



Interest of extra articular Anterior Cruciate Ligament(ACL) reconstruction with gracilis and semitendinosus tendons (STG)

A. Bessam¹, A.AL Ahmad¹, A.Sbihi², M.L Louis², S. Berrada¹ and M.El Yaacoubi¹

¹Department of Orthopaedic and Trauma Surgery - CHU ibn sina- Rabat.

²Clinique Juge -Marseille – France.

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ABSTRACT

The use of the gracilis and semitendinosus tendons (STG) is emerging as a method of choice for reconstruction of the anterior cruciate ligament (ACL) ,to restore knee stability and the results are shown. This retrospective comparative study involves two groups operated in Clinique Juge Marseille in France between January 2011 to December 20, 2012 by four senior surgeons for instability with an ACL injury: Group 1 with 30 patients undergoing extra-articular and Intra-articular ligament with STG. Group 2 with 30 patients undergoing intra-articular ACL reconstruction with STG. The mean IKDC subjective score of the last follow-up was 75.9 (\pm 9.1) in Group 1 and 67 (\pm 6.6) in the group 2. The purpose of this study was to compare the results of a series of isolated ACL reconstruction with STG to those of a series of ACL reconstruction with an external reinforcing.

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Introduction

Rupture of the anterior cruciate ligament often occurs during a sporting accident.

The use of the gracilis and semitendinosus tendons (STG) is emerging as a method of choice for reconstruction of the anterior cruciate ligament (ACL) ,to restore knee stability and the results are shown. [1,2,3]

Intra-articular ACL reconstruction can stabilize most knees. The use of a joint plastic surgery for the intra-articular and extra-articular side is used in the case of existence of damage associated to external devices which cause a large amplitude jump and varus or laxity; the presence of anatomical factors predisposing to the difficulties of controlling the projection (marked or epiphyseal varus laxity with hyperextension); or the need to ensure the result of a recovery surgery. [4]

The purpose of this study was to compare the results of a series of isolated ACL reconstruction with STG to those of a series of ACL reconstruction with an external reinforcing while answering the following questions: Does the use of extra-articular plasty with STG allows it to obtain the same results as the intra articular reconstruction with STG without increasing morbidity ?

Is there an influence on the external reinforcement on sports recovery?

In the literature, the effect of such a lateral extra-articular reconstruction is controversial.

Materials and methods

This retrospective comparative study focused on 60 patients divided into two groups operated under arthroscopy:

Group 1 included 30 patients undergoing ACL reconstruction with STG with an external reinforcing using the same transplant (STG).

Group 2 included 30 patients who underwent a simple STG ligament.

Both series were followed by consultation in orthopedic and sports institute surgery clinic Juge Marseille.

The overall mean follow-up was 13.4 months (with a minimum follow-up of 3 months and a maximum decrease of 26 months)

All patients were operated in the period 1 January 2011 to 20 December 2012 by four senior operators and had an earlier ancient laxity.

Comparative clinical examination standardize both knees was performed each time by the same examiner.

The study included major patients of both sexes, athletes, arthroscopic surgery of ACL reconstruction more or less with external reinforcing using STG. with or without meniscal gesture, as measured by the IKDC score before and after surgery, including Raisonance magnetic imaging (MRI) revealed a torn ACL.

The criteria evaluated in this study are the pre and postoperative IKDC score and sports recovery.

Surgery

For both groups, the patient is supine with the knee flexed. Flexion is maintained using a bar positioned under the ipsilateral foot.

Tourniquet inflated after vascular drain member 300 to 500 mmHg.

All our patients were operated with arthroscopy using two surgical approaches: an anterolateral optical path and anteromedial instrumental track.

Group 1:

Plasty mixed intra-and extra-articular with a single transplant STG.

This is a procedure that involves only maintain continuity between the intra-and extra-articular part of the intervention. [5] Intra-articular and extra-articular portion of the graft is composed of two strands, one of the Gracilis and the other right of the semitendinosus .

Both tendon remained attached to the tibia to improve fixation, and sutured to one another to increase the interference of the graft.

On the lateral side of the knee, two short 1cm incisions are made, one on Gerdy's tubercle and the other on the lateral epicondyle.

Preparation of the tunnel:

A special ancillary to the external reinforcing is used for drilling the femoral tunnel outside to inside. The two tibial tunnels are drilled with the same system.

