A Clinical, Radiographic, and Cost Comparison of Cerclage Techniques: Wires vs Cables

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Abstract: The cerclage technique is used to secure femoral fractures, allografts, and plates. It is not clear whether wires or cables are better suited for this technique. A retrospective radiographic review of the 6460 total hip arthroplasties done between 1986 and 2003 was performed. Wires/cables were used in 249 hips. It was found that one cable was broken (0.92%) compared with 11 wires (1.72%) ($P < .5373$). It was found that there was no statistical difference in Harris hip function or pain scores between patients with wires and those with cables or between those with broken wires/cables and those without broken wires/cables. The Luque wires, which cost $29.79 each, performed equally to the cables, which cost $275.40 each, suggesting that wiring may be the preferred cerclage technique. **Key words:** wires, cables, Luque, cerclage, cost-effective.

The cerclage technique is sometimes required during a total hip arthroplasty (THA), especially during revisions. It is used to prevent or stabilize femoral fractures [1-7], to secure allografts [8-10], and to manage fractures with plates or strut allografts [4]. The cerclage technique is especially recommended for intraoperative femoral cracks and fractures [1,2,6,7]. The use of multiple cerclage wires for this purpose has been found to be more effective than using only one [1]. Both cerclage wires and cables are widely used for the cerclage technique. There have been cadaveric biomechanical studies arguing that cables are stronger then single monofilament wires [5]. Others have argued that double wire can withstand the same compression forces as a single cable and that the extra cost of the cables is not justified because of their similarity in performance to the wires [11].

A clinical study on the differences between cerclage wires and cables has yet to be done. This present study seeks to determine if the use of cerclage wires instead of cables causes a difference in the rate of wire/cable breakage or in the postoperative Harris hip function and pain scores. The cerclage wires would be a better option, if they perform as well as the cables, because they are less expensive and are easier to install.

Materials and Methods

From 1986 to 2003, 6460 THAs were performed at the author's institution. The THAs in need of cerclage during this time had randomly received either Luque wires or cables according to the surgeon's preference. This preference was not based on the difficulty of the operation or the need for more stability. A retrospective radiographic analysis was performed to determine which patients, with at least a 1-year clinical follow-up, had received at least one cerclage wire or cable

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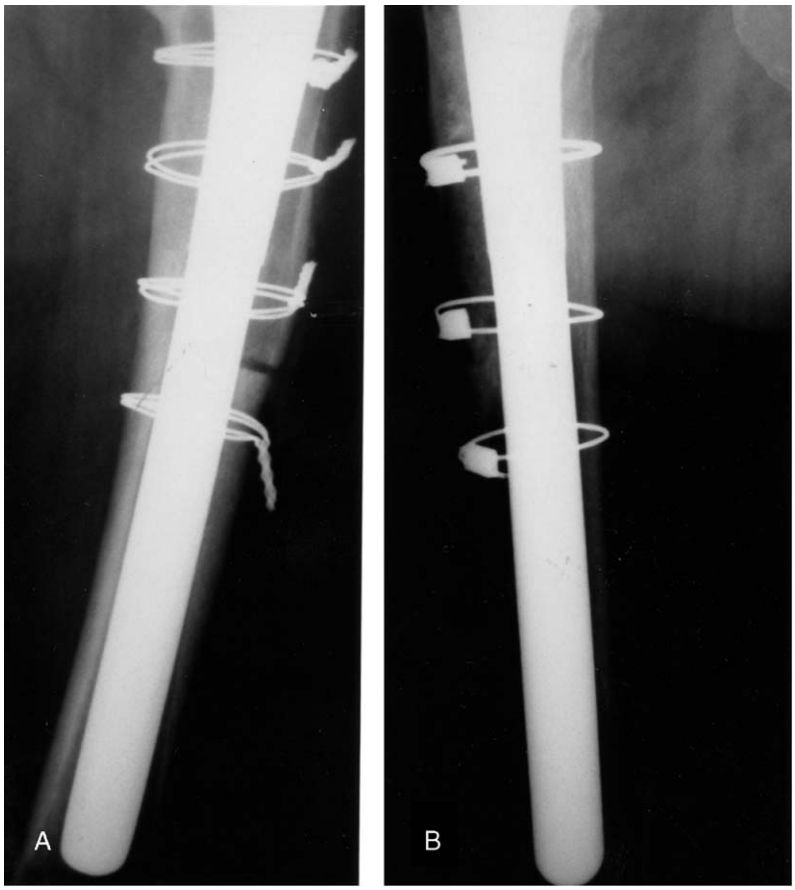

Fig. 1. A, An anteroposterior radiograph of the cerclage wiring technique on a left femur 3 months after surgery. B, An anteroposterior radiograph of the cerclage cable technique on a right femur 2 months after surgery.

around the femoral shaft. Two hundred forty-nine patients met these criteria. This group contained 215 patients with only wires (Fig. 1A), 28 patients with only cables (Fig. 1B), and 6 patients with wires and cables. Of these 249 patients, 60.50% were females. The mean age of the patients was 65 years with a range of 17 to 87 years. The diagnoses were osteoarthritis (6.07%), a loose acetabular revision (8.50%), a loose femur revision (21.46%), a loose acetabular and femur revision (48.58%), and miscellaneous others (15.39%). All surgeries were performed by 6 surgeons using either doubled Luque wires or cables supplied by Zimmer, Inc. Two of the surgeons used only Luque wires. Three surgeons used both Luque wires and cables between 1986 and 1997, while using only Luque wires after 1997. One surgeon used both wires and cables throughout the study. The Luque wires were 1 mm in diameter and the braided cables were 1.8 mm in diameter.

The cables were installed by being passed around the femur and through the cable crimp. They were then fixed by the cable tightener. When multiple cables were used, the surgical wound would become full of equipment. The Luque wires were tightened on themselves with the aid of a Luque twister.

The patients' most recent clinical follow-up was reviewed from a THA database to analyze the Harris hip function and pain scores. Radiographs from the most recent clinical follow-up were also reviewed. The clinical follow-up visit occurred at a mean time of 4.4 years postoperatively with a range of 0.8 to 15.4 years. Statistics were performed using the SAS statistical package (Cary, NC).

Results

Of the 215 patients with only wires, 11 (5.12%) patients had at least one broken wire (Fig. 2). Of the 28 patients with only cables, 1 (3.57%) patient had a broken cable. None of the 6 patients with both wires and cables had any broken wires or cables. A χ^2 test was run to compare the three groups ($P < .8024$). A Kaplan-Meier survival curve was produced to illustrate the rate at which a