"Tips, Quips, and Pearls" is a special section in The Journal of Foot & Ankle Surgery® which is devoted to the sharing of ideas to make the practice of foot and ankle surgery easier. We invite our readers to share ideas with us in the form of special tips regarding diagnostic or surgical procedures, new devices or modifications of devices for making a surgical procedure a little bit easier, or virtually any other "pearl" that the reader believes will assist the foot and ankle surgeon in providing better care. Please address your tips to: D. Scot Malay, DPM, MSCE, FACFAS, Editor, The Journal of Foot & Ankle Surgery®, PO Box 590595, San Francisco, CA 94159-0595; E-mail: editorjfas@gmail.com

Dorsal Suspension Stitch: An Alternative Stabilization After Flexor Tenotomy for Flexible Hammer Digit Syndrome

Paul Dayton, DPM, FACFAS,[1] and David Smith, DPM, FAPWCA[2]

The focus of this communication is to share an alternative form of positional maintenance for use after correction of flexible hammer digits via flexor tenotomy. The toe is maintained in a corrected position by means of a wide, horizontal mattress stitch with the suture passing through the extensor apparatus both proximal and distal to the interphalangeal joints. This suture prevents recurrence of plantarflexion contracture of the toe during the postoperative period without the use of Kirschner wire fixation. We have noted satisfactory maintenance and healing with this technique. (The Journal of Foot & Ankle Surgery 48(5):602–605, 2009)

Key Words: fixation, foot, hammertoe, phalanx, surgery, suture

Hammer digit syndrome is a pathological condition that is frequently encountered by the foot surgeon. Whether presenting as a source of pain (Figures 1–4), ulceration, the site of hyperkeratosis (Figures 5–10), or as a cosmetic concern, this form of pathology can be addressed with a wide range of treatment options. Surgical intervention may be indicated for those toes with rigid contracture, which require osseous correction and internal fixation. In the case of flexible hammer digit syndrome, some deformities can be resolved with flexor tendon release. In an attempt to accomplish splinting of flexible, contracted toes after soft tissue release, the authors have routinely used, over the last 5 years, a "dorsal

FIGURE 1 Preoperative dorsal appearance of a patient with flexible hammertoes. Figures 1 to 4 are of the same patient immediately preoperatively and postoperatively.

Address correspondence to: Paul Dayton, DPM, FACFAS, 804 Kenyon Rd, Ste 310, Fort Dodge, IA 50501. E-mail: daytonp@ihs.org.

[1]Director of Podiatric Medical Education- Trinity Regional Medical Center PM&S-36 Residency, Trinity Regional Medical Center, Fort Dodge, IA.

[2]Chief Resident- Trinity Regional Medical Center PM&S-36 Residency, submitted during residency, Trinity Regional Medical Center, Fort Dodge, IA.

Financial Disclosure: None reported.

Conflict of Interest: None reported.

1067-2516/09/4805-0016$36.00/0

doi:10.1053/j.jfas.2009.05.014

FIGURE 2 Preoperative appearance of flexible hammer digits.

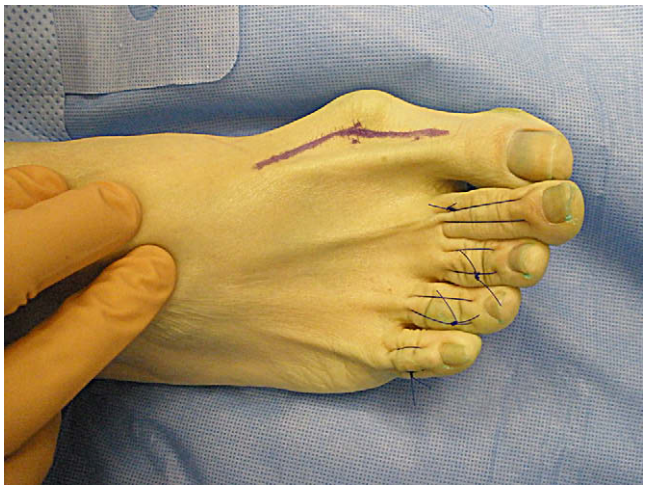

FIGURE 3 Immediate postoperative dorsal appearance. Notice the clear bowstringing of the extensor tendons caused by placement of the dorsal suspension stitch. Also note the distal pass of the suture immediately proximal to the nail.

suspension stitch'' to stabilize the digit during the early postoperative period. It is the authors' belief that this technique has not been described before for flexible hammer digit syndrome. An Ovid and Pubmed search did not reveal any relevant manuscripts with searches performed for ''suture splinting,'' ''suture fixation,'' ''suture toes,'' and ''suture fingers.'' Additionally, the technique was not described in seven orthopedic or podiatric surgery textbooks. Therefore, this technique is presented as an alternative to the classic, internal fixation more commonly employed in the treatment of hammer digit syndrome.

