Repair of extensor pollicis longus using extensor pollicis brevis in rheumatoid arthritis

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In rheumatoid arthritis the commonest tendon to rupture in the hand is the extensor pollicis longus (Brewerton, 1957; Pulkki, 1961). It is particularly vulnerable, partly because it is a common site for marked proliferation of the synovium which can invade the tendon and partly because of its long course and sharp bend round Lister’s tubercle which creates a point where attrition can occur (Backhouse and Kay, 1967; Vaughan-Jackson, 1962). This is illustrated by the fact that in the past 4 years forty repairs of extensor pollicis longus tendon have been required, while during the same period there have been only 23 repairs of the extensors digitorum; the majority of the latter involved extensor digiti minimi.

In 1967 one of our patients presented with ruptures of extensor pollicis longus and the extensor tendons of the fourth and fifth fingers of the same hand. Extensor pollicis brevis was used to repair extensor pollicis longus, reserving extensor indicis proprius for the extensors of the fingers. Good function in the thumb and fingers was achieved.

Since that time the tendon of extensor pollicis brevis has been used for repair of extensor pollicis longus. The reasons for this are:

1. It preserves extensor indicis proprius, which may be needed later to repair the finger extensors;
2. After this repair, extension of the thumb is in abduction rather than in adduction;
3. The operation is much easier to perform.

Method

Extensor pollicis longus is exposed 2 cm. proximal to the first metacarpophalangeal joint. Extensor pollicis brevis is divided and the proximal end is passed through a slit in the distal part of extensor pollicis longus, the two being sutured under tension.

In addition to the repair of extensor pollicis longus, associated procedures to ensure good function of the thumb may be required. In the presence of marked synovial proliferation of the first metacarpophalangeal joint, synovectomy should be considered if there is no serious radiological damage; similar consideration of the terminal joint is also required (Lipscomb, 1967).

If more serious destruction of joints is present at the time of repair, this requires separate consideration. 'Z' deformity or prolapse is a condition in which subluxation occurs at the metacarpophalangeal joint and is associated with hyperextension of the terminal joint (Clayton, 1962) (Fig. 1).

It should be dealt with at the same time as the ruptured extensor pollicis, but the method of repair will depend on the state of the joint.

1. If the subluxation is fully correctable actively in extension, then the extensor loop operation is performed. This consists of taking half of the distal end of extensor pollicis and passing it through a hole in the base of the proximal phalanx (Harrison, 1971). The loop so formed is sutured to itself (Fig. 2). This repair is designed to provide an insertion into the base of the proximal phalanx and thus reinforce the extensor mechanism. It also centralizes the extensor tendon over the joint. The object is to reduce the tendency to progressive subluxation.

2. If the subluxation cannot be fully corrected voluntarily, there is minimal joint destruction, the repair should be by arthroplasty, using a prosthesis for stability and not for movement.

3. If there is serious joint destruction, the joint should be excised and either an arthrodesis or an arthroplasty performed.

Postoperatively, the thumb is placed in plaster, aiming at immobilizing the intracarpal and carpometacarpal joints, but leaving the interphalangeal joint free to maintain movement. The plaster is kept on for 4 weeks, after which the thumb is mobilized.

Material

Forty repairs have been undertaken in 37 patients, all of whom were suffering from seropositive rheumatoid arthritis. Synovectomy of the first metacarpophalangeal joint was performed on eight occasions and of the interphalangeal joint on one. Fourteen patients underwent extensor loop operations, arthrodesis of the first metacarpophalangeal joint was carried out in four, and a silastic prosthesis was inserted in one.
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1 year, and then approximately annually, unless problems occur. The duration now ranges from 6 months to 4 years (Fig. 3). On each occasion the continuity of the tendon is checked by active extension of the thumb. Attention has also been paid to movement of the interphalangeal joint and to the state of the metacarpophalangeal and carpometacarpal joints.

