A MODIFIED TENDON TRANSFERENCE FOR RADIAL NERVE PARALYSIS

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In 1921 Sir Robert Jones described his technique of tendon transference for cases of irreparable damage of the radial nerve. In the original Jones's technique and its several modifications (Billington 1922, Luckey and McPherson 1947, Scuderi 1949) the pronator teres is transferred to the two radial wrist extensors. This leads to ugly radial deviation on attempted dorsiflexion of the wrist (Fig. 1). Moreover, it leads to a weak grip. In an attempt to reduce the radial deviation, Omer (1968) and Brooks (1969) transferred the pronator teres to the extensor carpi radialis brevis only. To overcome a weak grip, Parker (1963) advised arthrodesis of the wrist in addition to tendon transference. Riordan (1968), on the other hand, was opposed to wrist arthrodesis because its movements help the movements of the fingers and thumb.

This paper presents a technique which allows dorsiflexion of the wrist without any radial deviation, and hence a powerful grip. In this technique the pronator teres is transferred to the two radial extensors of wrist and to the extensor carpi ulnaris tendon.

OPERATION
The operation is done in a bloodless field. With the limb in mid-pronation an incision about seven centimetres long is made, centred at the middle of the forearm. The deep fascia over the extensor carpi radialis longus and brevis is incised; the muscles are retracted to expose the pronator teres tendon. This is detached from the radius with a periosteal elevator, with care to obtain it as long and strong as possible.

An incision is next made along the posterior border of the lower two-thirds of the ulna. The tendon of the flexor carpi ulnaris is identified, divided at the wrist and separated from the muscle fibres up to the middle of the forearm. Care is taken to avoid injury to the dorsal branch of the ulnar nerve as it crosses to the back of the hand. The posterior edge of the ulnar incision is dissected to expose the extensor tendons. The fascia over the extensor carpi ulnaris is incised, and the muscle and its tendon are freed. The tendon is dissected out of the muscle fibres to the upper end of the incision and divided at that level. The free tendon is now passed in a subcutaneous tunnel to the radial incision and is held in a clamp.
A third incision about seven centimetres long is made along the tendon of the palmaris longus, which is freed and divided at the wrist joint. If the palmaris longus is absent the flexor carpi radialis is used instead. Through an incision on the back of the wrist along the tendon of the extensor pollicis longus, this tendon is cut, freed and rerouted subcutaneously around the radial side of the wrist to the anterior incision and held there in a clamp.

For the rest of the operation the wrist, fingers and thumb are held in a fully extended position by an assistant. The pronator teres tendon is then threaded through and sutured to the tendons of the two radial extensors and its free end is sutured to the extensor carpi ulnaris tendon under tension. The tendon of the flexor carpi ulnaris is sutured to the extensor digiti minimi, extensor digitorum and extensor indicis tendons. The tendon of palmaris longus or flexor carpi radialis is sutured to the extensor pollicis longus tendon (Fig. 2). The wounds are closed.

A well padded below-elbow plaster is applied to maintain the wrist in full extension and the metacarpo-phalangeal joints of the fingers and thumb and interphalangeal joint of the thumb in neutral position. Immobilisation is maintained for one month, after which active rehabilitation is started.

RESULTS

The procedure was done on nine patients with complete and irreparable damage of the radial nerve. In five patients the palmaris longus was transferred to restore thumb function, and in the other four—the palmaris longus being absent—the flexor carpi radialis was used instead.

In each case the result was satisfactory in both appearance and function. The wrist was pulled straight backwards, without any radial deviation, when the patient attempted active dorsiflexion (Fig. 3). All patients had a powerful grip (Fig. 4). In all of them the metacarpo-
Active dorsiflexion without radial deviation.

Figure 4—Gripping without radial deviation. Figure 5—Full extension of the metacarpo-phalangeal joints of fingers and thumb with the wrist in neutral position.

phalangeal joints of fingers and thumb could be extended fully when the wrist was held in neutral position (Fig. 5).

SUMMARY

1. A modified technique of tendon transference for irreparable damage of the radial nerve is described. The tendon of the pronator teres is transferred to the two radial extensors of the wrist and to the tendon of extensor carpi ulnaris.

2. The method succeeds in preventing radial deviation on attempted dorsiflexion of wrist and helps to provide a powerful grip.

REFERENCES


