respond well to simple measures.

UPPER LIMB

Shoulder and Acromio-clavicular Joints

Though subject to dislocation, the shoulder and acromio-clavicular joints rarely suffer from sprains in a clinical sense. The shoulder is, however, very often the site of injury to the rotator musculo-tendinous cuff. This is not an injury primarily of the capsule and ligaments. Serious pain and limitation of abduction after injury require investigation to exclude a tear of the supraspinatus tendon which may need suturing.

Elbow

Partial tearing of the medial or less commonly the lateral collateral ligament of the elbow as the result of adduction or abduction strains is a common injury in children and adults. It is probable that some cases follow spontaneous reduction of dislocations. Examination of a sprained elbow will reveal tenderness over a collateral ligament, restricted movement of the elbow, and often an effusion as revealed by fullness on either side of the triceps insertion. It is important to exclude a complete tear of a lateral ligament. This is done by extending the elbow as much as possible and testing for lateral instability. Its presence indicates a severe soft-tissue injury requiring immobilization.

A radiograph in two planes must be taken. Whilst major bone injury is easy to detect, minor fractures of the radial head or coronoid process, or intra-articular inclusion of a bony fragment, are easy to miss. In children minimal tilting of the lower humeral epiphysis seen in the lateral view must be excluded. Frequent confusion is caused by the appearance of the normal epiphyses; if in doubt, comparison with the radiograph of the opposite uninjured elbow will help.

Treatment of a partial tear of the elbow ligaments requires immobilization for a short period. A sling for ten days or less is usually adequate. If the elbow remains "irritable" it may require longer. A plaster that includes the arm and the forearm to the wrist, with the elbow at right angles and the forearm in mid-rotation, may be useful for a patient who wants to use the hand more freely. Movement of the shoulder and hand must be maintained.

Occasionally, persistent limitation of flexion and extension results from very minor injury to the elbow. Subsequent to the immobilization, therefore, deliberate but unforced active extension, flexion, pronation, and supination must be taught and supervised. Persistent limitation, most commonly of extension, demands an x-ray examination to exclude myositis ossificans in front of the joint. If this is seen, or if limited movement persists, it is wise to refer the patient for a further opinion, particularly if a child.

Wrist

Although the wrist is a frequently injured joint, it is uncommon for a sprain to occur. When a wrist is painful after injury the presumptive diagnosis must be that of fracture

until this has been excluded by most careful radiography from four angles. Tenderness over the radial styloid with a normal x-ray appearance is often diagnosed as a sprain, but stenosing tenovaginitis of the thumb extensors with palpable thickening and limited adduction of the palm is usually the cause.

The usual site for pain and tenderness to occur is on the dorsum of the wrist, the result of a flexion injury. Movement of the wrist is limited, and the joint may be swollen, the result of an effusion. Treatment should be limited to strapping with adhesive bandage or, in many cases, to gentle active use.

Occasionally a patient may complain of persistent pain on the dorsum of the joint during forced extension or flexion. There is local tenderness, with minimal or no limitation of movement. Such a complaint again requires most careful radiography. If this excludes a fracture, a chronic sprain of the wrist may be diagnosed. Such a condition is often self-curative by vigorous use, but may persist despite this. Often it may be relieved by manipulation of the wrist under general anaesthesia. This entails moving the wrist through its fullest possible range and obtaining full backward and forward gliding of the carpus on the radius. Manipulation is followed by active use. A wrist should never be manipulated before recent radiographs from four directions have been scanned for bony injury or displacement.

Metacarpo-phalangeal Joints

The metacarpo-phalangeal joints in the four fingers are well protected and are rarely sprained, but the thumb metacarpo-phalangeal joint is, in contrast, frequently injured. The most common method is by a fall on the outstretched hand producing hyperextension and consequent pain and tenderness of the anterior capsule. The lateral ligaments are also commonly injured, particularly the medial, by abduction strains. On examination, the joint is limited in movement compared with the other side. A comparison is important, since the normal range of movement varies between 5 and 90 degrees. Straining the joint to stretch the torn ligament causes pain, and pressure is painful. It is important to test for instability of the medial collateral ligament, as this is often completely torn. A radiograph should be taken to exclude minor fractures or dislocation.

A sprain of the thumb metacarpo-phalangeal joint is a very considerable disability, shaking hands, turning a door handle, pinching, and many other casual movements causing pain, and repeated injury leading to persistence of symptoms. It is wise, therefore, to firmly bandage this joint with adhesive strapping and to immobilize it sufficiently to relieve pain on normal use. Three weeks' rest is normally required, though more may be needed. Complete tearing of the medial ligament, as shown by instability of the joint, is a severe injury, often leading to a permanent disability. As in other joints, a completely torn ligament does not heal because the two ends retract. A complete tear therefore requires plaster immobilization in the extended position for a month, and in cases seen early it may be wise to consider suture. Failure to treat this ligamentous tear may lead to such disability as to require an arthrodesis of the joint.

