Percutaneous release of the trigger finger: An office procedure

A new technique for percutaneous release of the trigger finger is described. A 21-gauge hypodermic needle is used to release the A1 pulley. The technique is effective, convenient, safe, and well tolerated by patients. Thirty-three of 35 procedures (94%) led to complete relief of symptoms, and in the remaining two digits partial symptomatic relief was achieved. There were no significant complications. After a mean follow-up of 13 months, there had been no recurrences. This technique should be the treatment of choice for the established trigger finger with symptoms of more than 4 months' duration. (J HAND SURG 1992;17A:114-7.)

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Trigger finger is a common example of stenosing tenosynovitis affecting the digital flexor tendon sheath. It can affect any finger, although it is most common in the thumb and ring fingers of the dominant hand.[1,2] The cause of the condition remains uncertain. A tendon nodule does exist; this is described by Hueston and Wilson[3] as a bunching up of the spiraling fibers of the flexor tendon at the site of a constriction in the fibrous flexor sheath. It is this nodule that becomes caught at the proximal end of the fibrous flexor sheath at the first annular (A1) pulley and causes the symptoms associated with a trigger finger. Symptoms range from mild discomfort and stiffness to a painful finger that can become locked in flexion. Most patients describe an intermittent snapping or triggering of the affected digit as it moves though flexion and extension, and hand function can be compromised significantly. Clinically, triggering can be demonstrated, and a tendon nodule is often palpable.

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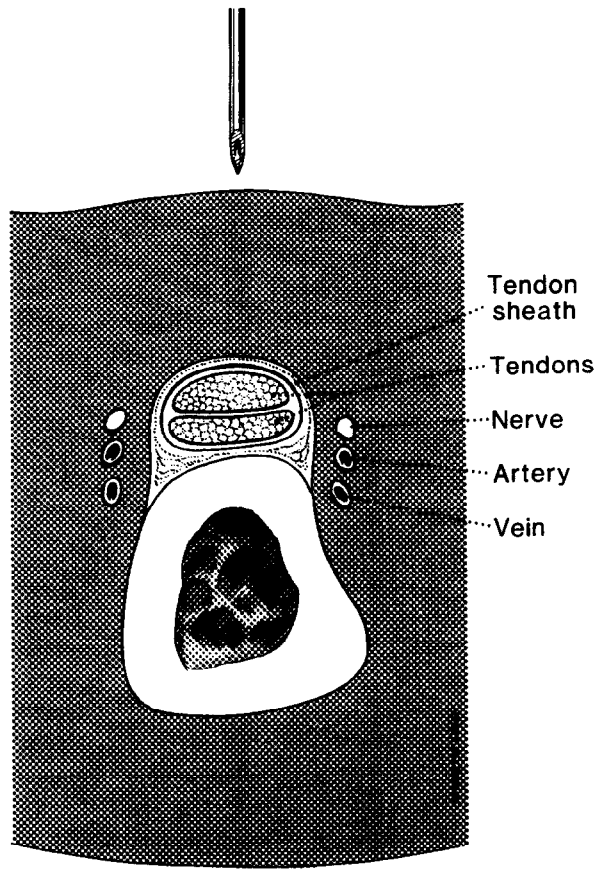

Fig. 1. Cross section at level of metacarpal neck to show direction of needle introduction in relation to flexor tendon sheath and neurovascular bundle.

Table I. Grades of triggering of the digit

Grade		*Description*
0	None	Even movement during flexion/extension
1	Mild	Uneven movements during flexion/extension
2	Moderate	Actively correctable; interferes with normal hand function
3	Severe	Passively correctable
4	Locked	Fixed in flexion

Nonoperative management, which involves the injection of steroid and local anesthetic into the flexor tendon sheath has been described. Overall, however, reported results are variable and can be disappointing, with fewer than 50% of the patients gaining long-term relief of symptoms.[2]

Operative treatment is performed through a small palmar incision and involves identification and division of the A1 pulley. Successful results can be achieved in up to 83% of the patients,[1] but a significant complication rate has been noted.[4]

The purpose of this study was to assess a technique for percutaneous release of the trigger finger that combines the benefits of surgical division of the A1 pulley with the ease and convenience of office treatment. The technique used is a modification of one that was first described by Aziz in 1987 at the Seventh Congress of the Asian Orthopaedic Association.

Materials and methods

A prospective study was performed on 35 trigger digits in 26 patients. There were 14 women and 12 men with a mean age of 58 years (range, 32 to 77 years). One patient had diabetes mellitus, and two had had a carpal tunnel release. None had a documented history of rheumatoid arthritis. The distribution of affected digits was similar to that reported in other studies[1, 2, 4] except that, as a matter of policy, only three thumbs were treated. Six patients had two digits released on the same occasion, and three others returned for a second procedure.