Follow-up

These patients are followed at a combined rheumatoid hand clinic where both physician and surgeon are present. The first examination is made 3 months after surgery, thereafter at 3-monthly intervals up to

At the first follow-up, 39 of the forty repairs showed that satisfactory correction had been obtained. This satisfactory state has been maintained in all except one patient who again ruptured extensor pollicis longus 7 months after the initial repair. She has subsequently had a further repair, using the same technique, and the second repair has been satisfactory for over 2 years. One patient could not be followed up as he died from bronchodisomonia within a year of surgery.

Movement of the interphalangeal joint was noted to be poor in nine cases. The majority of these were early in the series, at which time the interphalangeal joint was being included in the plaster. In one patient in whom the joint was not included, marked erosive changes were present, and these presumably account for the loss of movement. In one patient an extensor loop procedure was carried out.

FIG. 1 Subluxation of the first metacarpophalangeal joint and commencing hyperextension of the terminal interphalangeal joint

FIG. 2 The method by which an extensor loop is made, using half the extensor pollicis longus tendon and passing it through the proximal phalanx

FIG. 3 Duration of follow-up of 39 repairs of extensor pollicis longus
Discussion

This method of repair of extensor pollicis longus is favoured for the three reasons given in the introduction. It should be emphasized that the normal tendency of the thumb is to adduction. In the adducted position the tactile area of the thumb cannot be used in effective pinch. Using extensor pollicis brevis to repair extensor pollicis longus, the thumb is held in the abducted position so that the tactile area can be used efficiently in pinch (Harrison, 1972).

Because of the varying degrees of joint involvement in the rheumatoid subject, assessment by comparison of the two hands for span and range of movement of the joints is not possible. Therefore we decided that the only way to assess our results was to note the continuity of the tendon and its effect on the function of the thumb; the state of the interphalangeal and the metacarpophalangeal joints was also recorded.

There is no doubt that immobilization of the interphalangeal joint within the plaster tends to lead to loss of movement of that joint. This has largely been overcome by excluding the interphalangeal joint and, if necessary, using a dynamic type of splinting to maintain mobility.

If there is already very prolific synovitis, or severe destruction of the metacarpophalangeal joint, surgery should be undertaken to try to improve the thumb function (Harrison, 1971).

The disadvantages of arthrodesis of the first metacarpophalangeal joint is that the excision of the joint leaves the patient with a short thumb. This is a disadvantage in the normal person but even more so in the rheumatoid arthritic patient, as additional involvement of the adjacent index finger can lead to serious loss of pinch. Any form of arthrodesis demands lengthy immobilization and this often has an adverse effect on adjacent joints. It would therefore seem preferable to excise the joint in these cases and to insert a rigid prosthesis rather than a jointed section, in order to provide stability rather than mobility.

For the terminal interphalangeal joint, synovectomy is useful if there is persistent synovial hypertrophy aiming to maintain function. If joint destruction and erosion is present, the joint should be arthrodesed, preferably with a peg bone graft and a transverse wire. The whole aim of maintenance of thumb function is to provide effective pinch (Harrison, 1972).

Summary

Repair of extensor pollicis longus tendon using extensor pollicis brevis, is described. On 28 occasions associated procedures have also been undertaken involving the thumb. These have included operations on the metacarpophalangeal joint and extensor loop operations. It is important that adduction, or associated thumb deformities, should be corrected if good function is to be obtained. Finally, it is important to reduce splinting to the target joints, as this enables neighbouring joints to maintain mobility—a very important part of the management of patients with rheumatoid arthritis.

Discussion

DR. A. G. S. HILL (Stoke Mandeville) Do you believe that prophylactic tenosynovectomy prevents rupture in the majority of patients?

MR. S. HARRISON I am sure that it does; it is very difficult to believe that tendon attrition is not a continuous process, so that rupture is likely to occur.

MR. E. V. NICOLLE (London) As the MCP joint tends to sublux, do you feel that removal of the brevis from the MCP joint and its employment to extend the DIP joint will result in increased tendency to subluxation?

MR. HARRISON That is a very good point, but we have not seen it in practice. It would be a good reason for doing an extensive synovectomy.

References

LIPSCOMB, P. R. (1967) J. Bone Jt Surg., 49A, 1135 (Synovectomy of the distal two joints of the thumb and fingers in rheumatoid arthritis)