Different Femoral Fixation Techniques in Reconstruction of Anterior Cruciate Ligament

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Dear Editor,

We read the original article entitled "Comparison of different methods of femoral fixation anterior cruciate ligament reconstruction (1) in the issue of Acta Med Iran 2013;51(7):444-8, with great interest. We would like to commend the authors for their clinically relevant work. However, we believe that some important additional comments and observations seem necessary to be contributed through this study. In this article, the authors has stated that, they found only one study in which Uribe *et al.,* studied posterior cruciate ligament reconstruction with AperFix and to the best of their knowledge, their study was the only study comparing Endobutton, Rigidfix and Aperfix with each other. Nevertheless, we would like to call the attention of the readers to the fact that that there are several other studies referring this technique.

The AperFix (Cayenne Medical, Inc, Scottsdale, Arizona) is a relatively new (2007) system consisting of both femoral and tibial components designed to secure either allograft or autograft for soft tissue anterior cruciate ligament (ACL) reconstruction (2). This system provides strong fixation of soft tissue grafts with circumferential aperture intratunnel compression in ACL reconstruction (1-3). This fixation system is designed to decrease graft laxity, increase pullout strength, and augment bone–tendon healing with circumferential compression forces (2). AperFix is proven to restore native knee kinematics through a simple, single incision, "all-inside" technique that allows the implant to be inserted transtibially, or anteromedially, through a single-tunnel, and eliminates the need to drill through the femoral cortex (1-3). The femoral component is unique in that arms are deployed anchoring it firmly within the femoral tunnel (2,3). The components are made from polymer polyetheretherketone (PEEK) which is a nonabsorbable, radiolucent, semicrystalline, polyaromatic biomaterial that causes no inflammatory response (2,3).

There are some additional biomechanical and clinical publications reporting on the AperFix system.

In 2009, Gadikota HR *et al*., (4) firstly reported favorable biomechanical results in a biomechanical comparison study. PEEK polymer in fixation implants was used for single tunnel–double bundle ACL reconstruction in fresh-frozen human cadaveric knee specimens in this study.

Aaron K *et al*., (5), described a technique using a unique new implant, the Cayenne AperFix device, for soft-tissue reconstructions of the ACL. The system provides for aperture circumferential compressive fixation (360° position) of the graft at both the femoral and tibial sides and minimizes the working graft length. They concluded that the AperFix soft-tissue ACL reconstruction system allowed the surgeon the flexibility to perform conventional soft-tissue reconstructions, or to perform single tunnel double bundle (STDB) ACL reconstructions.

Cooper *et al*., (6) presented a case of a failed primary ACL reconstruction with the Cayenne AperFix system in a US Army active duty soldier who underwent revision ACL reconstruction. They described the successful removal of AperFix femoral and tibial components due to traumatic injury requiring a revision ACL procedure using achilles tendon allograft with a metal interference screw for fixation in the femoral tunnel and a biointerference screw for tibial fixation.

Uribe JW *et al*., (7) reported that allograft soft tissue PCL reconstruction with a novel all inside femoral fixation device (AperFix) through a single incision provides a safe and timely reconstruction and results in a reduction in bone and soft tissue injury.

Firooz M *et al*., (8) reported a comparison of the AperFix System (n=40), the TransFix method (n=40),

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and the EndoButton (Smith & Nephew, Mansfield, Massachusetts) (n=40) in ACL reconstruction. The cases were re-examined 12 months after surgery and evaluated by Lysholm score as well as with KT-1000 machine. The results were compared together for these methods. There was no significant difference in the operating time in the three groups.

Uzumcugil O *et al*., (9) compared the outcomes of the TransFix fixation method (Arthrex Inc, Naples, Florida) and the AperFix System in arthroscopic ACL reconstruction. A total of 38 patients with isolated complete ACL ruptures underwent arthroscopic reconstruction via two different fixation methods using hamstring autografts (n=19 with each fixation system). There was no significant association between the two groups in terms of laxity testing and complication rates. The study concluded that early clinical results with the relatively new AperFix implant system were satisfactory compared with that of cross-pin fixation in arthroscopy-assisted ACL reconstruction.

Uzumcugil O *et al*., (3) reported a comparison of the AperFix System (n=18), the TransFix method (n=29), and the EndoButton (Smith & Nephew, Mansfield, Massachusetts) (n=20) on the effect of tunnel widening after hamstring ACL reconstruction. All three graft fixation devices resulted in significant tunnel widening in both tibial and femoral tunnels at final follow-up (mean follow-up time, 30 months) when compared with the immediate postoperative period. They suggested that tunnel enlargement after ACL reconstruction is influenced by the type of graft fixation on the tibial side irrespective of clinical outcome, and PEEK polymer does not have an effect on tunnel widening after hamstring ACL reconstruction.

Uribe *et al*., (2) recently reported two-year outcome with the AperFix system for ACL reconstruction. The outcomes of 185 knees (180 patients) were retrospectively reviewed at a minimum of two years postoperatively. They concluded the AperFix System provides durable femoral aperture fixation in arthroscopic reconstruction of the anterior cruciate ligament with excellent clinical outcome scores and a low complication rate.

Ververidis A *et al*., (10) also recently reported the early clinical results of ACL reconstruction with the AperFix system, which enables arthroscopic ACL reconstruction with double bundle graft and one bone tunnel in the femur and tibia. The outcomes of 24 patients were retrospectively reviewed. They concluded that this retrospective clinical study shows arthroscopic ACL reconstruction using the AperFix system seems to offer good early subjective and objective clinical results.

References

1. Eajazi A, Madadi F, Madadi F, Boreiri M. Comparison of different methods of femoral fixation anterior cruciate ligament reconstruction. Acta Med Iran 2013;51(7):444-8.
2. Uribe JW, Arango D, Frank J, et al. Two-year outcome with the AperFix system for ACL reconstruction. Orthopedics 2013;36(2):e159-64.
3. Uzumcugil O, Yalcinkaya M, Ozturkmen Y, et al. Effect of PEEK polymer on tunnel widening after hamstring ACL reconstruction. Orthopedics 2012;35(5):e654-9.
4. Gadikota HR, Seon JK, Kozanek M, et al. Biomechanical comparison of single-tunnel-double-bundle and single-bundle anterior cruciate ligament reconstructions (published online ahead of print March 4, 2009. Am J Sports Med 2009;37(5):962-9.
5. Aaron K. Schachter, Kenneth D. Montgomery. Soft-Tissue Reconstruction of the Anterior Cruciate Ligament with the AperFix System. Oper Tech Sports Med 2009:17(1):57-61.
6. Cooper W, Machen S, Nelson J, et al. Anterior cruciate ligament revision of a relatively new implant system. Orthopedics 2009;32(5):326.
7. Uribe JW, Vargas L, Leo BM. Arthroscopic PCL reconstruction with a novel all-inside femoral fixation device: a single-incision technique. Orthopedics 2010;33(2):92-7.
8. Madidi F, Tavakolian J, Maleki A, et al. Femoral fixation in anterior cruciate ligament reconstruction (Comparison between three different fixation techniques). Iranian J Orthop Surg 2010;4(33):160-5.
9. Uzumcugil O, Dogan A, Dalyaman E, et al. AperFix versus TransFix in the reconstruction of anterior cruciate ligament. J Knee Surg 2010;23(1):29-35.
10. Ververidis A, Kiziridis G, Tilkeridis K, et al. Anterior cruciate ligament reconstruction with a double bundle single tunnel technique (aperfix). EEXOT 2013;64(2):80-4.