Patients entered the study if they had mechanical symptoms of triggering of a digit that could be confirmed on clinical examination and located in the region of the A1 pulley. Symptoms must have been present for a minimum of 4 months, with no previous treatment given. The use of this technique was contraindicated if there were signs of an acute inflammatory process affecting the tendon sheath. At presentation the patients' symptoms of pain and triggering were noted, and the severity of triggering was graded in a manner similar to that mentioned by Quinnell[2] (Table I).

The aim of the procedure is to cut the transverse fibers of the A1 pulley in the region of the metacarpophalangeal joint with the tip of a hypodermic needle inserted through the skin. The point of triggering at the A1 pulley is located on clinical examination. For the long, ring, and small fingers, this point lies near the distal horizontal palmar skin crease; for the index finger, it is at the proximal horizontal palmar crease. The finger is held firmly and hyperextended at the metacarpophalangeal joint. The skin is thoroughly cleaned and, with the use of an aseptic technique, 2 ml of 1% lidocaine without epinephrine is infiltrated into the skin and subcutaneous tissues by means of a needle inserted directly over the point of triggering. The needle remains centered over the metacarpal bone at all times and enters perpendicular to the skin. A 19- or 21-gauge needle (Microlance, Becton Dickinson, Rutherford, N.J.) is then inserted precisely along the previous needle track. Hyperextension of the finger is essential at this point, as it causes the flexor tendon sheath to lie directly under the skin and allows the digital neurovascular bundles to displace to either side (Fig. 1). The needle tip is inserted into the flexor tendon, and this is confirmed by observing movement of the hub of the needle when the patient is asked to flex the distal phalanx gently. The needle is then withdrawn slightly (1 to 2 mm) until it ceases to move with flexion of the fingertip. At this point the needle is lying on the A1 pulley. The needle point is now rotated so that the beveled edges are lying longitudinally along the flexor tendon. When the needle is moved to and fro in the direction of the metacarpal, a grating sensation can be felt by the operator as the needle tip cuts through the horizontal fibers of the A1 pulley. This grating sensation ceases when the pulley is completely divided. The needle is then removed and the finger is flexed and extended fully several times to confirm that the triggering has been abolished. A small elastic dressing is applied, and the patient is warned that there will be some discomfort for 1 to 2 weeks.

Table II. Results of percutaneous release on grade of triggering at initial and final review

Grade of triggering	*0*	*1*	*2*	*3*	*4*
At presentation	—	—	16	18	1
At 6-week review	32	3*	—	—	—
At final review	33	2	—	—	—

*One asymptomatic; one symptomatic; one asymptomatic after further release, moving to Grade 0.

All patients were seen at 2 weeks, reviewed at 6 weeks, and then reviewed again at a mean follow-up time of 13 months (range, 6 months to 2 years). Two patients were reviewed clinically at 4 months and by telephone at 6 months. At review, pain and triggering were assessed in the same manner as before the release, and symptoms and signs associated with stiffness, tenderness, and neurologic deficit were sought. At the 6-week review, each patient was also asked to grade the pain of the procedure itself and to comment on the degree of discomfort in the subsequent weeks.

Results

Of the 35 digits treated by this technique, 32 (91%) were completely free of triggering (grade 0) at the 6-week follow-up. The remaining three fingers had residual grade 1 triggering. One patient was unaware of this triggering; another was unconcerned about it and wanted no further treatment. The third patient requested a repeat procedure, and this was successful in relieving the remaining triggering. At late review, 94% had grade 0 triggering. There had been no recurrences (Table II).

At presentation, 30 of the trigger digits had some degree of pain associated with the triggering. This pain was completely relieved in 28 digits (93%) and partially relieved in the remaining two digits. These two patients still complain of an intermittent mild aching in the hand. Two others have mild tenderness at the site of the procedure but no pain. All four patients are satisfied with the results of their treatment.

One patient underwent bilateral release of the ring fingers and 6 weeks later was noted to have significant stiffness in both fingers. One finger was also swollen, but neither finger was painful or tender. The swollen finger was explored surgically by another surgeon. The A1 pulley was found to have been completely divided. The patient had not received any antibiotics, and, although there was a local synovitis and some surrounding edema, bacteriologic investigation did not detect any infection. The patient was given physiotherapy, and 4 weeks later both fingers were free of symptoms, with a full range of movement and no triggering. They remained free of symptoms at 6- and 18-month follow-up examinations.