The second tibial tunnel is drilled in the tibia of Late Gerdy's tubercle sample tendons level, returning to the starting point (making a sort of frame). [6]

Passage of the graft and tibial fixation:

The graft is first passed through the tibial tunnel and the femoral tunnel through from the inside to the outside; then the graft is passed under the iliotibial tract and then into the tibial tunnel last before it is fixed-knee flexed to 20 °, by a screw whose diameter resorbable measuring a size larger compared to the size of the tibial tunnel. (Fig.1)

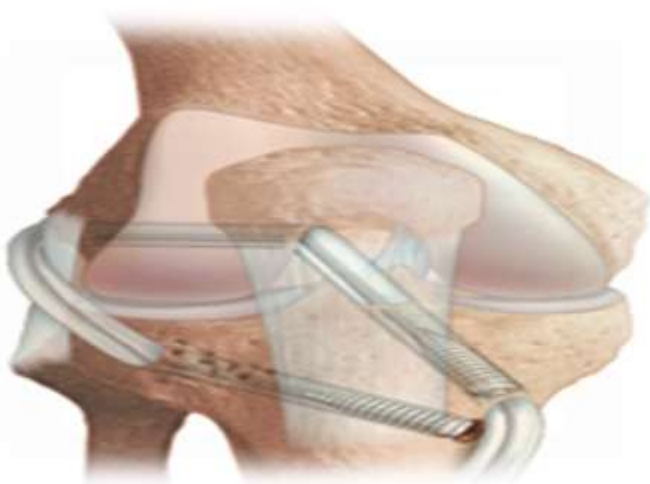


Figure 1: ACL reconstruction using STG with external reinforcing

A Redon drain is set intraarticular before skin closure.

Group 2:

Arthroscopic ACL reconstruction with STG graft with blind tunnel Anatomical landmarks are crow's feet and the posteromedial edge of the tibia A vertical skin incision approximately 4 cm begins within 15 mm of the tibial ridge upper ATT (anterior tibial tuberosity) edge. The upper edge of the crow's-foot is easily spotted finger.

Both tendons of domestic law and half tendon, joint their tibial insertion, are covered by the fascia of the Sartorius. The upper edge of the patted'oie Dissect which is incised.

The sample uses a stripper in which the gracilis and semitendinosus tendons (STG) passed and kept under tension

This stripper is pushed insistently and progressive smoothly brutal, ensuring to remain well within the longitudinal axis of the muscle to avoid cross section tendon. It is conducted to the muscle where the release is easy. After this removal, the muscle fibers are cleaned from the tendons, and all extensions are severed tendon graft in order to obtain a homogeneous and regular four strands. The graft is calibrated.

Digging Tunnels with a special and ancillary passage of graft

Femoral fixation:

Firstly the knee is flexed to 90 °. Femoral fixing is ensured by a EndoButton

Tibial graft fixation

Of course, it is made by a resorbable screws after making the usual voltage checks, isometric, and after checking the presence of a possible Swallowing on the knee in extension.

Postoperative rehabilitation:

The next day, walking with partial weight bearing is allowed, keeping the knee extended (An articulated splint with maximum extension depending on the pain) and the help of two canes as analgesic. After 4 or 5 days, the fully extended locking quadriceps is often acquired, Recovery of amplitudes is started immediately but closed in the first 70 degrees chain Three weeks after surgery, the canes will deleted. Doctor or physiotherapist will judge the judgment of the splint according to evolution.

This rehabilitation allows two months to resume sports discharge (cycling, swimming), jogging at 4 months and team sports or pivot and contact 6 months.

Control protocol

Controls knees were made by an independent examiner.

The review sought testing TRILLAT-Lachman and dynamic projection. Function was assessed using the IKDC score (Form 1999). Measurements were laxity made with the KT-1000 arthrometer allowing an overall assessment of the anterior laxity measured at the center of the knee.

Results

During the reporting period, 60 patients were hospitalized at the clinic Judge Marseille under an ACL reconstruction.

There is a male predominance of 87% for STG with external reinforcing and 97% for single STG.

The average age was 24.5 years (\pm 7.6) for STG with external reinforcing and 33.9 years (\pm 7.1) for single STG.

About the intervention, 30 patients were free to STG transplant, and 30 patients with a STG an extra joint reinforcement using the same transplant to STG.

There is no significant difference in level depending on the sport for both surgical techniques.

