Spor Hekimliği Dergisi
Cilt: 45, S. 9-14, 2010

RESULTS OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION IN ATHLETES

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SUMMARY

The aim of the study is to follow up operatively treated active athletes after arthroscopic reconstruction of their ACL, and their return to pre-injury sport activities. The analysis included 78 athletes (66 men and 12 women; 45 active and 33 recreational). Of the patients, 18 were treated with the non-anatomic single-bundle technique, 57 with the anatomic single-bundle technique, and three with the double-bundle technique. Clinical examination and functional testing parameters were analyzed and compared, before and 12 months following the surgery. Mean Lysholm scores were 57.3 preoperative, and 92.6 postoperative (range 43-100). Mean Tegner activity level was 2.43 preoperative, and 7.89 postoperative (range 1-10). Arthrometric measurements of the patients yielded an average of 8.45 mm of anterior shift of the tibia in relation to the femur before the operation, and an average of 2.18 mm upon reconstruction. While 64 patients returned to sport activities to the pre-injury extent, 14 did not.

Key words: Anterior cruciate ligament, arthroscopy, Tegner score, Lysholm score, exercise

ÖZET

SPORCULARDA ÖN ÇAPRAZ BAĞ REKONSTRÜKSİYONU SONUÇLARI

Çalışmanın amacı artroskopik ön çapraz bağ rekonstrüksiyonu uygulanan sporcuların başlangıç spor aktivitelerine dönüş süreçlerinin izlenmesiydi. Çalışmaya 66'sı erkek, 12'si kadın olmak üzere 45'i aktif, 33'ü rekreasyonel düzeyde spor yapan 78 sporcu katıldı. Yaralanma

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geçirenlerin 18'i non-anatomik tek demet tekniğiyle, 57'si anatomik tek demet tekniğiyle, üçü ise çift demet tekniğiyle opere edild. Klinik bakı ve fonksiyonel test parametreleri operasyon öncesi ve 12 ay sonrası analiz edilip karşılaştırıldı. Ortalama Lysholm skorları 57.3'den 92.6'ya (aralık 43-100); ortalama Tegner aktivite düzeyleri ise 2.43'den 7.89'a (aralık 1-10) arttı. Operasyon öncesi artrometrik ölçümlerde tibianın femura göre anterior translasyonu ortalama 8.45 mm iken, rekonstrüksiyon sonrasında ortalama 2.18 mm olarak gözlendi. Toplamda 64 hasta yaralanma öncesi spor aktivitesi düzeylerine dönerken, 14'ü dönemedi.

Anahtar sözcükler: *Ön çapraz bağ, artroskopi, Tegner skoru, Lysholm skoru, egzersiz*

INTRODUCTION

Rupture of the ACL is a common knee injury, and it often leads to sudden cessation of successful sport careers. The annual incidence of ACL injuries all over the world is 800000, half of it occurring in the USA, 70 % taking place during sport activities (3). The responsible mechanism is deceleration conjoint with knee torsion on fixed substrate, mostly without contact. In addition to rupture of ACL, 60 % of the cases have accompanying injuries -menisci injuries and injuries of other ligaments. The injury has permanent consequences leading to chronic anterolateral rotator knee instability, and eventually to osteoarthritis.

Arthroscopy-assisted ACL reconstruction is the treatment of choice, especially for active athletes. For the last 30 years, surgery of injured ACL was non-anatomical reconstruction. In the beginning, majority of patients display good results, but in 7-10 years posttraumatic degenerative alteration develops in most of them. In the majority, graft positioning in the single-bundle technique included a combination of posterolateral (PL) bundle insertion on the tibia with high-positioned anteromedial (AM) bundle insertion on the femur at 11 hours i.e. 01 hour (Fig. 1). In this type of ACL reconstruction, anteroposterior stability could be controlled, but rotatory instability and "mini pivoting" remained (2,4).

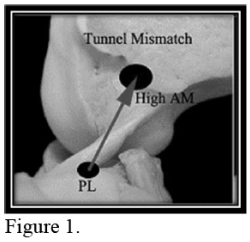

Figure 1.

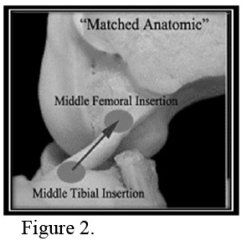

Figure 2.

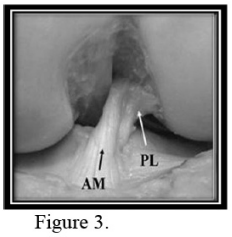

Figure 3.

Figs. 1,2,3. ACL reconstruction techniques.

The number of surgeons who prefer anatomical reconstruction with hamstring tendons with the double-bundle technique has been growing up significantly in the last 10 years (5). What does anatomical reconstruction mean? ACL is built up of two functional bundles, namely, the anteromedial (AM) and posterolateral (PL) ones (6). While the AM bundle regulates stability in the AP direction, the PL bundle regulates rotatory stability (Fig. 3) (7). However, as all cases do not have the same anatomy; rebuilding individual anatomy, including ACL's dimension, its the insertions' positioning, and its tension is the main concern during ACL reconstruction (1). Many analyses point at more favorable progress in clinical findings following this technique than after the traditional single-bundle technique, especially in terms of rotatory stability.