Surgical Technique

The initial decision to use this technique is predicated on the fact that the deformity is indeed a flexible one, because

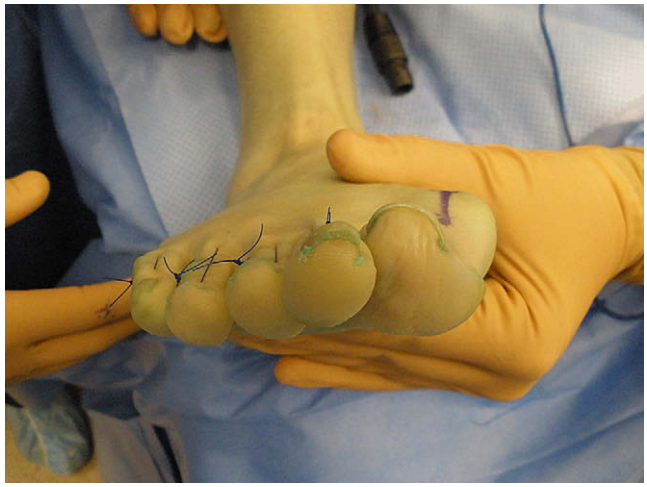

FIGURE 4 Immediate postoperative appearance. Note the alignment of the toes achieved with simulated weightbearing by loading the metatarsal heads. Although this procedure was performed in the operating room, it could easily have been performed in a procedure room.

FIGURE 5 Preoperative dorsal appearance of patient with distal toe lesions. The patient is also depicted in Figures 6 through 10.

a soft tissue correction alone would not be appropriate for a rigid contracture. The open or percutaneous flexor tenotomy is performed in standard fashion. Thereafter, the toe is temporarily stabilized with a 2-0 polypropylene monofilament dorsal suspension stitch, although any nonabsorbable monofilament suture of the appropriate size can be used. A horizontal mattress stitch is used to position the suture through the extensor apparatus proximal to the proximal interphalangeal joint with the distal arm of the suture passed through the extensor apparatus just proximal to the nail fold (Figure 3). We have found that this provides a long lever arm for the splinting force administered by the dorsal suspension stitch. The position of the toe can be adjusted by altering the

FIGURE 6 Preoperative appearance of the distal toes with partial thickness ulcerations. This is the plantar appearance of the toes 4 days preoperatively. Notice the hyperkeratoses with intradermal bleeding.

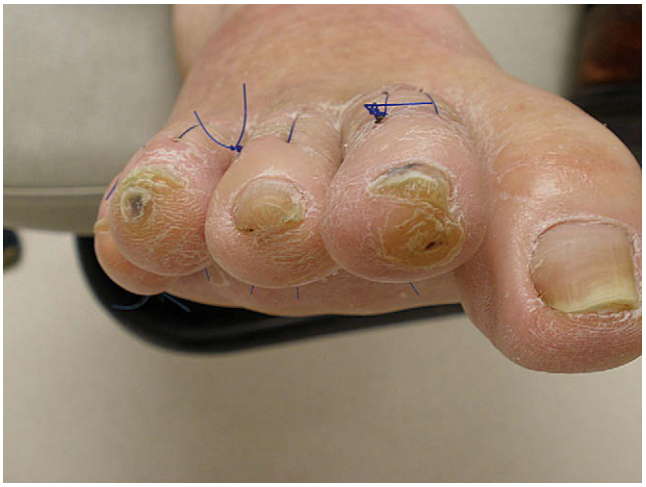

FIGURE 8 Two weeks postoperative. The rectus appearance of the toes is easily appreciated. The patient has been showering without restriction for 10 days.

FIGURE 7 Immediate postoperative appearance. The current practice is to place the distal pass of the dorsal suspension stitch just proximal to the eponychium, as in digit 4.

FIGURE 9 Eight weeks postoperative flexor tenotomies digits 2 to 5 with dorsal suspension stitch. The patient is 4 weeks status post suture removal, and ulcerations are nearly healed at the distal ends of the lesser digits.

tension of the suture intraoperatively. Next, the tenotomy incision is closed with a smaller, nonabsorbable suture, and a light bandage is applied in a standard fashion. The suture is left intact for 3 to 4 weeks, after which time it is removed in the usual fashion. In our practice, bandaging is discontinued and the patient is allowed to shower the toe after the third postoperative day and should avoid soaking or submersion of the operative site.

Discussion

The authors have been very pleased with this form of positional maintenance of the toe after soft tissue release and realignment of the flexible deformity. In our practice, we have rarely encountered postoperative complications when this technique is used for the correction of flexible hammertoe. We have also used the dorsal suspension stitch in conjunction with resection arthroplasty of the proximal interphalangeal joint, and thereby avoided the use of a temporary Kirschner wire for digital stabilization. In our experience, patients are generally happier during the early postoperative period if they can avoid having an axial Kirschner wire protruding from the end of their toe, or toes (Figure 11). Moreover, we have not encountered any wound problems related to dehiscence or infection, or

FIGURE 10 Appearance at 8 weeks postoperative. Notice the improved appearance of the toes, especially of the fourth toe.

FIGURE 11 Patient with both rigid and flexible contracted toes, postoperatively. Many patients have been pleased with the less invasive appearance and nature of the dorsal suspension stitch.

loss of correction, even when bathing of the foot and discontinuation of the surgical bandage are instituted as early as 3 days postoperative. In conclusion, in our experience, use of the dorsal suspension stitch allows simple and effective stabilization of the digit after surgical repair of the flexible hammertoe, and obviates the need for Kirschner wire stabilization.