In the 2 groups, sports practiced were mainly sports with pivot and contact (24 cases or 80% for STG with external reinforcing and 20 cases or 66.7% for Simple STG) including football competition.

The left side was injured in 60% STG with external feedback and 53% for single STG.

It was noted:

Two history of knee sprain and osteochondritis of the femoral condyle to the STG group with two external reinforcing against history ligament of the knee for the simple STG group.

ACL rupture was secondary to a sports injury in 100% for STG with external return against 97% for single STG.

The predominant mechanism of ACL rupture was twisting the knee in 60% for single STG against 33.5% for STG with external reinforcing.

The average period of the support for the two groups of patients was 3 months.

80% of patients in the STG group with external reinforcing received analgesic immobilization splint preoperatively against 76% for single STG.

The history and preoperative clinical examination of our patients have found the following signs:

Instability and pain are signs of major appeal found in all patients.

Pain, measured on a digital scale of 0 to 10 is slightly higher in the STG group with external reinforcing compared to single STG group and the limit of significance.

Indeed, the average preoperative pain level measured on a digital scale is indeed 5.1 ± 1.9 for the STG group with external reinforcing versus 4.9 ± 1.1 just for the STG group.

A morphotype valgus in 10.5% for STG with external reinforcing against 6.5% and 13.5% of valgus varus for single STG.

Significant swelling in 57% with external reinforcing STG against 54.5% for single STG.

A blockage in 33% STG with external reinforcing against 68% for single STG.

A sign of positive Lachman grade C in 11% and grade D in 89% with external reinforcing STG against a Lachman grade C in 33.5% and grade D in 66.5% for single STG.

Subjective functional outcomes did not differ preoperatively, with a subject STG.

The score corresponded to the preoperative clinical IKDC grade C in 3% of patients and grade D in 97% with external reinforcing STG against 100% grade D for single STG.

In all cases, the first time included arthroscopic surgical exploration. ACL rupture was complete in all patients.

In the STG group with an external reinforcing Six lesions of medial meniscus were found and 10 of external meniscus lesions against four internal meniscus lesions and four external meniscus lesions in the simple DIDT group treated with either sutures or meniscal resection.

The removal of STG was produced using a stripper. In the STG group with external reinforcing, the transplant was prepared as two strands single beam in 7 to 9 mm. In Tibia, fixing was carried out by a bioabsorbable interference screw. In simple STG group, the transplant was prepared as a single beam into four strands in 8 to 11 mm, the femoral fixation was carried out by an EndoButton, while at the level of the tibial fixation was carried by a bioabsorbable interference screw. The screw diameter was selected in each case equal to a size larger than the diameter of the drilled tunnel.

Once the graft in place, the knee was cycled several times. The hospitalization time was our series of one to three days. Then the sportsmen was sent to rehabilitation center specializing in sports medicine where an accelerated protocol was instituted in all patients.

This rehabilitation allows two months to resume sports discharge (cycling, swimming), jogging at 4 months and team sports or pivot and contact 6 months.

In the postoperative course we noted:

Three complications in the simple STG group namely a case of iterative rupture after a year of the ACL reconstruction in a skier hyperlax, a case of sepsis surface treated with antibiotics, a case of hypoesthesia in the territory of infrapatellar branches of the saphenous nerve medially.

Functional results:

At last follow-up 80% of the STG group ave external reinforcing have found the same previous level against 70% of single STG group.

Measuring the KT-1000 laxity At last follow noted in the STG group with external reinforcing (80%) knees with differential laxity between 0 and 2 mm, and 4% of knees with a value between 5 and 7 mm, whereas in the DIDT group mere 95% of the knees had a differential laxity between 0 and 2 mm and 4% knees with a value less than 5 mm.

The mean IKDC subjective score of the last follow-up was 75.9 (± 9.1) in the STG group with external reinforcing and 67 (± 6.6) in the simple STG group.

According to the IKDC score at follow clinic we noted in the simple STG group 9% of patients classified as grade A,

36.5% grade B, 45.5% of patients and 9% grade C grade D; whereas in the STG group ave external reinforcing we noted 4% of patients classified as grade A and 96% of grade D.

Discussion:

The ACL reconstruction is one of the most common orthopedic interventions (100,000 ACL reconstructions per year in the United States and 34,579 cases in 2006 in France according to the High Authority for Health).

Time management:

In our series, the average time support for both groups of patients was three months.

