Early versus late mobilisation after simple excision of the trapezium

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We randomly selected 39 patients undergoing excision of the trapezium for osteoarthritis of the first carpometacarpal joint into two groups, with mobilisation either at one or at four weeks after operation. The patients were reviewed at a median of six months (6 to 8). The clinical details, the severity of the disease and the preoperative clinical measurements of both groups were similar.

Excision of the trapezium resulted in significant improvement in objective and subjective function. Comparison of the outcomes of the two groups showed no differences except that patients found early mobilisation significantly more convenient. Although there was no significant difference in the range of movement between the groups, there was a small loss of movement at the metacarpophalangeal joint in the late mobilisation group.

Our findings show that simple excision of the trapezium is an effective procedure for patients with carpometacarpal osteoarthritis of the thumb and that prolonged splintage is neither necessary nor desirable.

Simple excision of the trapezium is a well-established method of treating osteoarthritis of the first carpometacarpal joint, but there have been few reports about the rehabilitation. When Gervis1 first described the operation in 1949, he stated: “Active movements are started at once. Because of pain, many of these patients have long avoided movement of the first carpometacarpal joint and supervision is necessary to see that the thumb is moved through a full range”.

There have been concerns regarding the loss of power and stability after surgery which are thought to be secondary to the proximal migration of the base of the first metacarpal and attenuation of the palmar oblique ligament which normally stabilises it. These have led to modifications such as interposition arthroplasty and ligament reconstruction, and have probably caused a number of surgeons to immobilise the thumb after simple excision of the trapezium for between ten days and seven weeks.2-15 Alternatively, percutaneous Kirschner wires have been used to hold an abducted position and to prevent proximal migration of the base of the thumb.8,14

Our standard practice for simple excision of the trapezium had been to protect the thumb in a splint worn continuously for four weeks after operation. We have, however, observed loss of movement at the metacarpophalangeal and interphalangeal joints after surgery and we were concerned that this may have resulted from postoperative splintage.13

We therefore examined the effects of splintage on the results of simple excision of the trapezium by comparing mobilisation at one week and at four weeks after surgery.

Patients and Methods

Between November 1999 and August 2000 we carried out surgical removal of the trapezium for osteoarthritis of the first carpometacarpal joint in 39 patients (40 hands). Patients were excluded from the study if they had rheumatoid arthritis, were undergoing another procedure, such as fusion of the metacarpophalangeal and interphalangeal joints at the same operation or if they chose not to be included. Approval was obtained from the Regional Ethics Committee and consent was obtained from all patients after they had read a detailed information sheet describing the nature of the study. All 39 patients were assessed before operation and reviewed at a median of six months (6 to 8) after surgery. We chose to review the patients relatively early after surgery to collect immediate subjective data. The clinical notes were reviewed for details of any complications.

Each patient was asked to complete a visual linear analogue scale in order to assess hand function, and pain in the thumb, and to give an opinion about their rehabilitation regimen and satisfaction with the operation (Fig. 1). These scales were graded from 0 to 100 with 0 indicating full function, no pain or inconvenience and high satisfaction, respectively.
Clinical assessments included the measurement of the range of movement at the interphalangeal, metacarpophalangeal and first carpometacarpal joints using a goniometer and ruler. The arc of movement of each joint was calculated and expressed as the total range of movement. Abduction and extension of the first carpometacarpal joint were assessed by measuring the distance (cm) between the crease of the interphalangeal joint of the thumb and the palmar crease. Opposition was assessed using the method proposed by Kapandji. The flexion deficit of the thumb was assessed by measuring the distance between the distal nail/pulp junction of the thumb and the proximal crease of the little finger. Grip strength, thumb pinch and key strengths were measured using the same Jamar dynamometer and pinch-meter throughout the study (Preston Instruments, Jackson, Michigan).

Stress radiographs were taken both before and after surgery, and the severity of the osteoarthritis of the carpometacarpal joint was graded using the classification of Eaton and Littler. Involvement of neighbouring joints was also noted. Loss of thumb height and subluxation of the base of the first metacarpal were assessed by measuring the minimum distance between the base of the thumb metacarpal, and the radial border of the trapezoid (TMD) and distal end of the scaphoid (SMD), respectively. Shortening of the thumb was calculated by comparison of the preoperative and postoperative scaphoid values.

Operative technique. All the operations were carried out by the senior author (HJCRB) or by a trainee under his supervision. A tourniquet was used and a single preoperative dose of flucloxacillin or cefuroxime was given. A lazy-S incision, 4 cm long, was made over the anatomical snuff-box and the trapezium-metacarpal joint was exposed, preserving the radial artery and terminal branches of the radial nerve. The capsule was incised longitudinally, reflected and two longitudinal saw-cuts were made in the trapezium to allow the removal of its central part, facilitating excision of the remainder. The capsule was closed with 3-0 Ethibond and the tourniquet was then released. Haemostasis was achieved and the skin wounds were closed with 5-0 monofilament nylon. The dressing included a palmar Scotchcast Plus (3M Healthcare, Cergy Pontoise, France) slab which immobilised the wrist in slight extension and the thumb in abduction and extension (Fig. 2).

Each patient remained in hospital with his or her arm elevated in a Bradford sling (Ventures & Consultancy Ltd, Bradford, UK) for at least one night after surgery. The patients were randomised, either for early or late mobilisation, according to the technique of minimisation using side of hand, gender and age as selection criteria. The early mobilisation group was reviewed one week after surgery when the surgical dressing was removed and a customised splint fitted (Fig. 2). These patients were instructed to remove their splint during the day to allow light use of the hand and were taught active exercises for the thumb. The

Diagram of the visual analogue score questionnaire used to assess patients.
EARLY VERSUS LATE MOBILISATION AFTER SIMPLE EXCISION OF THE TRAPEZIUM

A customised splint was worn for heavier activities, for protection and at night until six weeks after surgery. The skin sutures were removed at two weeks. The late mobilisation group was reviewed two weeks after surgery when the surgical dressing was removed to allow removal of sutures. A customised splint was fitted and worn continuously until four weeks after surgery. Gentle use and mobilisation were then allowed out of the splint. The splint was abandoned at six weeks in both groups, except when carrying out heavier tasks or at the discretion of the patient.

