

Early Experience with a Novel Non-Metallic Cable in Reconstructive Hip Surgery

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Introduction

Metallic cables are commonly used in complex primary and revision total hip arthroplasty (THA) for fixation of periprosthetic fractures and osteotomies of the greater trochanter. Currently, single filament wires, multifilament cables, and cable-plate systems are in widespread use. These devices counteract deforming forces about the femur and provide fixation for osteotomy and fracture healing. These systems have been effective to this end; however, fraying, third body generation, accelerated wear of the bearing surface, and injury to the surgical team by cut wire ends remain issues of concern. In this study, we sought to determine the short-term safety and efficacy of a novel, non-metallic cerclage cable in reconstructive surgery of the hip.

Methods

This is a retrospective, single surgeon series of complex primary and revision total hip arthroplasties utilizing non-metallic cables (SuperCable™, Kinamed Inc., Camarillo, CA, USA) in 29 cases. Indications for use included fixation of an extended trochanteric osteotomy (ETO) (22 patients), intraoperative fracture of the proximal femur in the course of a THA (4 patients: 3 primary and 1 revision), isolated strut allograft fixation (2 patients) and a Vancouver B1 periprosthetic fracture of the femur (1 patient). The cable design consists of a nylon core encased in a jacket of ultra-high molecular weight polyethylene (UHMWPE) braided fibers, with a metal clasp for tightening and locking (Fig. 1).

All patients underwent both clinical and radiographic evaluations postoperatively at 3 weeks, 6 weeks, 3 months and then annually thereafter (Fig. 2). Clinical and radiographic evaluation was performed by observers who were not part of the operating team. Healing of the ETO was based on bridging bone on orthogonal radiographic views with absence of proximal migration or fixation failure. Femoral component stability was evaluated radiographically using the criteria of Engh et al. Femoral deficiency was classified according to the Paprosky system.

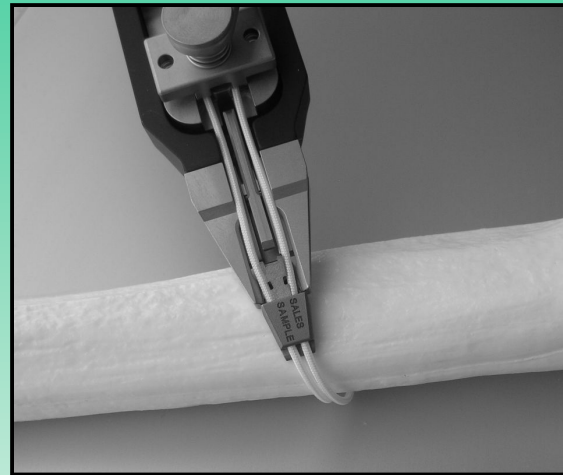


Figure 1. The cable design consists of a nylon core encased in a jacket of ultra-high molecular weight polyethylene (UHMWPE) braided fibers, with a metal clasp for tightening and locking.

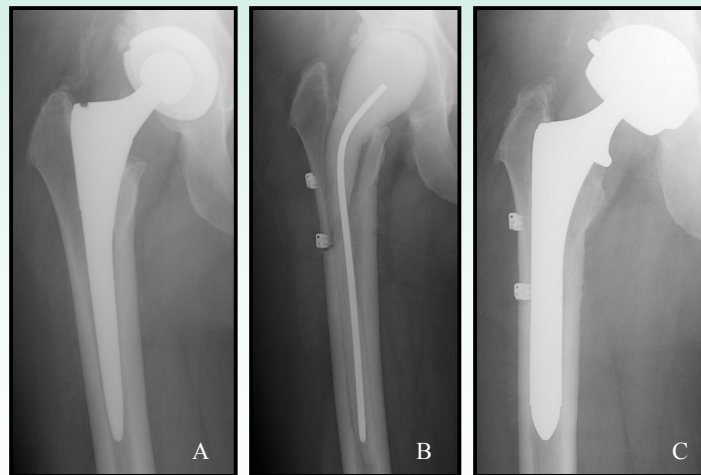


Figure 2A. Preoperative infected THA; **2B.** Status post ETO for removal of well-fixed stem and placement of antibiotic spacer; **2C.** One year follow-up radiograph demonstrating healed ETO and ingrown components.

Results

Twenty-nine patients were followed for a mean of 7.4 months (range, 1 to 15 months). The mean age was 63.9 years (range, 34 to 94 years), and the cohort included 18 women and 11 men. The average number of cables utilized was 3.1 (range, 1 to 6 cables). For the 23 revision THA's, there were 7 Paprosky Type II, 12 Type IIIA, 3 Type IIIB, and 1 Type IV femur.

The primary reason for femoral component revision included aseptic femoral component loosening in 12 patients (including 3 patients with a Vancouver B2/3 periprosthetic fracture), 2 femoral component fractures, recurrent instability in 2 patients, and a deep periprosthetic infection in 7 patients (including 1 patient with an infected Vancouver B2 periprosthetic fracture).

Two patients developed a non-union; one following an ETO and one following fixation of a Vancouver B1 periprosthetic fracture (6.9%). The mean time to union for the remaining 27 patients was 2.7 months (range, 1 to 6 months).

Two stems migrated (6 and 11 mm, respectively) in the first 3 weeks postoperatively but subsequently stabilized and showed evidence of bone ingrowth. One of the revision THA's developed a deep infection, which was successfully treated with an irrigation and debridement. Four of the 29 patients (13.8%) dislocated post-operatively; two were treated successfully with closed reduction, while the other two required reoperation.

Discussion

The non-metallic periprosthetic cables utilized in this patient cohort provided adequate early fixation strength to allow for both osteotomy and fracture healing. We did not observe any complications directly related to the cables although the complication rate in this series of complex primaries and revisions was high. These early-term results suggest that non-metallic cable fixation is a viable alternative to traditional metallic or wire cerclage in complex total hip arthroplasty.