Indeed, in the literature The high proportion of stiffness and algodystrophies reported after ACL reconstruction in "emergency" (especially with patellar transplants) has guided the current trend to delay ligamentoplasty 3 to 4 weeks for the knee recovers sufficient function.

In this context, there are two distinctly different types of patients:

- Sedentary whose daily life or sport is accompanied occasionally practices at risk. Often difficult postoperative course should make careful about the response time, even on the indication.

- The motivated athlete whose postoperative recovery is often quick and easy, even in the context of the emergency.

In our study, the femoral fixation is performed by using the tibial fixation and EndoButton a bioresorbable screws, the strength of the effect depends intimately mounting the quality of the graft fixation that is the weak link in the chain. Regarding the use of STG, several techniques binding have been described in the literature. The fixing means to the cortical support (type EndoButton) allow high mounting strength, even higher than the assembly interference screw / bone-tendon-bone but with less rigidity.

Mac Donald et al. and Muneta et al. Showed that the implementation of a program of accelerated rehabilitation does not cause particular complication after ACL reconstruction using STG. Rehabilitation In our series This allows two months to resume sports discharge (cycling, swimming), jogging at 4 months and team sports or pivot and contacting six months.

Meniscal lesions do not directly affect the laxity and muscle recovery but rather an impact on the outcome of knee pain.

According to several authors, the resumption of sport at the same level does not differ regardless of the surgical technique performed.

The average time to return to sport after a reconstruction using STG to tuck is different depending on the series; it is six months Beynon et al. and, as in our series, and ten months to Marder et al. . These authors emphasize that recovery time depends on the clinical progression of knee but also the psychological profile and motivation of the athlete; hence the importance of support by an experienced psychotherapist.

In our series, the last follow-up 80% of the STG group with external reinforcing have found the same previous level against 70% of single STG group.

This is consistent with Anderson et al. Study, which showed that the use of extra-articular reconstruction does not alter the terms of the resumption of sport. The question is therefore whether the combination of an external reinforcement for the rehabilitation of ACL reduces or not the impact of iterative ruptures true, especially when the return to sport. If this is the case, the realization of an extra-articular reinforcement could be justified for certain indications to discuss.

Type of lateral plasty

Many methods of extra-articular lateral plasty (LEO) have been described that are often associated with ACL reconstruction [Lerat et al.].

The external reinforcing are most often made with strips of iliotibial tract or biceps, in our study we used a single transplant is STG who keep their tibial insertion.

The disadvantages of extra-articular plasty

Several authors have emphasized the disadvantages of taking part of the iliotibial tract. And Middle et al. showed that this sample was undermining the shroud lateral knee that could explain the occurrence of side decoaptation and especially osteoarthritis knee varus and if medial meniscectomy. The artifice

Jaeger et al. seems to avoid this problem by allowing closure of the iliotibial band after sampling.

The benefits of extra-articular lateral plasty are controversial

Many authors have highlighted the effectiveness of the lateral plasty based on good functional results and control of the jump that seems best for isolated reconstructions.

Mixed ACL reconstruction with STG in one transplant has advantages:

- 1) to improve the tensile strength of the reconstruction using both grafts.
- 2) protect the intra-articular ACL reconstruction by reducing the load applied to the intra-articular portion of the graft, especially in the period ligamentisation.
- 3) better control of external rotation especially in complex cases such as revision surgery of the ACL.
- 4) preserve the extensor apparatus of the knee.

In vitro analysis performed by Engebretsen et al. showed that the lateral plasty, when used in combination with intra-articular reconstruction reduces stress the grafting of about 43%.

Interest arthrometer

In our series, the differential laxity is comparable in both techniques (STG with external reinforcing and simple STG)

We find no difference between the two types of plastic surgeries. Postoperative differential laxity was similar in the 2 groups. The LEO does not seem have "protected" the ACL as postoperative distension was similar in the 2 groups.

Control the translation of the lateral compartment or rotational laxity

This control of the internal rotational laxity, we are trying to achieve with a side tuck, some authors also trying to get by two reconstructions bundle anterior cruciate ligament. Reconstruction beam, in fact, does not restore normal control of tibial rotation.

Conclusions

ACL reconstruction should eventually regain a functional knee (dry, mobile, painless, stable and muscular) and therefore suitable for sporting activity in a sustainable way, avoiding the long-term osteoarthritic risks.

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