The anatomical ACL double-bundle reconstruction concept can be used in the single-bundle technique. In this technique, ideal positioning of the femoral insertion involves bone bridging between the AM and PL bundles, below the lateral condylar shelf (at 90° knee flexoin), i.e. in the mid-point of anatomical insertions of both bundles, which is located significantly lower than the traditional positioning (Fig. 2). Tunnel checking is necessary from the medial portal view. Also, boreing can be done from accessory medial portal and transtibial boreing, and femoral guides usage is practically impossible. Surgeons who prefer anatomical ACL reconstruction believe that this concept can bring in the long-term much better results than traditional non-anatomical reconstruction.

The aim of the present study is to follow up the post-operative results of young active athletes, following their arthroscopic ACL reconstruction operations, and their return to pre-injury sport activities.

MATERIAL and METHODS

The analysis included 78 athletes (66 men and 12 women, 45 active and 33 recreational) who were operatively treated for their ACL ruptures in the Institute for Physical Medicine and Rehabilitation "Dr. Miroslav Zotovic" in the 2006-2008 period. All patients were injured during sport activities. Injury of the ACL had been diagnosed by clinical examination, and suspicion of injury had been confirmed by NMR. All patients underwent short preoperative treatment. Thromboembolic prophylaxis was obtained with Enoxaparin-natrium 3430 IU, 1x1, administered for 10 days, and antibiotic prophylaxis was done with Cephasolin 1 g, 3x1, for one day.

In all patients, surgery was done using spinal anaesthesia, and postoperative pain was controlled with VAS scale. Arthroscopy-assisted

ACL reconstruction was done in all patients by using the ST graft, along with endobutton + endotack fixation (12 patients), retrobutton + delta bioresorbable interference screw for tibia (46 patients), and transfix II fixation for femoral condyle + bioabsorbable interference screw for tibia (20 patients). In all, 18 patients were treated with the non-anatomical single-bundle technique, 57 patients were treated with the anatomical single-bundle technique, and three patients with the double bundle technique. Graft was fixated on the tibia in knee flexion at 30°. Nochplasty was applied in 12 patients, and partial menisectomy was applied in 37 patients because of meniscus injury presence.

Knee brace was put postoperatively, and walking with two crutches until four weeks was recommended. Full weight bearing with restriction of hyperextension was allowed, and postoperative rehabilitation was conducted according to the Institute protocol in four phases for all patients. Parameters obtained by clinical examination and functional tests were analyzed and compared, before and 12 months after the operation. Complications were described, and assessment of return to sport activities to the pre-injury extent was accomplished.

RESULTS

While the mean preoperative Lysholm score of the patients was 57.3, and reached 92.6 in 12 months postoperatively; mean Tegner activity levels increased from 2.43 to 7.89 in the same period. Arthrometric measurements of the patients displayed an average anterior shift of the tibia in relation to the femur of 8.45 mm before the operation, and of 2.18 mm postoperatively. Remaining "mini" pivot shift was found postoperatively in 22 patients who had undergone the single-bundle technique. Five patients (6.4 %) had a tibial anterior shift of more than 2 mm (2-5 mm) after endobutton + endotack fixation. One patient (1.3 %) had local infection that was successfully resolved by arthroscopic knee lavage and antibiotic therapy (Vancomycin for 10 days and Ciprocinal till six weeks).

No remaining complications such as intraoperative lesions of soft tissues, graft lysis and DVT were observed. While 64 patients returned to sport activities to the pre-injury extent, 14 (11 active and three recreational) did not (Fig. 4). Five patients did not return to sport activities due to change in life style, and nine patients had movement amplitude limitations, and low intensity pain during movements. Of these, 13 had the non-anatomical single-bundle ACL reconstruction.

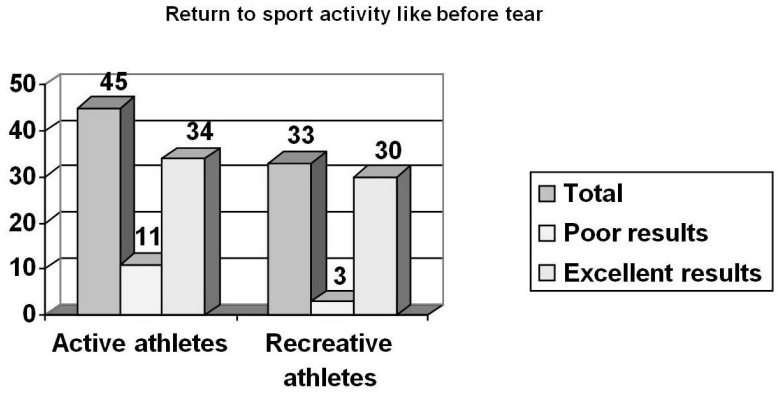

Fig. 4. Return to sport activity levels of the cases.

DISCUSSION

Arthroscopy-assisted ACL reconstruction is the treatment of choice, especially for young active athletes, after rupture of the ACL. Anatomical reconstruction of the ACL by the single-bundle or double-bundle technique is fundamental for full recovery of the athletes, their return to pre-injury activity level, and promises good long-term prognosis, as it has been the case in the present study, involving different techniques. The endobutton + endotack graft fixation revealed the "banging" effect in the cases, but sampling size was not large enough to make conclusions about bad fixation material.

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