EXTENSOR INDICIS PROPRIUS TRANSFER FOR RUPTURE OF THE EXTENSOR POLLICIS LONGUS TENDON

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We reviewed 21 patients with 22 ruptures of the extensor pollicis longus at a mean of 5.3 years after transfer of the extensor indicis proprius tendon. Of these, 19 with 21 transfers described the result as good, and two as fair. The mean deficit of extension between the operated and unoperated thumbs was 1.4 cm, and the mean flexion deficit 0.6 cm. Pressure gauge measurements showed that the strength of the transfer was 51% of that of the uninjured extensor. The two fair results had an extensor lag of over 1.5 cm. Independent extension of the index was maintained in all patients, none having a discernible lag, but the strength of index extension was reduced to 49% of that of the normal finger. There was no evidence of functional loss.

Extensor indicis proprius transfer for rupture of the extensor pollicis longus tendon is a simple and reliable procedure with few complications. It gives satisfactory long-term extension of the thumb.

Extensor pollicis longus (EPL) is the main extensor of the interphalangeal joint and an important extensor of the metacarpophalangeal joint of the thumb. The significant disability after its rupture is the inability to elevate the thumb to the plane of the palm (Schneider and Rosenstein 1983).

Most patients present some time after their EPL rupture, when direct repair is not feasible because of the gap and/or the poor condition of the ruptured tendon ends (Flatt 1974). Some authors advocate a free intercalated tendon graft, but this has the disadvantages of needing two tendon repairs and the sacrifice of a donor tendon (Hamlin and Littler 1977).

Tendon transfer is commonly advised. The use of extensor carpi radialis longus or of extensor pollicis brevis have been described (Goldner 1974; Magnell, Pochron and Condit 1988), but transfer of extensor indicis proprius (Mensch 1925) is the most widely used and reported. This has been criticised as producing an extensor lag in the index finger (Levine and Schneider 1955; Magnell et al 1988). Our aim was to make a long-term review of the results of extensor indicis proprius transfer.

PATIENTS AND METHODS

From 1979 to 1986, 32 patients with 33 ruptures of extensor pollicis longus tendons had an extensor indicis proprius transfer, and 21 patients with 22 ruptures could be contacted for review, most of the remainder having moved to other areas. The average age at the time of rupture was 51 years (18 to 69). There were nine men and 12 women with ruptures equally distributed between dominant and non-dominant hands.

The causes of the rupture included direct trauma (3), rheumatoid arthritis (5), scleroderma (1), and Colles' or Smith's fractures (12). Half of the ruptures followed a Colles' fracture (11); six earlier than three months (5 days to 9 weeks) and five later (5 to 18 months). The average time between rupture and tendon transfer was 4.2 months (1 day to 12 months) and the average follow-up was 5.3 years (1 to 9).

Before operation all the patients complained of a 'useless thumb' with inability to elevate the thumb to the plane of the palm, giving difficulty, for example, with opening large bottle tops and using a keyboard. They also noted weakness of the thumb and some local discomfort.

Operative technique. The standard operative technique described by Schneider and Rosenstein (1983) was used in all cases, by either MAT or FJH, and a thumb splint was worn for six weeks.

Assessment

Range of movement. Any extension deficit was measured
as the difference between normal and operated thumbs in elevation to the plane of the palm (Fig. 1) and in degrees loss of interphalangeal or metacarpophalangeal extension. Flexion deficit was measured by comparing the distance from the nail tip to the distal palmar crease in full flexion (Fig. 2). Extension of the index was compared in degrees from the plane of the second metacarpal, with the other three fingers fully flexed.

**Strength.** The strength of thumb extension was measured with a pressure gauge calibrated in gradations of 50 g (Haldex AB, Sweden), and expressed as a percentage of that on the unoperated side (Fig. 3). Key pinch, grip strength and the strength of index extension were also measured and compared with the normal side (Fig. 4).

**Subjective assessment.** Patients were asked their opinion as regards pain, strength, range of movement, disability and general satisfaction. These opinions were graded into good, fair or poor.

**RESULTS**

**Range of movement.** The mean extension deficit was 1.4 cm (0 to 7) and the mean flexion deficit 0.6 cm (0 to 2.7). No patient had an extension deficit at either the metacarpophalangeal or the interphalangeal joint of the thumb.

At the donor index finger, no patient had an extension lag or any loss of flexion.

**Strength.** Strength of extension at the operated thumb averaged 51% of that on the unoperated side (28% to 100%). At the donor index finger, strength in extension averaged 49% of normal (14% to 100%). Key pinch strength was 90% (62% to 109%), and hand grip strength was 87.5% (50% to 116%).

**Subjective result.** Nineteen patients with 20 tendon transfers thought that they had a good result. Two regarded the result as fair because of their inability to extend the thumb far enough to open the web space. One other patient initially had a poor result due to extension lag caused by adhesions, but subsequent tenolysis improved his range of extension.

Four patients complained of some soreness at the donor site, but had no functional deficit and no local tenderness.

**DISCUSSION**

Primary repair, tendon grafting, and tendon transfer have been advocated for rupture of the EPL tendon. McMaster (1932) advised direct end-to-end repair with subcutaneous rerouting to gain length. This primary repair is rarely performed because of tendon damage and muscle contracture.

Free tendon grafting, was first reported by Platt (1931), who used a length of toe extensor. Other authors have recommended use of palmaris longus (Hamlin and Littler 1977; Magnell et al 1988). The stated advantage
is that index finger function is not compromised, but two tendon anastomoses are required; one of these junctions may fail, as reported for one of the 21 patients reviewed by Magnell.

Various tendon transfers have been used. Objections to the use of EIP centre around extensor lag or residual weakness of the index. Russell Moore, Weiland and Valdata (1987) disputed this, reporting 27 EIP transfers with no cases of index finger lag, but Browne, Teague and Synder (1979) recommended repair of the extensor hood. Riddell (1963) compared EIP and extensor carpi radialis longus (ECRL) transfer, finding more loss of thumb extension with ECRL because of its shorter excursion.

Two of our patients had some disability because of lack of thumb extension, and it appears that an extension deficit of more than 1.5 cm is significant. Loss of thumb flexion gave no functional problems. None of our cases showed hyperextension of the metacarpophalangeal joint. Like Riddell (1963), we feel that the transfer should be tight enough to give full thumb extension and that immobilisation in this position gave the best results. A tight transfer is better than a loose one.

Although we found loss of half the strength of extension of the thumb, no patient complained of weakness: strength is not necessary for good function. Similarly, no patient complained of functional loss or weakness of the donor index or had an extensor lag. The operation was as successful in rheumatoid patients as after a Colles’ fracture.

We conclude that EIP transfer causes no functional deficit in the donor index; it is a simple and reliable procedure with few complications.

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REFERENCES