Interphalangeal Joints

The proximal interphalangeal joints of the fingers are easily sprained, usually by hyperextension in falling or during football, fighting, etc. The distal joints are less commonly sprained. Often the patient will ignore this pain for

some days or weeks. When examined the joint will be swollen and limited in extension and flexion; sideways bending or hyperextension will cause pain. Dislocation and small intra-articular fractures are not easily differentiated and an x-ray examination is essential.

The lesion is persistent and may be painful for many months. If seen within a few days immobilization by strapping in slight flexion, with the other joints left free, will

FIG. 1.—A useful and simple splint which allows assisted active movements in the interphalangeal joints of the fingers.

relieve the immediate symptoms and shorten the eventual duration of disability. If seen late little can be done other than to encourage the patient to maintain or regain full movement, and to assure him that the pain and swelling will disappear, which they will do if the finger is actively used. If the joint is stiff, strapping the finger to its normal neighbour and using this finger to assist movement may ease pain and encourage use (see Fig. 1).

Tears of the extensor expansion may simulate sprains of the interphalangeal joint. At the proximal interphalangeal joint the central slip suffers; there is then inability to extend the joint while the distal interphalangeal joint is hyperextended; this injury requires suture. A comparable injury at the distal joint produces mallet-finger.

LOWER LIMB

Hip

The hip is protected by large muscles and strong ligaments. It is not susceptible to sprain in a clinical sense. Impacted abduction fractures of the femoral neck may be mistaken for a ligamentous injury.

Knee

The knee is a large mobile joint, dependent on its ligaments if injured severely or unexpectedly. The ligaments commonly injured are the medial and lateral collaterals and the cruciates; the capsule anteriorly and posteriorly is not so liable to these injuries. It is obvious that injury to the lateral ligaments is produced by abduction or adduction strain, but often a rotatory element is added. In the knee, diagnosis is complicated by the joint's susceptibility to meniscal injury, particularly from flexion and rotation strain. If the patient can give details of the direction of the injury it often assists greatly in making the diagnosis. Such information must therefore be sought with care.

The injury which causes a sprain of the medial or lateral ligaments often occurs in football, climbing, or skiing, injuries at this last sport being particularly apt to damage the medial ligament. The patient complains of pain over the inner side of the joint, often severe at the beginning. A differential point important to elicit in diagnosis is the fact that immediately after a tear of a lateral ligament there is ability to extend the knee, though often the patient does not test this. After some hours the knee is so painful and swollen that

extension is impossible, and this may then be mistaken for true locking. Locking from a torn meniscus is most apparent immediately after injury. An effusion is characteristic of both ligamentous and meniscal injuries and occurs within a few hours. An immediate large effusion suggests haemarthrosis, and this is confirmed by the boggy feel of the knee. If the knee is full of blood, it suggests a serious injury and aspiration will be required. In a sprained knee there is

tenderness over the medial or lateral ligament, and often the ability to extend and flex the knee through most of the range is retained. A radiograph at this stage is normal. Later x-ray examination may show an ossified haematoma, particularly on the medial side.

The ligaments of the knee are susceptible to partial tearing or sprain, but in more violent injuries complete tears are usual. The differential diagnosis of these two injuries is most important. Modern opinion holds that complete tears of the lateral ligaments of the knee are best treated by open operation and suture. If the knee is seen some time after the injury it will be grossly swollen and painful, and an anaesthetic will be necessary to allow full extension of the knee and testing

of lateral stability. Even slight flexion allows a normal knee to be rocked from side to side, therefore full extension, which is painful, must be obtained. If in doubt, compare with the opposite normal knee; there should be no marked difference between the two. As already noted, if there is great instability, operation is indicated and the patient should be immediately referred to an orthopaedic surgeon. This thorough examination of a severely injured knee should not be omitted and such patients should be referred for this purpose. Exact and early diagnosis of knee injuries is vital to proper treatment and there should be no hesitation in giving an anaesthetic for this purpose.

The treatment of a partially torn lateral ligament is a matter of ensuring comfort. Usually patients want to continue their normal activities, and the best way of making this possible is to apply a plaster from one inch (2.5 cm.) above the malleoli of the ankle to high up the thigh. This should be an unpadded plaster fitting particularly well at its lower end (Fig. 2). If not applied tightly it may slide down the leg and cause rubbing. The knee is flexed some 10 to 15 degrees, as in slight flexion the ligaments are relaxed and

FIG. 2.—A knee plaster from groin to above the malleoli.

the plaster cannot then slide down. Two to three weeks of such immobilization is sufficient; weight-bearing is permitted.

