Percutaneous release of trigger digits
A TECHNIQUE AND RESULTS USING A SPECIALLY DESIGNED KNIFE
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We describe a safe and easy percutaneous technique for release of trigger finger using a specially designed knife. The A1 pulley is sectioned by a blade which has a hooked end. We released, percutaneously, 185 trigger fingers, including 62 which were locked using this technique. Satisfactory results were achieved in 173 (93.5%). There were no significant complications. We recommend this as a safe and effective outpatient procedure for those patients who have not responded successfully to conservative treatment, have longstanding symptoms or severe triggering.

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Trigger finger is common, and treatment by local injection of steroid is often recommended. Although simple and with low morbidity this has a high rate of failure and repeated injections may be required. When conservative treatment fails, open release of the A1 pulley is usually recommended. Since Lorthioir first described a technique of percutaneous release using a fine tenotome, several methods using various instruments have been reported with satisfactory results and few complications.

Use of the tip of a hypodermic needle to divide the pulley has been advocated, but we found this technique to be unreliable. We now describe the results of percutaneous release of the trigger finger using a specially designed knife.

Patients and Methods

We performed percutaneous release of the A1 pulley on 185 digits with triggering in 151 patients. There were 120 women and 31 men with a mean age of 54.3 years (30 to 78). The thumb was involved in 79, the index finger in 9, the middle in 58, the ring in 36 and the little in three. The mean duration of symptoms before treatment was 9.4 months (2 to 40). Five patients had rheumatoid arthritis and 30 had diabetes mellitus. Previously, 23 patients had had a carpal tunnel release in the same hand. A total of 80 digits (43.2%) had failed a trial of treatment by steroid injection at least once before percutaneous release. A single digit was involved in 123 patients, two in 25, and more than three in three patients.

The digits were graded according to the severity of symptoms similar to that suggested by other authors. In grade 1, there was no triggering, but uneven finger movements. In grade 2, triggering was actively correctable, in grade 3, it was usually correctable by the other hand, and in grade 4 the digit was locked. We classified 53 digits (28.7%) as grade 2, 70 (37.8%) as grade 3, and 62 (33.5%) as grade 4. Of the last, 17 were locked in flexion and 45 in extension.

Patients who had not responded to conservative methods, including injection of steroids, were selected for treatment by this method, which was also used for the primary management of those who had experienced symptoms for more than four months or who had grade-3 or grade-4 triggering.

Operative technique. The instrument used (HAKI Knife; Solco, Seoul, Korea) has a pointed end to facilitate its insertion into the skin. The blade is on the inner side with a hook-shaped end. The depth of the blade required to release the A1 pulley is less than 1 mm (Fig. 1). It is designed to divide the pulley longitudinally from proximal to distal after it is hooked beneath the proximal margin (Fig. 2).

The procedure can be done in the outpatient department under local anaesthesia. The point of triggering at the A1 pulley is located by palpation. The surface landmarks of the proximal edge of the pulley are marked on the skin. These are located at the proximal palmar crease for the index finger, halfway between the proximal and distal palmar creases for the middle finger, the distal palmar crease for the ring and little fingers, and the metacarpophalangeal crease for the thumb.

For the fingers, but not the thumb, the knife is introduced
a few millimetres distal to the distal edge of the pulley, which coincides with a point approximately 1.5 cm distal to the landmarks of the proximal edge of the pulley. The knife is advanced to the proximal edge by palpating the surface of the pulley with its tip. When the margin of the pulley is identified, the blade is hooked around it and the pulley sectioned by moving the knife from proximal to distal (Fig. 2). On withdrawal of the knife the relief of clicking or locking can be confirmed by the patient by flexion and extension of the digit. The procedure usually takes less than five minutes.

For percutaneous release of a trigger thumb, the location of the pulley needs to be carefully outlined by positioning the thumb in abduction, slightly flexing the wrist and supinating the forearm. The knife is inserted 1 cm distal to the metacarpophalangeal crease, in the centre of the thumb under local anaesthesia. The proximal edge of the pulley is identified with the tip of the knife at the level of the metacarpophalangeal crease. Care must be taken not to extend the tip too proximally because of the proximity of the radial digital nerve.

All patients were seen at one week and four weeks after operation, and were re-examined or spoken to by telephone at a mean follow-up of 12.2 months (6 to 24). The results were classified as satisfactory if the treated digit no longer clicked or locked and was comfortable, and as unsatisfactory if there was persistent discomfort or if open surgery had been required.

**Results**

Of the 185 digits treated, there was complete resolution of symptoms in 164 when seen one week after operation. Nine digits had residual grade-1 triggering at the first follow-up. Three had resolved at the second follow-up after four weeks. One patient underwent a satisfactory repeat procedure at four weeks. The remaining five had persistent minor symptoms which did not require further treatment. At the last review, 173 digits (93.5%) were satisfactory and there had been no recurrence.

There were 12 digits (6.5%) in which treatment failed to relieve the symptoms, and these were graded as unsatisfactory. In 11 (5.9%) there was persistent triggering. These included six thumbs, three middle and two ring fingers. Nine of those were locked (grade 4) at presentation and the remaining two were grade 3. Ten digits had successful open release. One patient refused further treatment. Another patient with a locked trigger thumb had persistent pain at the site of release, despite relief of the triggering.

Significant complications, such as injuries to the digital nerve, infection of the tendon sheath or bowstringing of the flexor tendons were not encountered.

**Discussion**

Several techniques for percutaneous release of the A1 pulley have been described with satisfactory results and few complications. If equally effective, a percutaneous release will avoid the time and expense of an open procedure. We have also undertaken percutaneous release using a hypodermic needle similar to that described by Eastwood et al. We found, however, that the needle bent easily and that the tip did not readily divide a thickened pulley. The procedure is much more easily accomplished by using the HAKI knife.

Several authors have indicated that the proximity of the digital nerves in the thumb poses a considerable risk of injury when the percutaneous technique is used. The radial digital nerve passes diagonally across the tendon of flexor pollicis longus from the ulnar to the radial side, a few millimetres proximal to the metacarpophalangeal flexion crease. Distally, the nerve is located on the far lateral side of the thumb. In our technique, the knife is introduced distal to the pulley between the two digital nerves 1 cm distal to the metacarpophalangeal crease thus minimising the risk of injury. This is in contrast to other described techniques in which the needle or knife is inserted proximal to the metacarpophalangeal crease.
ter any nerve injuries in the 185 digits, including 79 thumbs.

Injury to the flexor tendon has also been described as a complication of the percutaneous technique.\textsuperscript{12,14,16} The blade portion of the knife has a depth of less than 1 mm which should prevent this.

Satisfactory results with complete relief of triggering were achieved in 93\% of the digits using this technique. It can be easily, quickly and safely carried out in the outpatient clinic. It is well tolerated. A patient with acute triggering is probably best managed by an injection of steroid but when this fails, we believe that percutaneous release is the treatment of choice. We also recommend it in those patients who have had symptoms for more than four months or who have grade-3 or grade-4 triggering.

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References