DECOMPRESSION OF THE EXTENSOR TENDONS AT THE WRIST IN RHEUMATOID ARTHRITIS

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Simple decompression of the extensor tendons at the wrist was carried out on fifty-four wrists in a total of forty-one patients with rheumatoid disease. This procedure was combined with excision of the ulnar head in forty-five wrists. Complete resolution of the synovitis occurred in 81.5 per cent of the wrists. In two patients the tendons ruptured soon after operation and in both cases this was due to prolapse of the ulnar stump after an associated Darrach procedure.

The clinical results of decompression compare favourably with those of the widely accepted operation of dorsal tenosynovectomy.

Synovitis of the extensor tendons at the level of the wrist is a common manifestation of rheumatoid disease, although no precise estimate of its incidence is available.

Despite considerable discussion in the literature on the effects of synovitis, there is little evidence to suggest that the mere presence of dorsal tenosynovitis can in itself produce pain. When pain is present, it is generally believed to be due to an associated involvement of the inferior radio-ulnar or radiocarpal joints. Once the synovium invades the substance of the tendon localised pain from the tendon is the most consistent clinical indication of damage (Backhouse et al. 1971).

There are also considerable differences of opinion about the role of synovium in the pathogenesis of rupture of the tendons in rheumatoid disease. Backhouse et al. (1971) claimed that increased synovial loading arising as a result of a directional change in the tendons could sometimes be a factor. They showed that the common site of damage was distal to the retinaculum and the site of directional change was in the tendons. Others have said that compression produces ischaemic changes within the tendon, leading to subsequent rupture (Flatt 1968). Vaughan-Jackson (1948, 1959, 1962) has described attritional ruptures of the extensor tendons occurring as a result of bony spicules on a subluxed ulnar head and Robins (1977) recently supported the concept of attritional rupture.

Synovial swelling is most commonly observed as it bulges below the distal border of the extensor retinaculum. Less commonly the synovitis may extend above and below the extensor retinaculum to produce an hour-glass shaped deformity.

Because of the potential threat to the extensor tendons, radical tenosynovectomy is usually recommended when the swelling has persisted for a period of at least six months despite adequate conservative therapy (Clayton 1965; Millender et al. 1974). This procedure is combined with repositioning of the retinaculum deep to the extensor tendons. This relocation is said to protect the tendons from any underlying rough areas of bone, and also to provide a deep barrier against invasive synovitis originating from within the radiocarpal joint (Clayton 1965). When there is clinical evidence of subluxation of the ulnar head and pain on rotation of the forearm, tenosynovectomy is usually combined with excision of the ulnar head.

Savill (1966, 1969) first introduced the concept that mechanical decompression of the tendons by relocation of the retinaculum might be more important than the standard removal of the synovial tissue itself.

This paper presents the results of a series of cases in which simple decompression was carried out without associated dorsal tenosynovectomy regardless of the degree and extent of the clinical synovitis.

CLINICAL MATERIAL

Fifty-four wrists in forty-one patients were studied. All the patients had rheumatoid arthritis according to the diagnostic criteria laid down by the American Rheumatism Association. There were twenty-eight women. The age range was twenty-four to seventy-eight years with an average of fifty-five years. The length of follow-up varied from eight months to eighteen years with an average of four and a half years. The duration of generalised rheumatoid disease in the individual patient varied from five months to twenty-five years with an average of eight years. The average duration of localised dorsal tenosynovitis was four and a half years.

Excision of the ulnar head was carried out in combination with decompression in forty-five wrists. (We have also combined simple decompression with stabilisation of the wrist and with repair of extensor tendons, but these cases have been excluded from the series.)

The extent of the synovitis before operation was classified into three grades (Fig. 1): severe synovitis was that which was seen to extend above and below the limits of the retinaculum; moderate...
synovitis bulged visibly below the distal border of the retinaculum; and mild synovitis could be felt surrounding the tendons but was not associated with a visible clinical deformity.