Statistical analysis. The results are given as the mean (standard deviation, SD) or the median (range) as indicated by tests for normality. Comparisons between the two study groups were assessed using Student’s t-test (parametric data) or the Mann-Whitney U test (non-parametric data). Comparison within groups was made using the paired t-test or the Wilcoxon signed-rank test.

Results

All patients were available for review. Details of the patients, the severity of the disease and the preoperative clinical condition in both groups were indistinguishable (Table I).

There were four complications. Two patients in the early mobilisation group reported altered sensation on the dorsum of the thumb, but they showed no clinical evidence of the formation of neuroma. One patient in each group suffered a spontaneous rupture of the tendon of flexor carpiradialis during rehabilitation, presumably because of intraoperative damage to the tendon.

Comparison of the outcomes of the two groups showed no significant differences except that, subjectively, patients found early mobilisation to be more convenient than late (Tables II and III). Although there were no significant differences in the range of movement between the two groups, there was a small loss of movement at the metacarpophalangeal joint in the late mobilisation group (p < 0.02), comparing preoperative and postoperative values. This was not apparent in patients who were mobilised early. There was no evidence that early mobilisation predisposed to subluxation clinically or radiographically as judged by the measurement of the TMD.

The outcome following operation was almost identical in both groups (Table II). There was significant improvement in abduction (p < 0.02) and extension (p < 0.01) of the first carpometacarpal joint, contributing to an increase in total span of the digits (p < 0.05). Excision of the trapezium did not significantly alter the range of movement of the interphalangeal joint, or opposition and flexion deficit. The power of grip strength (p < 0.001), pulp pinch (p < 0.001) and key pinch (p < 0.03) was increased. The procedure resulted in significant shortening of the thumb as indicated by the reduction of the scaphometacarpal distance (p < 0.001). As shown in Table III surgery improved the patients’ perception of pain (p < 0.01), function (p < 0.01) and mobility of the thumb (p < 0.001).

Table I. Details of the two groups with either early or late mobilisation after a simple excision of the trapezium for osteoarthritis of the carpometacarpal joint

<table>
<thead>
<tr>
<th></th>
<th>Early</th>
<th>Late</th>
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<tbody>
<tr>
<td>Number of hands</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Gender (M:F)</td>
<td>6:14</td>
<td>4:16</td>
</tr>
<tr>
<td>Mean (SD) age in years</td>
<td>58 (7)</td>
<td>59 (9)</td>
</tr>
<tr>
<td>Side (R:L)</td>
<td>11:9</td>
<td>9:11</td>
</tr>
<tr>
<td>Dominance (D:ND)</td>
<td>9:11</td>
<td>11:9</td>
</tr>
<tr>
<td>Median (range) Eaton and Littler grade</td>
<td>4 (3 to 4)</td>
<td>4 (3 to 4)</td>
</tr>
<tr>
<td>Mean (SD) tourniquet time in minutes</td>
<td>27 (7)</td>
<td>27 (7)</td>
</tr>
<tr>
<td>Median (range) review in months</td>
<td>6 (6 to 8)</td>
<td>6 (6 to 7)</td>
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Fig. 2
Photograph of the two splints used in the study. Figure 2a -- The method of Scotchcast application, designed to be folded into the web-space. Figure 2b -- The final appearance of the surgical splint. Figures c and d -- The custom-made splint applied at review.
Our study has shown that prolonged splintage confers no extra benefit on the objective or subjective outcome of simple excision of the trapezium and is less convenient for patients. This supports our previous impression that splintage may contribute to stiffness in the metacarpophalangeal joints. Our findings confirm the views of Dhar et al.5 who stated that “our protocol of mobilisation of the thumb, under supervision, immediately following the operation is responsible for maintaining an adequate web space and thumb abduction”.

Although the rationale for the use of splintage is clear when either ligament reconstruction or tendon shortening has been performed together with excision of the trapezium, the reason for the general trend towards splintage after simple excision is not. It was possibly introduced to prevent recurrence of adduction contracture of the thumb. None of the patients in our series had marked preoperative instability, but our findings do not suggest that early mobilisation lends to subluxation. It had been our experience that the combination of simple excision of the trapezium with prolonged splintage failed to correct severe deformity. It is unlikely that even quite lengthy periods of splintage will compensate for chronic ligamentous insufficiency. Under these circumstances it may be necessary to release the first web-space and correct hyperextension of the metacarpophalangeal joint, at the same time as addressing the underlying instability of the trapezium-metacarpal joint. Although the indications for reconstruction of the soft tissues as an adjunct to excision of the trapezium have not been precisely defined, this is a more logical approach to correction of the deformity than splintage alone.13,14 Most patients who have reasonable stability of the soft tissues, do well after simple excision. We suggest that patients with marked instability are not suitable for this procedure, but should undergo either excision arthroplasty combined with reconstruction of the ligaments or arthrodesis of the trapezium-metacarpal joint.

Our study shows that simple excision of the trapezium is an effective procedure for patients with trapezium-metacarpal osteoarthritis, but that prolonged splintage is neither necessary nor desirable. The operation can be a painful procedure. A case can be made for protecting the thumb in the early days after surgery but regimens should be adjusted according to the convenience and comfort of the patient, and splintage should be kept to a minimum.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


