

TENDON INJURY

Introduction

Muscles are attached firmly to bone and connective tissue at one end and generally insert in bones via tendons at the other. Tendons are white fibrous cords that are lined with a loose tissue (paratenon) and which sometimes run through a fibrous tube (tendon sheath). Tendons have the ability to glide over bone and through tissues. Muscle contraction is therefore transmitted via the tendons causing intervening joints to move. Muscles that bend the fingers and wrist are termed “flexor” and those that straighten the fingers and wrist, “extensors”.

Tendon injuries are very common and usually caused by accidents involving glass or knives (open injury). These injuries can cause damage to single or multiple tendons as well as neighbouring structures such as nerve, blood vessels and bone. Tendons can also snap if overstressed such as occurs in sports (closed injury, figure). The complete division or detachment of a tendon causes immediate loss of its function, which is permanent unless it is repaired. Patients are usually immediately aware of difficulty in moving a finger but some injuries may be less obvious where there is some duplication in the function of muscles. Partial cuts of tendons will not be obvious but can be suspected if use of the tendon causes pain.



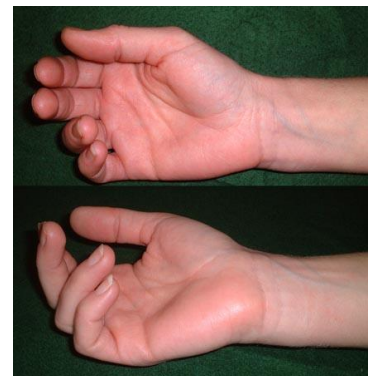
Assessment

Assessment of tendon injuries requires careful examination during which the doctor will ask how the injury occurred and then systematically tests each and every tendon as well as nerves that may have been damaged. When examining the limb, the doctor will look for the following signs.

Position The exact position of the cut will indicate which structures may have been injured. The doctor will also consider the nature of the injuring agent. Slicing injuries from knives and saws produce fairly predictable damage but stabbing injuries particularly from glass can damage structures at some distance from the site of entry.

Posture When relaxed, the hand lies in a characteristic posture with the thumb-tip held slightly flexed and fingers held in a cascade (figure). Any change in the resting posture can suggest tendon or even nerve damage.

Passive movement Gentle pressure on each fingertip can reveal loss of tension or floppiness of a joint. Tendon function can be assessed by gentle pressure over the muscles in the forearm, which will normally cause some movement of the relevant tendon. An alternative way of testing the finger tendons is for the doctor to move the wrist, which causes finger movement.



Active movement The best way of testing a tendon is for the doctor to ask the patient to use the tendon by moving or tensing the relevant joint (figure).

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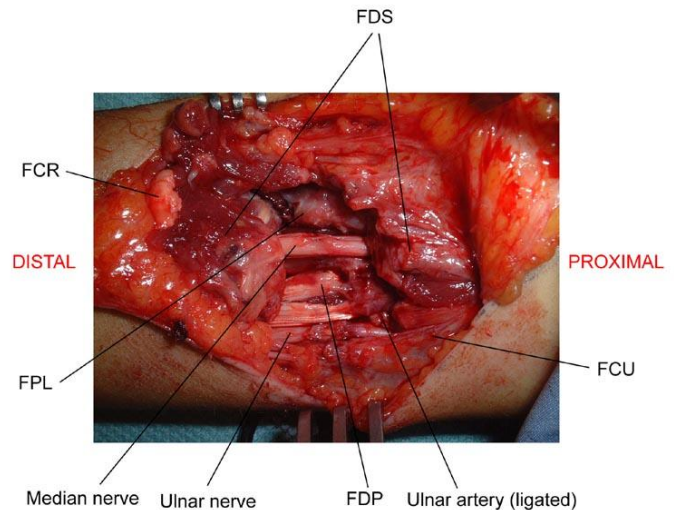
Treatment

Not all tendon injuries need to be repaired. In particular, closed ruptures of the extensor tendons such as cause a mallet finger are probably best managed by a period of splinting unless there is a large associated fracture fragment (figure).



The situation is, however, different for open injuries. If the doctor considers it likely or even possible that there is tendon or nerve damage, arrangements will be made for either (i) further examination by a more senior or specialised doctor and/or (ii) surgical exploration of the wound. This type of surgery is generally undertaken in Specialist Orthopaedic or Hand Units because of its complexity. Arrangements may therefore be made for referral to this Unit to enable the injury to be explored and repaired by the most appropriate Team. If surgical exploration is indicated, it should be performed soon after injury but it is not essential that it occur on the day of injury.

If a cut tendon is not repaired, its function is permanently lost. This may cause deformity, loss of movement and weakness. Delay in treatment especially beyond a month can make subsequent attempts at repair difficult or even impossible depending on the length of



delay and the tendon(s) injured. If unrepaired, the tendon ends retract and get stuck in scar tissue; the muscle shortens and withers; the tunnels through which the tendons run shrink; and the joints affected can stiffen. Late secondary reconstruction can be performed but the surgery is more complex and the results are poorer.

Surgery

Exploration of the wound will often occur with the patient awake (local or regional anaesthetic) but more complex injuries would be explored whilst the patient is asleep (general anaesthetic). The surgeon will apply a tourniquet to the limb to prevent bleeding, which makes the operation much easier. It is likely that the wound will be made larger by the surgeon to enable a thorough inspection of the structures in the vicinity as well as to retrieve tendon ends that tend to spring apart when cut. The operation can be technically demanding particularly with the flexor tendons and involve microsurgery if nerves require repair. The cut tendons are retrieved and stitched together, the skin stitched and the wound dressed. The hand/wrist is almost always protected by a splint (plaster of Paris, fibreglass, metal) to prevent the tendon repair being over-stretched.



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Rehabilitation

Good rehabilitation after tendon repair is crucial. The tendon repair is initially much weaker than normal and can snap if over-stressed. The repair will need to be protected by a splint for at least four weeks although the tendon will take about 12 weeks to recover full strength. At the same time, it is important that the repair does not get stuck to surrounding tissues, which would prevent the tendon gliding properly. Most rehabilitation regimens therefore involve “protected mobilisation”, which allows early movement without excessive stress on the tendon repair (figure). The precise regimen used depends on the preferences of the surgeon and the specific injury. Rehabilitation may be varied according to the progress a patient is making. The patient will be given specific advice about the timing of return to work and daily activities, which will depend on the tendon(s) injured. In general, return to work for extensor tendon repairs is light (clerical) 6 weeks, medium (shop-keeper, light-engineering) 8 weeks and heavy (heavy engineering, building) 10 weeks. Return to driving a car is 6 weeks, a motorbike and HGV 8 weeks, and contact sports are 10-12 weeks. The time scale for flexor repairs is about two weeks longer.



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Complications

Tendon injuries require careful repair, thoughtful rehabilitation and a compliant patient if an optimum result is to be achieved.

Infection Wound infections can occur in 5% of cases of repair, particularly if the injury occurred on a contaminated surface such as in an agricultural setting. This usually can be resolved by antibiotics but if severe can cause failure of the repair

Tendon snap Failure of the tendon repair can occur in 5-10% of cases and can be contributed to by factors such as infection or technical failure or patient non-compliance.

Tendon adhesion Some loss of tendon glide is very common. In the majority of patients the loss of movement is minor. In some, however, further surgery is required to free the tendon (tenolysis)

Joint stiffness Joints in the region can become stiff even if not directly injured as a result of factors such as swelling, infection and immobility. In the majority of patients the loss of movement is minor. In some, however, further surgery is required to release the joint (arthrolysis).