**Indications for operation.** The indications for operation in this series were: persistent dorsal tenosynovitis which proved resistant to conservative treatment and which had been present for a minimum period of six months; demonstrable adherence of the synovial mass to the underlying extensor tendons; the suggestion of "tendon at risk" characterised by tenderness in the line of the tendon at the distal border of the retinaculum with the tendon in the loaded position; and a history of previous rupture of the extensor tendon in the opposite hand, which was an indication for immediate operation regardless of the duration of the synovitis.

**OPERATIVE TECHNIQUE**

Although fourteen of our early cases were done through dorsal curvilinear incisions, our standard technique in recent years has been to use a vertical incision. The incision is carried down to the retinaculum and the flaps of skin are undermined in an attempt to preserve the dorsal branch of the ulnar nerve and vascularity of the skin. The extensor retinaculum is incised in the line of extensor digiti minimi and reflected laterally. Dissection is extended as far as the combined sheath of abductor pollicis longus and extensor pollicis brevis.

After removal of the dorsal tubercle of Lister, the retinaculum is relocated deep to the extensor tendons. Regardless of the degree of synovitis or involvement of the tendons, the synovium is not excised (Fig. 2). The retinaculum is then sutured into position on the ulnar side of the wrist over the dorsal capsule of the radio-ulnar joint. In those cases where an associated excision of the head of the ulna is carried out, careful closure of the dorsal capsule is achieved and is reinforced by the retinaculum.

The extensor retinaculum is usually described as a band of thickened tissue approximately 3 centimetres wide. Often the distal border of the retinaculum is in continuity with the deep fascia of the dorsum of the hand, and then this attenuated distal extension must be divided in order to decompress the underlying tendons completely (Fig. 3).

It should be noted that operation on the extensor aspect of the wrist is carried out with the forearm in full pronation and in this position the extensor carpi ulnaris normally lies along the medial border of the ulnar head, the tendon taking up a dorsal position only on supination of the forearm. When the extensor carpi ulnaris tendon was observed to be displaced excessively in a volar direction and seemed to be acting as a wrist flexor, it was repositioned within a loop of retinaculum using the technique described by Clayton (1965).

**RESULTS**

**Synovitis.** The degree of synovitis before and after operation is shown in Figure 1. Simple decompression gave complete resolution in 81.5 per cent of patients usually within two months (Figs. 4, 5 and 6), regardless of the degree of synovitis before operation. There was an 18.5 per cent overall incidence of synovitis after operation: 14.8 per cent was classified as mild, and 3.7 per cent (two cases) as severe. In all the mild cases the synovitis was asymptomatic and the patients were unaware of its presence.

**Movements.** Since operation, we have been able to assess the ranges of dorsiflexion and palmar flexion in thirty-five wrists, twenty-one of which had had associated Darrach procedures. Seven patients retained or increased their range of movement; twenty-eight
patients lost an average of 33.4 degrees in the flexion and extension range.

Rotation before and after operation was studied in thirty-five wrists, all of which had had Darrach procedures. In seventeen there was an increase in rotation through an average of 23.8 degrees. In twelve patients rotation was unchanged and six patients lost an average of 52.5 degrees of rotary movement.

Complications

Necrosis of the skin. Significant necrosis of the skin was found in 5.3 per cent of wrists with straight incisions and in 7.1 per cent with curvilinear incisions.

Rupture of the tendons. Two cases of early rupture of the tendon occurred: extensor digiti minimi was affected in one case and extensor digiti minimi and the extensor to the ring finger in the second case. Both ruptures occurred within eight weeks of operation, and on re-exploration were found to be due to herniation of the ulnar stump through the dorsal capsular repair. There were no cases of late rupture.

Bowstringing. This was observed on fourteen occasions and was noted to be prominent in eight wrists.

