

Hammer Toe Surgical Correction

Arthrodesis of the Proximal Interphalangeal (PIP) Joint Using a New Shape Memory Intramedullary Implant.
Marino Delmi, MD Foot & Ankle Centre, Clinique des Grangettes, 1224 Chene-Bougeries/Geneva, CH-Switzerland

PURPOSE

Surgery for hammer toes often requires an arthroplasty or an arthrodesis of the proximal interphalangeal (PIP) joint (1, 2, 3). Usually, joint is secured with a pin for weeks (figure 1-2), with risk of infection, breakage (figure 3), migration and discomfort for the patient (1, 2, 4). Furthermore, fusion is not always obtained after pin removal and malposition may then happen (figure 4) (5). Various internal implants (6, 7) have been used with complications (8). Use of a new intramedullary implant (FDA K070598) could increase fusion rate, decrease complications and improve patient's comfort.



Figure 1
Kirschner wires fixation for arthrodesis of the PIP.



Figure 2
Clinical aspect of wire fixation with rotation of the second toe.



Figure 3
Rupture of a metallic wire within the 2nd metatarsal.



Figure 4
Missed position (rotation) of the second toe.

METHODS

A prospective study of 170 hammer toe corrections was performed. We used a new shape memory intramedullary implant for arthrodesis of the PIP

joint. The implant consists of a small titanium shape memory alloy anchor, expanding at body temperature. Subjective, objective and radiological assessment were obtained at a mean follow-up of 12 months.



Figure 5
Implant expanding at body temperature.

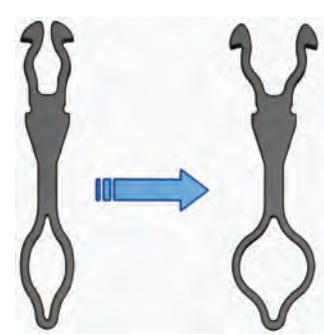


Figure 6
Fixation (grasping) within the 1st and 2nd phalanx.



Figure 7 - Pre-op X-ray.



Figure 8 - Post-op X-ray (correction of hallux valgus and 2nd hammer toe).

PROCEDURES

PIP joint is opened through a transverse incision and is prepared with specific instruments. The implant is then inserted in a cold (freezer) state and expands quickly at body temperature (figure 5), this allowing solid fixation within the bone of the proximal and middle phalanx (figure 6, 7, 8). The incision is then closed. Immediate weight bearing is allowed with a rigid sole shoe.

RESULTS

128 patients with 170 hammer toe corrections were included. 2nd toe: 130, 3rd toe: 34 and 4th toe: 6. 32 patients had two or three toes operated with this implant at the same time (figure 9). Additional procedures were performed in 142 toes, for most tendon lengthening.



Figure 9
Memory implant in the 2nd,
3rd and 4th toes



Figure 10
Clinical aspect at one month
(3rd toe with implant)



Figure 11
Fusion of the PIP at
four months

At 12 months, radiological PIP fusion (figure 10, 11) was obtained in 167 toes (98%), 94% being solid at 3 months.

Complications were 7 (4%) and included: infection (superficial): 1 (healed uneventful), dislocation of PIP: 1, rupture of implant: 3, protrusion in the DIP joint: 2. All these complications lead to a final good result. No redo surgery was necessary.

The subjective and objective results were:

- excellent 94%
- good 5%
- unsatisfactory 1%.

SIGNIFICANCE OF FINDINGS

This shape memory intramedullary implant allows a high rate of fusion of the PIP joint and excellent results with few complications.

REFERENCES

1. Edwards WH, Beischer AD. Interphalangeal joint arthrodesis of the lesser toes.
Foot Ankle Clin. 2002 Mar; 7 (1):43-8.
2. Caterini R, Farsetti P, Tarantino U, Potenza V, Ippolito E. Arthrodesis of the toe joints with an intramedullary cannulated screw for correction of hammertoe deformity.
Foot Ankle Int. 2004 Apr; 25(4): 256-61.
3. Yu GV, Vincent AL, Khoury WE, Schinke TL. Techniques of digital arthrodesis: revisiting the old and discovering the new.
Clin Podiatr Med Surg. 2004 Jan; 21(1): 17-50.
4. Imhäuser G. Operation of hammer toes and claw toes, and treatment of unfavourable results (author's transl).
Z Orthop Ihre Grenzgeb. 1979 Apr; 117(2): 179-84.
5. O'Kane C, Kilmartin T. Review of proximal interphalangeal joint excisional arthroplasty for the correction of second hammer toe deformity in 100 cases.
Foot Ankle Int. 2005 Apr; 26 (4):320-5.
6. Konkel KF, Menger AG, Retzlaff SA. Hammer toe correction using an absorbable intramedullary pin.
Foot Ankle Int. 2007 Aug;28(8):916-20.
7. Ohm OW 2nd, McDonell M, Vetter WA. Digital arthrodesis: an alternate method for correction of hammer toe deformity.
J Foot Surg. 1990 May-Jun;29(3):207-11.
8. Shaw AH, Alvarez G. The use of digital implants for the correction of hammer toe deformity and their potential complications.



MEMOMETAL INC. USA

www.mmi-usa.com

866. 682. 7577 901. 683. 7077

6000 Poplar Ave., Suite 110, Memphis, TN 38119

© MMI 2007 - A MEMOMETAL TECHNOLOGIES INC. COMPANY