Hammer-toe surgery

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Policy contains: Arthrodesis, arthroplasty, hammertoe.

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Coverage policy

Hammertoe arthrodesis of the proximal interphalangeal joint with Kirschner-wire (K-wire) fixation is clinically proven, and, therefore, medically necessary when the following criteria are met (Clinical Practice Guideline Forefoot Disorders Panel, 2009; American College of Foot and Ankle Surgeons, 2020):

- Disease is symptomatic or impairs function, and is refractory to conservative medical therapy (i.e., the hammertoe is more rigid and painful, and/or an open sore has developed).
  - Conservative medical therapy may include, but is not limited to, the following:
    - Wider, lower-heeled shoes.
    - Bunion pads.
    - Over-the-counter analgesics and nonsteroidal anti-inflammatory medications.
    - Debridement.
    - Padding.
    - Anti-inflammatory injections.
    - Steroid injections.
    - Foot orthoses (American College of Foot and Ankle Surgeons, 2020).

Limitations

Hammer surgery using intramedullary device options is investigational/not clinically proven, and not medically necessary.
Hammertoe surgery for the sole purpose of improving appearance of the foot is not medically necessary.

All other uses of hammertoe surgery are not medically necessary (American College of Foot and Ankle Surgeons, 2020).

Alternative covered services
- Primary medical care evaluation and management of hammertoe.
- Podiatric medical care evaluation and management of hammertoe.

**Background**

Hammertoe deformity is the most common deformity of the lesser toes. It primarily comprises flexion deformity of the proximal interphalangeal joint of the second toe, with hyperextension of the metatarsophalangeal joint. Second toe hammertoes typically occur from an elongated 2nd metatarsal and from pressure due to an excessively abducted large toe, known as hallux valgus.

A hammertoe is a deformity of the second, third or fourth toes. In this condition, the toe is bent at the middle joint, so it resembles a hammer. The most common cause of the condition is the use of shoes that push the toes together and down excessively, namely narrow shoes and high heels (American Academy of Orthopaedic Surgeons, 2012). The condition affects up to one-third of the general population (Albright, 2018).

Etiologies of hammertoe deformity include a foot in which the second toe is longer than the first, metatarsophalangeal synovitis and instability, inflammatory arthropathies, neuromuscular conditions, and ill-fitting shoe-wear. Rheumatoid arthritis causes hammertoe deformity by progressive metatarsophalangeal joint destruction, leading to metatarsophalangeal joint subluxation and dislocation.

With all of these etiologies, the extensor digitorum longus tendon gradually loses mechanical advantage at the Proximal InterPhalangeal joint, as does the flexor digitorum longus tendon at the metatarsophalangeal joint. The intrinsic muscles fire and sublux dorsally, as the metatarsophalangeal hyperextends. They now extend the metatarsophalangeal joint and flex the proximal interphalangeal joint, as opposed to their usual function of flexing the metatarsophalangeal joint and extending the proximal interphalangeal joint (Watson, 2018).

Conservative treatments for hammertoes include wearing shoes with no heels and are soft and roomy; exercises of the foot to stretch and strengthen muscles; orthotic devices; corticosteroid injections; oral non-steroidal anti-inflammatory drugs; and splints/straps, cushions, or non-medicated corn pads to relieve symptoms. Many cases will resolve using one of these approaches, although some are refractory to treatment and will require surgery (American Academy of Orthopaedic Surgery, 2012; Federer, 2018; American College of Foot and Ankle Surgeons, 2020).

Those cases requiring surgery will be performed on an ambulatory basis using a local anesthetic. Kirschner wire fixation, also known as K-wire, is considered the gold standard for hammertoe surgical fixation. K-wire fixation involves resection arthroplasty of the proximal interphalangeal joint and fixed with a K-wire. In addition, techniques involving percutaneous diaphyseal osteotomy of the middle and proximal phalanges combined with tendon release, after which toes are wrapped in 3M Coban dressing, is another approach to hammertoe surgery being used more frequently (Yassin, 2017).
Findings

The American College of Foot and Ankle Surgeons developed a series of clinical practice guidelines on foot and ankle abnormalities. The consensus of the College’s panel on forefoot disorders was that hammertoe typically is treated by non-surgical methods first. If a patient does not respond to these non-surgical therapies, a series of soft tissue and osseous procedures may be used (Clinical Practice Guideline Forefoot Disorders Panel, 2009).

A review of hammertoe resection arthroplasty using K-wire included 1,115 operations on 876 patients, followed for an average of 20.8 months. Complication rates included pin migrations (3.5%), pin-tract infections (0.3%), and pin breakages (0.1%). Recurrent deformities occurred in 5.6%; 3.5% required revision hammertoe surgery; malalignment occurred in 2.1%; vascular compromise occurred in 0.6%; 0.4% required amputation; and 3.5% required revision surgery. Authors conclude that K-wire is an effective, low-cost method of treating hammer defects (Kramer, 2015).