A second patient who also underwent treatment for bilateral grade 3 triggering of the ring fingers was noted at 6-week follow-up to have 20-degree fixed flexion deformities at the proximal interphalangeal joints. Each finger had an otherwise full and pain-free range of movement with no triggering.

There were no cases of tendon sheath infection or digital nerve damage. The procedure itself was described as uncomfortable by 60% of the patients and painful by 19%. Subsequently, 47% were free of any discomfort at 48 hours, 72% at 7 days, and 94% at 2 weeks. Twenty-four of the 26 patients would be prepared to have the procedure performed again.

Discussion

The decision on how best to treat a patient with a trigger digit is often based on personal preference rather than on scientific fact, but it must take into account that up to 29% of these problems may resolve spontaneously.[5] The cost-effectiveness and lack of complications make injection treatment an attractive alternative to surgery. The aim of such treatment is to instill steroid, with or without a local anesthetic, into the lumen of the tendon sheath, but Kamhin et al.[6] showed that the injection reaches this point in only 49% of the cases. In reported studies, the results of such treatment vary considerably; often the meaning of *success* is not clear and the duration of follow-up is not defined. Injections often give immediate benefits, but the absence of this effect does not mean that the technique has failed. If symptoms persist at 6 weeks, no delayed benefit will occur.[2] After injection of steroid alone, Quinnell[2] reported a cure rate of 38% at 1 year, with a further 10% of the treated digits being improved. Rhoades et al.[7] injected steroid and local anesthetic and combined this with 3 weeks of splintage. Their cure rate was 64%, and overall 72% of their patients were satisfied although a second injection was sometimes required. In patients with a short history of symptoms (less than 4 months), the injection is more likely to

reach its target,[6] and the success rate is correspondingly higher, with 93% satisfactory results. Patients with a long history had a success rate of only 41%. Clark et al.[8] reported a cure rate of 55% with a single injection but improved this to 82% with the use of repeated injections. Kolind-Sorensen[9] reported a success rate of 67% after a single injection and found that the response rate was lower when the trigger digit was associated with such conditions as rheumatoid arthritis and diabetes mellitus. More recently, better results have been reported when particular attention has been paid to the injection technique. Cure rates of 84%[10] and 79%[11] were achieved after a single injection.

Operative division of the A1 pulley under local or general anesthesia is expensive and inconvenient but nevertheless is reputed to be more successful. However, a critical analysis of this form of treatment[4] showed a cure rate of only 60%, with 28% of the operations leading to complications that affected the patient. Infection and digital nerve damage occurred in 12% of the patients, with 6% having permanent significant functional deficit in their hands. Bonnici and Spencer[1] reviewed their patients by questionnaire only and found that 83% were satisfied.

Our technique of percutaneous release of the trigger finger as an office procedure is cost-effective and convenient. Complete long-term relief of symptoms was achieved in 94% of the patients; this figure compares favorably with the best results achieved by other methods.

There were no long-term complications. The patient who underwent open exploration for a persistently stiff and swollen finger represents our only complication. The patient who was noted to have flexion deformities of the proximal interphalangeal joints at 6-week review had had grade 3 triggering for many months before release of the A1 pulley. We believe that the joint contractures were present at the time of release but went unnoticed. This has been reported in other series.[5] One patient underwent a second release of his finger after incomplete resolution of his symptoms. This occurred early in the study and could have been prevented if we had ensured the abolition of all triggering at the time of the first release.

Only three trigger thumbs have been released during this study. All releases have been successful, but the proximity of the neurovascular bundles to the A1 pulley and their anterior position have made us wary of using this technique for the thumb. This is in contrast to the study reported by Tanaka et al.,[12] who used a subcutaneous method of trigger digit release on 116 thumbs and achieved an excellent result in 80%. They felt that their technique was particularly indicated in the thumb inasmuch as their cure rate in the fingers was only 49%.

The procedure itself was well tolerated, and we believe that the discomfort associated with it compares favorably with that accompanying routine injection treatment or surgical release.

In 1958 surgical subcutaneous release of the trigger finger with a tenotome was reported by Lorthioir.[13] He claimed excellent results but did not comment on digital nerve damage, which must be a risk if a tenotome blade is used. We believe it is less likely to occur when a needle tip is used for the release, and indeed there were no cases of nerve damage in our series. A patient with acute triggering in a digit is best treated with an injection of steroid and local anesthetic. However, when the symptoms have been present for more than 4 months, percutaneous release of the A1 pulley with a needle should be the preferred treatment.

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