DISCUSSION

The precise rate and degree of synovial recurrence after dorsal tenosynovectomy is not well documented. Straub and Ranawat (1969) suggested that synovitis after operation was found only in those areas where synovectomy had not been carried out initially. Millender et al. (1974) reported recurrence in five out of ninety-three hands (5.4 per cent).

In our series simple decompression gave complete resolution of the synovitis in 81.5 per cent of cases, regardless of the degree of synovitis before operation. This resolution usually occurred within two months of operation (Fig. 4).

In most of our cases it was impossible to differentiate between persistence and true recurrence after operation. In one of the two cases of severe synovitis it was clinically evident that there had been no resolution after decompression; re-exploration eight weeks later revealed a distal band of retinaculum (Fig. 7). This may have been due to failure of adequate decompression, although Millender et al. (1974) have suggested that regeneration of the retinaculum can occur. Our only other patient with severe synovitis after operation had had an acute exacerbation of her rheumatoid disease immediately after the operation, and this flare-up may have been a significant factor. Our patients with mild tenosynovitis at the time of follow-up had never previously been aware of swellings even during acute exacerbations of their disease. It appears that there may be a critical period following decompression after which the synovium remains unreactive to the

![Fig. 6](image)

Same hand. Figure 4—Degree of synovitis before operation. Figure 5—There is spontaneous resolution of the synovitis eight weeks after simple decompression. Figure 6—The findings at operation showed the synovitis bulging distally beneath the retinaculum.
stimulus of acute exacerbation of the disease. There was no evidence of an increasing incidence of synovitis with longer duration of follow-up.

The extensor mechanism appears to play an important part in both the maintenance and distribution of the synovitis affecting the extensor tendons in rheumatoid disease. Simple decompression of the tendons produces a change in the local environment which evokes a satisfactory resolution of synovitis in the majority of cases. The mechanism of this response is not known.

In four of our cases we studied the histological changes in the synovium: biopsies were taken at the time of the decompression and again six to eight weeks later. In comparison to the first biopsies where the heavy infiltrate of lymphocytes and plasma cells were seen initially (Fig. 8), the later specimens showed atrophy of the serosal layer and a predominance of fibrous tissue in the subserosal layer with only few scattered chronic inflammatory cells (Fig. 9). It appears that after initial decompression the synovium undergoes spontaneous regression with fibrosis.

The precise role of synovitis in the aetiology of tendon rupture in rheumatoid disease has not been clearly delineated. In our series no synovium was excised. We were unable to classify the precise degree of synovial involvement of each tendon, but we were able to recognise significant involvement of individual tendons in some cases. In spite of this we did not find rupture after operation which could be attributed directly to the invasive effects of synovitis. The two cases of tendon rupture after operation were due to attrition by a prolapsed ulnar stump after associated Darrach procedures. In neither case had a splint been used and it is now our practice to use a splint for two weeks after resection of the ulnar head.

After decompression the residual fibrous synovium was never observed to be a threat to the tendons within the average follow-up period of 4.6 years. Probably the duration of synovitis is much less important than the biological characteristics of the synovium.

All our patients who lost rotary movement also showed radiological progression of the disease at the time of follow-up.

Bowstringing was observed in only fourteen wrists, but in the eight cases where it was prominent, the patients had more than 30 degrees of wrist extension after operation. There was no relationship between the degree of bowstringing and the subjective functional loss. These findings are in keeping with those of Flatt (1968).

The value of simple decompression as an alternative to dorsal tenosynovectomy may not be readily apparent, apart from the obvious advantages of reducing the dissection and the operation time, but we believe that the technique also has a useful application in the management of rupture of the extensor tendons in rheumatoid disease. With multiple ruptures, the results of tendon transfer or adjacent anastomosis can be unpredictable (Shannon and Barton 1976); by leaving the synovitis undisturbed, the resulting fibrous tissue can be used to bridge the ends of the tendons or produce adjacent healing without resort to formal reconstruction of the tendons themselves.

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REFERENCES


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