A study of 152 patients (311 toes) who underwent hammertoe surgery were tracked for at least six months to identify risk factors for failure. These included a larger preoperative transverse plane deviation of the digit ($P < .001$); operating on the second toe, versus third or fourth ($P = .003$); use of a phalangeal osteotomy to reduce the proximal interphalangeal joint ($P = .005$); and using less common/conventional operative techniques to reduce the proximal interphalangeal joint ($P = .03$) (Albright, 2020).

A review of nine studies (602 toes in over 400 patients) assessed newer intramedullary devices for treating hammertoe defects. Satisfaction was high (93 to 100%), and radiological arthrodesis achieved in 60.5% to 100.0% of cases. The three studies that compared intramedullary and K-wire devices showed similar rates of complications and re-operations (Guelfi, 2015).

A trial of 675 hammertoe procedures for 352 patients compared outcomes for surgery with K-wire fixation of the proximal interphalangeal joint to percutaneous diaphyseal osteotomy of the middle and proximal phalanges. Patients were followed for six months. Complications of the K-wire surgery group included pin migrations, infections, and impaired wound healing (5.5%, 4.5% and 3.0%), along with recurrent deformities, toe revisions, malalignment, vascular compromise, and amputation (6.2%, 2.6%, 3.3%, 0.5%, and 0.25%). In the percutaneous surgery group, impaired healing and infection were observed in 18.4% and 2.3%. Visual analog scale score fell more markedly in the percutaneous group (2.0% versus 0.5%). The per toe infection rate of patients undergoing K-wire hammertoe correction was significantly higher than with the percutaneous correction group (5.3% versus 2.2%) (Yassin, 2017).

A review of 287 patients compared open surgery ($n = 112$) and percutaneous treatment ($n = 175$) for hallux valgus and lesser toe deformities, and followed up to 24 months. Less post-operative pain and less infection risk suggests that percutaneous techniques are superior to the open technique (Yassin, 2020).

A comparison of hammertoe correction using K-wire fixation or fusion with the CannuLink implant was made for 149 toes in 99 patients followed for one year. The K-wire group had worse results for patients remaining symptomatic (27.0% versus 7.7%). The K-wire group also had reported rates of 9.5% for recurrent deformity, 3.0% for late infection, 1.0% for partial numbness, and 5.3% required revision surgery. The intramedullary group, with only 5.6% having had complications, was superior in both safety and efficacy (Richman, 2017).

A study of 186 toes (in 96 patients) treated for hammertoe problems compared outcomes for those treated with K-wire ($n = 65$ toes) versus those treated with newer implant methods, i.e., Smart Toe titanium implant ($n = 94$)
and TenFuse (n = 27). Implants were developed due to reported complications using K-wire. Patients were followed for over 12 months. No significant differences were observed among the groups in decrease of visual analog scale and short form-36, although breakage of Smart Toe implant occurred in a significantly higher 10.6% of implants (Obrador, 2018).

A multicenter randomized controlled trial of 91 patients (well over 100 toes) compared outcomes after treatment of lesser digital hammertoe using either a Kirschner wire or a two-piece intramedullary, stainless steel implant. No significant difference in complication rates were observed between the two groups, but the implant group had a higher average Bristol Foot Score and Foot Function Index score and higher incidence of fusion (Jay, 2016).

Results of proximal interphalangeal joint fusion carried out with a StayFuse intramedullary fusion device in 150 toes in 140 consecutive patients found the rate of postoperative radiologic fusion was 73%. There were implant-related complications in eight toes. Ninety-five percent of the patients were satisfied with the procedure, and 3.3% of the patients needed revision surgery (Fazal, 2013).

A study of 114 patients (136 toes) with second hammertoe deformities compared those who underwent joint resection arthroplasty, proximal interphalangeal joint arthrodesis without osteotomy, or interpositional implant arthroplasty. All groups had significantly reduced Visual Analog Scale scores (P < .01) and radiographic correction in average measured lateral angle of the second proximal interphalangeal joint (P < .01). The interpositional implant group had significantly corrected the second proximal interphalangeal joint in the axial plane, with an average postoperative anterior-posterior angle of 2.9° (P < .01), also significantly different versus the other groups (P < .01) (Sung, 2014).

A review of 117 patients (156 toes) with hammer and claw toe deformities requiring proximal interphalangeal joint realignment followed subjects for one year. The average metatarsophalangeal-interphalangeal scale improved from 40.4 to 85.5 after the operation. Subjects with pain fell from 15.5% to 4.7%, satisfaction was reported by 98%, and complications were reported in 1.3% (Coillard, 2014).

A randomized trial of 86 digits with interphalangeal joint arthrodesis, nearly all second and third digits, compared Smart Toe® implants (n = 58) with Kirschner wire (n = 28). No significant differences were found between the two groups, including rate of malunion, nonunion, fracture of internal fixation, and need for revision surgery, leading authors to conclude both services were viable choices (Scholl, 2013).

References

On March 13, 2020, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were "hammertoe," "intramedullary devices," "K-wire," "Kirschner wire," and "percutaneous." We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.


American College of Foot and Ankle Surgeons. Hammertoe. 


**Policy updates**

6/2016: initial review date and clinical policy effective date: 7/2016

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