Results of All-Inside Meniscal Repair With the FasT-Fix Meniscal Repair System

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Purpose: The goal of this prospective study was to evaluate the results of arthroscopic meniscal repair using the FasT-Fix repair system. **Type of Study:** Prospective case series. **Methods:** Sixty-one meniscal repairs with the FasT-Fix meniscal repair system in 58 patients with a mean age of 32.6 years were performed between 2001 and 2002. Concurrent anterior cruciate ligament reconstruction was performed in 36 patients (62%). All tears were longitudinal and located in the red/red or red/white zone. Criteria for clinical success included absence of joint-line tenderness, locking, swelling, and a negative McMurray test. Clinical evaluation also included the Tegner and Lysholm knee scores, and KT-1000 arthrometry. In addition, all patients were evaluated preoperatively with magnetic resonance imaging. **Results:** The average follow-up was 18 months (range, 14 to 28 months). Six of 61 repaired menisci (9.8%) were considered failures according to our criteria. Therefore, the success rate was 90.2%. Time required for meniscal repair averaged 11 minutes. Postoperatively, the majority of the patients had no restrictions in sports activities. The mean Lysholm significantly improved from 43.6 preoperatively to 87.5 postoperatively ($P < .001$). Fifty-one patients (88%) had an excellent or good result according to the Lysholm knee score. Four patients had a restriction of knee joint motion postoperatively, and an arthroscopic arthrolysis was performed in 1 of them. Analysis showed that age, length of tear, simultaneous anterior cruciate ligament reconstruction, chronicity of injury, and location of tear did not affect the clinical outcome. **Conclusions:** Our results show that arthroscopic meniscal repair with the FasT-Fix repair system provided a high rate of meniscus healing and appeared to be safe and effective in this group of patients. **Level of Evidence:** Level IV, therapeutic study, case series (no control group). **Key Words:** Meniscus repair—All-inside technique—Clinical results.

Although meniscal repair was first reported more than 100 years ago by Annandale,[1] it did not gain appreciation until the last 2 decades. This is because the importance of the meniscus for the knee has been well established owing to laboratory and clinical investigations during the last 2 decades.[2-4] In addition, improvements in arthroscopic techniques and instrumentation in recent years permit a large number of surgeons to easily perform this procedure.

Among the 3 arthroscopic techniques that are known today (inside-out, outside-in, and all-inside), the all-inside fixation with biodegradable products has increased in popularity because of its fast application and reduction of the risk of serious neurovascular complications.[5,6] However, there are several reports in the literature of complications directly associated with these devices such as chondral injuries and synovitis.[7-9] Another concern is the inferior strength of these devices in comparison with vertical sutures, which could be a critical factor contributing to meniscal healing according to some biomechanical studies.[10-12]

There is today a plethora of devices for all-inside meniscal repair. Most of these have been tested in vitro but clinical results are not available for the

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majority of them. One of these devices that has been recently introduced is the FasT-Fix meniscal repair system (Smith & Nephew). It combines the advantages of all-inside technique while providing high biomechanical properties.[13,14]

Therefore, we designed a study to evaluate the clinical results and complications of arthroscopic meniscal repairs in a consecutive series using the FasT-Fix meniscal repair system, and to evaluate factors that could affect the healing rate. Our hypothesis was that the FasT-Fix meniscal repair system will provide clinical results equal to other similar meniscal repair systems.

METHODS

From June 2001 through December 2002, 64 arthroscopic meniscal repairs in 61 consecutive patients were performed by the senior author (H.H.P) with the FasT-Fix Meniscal Repair Suture System (Smith & Nephew) using the arthroscopic technique detailed below. During this period only this system was used for meniscal repair in our institution. Ten meniscal repairs using a hybrid fixation of sutures and the FasT-Fix System were performed but these cases were not part of this study. Inclusion criteria were (1) vertical full-thickness tear greater than 10 mm in length, (2) location of the tear less than 6 mm from the meniscocapsular junction, (3) no former meniscus surgery, (4) no evidence of arthritis during arthroscopy, and (5) fixation of the meniscus only with FasT-Fix. Anterior cruciate ligament (ACL)-deficient knees were reconstructed using hamstrings autograft at the time of the meniscal repair. Institutional Review Board approval was obtained before initiating the study. All patients gave their informed consent to participate.

Preoperatively, diagnosis of meniscal tear was based on clinical examination; special attention was paid to signs of meniscal tear, such as locking, tenderness on palpation of the joint line, presence or absence of effusion, and meniscal tests like McMurray and Appley test. Knee laxity was measured with the KT-1000 Arthrometer (MEDmetric, San Diego, CA). The Lysholm knee score[15] and Tegner activity score[16] were obtained to evaluate knee function. In addition, all patients underwent preoperative evaluation with magnetic resonance imaging.

Surgical Technique

Each device of FasT-Fix contains two 5-mm polymer suture bar anchors with a pre-tied self-sliding knot of No. 0 nonabsorbable USP braided polyester suture material. Also, there is a split cannula for easier introduction of the device into the knee joint, a depth penetration limiter, and a knot pusher–suture cutter (Fig 1).

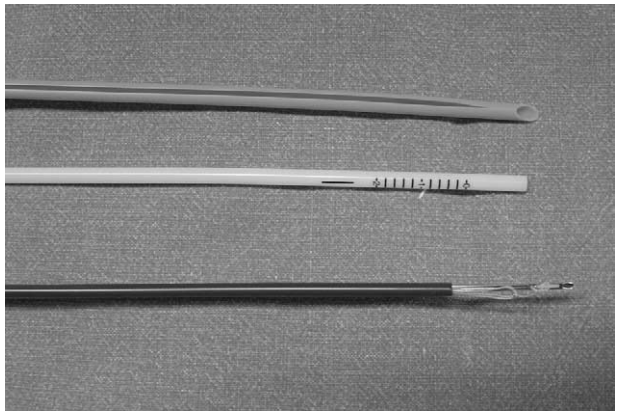

FIGURE 1. Components of the FasT-Fix meniscal repair system: delivery needle with the implant, depth penetration limiter, and split cannula.

General anesthesia was used in all patients. After diagnostic arthroscopy, the morphology of the meniscus tear was determined. The tear length and the rim width were recorded at the time of surgery. In case of a dislocated bucket-handle tear, reduction was performed. Tear edges were freshened with a meniscus rasp and shaver. Multiple perforations were made with microfracture awls in the meniscus rim to produce vascular channels and encourage bleeding in order to stimulate healing response. Using a meniscal depth probe the desired length of penetration is determined and then the depth limiter is trimmed accordingly, followed by the introduction of the Fast-Fix delivery needle through the split cannula. It was positioned so that it perpendicularly pierced the surface of the inner meniscal fragment and then was advanced into the peripheral meniscal fragment to the end of the depth penetration limiter (Fig 2). The needle was then withdrawn from the meniscus with a gentle oscillating motion, releasing the first anchor. Then the gold trigger was slid forward to advance the second implant. For a horizontal suture, the delivery needle was transferred 5 mm sideways and for a vertical one we placed it perpendicular to the tear (Fig 3). As soon as the second implant was inserted, the delivery needle was removed from the knee joint, leaving the free end of the sutures (Fig 4). Finally, the pre-tied self sliding knot was tensioned with the aid of the knot pusher–suture cutter. The sutures could be cut with the knot