Digital Arthrodesis with a One-Piece Intra-medullary Fixation Device: A Retrospective Review
Disclosure

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My disclosure is in the Final AOFAS Program Book.

I have a potential conflict with this presentation as I am on Stryker’s speaker’s bureau.
Correction of lesser digital deformities via proximal interphalangeal joint (PIPJ) arthrodesis has traditionally been accomplished with externally placed Kirschner wires. Although intramedullary devices are available, hesitation to utilize these devices often centers around concerns of increased complication rates or the need for hardware removal. We present a case series where a one piece memory Nitinol intramedullary fixation device was utilized for PIPJ arthrodesis.
Materials & Methods

- A retrospective chart and radiographic review of 35 patients with 65 hammertoe implants was performed.
- Our goal was to assess union rates, complication rates and the need for hardware removal for all implants in digits two, three and four.
- Successful fusion was defined by the following parameters:
  - no joint pain, no digital erythema or edema, and radiographic evidence of bony trabeculation on at least two radiographic views.
- Fifth digit implants were not utilized.
- All procedures were performed by the same surgeon utilizing the same surgical technique.
- Post operatively, patients were permitted protective weight bearing in a surgical shoe for 2-4 weeks.
- Return to normal shoe gear and full activity is permitted at 4-6 weeks.
Thirty-five patients were included in this study, thirty-two females and three males.

Mean follow up time of 27 months (Range 12-40 months; SD: 7)

Mean age was 62.2 years (Range 27-82, SD 12.5)
Complications were noted in four patients (6.1%)
  - one asymptomatic non-union (1.5%)
  - two hardware failures (3%)
  - one implant displacement (1.5%)

To date, no patients required revisional surgery or hardware removal.
Several methods for PIPJ fusion when correcting digital deformities have been described in the literature including use of k-wires, silicone implants, allograft bone, stainless-steel wire suture, titanium screws and absorbable screws.

Our focus in this study was to evaluate the efficacy of a one-piece memory Nitinol intramedullary fixation device to correct digital deformities.

Implantable devices offer both one and two-component options.

Success rates for these devices have been reported to range from 54-97%.

With one-piece implants, fusion rates have been reported at 93% with no additional surgeries or implant removal required.
In our experience, utilizing a one piece memory Nitinol intramedullary internal fixation device for PIPJ arthrodesis provided a success rate of 93.8%, which is comparable to previously reported rates.

Despite having a 6.1% complication rate, none of our patients required a second procedure or removal of hardware.

There are limitations in our study:
- This is by design a retrospective analysis which is therefore inherently limited in application.
- In addition, future research is needed to evaluate if fusion rates vary or are dependent on which digits (two, three or four) are being addressed.
Conclusion

- The authors suggest an intramedullary approach for PIPJ arthrodesis when faced with digital deformities.
- In our experience a one-piece memory Nitinol intramedullary fixation device offers low complication rates, does not require removal, provides a cosmetically appealing alternative to fixation with percutaneous K-wires and avoids potential pin track complications.
References

- Harris, W et al. “Fixation of the Proximal Interphalangeal Arthrodesis with the Use of an Intraosseous Loop of Stainless-Steel Wire Suture” JFAS 48(3):411–414, 2009