In an elderly patient it may be better to maintain reasonable activity without weight-bearing until the knee has become less swollen. A few days in bed is followed by the application of an elastic adhesive plaster strapping which

gives a feeling of stability and reduces the amount of movement of the knee to a degree where pain is slight. Whether the knee is immobilized, strapped, or gently used, it is important to maintain quadriceps activity. This should be done by carrying out static quadriceps exercises and knee extension and flexion. Knee exercises can be carried out at home, sitting on a table edge; later, weights or a sand-bag can be carried on the foot to increase the power required by the exercise. Cycling is an excellent method of maintaining and improving quadriceps tone.

The guiding principles of treatment are a few days' rest until the knee has begun to settle, and then active, but not necessarily weight-bearing, exercises, increasing as much as is tolerated by the knee and the patient. Sometimes pain will persist for weeks. It usually indicates a lack of determination on the patient's part to get the knee going. Alternatively there may have been a mistake in the diagnosis and there may be an underlying osteoarthritis or meniscus lesion. If pain continues for more than six weeks it is likely that an incorrect or incomplete diagnosis was made.

A partial tear of the cruciate ligaments with laxity of the tibia in a backwards or forwards direction may result from an injury that displaces the tibia backwards or forwards on the femur; it is often associated with meniscus tears. Tears of the cruciate ligament are often complete and associated with meniscal injury and are best referred for exact diagnosis. The knee may never return to perfect function.

Ankle

No joint is more liable to sprain than the ankle. Sprains occur at all ages, and are due to either adduction or abduction strain, commonly associated with external rotation of the foot. The typical cause is a twist of the ankle on rough ground, or the ankle and foot being held while the body is moving and twisting. The immediate symptom is pain. Examination of the foot shows swelling with perhaps bruising and limitation of movement. The most characteristic sign is tenderness of the external collateral ligament or of the deltoid ligament. In sprains this tenderness is over the ligament rather than the bone; in minor fractures it is bony tenderness that is to be sought. However, it cannot be stressed too much that there is no reliable clinical method of distinguishing between a sprain and a fracture. In all injuries of the ankle a radiograph must be taken.

There may be a complete tear of a ligament, usually the external collateral ligament. Clinically this is very difficult to determine. In all severe sprains of the ankle an additional radiograph should be taken with the foot held inverted. If the patient's pain will not allow inversion, an anaesthetic will be necessary. Complete tearing of the external collateral ligament is certainly not rare. Recurrent instability of the ankle is a fairly common complaint of patients in whom a complete tear has been missed. The diagnostic tilting of the talus in the ankle mortise is well shown in Fig. 3. The radiograph is that of a man with a complete tear of the external collateral ligament. Immobilization in a below-knee plaster for six weeks is essential in complete tears.

If there is no fracture and a "tilt" film of the talus (if considered necessary) is normal, one can proceed to treat the sprain. It is notorious that sprains of the ankle often heal more slowly than fractures in this region. If pain is severe and there is much bruising, it is certain that there is an extensive soft-tissue injury. A plaster from the knee to the toes, leaving the toes free, should be applied, a rocker to allow weight-bearing being added. With such a plaster immediate walking is comfortable and the patient can return to his normal activities. After a fortnight the plaster can be removed and the ankle will be relatively free from pain.

A short period of ankle exercises will result in a normal ankle. If the patient does not want a plaster, or if the lesion is a minor one, firm strapping of the ankle with elastic adhesive plaster will usually give considerable relief and allow the patient to continue his activities. In general terms—as for the knee—the joint should be rested by plaster or strapping until the major injury has recovered and then restored to full activity and freedom from pain by very vigorous use.

There is a syndrome called chronic sprain of the ankle. It is common in women, who complain of the ankle turning over and of pain below the external malleolus. There is tenderness of the anterior fasciculus of the external collateral ligament, and inversion of the foot is limited and slightly painful in the same area as the tenderness. X-ray examination of such an ankle should always include a "tilt" film to exclude complete tearing of the external collateral ligament. The lesion may have been present for years and will often date from an original minor sprain of the ankle. If it has been present for some weeks or months, vigorous use may cure it and low-heeled shoes or a floated-out heel will prevent repeated injury. If such treatment fails, manipulation of the ankle, which must include forward displacement of the talus within the mortise, is advisable.

FIG. 3.—The first radiograph shows tilting of the talus as a result of a complete tear of the external collateral ligament. The second radiograph, taken six weeks later, shows that there is no tilting on inverting the foot.

If it is important that the patient should be able to engage in temporary activity, the local injection of analgesics such as procaine hydrochloride is useful. The effectiveness of hyaluronidase in dispersing the haematoma of a sprain is still under trial. It must be stressed, however, that such local methods do nothing to heal the soft-tissue injuries, which are always greater than is supposed. It is more logical to rest the damaged area to allow healing, whilst maintaining function by active use of the adjacent parts. When the injury has healed, active use and vigorous exercise are required to restore function and overcome limitations of movement due to adhesions and contractures. At this stage there will be slight pain and a feeling of instability. The nervous and uninstructed patient may fear to be vigorous; he is then liable to suffer from a chronic sprain.

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